



Evaluation of Directive 1999/94/EC ("the car labelling Directive")

Final report

Study contract no.

340201/2015/710777/SER/CLIMA.C.2



Ricardo
Energy & Environment



Gena Gibson, Achilleas Tsamis, Stephane Cesbron, Marius Biedka, Giulia Escher (Ricardo Energy & Environment)
Ian Skinner (TEPR)
[April– 2016]

**Transport and
Environmental
Policy
Research**

EUROPEAN COMMISSION

Directorate-General for Climate Action

Directorate C — Climate strategy, governance, and emissions from non-trading sector

Unit C4 – Road Transport

Contact: Raphael Sauter

E-mail: CLIMA-CAR-LABELLING-CONSULTATION@ec.europa.eu

European Commission

B-1049 Brussels

Ex-post evaluation of Directive 1999/94/EC

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Luxembourg: Publications Office of the European Union, 2016

ISBN 978-92-79-59637-7
doi:10.2834/541874

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Table of Contents

1	EXECUTIVE SUMMARY	3
1.1	Purpose and scope of the study	3
1.2	Main findings and conclusions	3
2	INTRODUCTION.....	8
2.1	Purpose of the evaluation	8
2.2	Scope of the evaluation.....	8
3	BACKGROUND TO THE INITIATIVE.....	9
3.1	Description of the initiative	9
3.2	Intervention logic	11
3.3	Baseline	18
4	EVALUATION QUESTIONS	23
5	METHOD/PROCESS FOLLOWED	24
5.1	Methodological framework	24
5.2	Research tools used.....	24
5.3	Limitations – robustness of findings	28
6	IMPLEMENTATION – STATE OF PLAY	30
6.1	Introduction.....	30
6.2	Transposing legislation.....	30
6.3	Label	32
6.4	Guide on fuel economy.....	37
6.5	Poster	41
6.6	Promotional materials	42
6.7	Enforcement	44
6.8	Compliance levels.....	47
7	ANSWERS TO THE EVALUATION QUESTIONS	50
7.1	Relevance (EQ1): To what extent do the (current) objectives of the Directive still respond to the needs in the EU considering current and expected technical, environmental and economic challenges?	50
7.2	Relevance (EQ2): What, if any, technological, economic, or administrative issues exist that are not covered by the existing legislation which could be introduced in view of their potential added value?	53
7.3	Effectiveness (EQ3) - What have been the (qualitative and quantitative) effects of the intervention?	56
7.4	Effectiveness (EQ4): To what extent has the approach taken, in terms of both scope (e.g. the exclusion of used cars) and main elements in the legislation, ensured or hampered the achievement of the objectives?.....	75
7.5	Effectiveness (EQ5): What factors have influenced the Directive’s impacts, how and to what extent?.....	82
7.6	Effectiveness (EQ6) - What unintended or unexpected positive and negative effects, if any, have been produced?.....	88
7.7	Efficiency (EQ7): To what extent are the costs resulting from the implementation of the legislation proportionate to the benefits that have been achieved as regards each main element of the Directive?	90
7.8	Efficiency (EQ8): To what extent do the different types of costs resulting from the implementation of the legislation vary based on the approach taken to implement the legislation (while achieving the same results)? Which approach was most efficient?	98

7.9	Efficiency (EQ9): What are the major sources of inefficiencies? What steps could be taken to improve the efficiency of the Directive? Are there missing tools and/or actions to implement the Directive more efficiently?	100
7.10	Coherence (EQ10): How well does the legislation fit with and complement other EU policies (e.g. air pollution) and their objectives (e.g. environmental, social or economic)?	101
7.11	Coherence (EQ11): To what extent are objectives and achievements coherent with the Europe 2020 strategy and Europe 2030 policy goals?	106
7.12	Coherence (EQ12): How does the legislation interact with other EU/ national/ international initiatives which have similar objectives (e.g. actions in the field of environment, single market, climate action)?	107
7.13	EU added value (EQ13) - What has been the EU added value of the legislation?	110
7.14	EU added value (EQ14): To what extent do the issues addressed by the intervention continue to require action at EU level?	113
8	CONCLUSIONS	115
8.1	Status of the implementation of the Directive	115
8.2	Relevance	116
8.3	Effectiveness	117
8.4	Efficiency	119
8.5	Coherence	120
8.6	EU added value	121
9	GLOSSARY.....	122
10	REFERENCES	123
ANNEX A	: STRUCTURE OF THE EVALUATION	135
ANNEX B	: ANALYSIS OF RESPONSES TO PUBLIC CONSULTATION	146
ANNEX C	: INTERVIEW PROGRAMME	156
ANNEX D	: SUMMARY OF NATIONAL LEGISLATION IMPLEMENTING DIRECTIVE 1999/94/EC	158
ANNEX E	: SUMMARY INFORMATION ON CAR LABEL BY MEMBER STATE.....	162
ANNEX F	- CASE STUDIES	165
F.1	- France.....	165
F.2	- Germany	178
F.3	- United Kingdom	188
F.4	- Denmark.....	200
F.5	- Netherlands	215
F.6	- Austria	228
F.7	- Czech Republic	236
F.8	- Italy	239
F.9	- Poland	246
F.10	- Spain.....	252
F.11	- Summary of average new car CO ₂ emissions data for case study countries.....	258
ANNEX G	: EU CAR LABELS	260
ANNEX H	- EXAMPLES OF CAR LABELS USED OUTSIDE THE EU.....	265

1 EXECUTIVE SUMMARY

1.1 Purpose and scope of the study

This document summarises the findings from an independent study that has been carried out in support of the ex-post evaluation of Directive 1999/94/EC relating to the availability of consumer information on fuel economy and CO₂ emissions in respect of the marketing of new passenger cars (the Car Labelling Directive). The scope of the evaluation is all 28 EU Member States, taking into account the wider international context, while the period examined is that since the adoption of the Directive in 1999.

The methodology followed the standard evaluation framework for an assessment of legislation and the key evaluation questions related to relevance, effectiveness, efficiency, coherence and EU added value. The research tools used included desk research and literature review, an online consultation, a survey of competent national authorities, and targeted interviews..

1.2 Main findings and conclusions

The main findings of the study are presented thematically.

1.2.1 Status of the implementation of the Directive

The Directive has been transposed in all Member States but with important variations, particularly in relation to the car label. 11 Member States (BG, FI, FR, IE, NL, ES, EE, DE, DK, SI and UK) have adopted a colour-coded design similar to that of the EU energy label applicable to household appliances. Three (BE, PT, AT) have implemented alternative colour-coded formats. In the remaining countries there is no format specified.

Among those countries that have adopted the EU energy label format, there are significant variations in terms of the number of categories – with a few countries using more categories (10 in SI and 13 in the UK) or adding additional categories at the top (A+ in Germany; A+, A++ and A+++ in Denmark). Three Member States (DE, ES, and NL) have adopted a relative categorisation approach, rating vehicles in comparison to a weighted average of other vehicles, each using a different weighting method.

Additional information provision requirements have also been introduced on the label in some Member States. This includes fuel consumption values for different drive cycles (IE, DE, FR, BG, FI, SI, UK), vehicle running costs (UK, DE, IE, FI, DK, EE, FI), taxes applicable to the specific model (UK, DE, IE, FI, DK), safety ratings (DK), noise (AT, NL, FI), air pollutant emissions (FI, SI), and information on electricity consumption for electric and hybrid vehicles (DE, UK). The label has also been extended to cover new vans in two countries (DK, ES) and used cars in the UK and Finland (both on a voluntary basis).

In relation to the other information tools (poster, guide and promotional material), there is much less variation from the minimum requirements, particularly in the case of the poster and promotional material. Two Member States (DE, ES) have implemented Recommendation 2003/217/EC, which recommended that information on CO₂ emissions is made available when cars are offered for sale or lease by electronic means while in others cases best practice codes (NL, BE) or promotional material pre-screening services (UK) are in place. In Denmark, the promotional material also has to include the colour-coded arrow from the respective label, while the legislation in Slovenia also requires the provision of information on air pollutants. Finally, in the case of the guide, while a few Member States continue to print hard copies to be distributed to consumers in showrooms, many have already moved to the provision of exclusively electronic copies (AT, IT, BE, EE, FI, NL, PT, SE, SK). In the countries where hard copies are still printed,

their numbers are gradually decreasing, due to declining demand. Many Member States have created fully searchable online databases (AT, BE, DK, FI, FR, EE, ES, NL, SE and UK) that allow users to easily find the vehicles they are searching for and to make detailed comparisons of vehicles on the basis of fuel consumption and CO₂ emissions, as well as a wide range of other vehicle features.

In terms of the enforcement of the Directive, the information provided suggests that only a few countries have regular enforcement activities organised (DK, FR, BE, RO, UK and five German Länder), including visits in showrooms and reviewing promotional material. In some cases (e.g. SE, LT), the authorities respond to reports of non-compliance from organisations or individual consumers while in Austria the authorities have entered into a collaborative agreement with industry and there are no formal enforcement activities.

Finally, compliance rates with the label requirements are high in the majority of countries for which data are available (80%-90%); although with variations (e.g. in SE compliance is reported to be less than 50%). Compliance with the poster is slightly lower (e.g. poster is not always visible) while the most common area of non-compliance seems to be related to promotional material, the main issue being the clarity and prominence of the information provided.

1.2.2 Relevance

The Car Labelling Directive was and continues to be relevant. Climate change and energy security were issues when the Directive was originally adopted and are still issues that need to be addressed. There is still a need to reduce GHG emissions from all sources and from transport in particular, to reduce CO₂ emissions and to improve the fuel efficiency of new passenger cars. There also remains a need to make information on fuel economy and CO₂ emissions available to consumers. There is evidence that consumers still do not take account of a car's fuel efficiency as much as they might when purchasing a new car.

However, the increasing discrepancy between real world and test cycle emissions and the increasing number of alternatively-fuelled cars on the market, have led to concerns about the relevance of the information that the Directive requires to be communicated to consumers. If the information on fuel consumption communicated to consumers had better reflected the fuel consumption that drivers experience in the real world, the Directive would have been more relevant to consumers. Additionally, if the Directive had set out requirements for the information to be communicated about alternatively-fuelled vehicles, it would also have been more relevant for consumers. Thus, there is still a need to make *accurate* information available to consumers *in a way that best facilitates its use in enabling* consumers to make an informed choice.

Finally, the focus of the Directive on non-electronic media has made it become less relevant. Consumers are now much more informed before going to the showroom as a result of being able to undertake research using the internet, so the inclusion of the internet within the scope of the Directive would have made it more relevant to consumers.

1.2.3 Effectiveness

Concerning the contribution of the Directive to enabling consumers to make informed decisions, the available evidence is mixed. The level of compliance with the Directive suggests that the relevant information is generally provided to consumers. There is supporting evidence that awareness of the information on fuel economy and CO₂ emissions has been improving steadily since the Directive was implemented and is now medium-to-high (>75%) in many countries.

There is more mixed evidence on the effectiveness of the Directive in terms of its ultimate impact on new car CO₂ emissions. In France, the label appears to have been effective on its own as an informational instrument (and even more so when combined with fiscal incentives). However, in other countries there are only indications of lesser contribution. The Directive appears to have the potential to influence consumer choices in a way that eventually reduces overall CO₂ to a degree.

In terms of the role of the Directive in **encouraging manufacturers to take steps to reduce the fuel consumption of new cars**, the Directive has the potential to elicit a marginal supply side response, mainly in terms of optimising vehicles to meet threshold categories (i.e. reductions of a few gCO₂/km in order to reach an A-label category). However, there is no empirical evidence of a strong effect on the supply of more efficient vehicles.

There appear to be valuable **synergies between national fiscal measures and the label**, both in terms of the overall effectiveness in reducing CO₂ emissions (e.g. in France), as well as raising consumer awareness of CO₂ emissions (UK). However, there are also cases (e.g. Netherlands, before 2010) where the car label did not work well with the fiscal measures adopted because the labelling scheme based on a relative classification confused consumers and the supply of cars in the most efficient (hence most subsidised) categories was limited. Less direct synergies have also been identified in other cases. In Denmark the label allows consumers to calculate the equivalent taxes while in Austria the information in the online version of the guide has been the basis for the design of the national bonus malus scheme.

Parameters that drive the effectiveness of the Directive

We have identified a number of drivers and barriers of the effectiveness of the Directive:

- With regards to the effectiveness of the **information tools**, there is a broad consensus in support of the label as the most successful tool to date. There is also a general consensus that the poster does not have any beneficial impacts and is probably now redundant. Similarly the printed guide is not found to be very useful.
- There is a need to provide the relevant **information online** (e.g. online databases), adapting to changes in how consumers collect and analyse information prior to a purchase and to ensure that consumers trust the information provided under the Directive.
- In terms of the **design of the label**, the use of colour-coded categories similar to the EU Energy Label, as applied in some Member States, is well recognised and understood by consumers. This is especially the case for categories using A-G (or A-M) range whereas A+++, A++ and A+ categories are less effective. Furthermore, absolute scaling is more transparent and easier to understand for consumers than relative scaling, although a car class specific rating is also seen as providing useful guidance for consumers.
- In terms of the **information provided on the label**, provision of additional information on running costs (including taxes) on the label increases the effectiveness of the Directive. Similarly, the Directive is most effective if coupled with fiscal measures.

- With regard to the **scope** of the Directive, the current exclusion of used cars from the Directive limits its ability to inform the majority of consumers (since used car market volumes are greater than new car market volumes), thereby limiting its effectiveness. The limited evidence from the UK and Finland where a voluntary labelling scheme is in place suggests that it is useful for both consumers and dealers.
- The **lack of guidance on how to deal with alternatively-fuelled cars** and enable like-for-like comparison with other cars has had a limited impact on the effectiveness of the Directive to date due to the small market share of such vehicles. However, this will change in the future, as the number of such vehicles increase. For the time being, there is a need for more appropriate metrics to effectively communicate relevant information to consumers (such as the energy efficiency and range of electric vehicles).
- The diversity of national label designs clearly demonstrates that Member States have taken advantage of the **flexibility permitted** in the Directive in order to implement their own schemes. However, this flexibility has not been translated into greater effectiveness in all cases as only a limited number of countries have adopted a labelling scheme which consumers find easy to understand. The consensus from stakeholders across the market is that a more harmonised approach would enhance the effectiveness of the Directive by aiding recognition and understanding of the label.

There appear to be a few **unintended impacts of the Directive**. On the positive side, there has been a proliferation of car labelling schemes globally and the EU approach has been followed by some schemes adopted outside the EU in the last 5-10 years. It has also served as a very useful source of data for the development of relevant policies in third countries. On the negative side, the requirement for printed guides, which are not considered to be effective, is arguably a waste of resources. Publishers also argue that including advertising in the definition of promotional material has the potential to have an adverse effect on the demand for advertisements in printed media.

1.2.4 Efficiency

The **costs** of the implementation of the Directive are mainly linked to ongoing annual costs for authorities and industry. Implementation costs appeared to be rather minor.

- Monitoring and enforcement costs are typically in the region of €10,000-100,000 if enforcement is actively conducted. However, in a number of Member States no enforcement is carried out while in Austria, a high level of compliance is linked with very limited costs based on a voluntary agreement with industry.
- Collection of information seems to constitute a major cost in some countries (e.g. FR and NL – amounting to €70,000-90,000), but was not identified elsewhere.
- Maintenance costs for (voluntary) online databases are in the order of €140,000 – 240,000 (DE and UK), although other countries reported much lower costs. In Austria, the industry is largely responsible for this activity and hence bears the associated cost.
- The printing of guides makes up a significant share of overall ongoing costs (€30,000-60,000 per year), although many Member States have moved to an online-only version that minimises printing costs.
- For industry, the main ongoing cost is that of printing the labels, estimated at between €0.5 and €1 million per year for the EU-28.

Further costs associated with uncertainty over the requirement to ensure that the information in promotional material should be “no less prominent than the main part of the information provided in the promotional literature” were reported by German dealers. These costs include higher advertising costs due to the larger advertisements required in order to accommodate the required CO₂ and fuel consumption information

and greater risk of high fines for non-compliance. However, similar issues were not mentioned by stakeholders from other countries.

The available data do not allow for a comprehensive quantification of the **benefits** of the Directive, which are primarily in the form of fuel and CO₂ savings. Nonetheless, given the relatively low cost of the Directive and the fact that cars are driven for many years after purchase, even significantly small contributions to reductions in new car fuel consumption can yield high benefit: cost ratios. Thus, it appears reasonable to expect a significant benefit: cost ratio for all those countries where some form of a colour-coded label has been used. Conversely, in the countries where only the minimum requirements have been implemented it should be expected that benefits are limited, and the cost-effectiveness much lower.

1.2.5 Coherence

The Car Labelling Directive is broadly coherent with other EU strategies and policies, with relevant international agreements and with approaches taken at the Member State level and in countries outside of the EU. However, there are a number of issues.

The coherence of the Directive with other EU legislation that promotes the use of alternative fuels and energy sources for transport could have been improved. The Directive does not require that accurate and relevant information about cars that use electricity and hydrogen as energy sources is provided to consumers. This is not coherent with other legislation (Renewable Energy Directive, Fuel Quality Directive and the Alternative Fuels Infrastructure Directive) which aims to promote the use of such energy sources in the transport sector. As the number of vehicles using these energy sources increases, it will be important to ensure that the Directive works with these pieces of legislation to promote the best fuel-vehicle combinations from the perspective of decarbonising transport.

Potential synergies between the car label and EU Energy Label are being exploited in some Member States, but not in others. Furthermore, while the Tyre Labelling Regulation and EU Energy Labelling Directive cover the internet, the Car Labelling Directive does not.

1.2.6 EU added value

The analysis points to a clear added value of the EU action in introducing the Car Labelling Directive. The available evidence and input from stakeholders suggests that, in the absence of the EU legislation only some Member States would have introduced mandatory labelling schemes, meaning that only part of the EU consumers would benefit from the minimum level of information secured through the implementation of the Directive across the EU. The introduction of a minimum framework across the EU has had certain benefits for manufacturers in terms of avoiding the need to comply with diverging national legislation across the EU, and thus reduce their costs. Considered against other alternatives, such as voluntary schemes and non-binding guidelines, the adoption of the Directive had significant advantages.

The analysis also indicates that there is still scope for EU action. The majority of stakeholders agree that there is need for achieving greater harmonisation, particularly in terms of the design of the label which could further reduce costs. In that respect, the use of an EU Regulation is often suggested as a more appropriate tool, even though it is also accepted that here is a need to allow flexibility to take into account national parameters, particularly in relation to fiscal measures. The adoption of an EU level common framework is also relevant for addressing important changes such as the introduction of the WLTP test cycle.

2 INTRODUCTION

2.1 Purpose of the evaluation

This evaluation study has been commissioned by DG CLIMA and focuses on Directive 1999/94/EC relating to the availability of consumer information on fuel economy and CO₂ emissions in respect of the marketing of new passenger cars (the Car Labelling Directive).

The objectives of the evaluation are as follows:

- Examine the relevance, effectiveness, efficiency, coherence and EU added value of the Directive.
- Assess the Directive's interactions and effectiveness with regard to other relevant legislation and taking into account foreseen trends in technology and market.
- Consider the impact of the Directive in its current form and assess the degree to which it is fit for purpose, looking at ongoing trends in vehicle technologies (e.g. alternative powertrains), consumer behaviour and information technologies used when purchasing a car (e.g. virtual showroom) and national legislation.

The evaluation report should enable the Commission to:

- Have a better understanding of how, and why, the current EU legislation has worked well or not so well, identifying factors which have helped or hampered achievement of the objectives.
- Quantify and qualify the impact of the legislation, particularly in terms of progress towards achieving its objectives.

2.2 Scope of the evaluation

The scope of the evaluation is all 28 EU Member States, taking into account the wider international context, while the period examined is that since the adoption of the Directive in 1999.

Furthermore, although the evaluation does take into account other relevant policy measures and tools (e.g. regulations, fiscal measures) implemented at EU and national level where relevant, the focus of the evaluation is on the Car Labelling Directive and not on the impact of the overall policy framework in place affecting the fuel economy and CO₂ emissions of passenger cars.

3 BACKGROUND TO THE INITIATIVE

3.1 Description of the initiative

The purpose of the Car Labelling Directive, as stated in its Article 1, “is to ensure that information relating to the fuel economy and CO₂ emissions of new passenger cars offered for sale or lease in the Community is made available to consumers in order to enable consumers to make an informed choice”. The Directive requires information on fuel economy and CO₂ emissions to be displayed in the following ways:

- A **fuel economy label** for all new cars to be displayed at the point of sale.
- A **guide on fuel economy** and CO₂ emissions that should be available at the point of sale and from designated bodies.
- A **poster (or a display)** showing the official fuel consumption and CO₂ emissions data of all new passenger car models displayed or offered for sale or lease at, or through, the respective point of sale.
- All **promotional literature** must contain the official fuel consumption and specific CO₂ emission data for the passenger car model to which it refers.

The Directive has four Annexes, each of which sets out a more detailed specification of one of the four information sources. While the Directive has not been fully revised since its publication, there have been two changes (one required, the other recommended) relating to the way in which information is displayed, i.e.:

- Directive 2003/73/EC¹ required that, in addition to (or even instead of) the poster/display, information on fuel economy and CO₂ emissions should also be displayed on an electronic screen.
- Commission Recommendation 2003/217/EC (European Commission, 2003) recommended, rather than required, Member States to ensure that promotional material transmitted electronically or stored using electronic, magnetic or optical media should contain information on a car’s fuel economy and CO₂ emissions. It also recommended that the latter information is available generally by electronic means.

It is important to remember that Directive 1999/94/EC was part of a package of measures to reduce the CO₂ emissions of passenger cars. A potential measure on fuel economy labelling was first proposed in a Commission strategy on passenger car CO₂ in 1995 (European Commission, 1995).

The 1995 strategy set out three measures that were supposed to work together to reduce the CO₂ emissions from new cars in the EU:

- **Voluntary commitments by automobile manufacturers.** These were concluded some years later between the European Commission and the respective European, Japanese and Korean manufacturers associations (respectively, ACEA, JAMA and KAMA).
- **Consumer information.** This led to the adoption of Directive 1999/94/EC, which is the subject of this report.
- **Promotion of fuel-efficient cars by fiscal measures.** This pillar was expected to be delivered largely through Member State action. By 2005, few Member

¹ Commission Directive 2003/73/EC; see <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:186:0034:0035:EN:PDF>

States had taken action to differentiate their vehicle taxation systems according to a car's CO₂ emissions, although several were planning action at that stage (for example, see TNO *et al* (2006)). Consequently, the Commission published a proposal for coordinated action in this respect (European Commission, 2005), but this did not become EU law. There was opposition from some Member States, which proved to be a decisive barrier given that agreement on tax proposals requires unanimity.

The three measures were complementary as the voluntary agreement focused on the supply-side, i.e. ensuring that manufacturers developed more efficient cars, while the label and taxation both focused on the demand-side as they encouraged consumers to purchase more fuel efficient vehicles.

The passenger car CO₂ strategy was also supported by Decision 1753/2000/EC, which set up a system to enable the monitoring of the implementation of the strategy, in particular the voluntary agreements, by requiring Member States to collate and report the necessary information.

By 2006, it had become clear from the data monitored under Decision 1753/2000 that the voluntary agreements were not on course to meet the target of the passenger car CO₂ strategy, so the Commission proposed a new strategy in early 2007 (European Commission, (2007a) and (2007b)). The main element of this new strategy was the introduction of a regulatory framework for reducing the CO₂ emissions of the average new car fleet to 130g/km by means of improvements in vehicle technology.

In the strategy, the Commission also stated that it would publish a proposal to amend Directive 1999/94 later that year in order to improve its effectiveness, including the harmonisation of the design of the label, as well as to extend the scope of the label to vans (European Commission, 2007b).

While the commitment to develop a regulatory framework for reducing CO₂ emissions from cars and light commercial vehicles (LCVs) led to the adoption of the passenger car CO₂ Regulation in 2009² and the LCV CO₂ Regulation in 2011³, a proposal to amend Directive 1999/94 was not published. The Commission undertook a consultation and held a stakeholder workshop on the revision of the Directive in 2008; another stakeholder workshop was held as part of the service contract that led to the production of the 2011 report on the implementation of the Directive (AEA and TEPR, 2011). Action to amend the label was also one of the initiatives set out in the Commission's 2011 Transport White Paper, which included a review of the label that was to consider the extension of the label to LCVs and to L-category vehicles (e.g. motorcycles, tricycles and quadricycles), as well as the harmonisation of the label, particularly with respect to vehicle efficiency classes. Furthermore, in 2013, the Commission launched a study intended to test in experimental settings the effectiveness of possible new variants of car labels and promotional material (Codagnone *et al*, 2013).

A final piece of legislation that is fundamentally important for the operation of both the CO₂ Regulations and the Directive is that which sets the methodology for measuring the CO₂ emissions and fuel efficiency of cars. The existence of an agreed, consistent and transparent methodology is a necessary condition for the measurement and reporting of the CO₂ emissions and fuel consumption of vehicles. Currently, the approach for

² Regulation (EC) 443/2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO₂ emissions from light-duty vehicles

³ Regulation (EU) 510/2011 setting emission performance standards for new light commercial vehicles as part of the Union's integrated approach to reduce CO₂ emissions from light-duty vehicles

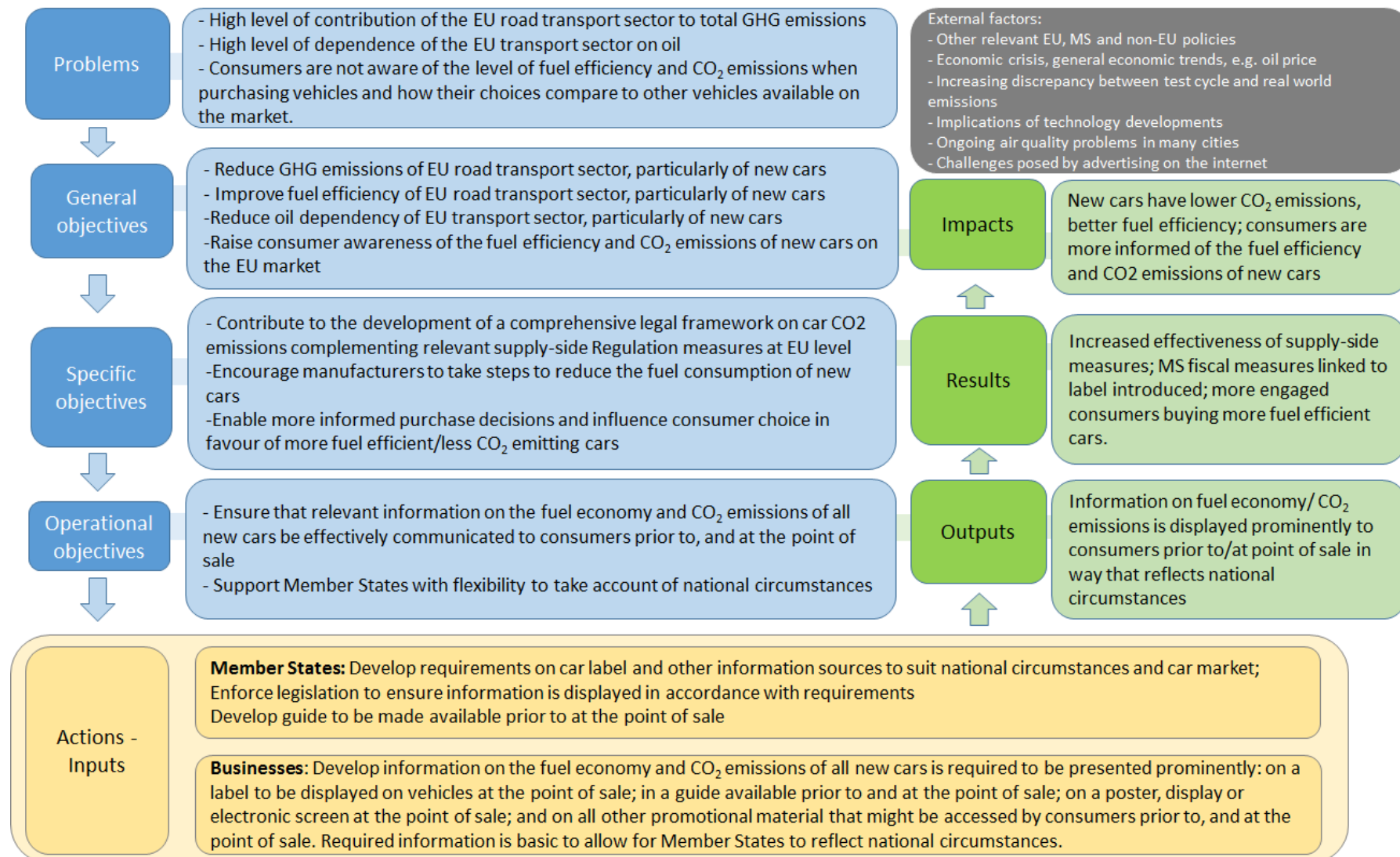
measuring these values for new cars is based on a methodology set out in Regulation (EC) No 715/2007 which sets out the methodology for such measurements using an agreed test cycle. The current test cycle, the New European Driving Cycle (NEDC), will be replaced in the next few years by a new, World-harmonised Light-Duty Test Protocol and Cycle (WLTP/C). One of the reasons behind this change is the increasing divergence between the test cycle and real world CO₂ emissions, which is discussed further in Section 3.2.3.

3.2 Intervention logic

3.2.1 Intervention logic diagram

The intervention logic of the Directive developed by the study team is set out in Figure 3-1, and we describe the rationale behind it below.

Figure 3-1: Intervention logic



The first step in the development of the intervention logic is the definition of the 'problems' that the objectives of the Directive aim to address. We consider that there are three overarching 'problems' that the Directive aims to address:

- High level of contribution of the EU road transport sector to total GHG emissions;
- High level of dependence of the EU transport sector on oil; and
- Consumers are not fully aware of the level of fuel efficiency and CO₂ emissions when purchasing vehicles.

The Directive is a demand-side measure and its role is to complement the supply-side measure, which is now the passenger car CO₂ Regulation. While the car CO₂ Regulation aims to ensure that manufacturers develop more fuel efficient cars and that these are put on the market, the Directive focuses on increasing consumers' awareness of the fuel efficiency and CO₂ performance of different cars. If consumers are unaware of the differences in the fuel efficiency and CO₂ emissions of the cars that they are considering buying, the demand for more efficient cars is less likely to change. Hence, ensuring that potential buyers receive such information in a transparent and consistent way is important both for the buyers, but also the problems that the Directive aims to address.

The next level includes the definition of the general, specific and operational objectives. The **general objectives** of the Directive can be defined, as follows:

- Reduce GHG emissions from the EU road transport sector, particularly of cars;
- Reduce the oil dependency of the EU transport sector, particularly of cars;
- Improve the fuel efficiency of the EU road transport sector, particularly of cars; and
- Raise consumer awareness of the fuel economy of new cars on the EU market.

For the **specific objectives** of the Directive, it is important to take account of the Commission strategy in which fuel economy labelling was first mentioned. As discussed in Section 3.1, the Directive was introduced as part of a broader strategy to reduce CO₂ emissions from passenger cars, with supply-side action on the fuel efficiency of cars and demand-side action on vehicle taxation at the national level being the other elements of the strategy. The mutual interactions between these elements need to be reflected in the specific objectives of the Directive:

- Contribute to the development of a comprehensive framework complementing relevant supply-side measures at EU level;
- Enhance the effectiveness of fiscal measures at national level;
- Encourage manufacturers to take steps to reduce the fuel consumption of new cars; and
- Enable more informed purchase decisions and influence consumer choice in favour of more fuel efficient/less CO₂ emitting cars.

Finally, the intervention logic also requires a set of **operational objectives** that set out how the relevant legislation will in practice meet the higher level objectives. For the Directive as it currently stands, these are:

- Ensure that relevant information on the fuel economy and CO₂ emissions of all new cars be effectively communicated to consumers prior to, and at the point of sale; and
- Support Member States with flexibility to take account of national circumstances.

The first of these two operational objectives can be seen as being directly linked with all previously mentioned objectives. The second objective was interpreted within the Directive as specifying only the most basic of requirements for the label.

The objectives of the Directive are expected to be translated to respective outcomes – in the form of direct outputs, results and impacts – on the basis of a set of actions taken by Member States and business (see Figure 3-1). The actions are based on those required by the Directive that aim to communicate information on fuel economy and CO₂ emissions of new passenger cars to consumers. They are discussed in more detail in the following section, including how they are expected to lead to the respective outcomes.

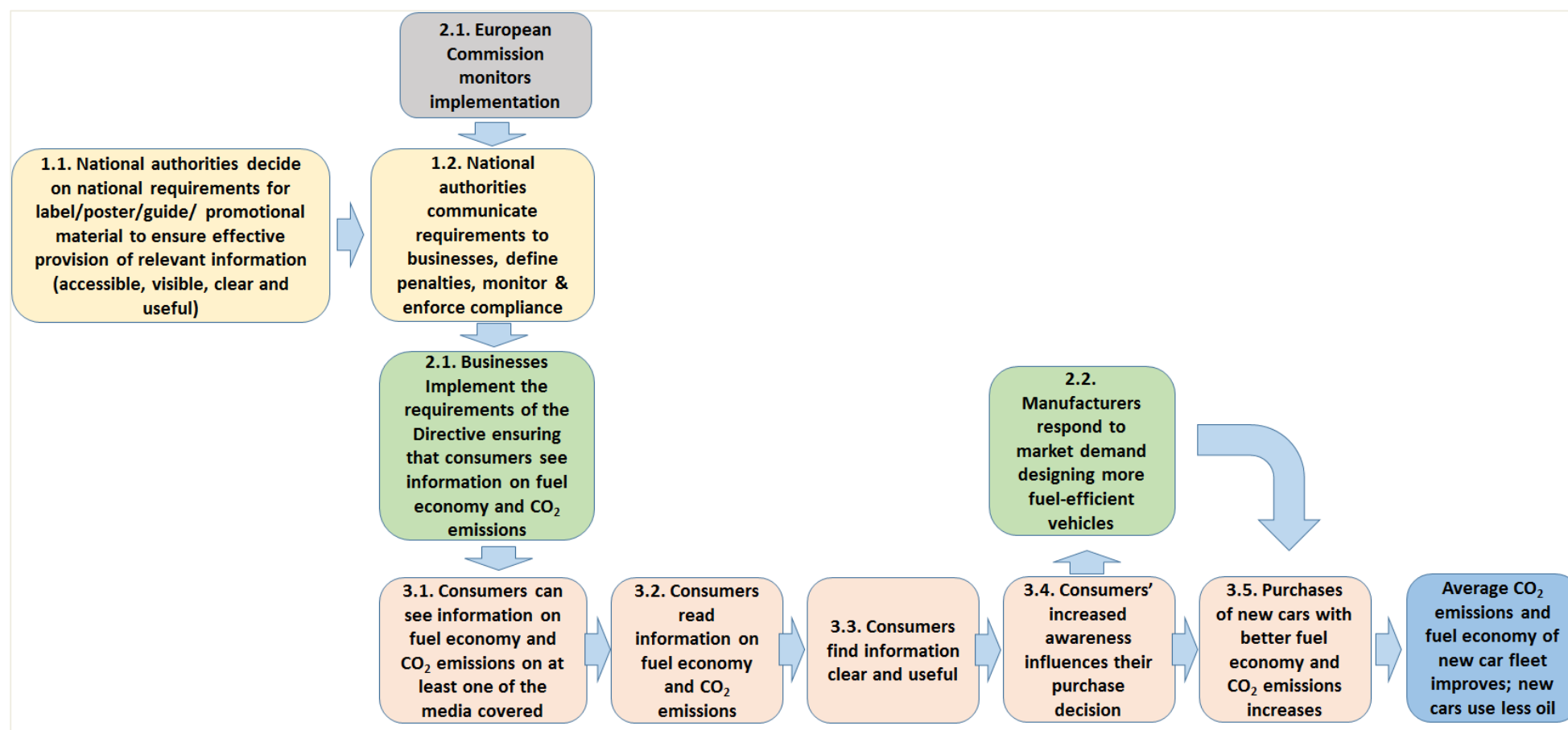
3.2.2 Actions and causal chain

This section details the actions and the mechanisms through which they are expected to lead to outputs, subsequent results and impacts – the “causal chain”. The causal chain diagram presented in Figure 3-2 provides a more detailed view of the relevant aspects of the intervention logic.

Member States are effectively required, in Articles 3-6, to develop national provisions for the implementation of the Directive's provisions. Businesses are expected to comply with the requirements set by Member States at the national level. This is to ensure that the information sources (label, guide, poster, promotional material) on CO₂ emissions and fuel consumption – according to the national provisions – are visible to consumers. Member States authorities are responsible for ensuring that business comply with the requirements through inspections and other enforcement activities and, when appropriate, impose penalties for non-compliance.

The provision of relevant information is expected to lead a number of actions from the side of consumers. The first of these is simply that consumers see at least one of the label, guide or poster/electronic display or see the information on CO₂ emissions and fuel economy in the promotional literature. The next actions that consumers need to take are to read and understand the information. Only if they reach this point will they be able to use the information to inform their purchase decision. For each of the four media, it has been important to explore as far as possible, which one is most effective in informing consumers and ultimately influencing the purchase decision towards more fuel efficient vehicles. The purchase of more fuel efficiency vehicles should contribute to an increase in the number of cars with better fuel economy and lower CO₂ emissions, which in turn should contribute to the high level objectives of the Directive. In parallel, manufacturers are expected to respond to the shift in consumer demand by designing more fuel efficient vehicles.

Figure 3-2 summarises the causal link of the required actions leading to an improvement to the average CO₂ emissions and fuel economy of the new car fleet in the EU. Different colours, as indicated in the key, are used to show which actors are involved or responsible for each action along the causal chain.

Figure 3-2 : Actions and causal chains needed implicitly to achieve Directive's objectives

Key: Grey: Actions by the European Commission; Yellow: Member State Authorities; Green: Businesses; Orange: Consumers

3.2.3 External factors and their interactions with the intervention logic

The other element of the intervention logic set out in Figure 3-1 is the **external factors** that might affect the performance of the legislation.

Given the origins of the Directive, the most important factor that affects the performance of the Directive is the success or otherwise of the **associated EU and Member States policies**, including the passenger car CO₂ Regulation and Member State vehicle taxation policies. The evaluation of the passenger car (and van) CO₂ Regulations (Ricardo-AEA and TEPR, 2015b) demonstrated that the Regulation has been a success, but also that Member State taxation measures have a role to play. The report concluded that the passenger car CO₂ Regulation has contributed to between 65% and 85% of the observed reductions in average EU-27 CO₂ test cycle emissions for new cars registered between 2009 and 2013, while vehicle taxation linked to CO₂ emissions in some Member States, such as France, the Netherlands and the UK, had also contributed a few gCO₂/km reduction in those countries.

However, an additional element is the way in which Member States have developed the requirements of the Car Labelling Directive beyond the basic mandatory requirements (see analysis in Section 6). In addition, there is likely to be an interaction with higher level EU and Member State policies, e.g. general policy frameworks to reduce GHG emissions.

In terms of interactions with other **international policies**, it is possible that at least the design of labels in the EU might have been affected by those elsewhere or vice versa. As AEA and TEPR (2011) showed in their review of the implementation of the Directive, most car labels in the EU have taken their inspiration for their design from another EU energy efficiency label, i.e. the EU Energy Label as specified by Directive 2010/30/EU.

Another important consideration relates to **the technological development of cars' engines**, particularly the increased use of electrification in new cars. This is linked to the way in which the information on the label and in other material is presented, and to consumers' confidence in this information. The issue is most pertinent for pure electric cars (and also for those cars using hydrogen fuel cells), as these cars appear to be "zero" emission vehicles, which ignores the emissions associated with the production of the electricity. The same issue, although to less of an extent, is relevant for plug-in hybrid cars. At the time that the Directive was introduced, these vehicles accounted for a negligible share of new vehicle registrations (essentially zero electric and hybrid vehicles in 2000).CO₂CO₂

Another important external factor **is the ongoing air quality problem** in the EU. Many cities are struggling to meet EU air quality standards, particularly for nitrogen dioxide and particulate emissions, which were supposed to have been met by 2010. The Commission has begun legal action against several Member States and is threatening some with fines for non-compliance (European Commission, 2015e). Some of the urban air quality problems have been exacerbated by the increase in the number of diesel cars in use. National fiscal measures have led to significant increases in sales of diesel cars across the EU. Given the possible role of the labelling Directive in supporting these fiscal measures, it is possible that the Directive has potentially played a role in this shift. This aspect is further examined in when we answer the evaluation questions on coherence (see Section 7.10).

The final external factor of importance is the **challenge posed by the internet**. The way in which consumers access information when researching potential purchases is changing, which has a potential impact on the effectiveness and relevance of the Directive. When the original Directive was proposed in 1998, it was recognised that

the internet had an increasing role to play in providing information to consumers, but the Commission chose not to include the internet within the scope of the Directive as a result of the lack of regulatory certainty surrounding the internet (European Commission, 1998). While the increasing use of the internet is beneficial from the perspective of the consumer, as it is easier to access more information about the cars that they might buy, it poses a challenge to regulators. As a medium, the internet is a lot more dynamic than those media covered by the Directive and regulating the content of the internet is far from straightforward for many reasons, not least its international nature. The previous implementation report on the Directive (AEA and TEPR, 2011) explored the potential to expand the scope of the Directive to other media, including to television and radio, and concluded that the most promising option was to expand the scope of the Directive to the internet, but only to visual and static information; the report proposed that further research be undertaken with respect to the potential to include information in more dynamic media. In addition, in the case of the EU Energy label for household appliances, the Commission recently (2014) amended the relevant delegated acts introducing requirements in relation to the labelling of energy-related products on the internet (European Commission, 2014b). The adopted changes require that an electronic label and an electronic product fiche are made available to dealers and make specific provisions in relation to the presentation of the label and the type and format of the information to be provided.

The role of the internet in relation to passenger cars is explored further in Evaluation Question 4 (see Section 7.4).

3.3 Baseline

As in all evaluation studies, the assessment of the effectiveness and efficiency of the Directive requires the establishment of a baseline scenario. The baseline represents a counterfactual scenario in which the intervention did not occur. Ideally, the baseline should include a quantitative assessment of what would have happened in the absence of the intervention being evaluated. However, there are some important limitations that preclude this type of analysis for this study:

- As already explained in Section 5.2.1.1, data availability for the reference period is another important issue. Data on the average CO₂ performance of new passenger cars is only available for the period after the introduction of the label in specific countries, while data on the actual sales of vehicles by label category is only available for a small number of Member States (UK, FR, NL, DK and DE) and only for the period after the introduction of the label. Importantly, the lack of data on the trends prior to the introduction of the Directive means that it is not possible to provide a projection of what would have happened in the absence of the Directive. It also means that the use of an econometric approach to quantify the effectiveness of the Directive in terms of the demand-side response (impact on consumer decisions to buy vehicles with different fuel efficiency or CO₂) is not possible.
- Furthermore, various factors other than labelling have driven changes in the CO₂ performance of new passenger cars in recent years. At the EU level, these include the ACEA/JAMA/KAMA voluntary agreements (signed in 1998), which were succeeded by obligatory CO₂ standards in Regulation 443/2009. It also includes the various changes in national fiscal incentives for consumers buying new passenger cars, which many national governments have implemented at the same time as they introduced the new labelling requirements or later, and the economic recession (especially relevant if considering price effects).

These limitations were already identified in the first report on the effectiveness of the Directive identified this problem, where it was concluded that it was difficult to identify the impact of the label on its own (ADAC, 2005). The report for the European Parliament (Ecologic et al., 2010) undertook a literature review and noted that other authors have reached similar conclusions.

Another possible approach considered would be the use of a relative baseline based on the use of a so-called difference-in-difference approach. This would aim to find differences between the average CO₂ reduction rates of new car registrations in countries that have introduced labels compared to those that had not. It should be noted though, that such an approach may measure the impact of Member State actions that go beyond the basic requirements of the Directive (one example – among others – is that the introduction of coloured labels is generally thought to be more effective but is not required) but not the impact of the Directive itself. Even so, there are very large national differences that drive the overall trends seen – most importantly related to taxes and other fiscal policies, but also due to consumer preferences – which make cross-country comparisons rather difficult to interpret. Major changes in taxes/incentives within a country over time would also make the comparison more difficult. Furthermore, clear and wide differences in the rate of CO₂ reduction across countries were apparent before the introduction of the labels, negating the assumption of parallel trends between treatment and non-treatment groups. This is a necessary condition for a formal difference-in-difference approach.

Due to the challenges outlined above, the development and use of the baseline in the analysis is largely a qualitative assessment. It was based on the following aspects:

- Analysis of expected legal and broader policy framework concerning information provision related to fuel efficiency and CO₂ emissions for

passengers in the absence of the Directive. This was based on available information collected through desk research looking into policy documents in place prior to the adoption of the Directive – at the national and EU level. It was also based on the input from the interviews, where Member States were asked to indicate whether relevant measures would have been introduced in the absence of the Directive. Since the Directive was adopted prior to the EU enlargement, the focus of this element was on EU-15 Member States.

- Analysis of the level of awareness among consumers of the level of fuel efficiency and CO₂ emissions of passenger cars and their behaviour in terms of vehicle purchase before and after the adoption of the Directive. This is linked with the causal chain analysis presented in Section 3.2 and assesses whether the intended actions have taken place and if there is evidence indicating that they can be linked to the identified outputs and results.

3.3.1 Legal framework in the absence of the Directive

In terms of the legal framework prior to the adoption of the Directive, only two Member States⁴ (Sweden, UK) had already adopted national rules on fuel economy information of passenger cars prior to the adoption of the Directive. Both countries had introduced such legislation as early as 1977 (ADAC, 2005). Our interviews and the survey of Member State authorities did not reveal the presence of any other similar measures in any other country prior to the adoption of the Directive.

However, in some EU-15 Member States (AT, FI, DE, DK, and NL) initiatives and campaigns on energy efficiency driving and other environmental related issues were carried out (ADAC, 2005). Various information brochures or leaflets on fuel consumption and environmental pollution were issued. These were initiated by the government, industry or consumer-group initiatives or a combination of these. The study also points to initiatives in most Member States directly linked to the introduction of the Directive but these are not considered as part of the baseline. Table 3-1 **Error! Reference source not found.** summarises the relevant measures and initiatives present prior to the adoption of the Directive.

Table 3-1 – Relevant policy measures adopted by EU-15 Member States prior to the adoption of the Directive

Country	Relevant policy measure(s)/initiative(s)
AT	Initiative of VCÖ (Austrian Traffic Club) in co-operation with the corresponding clubs in Germany and Switzerland: "Auto-Umweltliste" (Passenger Cars – Environment List), booklet with information on environmental friendly and fuel efficient passenger cars, published annually up to 2000.
DK	In combination with the introduction of the "Green motor tax" in 1997, distribution of an information brochure via dealerships and libraries as well as voluntary agreement of the automobile industry regarding the fuel consumption labelling of new vehicles and the statement of fuel consumption data in promotion literature.
FI	Initiative of MOTIVA OY (service organisation promoting renewable energy sources and efficient energy use): Consumer guide for new passenger car buyers including fuel economy information

⁴ Referring to EU-15. **Error! Reference source not found.**

Country	Relevant policy measure(s)/initiative(s)
NL	<p>During the 1990s, brochure on the fuel consumption of passenger cars was published in co-operation with the automobile industry. The brochure was displayed at the post offices.</p> <p>"Buy economically, drive economically" ("Koop zuinig, Rij zuinig"): Programme by NOVEM (The Netherlands Agency for Energy and the Environment) on behalf of the government in the nineties with different actions, e.g. distribution of slide with fuel consumption data of new passenger cars.</p>
SE	<p>KOVFS 1977:2: First Decree regarding the information on fuel consumption of new passenger cars: label with fuel consumption data, fuel type and fuel cost for a driving distance of 15.000 km, poster in the showroom with same information for all available vehicle models, same information in promotion literature and owners manuals.</p> <p>KOVFS 1979:11 (revision): Modified information text and reference to the new brochure "Bränsleförbrukning personbilar" (Fuel consumption of passenger cars) issued by Konsumentverket.</p> <p>KOVFS 1988:1 (revision): Brochure "Bränsleförbrukning personbilar" must be displayed at the dealerships, more severe provisions on promotion literature and other media.</p> <p>KOVFS 1996:12 (revision): Inclusion of CO₂ emissions and environmental class on label and poster, new brochure "Bränsleförbrukning, koldioxid och miljöklassing" (Fuel consumption, CO₂ emissions and environmental class), more severe provisions on printed media but provisions on TV and radio promotion were deleted.</p>
UK	<p>Since 1977 passenger cars had to be labelled with their official fuel consumption data. Since 1978 the government has produced a fuel economy guide.</p>
Eco-driving promotion	
AT	<p>Initiatives of automobile clubs (ÖAMTC and ARBÖ): Free public information leaflet on fuel saving driving, also available online.</p>
DE	<p>Regulation regarding the education in driving schools (since 01.01.1999): Theoretical and practical lessons on energy saving driving.</p>

Source: (ADAC, 2005)

As can be seen, in some Member States national associations implemented similar information provision schemes, indicating demand for provision of such information that may have eventually turned into a broader national legislation. However, it is not clear how broadly it was used, whether it covered every car and how consistently the information was displayed. Hence, the introduction of the Directive was an improvement on these less comprehensive national initiatives.

Additional voluntary labelling schemes – that go beyond the CO₂ emissions and fuel consumption information – have also been developed in a number of countries. For example, ADAC EcoTest in Germany provides an environmental ranking and labelling scheme for new and used cars since 2003. The Ecoscore system in Belgium ranks light-duty, heavy-duty and two-wheeled vehicles using a partial life cycle approach. It

uses official type approval data to classify vehicles according to their CO₂ and air pollutant emissions and engine noise (AIRUSE, 2015).

Overall, even in the absence of the Car Labelling Directive, similar information provision policy tools may eventually have been adopted – either on a mandatory or a voluntary basis – in some Member States. However, this would most likely not have been the case in the majority of Member States and the coverage of all new cars for sale would not have been guaranteed to allow for a minimum of comparability for consumers.

3.3.2 Level of consumer awareness and decision making

In terms of the level of awareness among consumers of the level of fuel efficiency and CO₂ emissions of passenger cars in the absence of the Directive, there are limited data available concerning its level and the trends at the time of its introduction. The data provided in the 2005 study by ADAC, based on a survey of 7,168 consumer in eight Member States, could be used as an indication of the situation soon after the adoption of the legislation in most Member States. The main findings of the study were that:

- Environmental friendliness was ranked low among consumer in vehicle purchase decisions.
- Car reliability and safety standard were given priority among consumers in all Member States (except in the Netherlands where the vehicle type, was considered more important than safety).
- Vehicle price, running cost and comfort were also ranked higher than environmental friendliness for the selection of a new passenger car in all of these countries.
- On the other hand, for nearly half of the respondents, a direct comparison of CO₂ emissions or fuel consumption of passenger cars was considered important.

The same study provided also information on the level of consumer awareness, understanding of fuel economy issues and vehicle purchase decision criteria at national level (see **Error! Reference source not found.**). It is based on studies that had taken place before or soon after the adoption of relevant national legislation. The majority of the studies found that consumers were not well aware of fuel economy and environmental issues and that these were not a major factor in vehicle purchase decisions.

Table 3-2 – Main findings on the level of Consumer awareness, understanding of fuel economy issues and vehicle purchase decision criteria (studies taking place before 2003)

Country	Study year	Awareness, understanding of fuel economy and environmental issues	Vehicle purchase decisions
AT	1999	No information	Study for the Austrian Energy Agency found that environmental issues ranked 7th (last) as a factor in vehicle purchase decision, fuel consumption ranked 4th, safety 1st, cost 2 nd .
BE	2001-	Consumers not well aware of fuel economy and	Fuel economy and environmental impact not a

Country	Study year	Awareness, understanding of fuel economy and environmental issues	Vehicle purchase decisions
	2003	environmental issues	major factor in vehicle purchase decisions.
DK	1999	Awareness of consumers on fuel economy and environmental issues is increasing.	1st priority factors influencing consumers' vehicle purchase decision: fuel consumption/cost (15%), size/space (14%), manufacturer (14%), and price (12%). Fuel consumption only important because of the cost, but not to environmental issues.
FI	2003	Consumers not well aware of fuel economy and environmental issues.	Foremost factors (very important, quite important) influencing consumers decision are cars reliability (95.1% of respondents), safety qualities (91.7%) and comfort (85.6%). Fuel cost ranked 8th (67.1%) and environmental impact 9th (64.3%).
NL	2001-2002	Consumers not well aware of fuel economy and environmental issues.	Fuel economy and environmental impact no major factor in vehicle purchase decisions.
PT	2001	Consumers not well aware of fuel economy and environmental issues.	Fuel economy and environmental impact no major factor in vehicle purchase decisions
ES	2003	Consumers not well aware of fuel economy and environmental issues.	Fuel economy and environmental impact no major factor in vehicle purchase decisions.
SE	1997-2003	Partly, consumers are aware of fuel economy and environmental issues.	Fuel economy and environmental impact only one factor among others in vehicle purchase decisions.
UK	2000	Interest is growing slowly with greater awareness of climate change and CO ₂ emission issues.	Foremost factors influencing consumers' decision: Cost, reliability, performance, practicality and safety. Fuel economy ranks 6th from 15th characteristics.

Source: Own elaboration based on ADAC (2005)

Thus, the available evidence shows that at the time of the adoption of the Directive the level of awareness of consumers on issues of fuel economy as well as in terms of

its role in vehicle section was rather low. However, by itself this is not sufficient for developing a counterfactual of what would have happened in the absence of the Directive. As already indicated – and further analysed in more detail in the case studies – most Member States have adopted additional policies, including tax schemes that should by themselves be expected to influence consumer awareness and behaviour.

4 EVALUATION QUESTIONS

Relevance

(1) To what extent do the (current) objectives of the Directive still respond to the needs in the EU considering current and expected technical, environmental and economic challenges?

(2) What, if any, technological, economic, or administrative issues exist that are not covered by the existing legislation which could be introduced in view of their potential added value?

Effectiveness

(3) What have been the (qualitative and quantitative) effects of the intervention?

(4) To what extent has the approach taken, in terms of both scope (e.g. the exclusion of used cars) and main elements in the legislation, ensured or hampered the achievement of the objectives?

(5) What factors influenced the achievements observed, how and to what extent?

(6) What unintended or unexpected positive and negative effects, if any, have been produced?

Efficiency

(7) To what extent are the costs resulting from the implementation of the legislation proportionate to the benefits that have been achieved as regards each main element of the Directive?

(8) To what extent do the different types of costs resulting from the implementation of the legislation vary based on the approach taken to implement the legislation (while achieving the same results)? Which approach was most efficient?

(9) What are the major sources of inefficiencies? What steps could be taken to improve the efficiency of the Directive? Are there missing tools and/or actions to implement the Directive more efficiently?

Coherence

(10) How well does the legislation fit with and complement other EU policies (e.g. air pollution) and their objectives (e.g. environmental, social or economic)?

(11) To what extent are objectives and achievements coherent with the Europe 2020 strategy and Europe 2030 policy goals?

(12) How does the legislation interact with other EU/ national/ international initiatives which have similar objectives (e.g. actions in the field of environment, single market, climate action)?

EU Added Value

(13) What has been the EU added value of the legislation?

(14) To what extent do the issues addressed by the intervention continue to require action at EU level?

5 METHOD/PROCESS FOLLOWED

In this section we present the methodological approach followed (Section 5.1) and the research tools used (Section 5.2) to address the evaluation questions. In Section **Error! Reference source not found.** we describe the baseline scenario against which the effectiveness and efficiency of the Directive can be assessed. Finally, in Section 5.3 we identify and discuss the limitations of the methodological approach and the research tools used and their impact on the validity of the analysis and conclusions.

5.1 Methodological framework

The first part of the evaluation study focused on the development of the structure of the evaluation. Making use of the intervention logic presented in Section 3.2, for each evaluation question we defined the following:

- **Success Criteria:** Operational criteria used for judging the intervention positively or negatively, and thus for answering the evaluation questions and formulating the conclusions.
- **Operational sub-questions:** These questions provide a more detailed breakdown of sub-questions within each of the main evaluation questions.
- **Indicators/metrics:** In conjunction with success criteria to assess the performance of the Directive – e.g. derived from the objectives or benchmarks with good practice.
- **Data sources:** Sources of data and information that will be used to inform the indicators. We aim to triangulate information from several sources for each indicator.

The table with the analysis for each evaluation question is provided in Annex A.

5.2 Research tools used

The development of the methodological framework also determined the research tools that were used in the evaluation.

5.2.1 Data collection

The first part of the evaluation focused on collating and reviewing existing information required for the study. This involved identification and collection of data and other information from a range of sources, including:

- Quantitative datasets including data on vehicle sales/registrations, average CO₂ emissions from new cars as well as other supporting data required for the analysis;
- Existing literature including relevant studies and reports at the EU and national level as well as other relevant web-based sources;

- Primary data from stakeholders through the use of public online consultation, 26 in-depth interviews with stakeholders (representatives from vehicle manufacturers, components suppliers, national ministries/competent authorities, trade/dealer associations and NGOs) at the EU and national level and a survey of national authorities that focused on focusing on the implementation of the Directive.

More information on the tools used is provided in the section below.

5.2.1.1 Quantitative data sets

The study draws upon a range of data sources covering Europe and individual Member States, including:

- Data on average CO₂ emissions for the period 2001-2014 at the EU and national level based on data from the European Environment Agency collected to monitor CO₂ emissions from passenger cars under Commission's Decision 1753/2000 (covering period 2000-2009) and Regulation 443/2009 for the period 2010-2014. Critically, there are no data available for the period prior to the adoption of the Directive, since the official monitoring requirements only came into place in 2000. This has implications for the establishment of the baseline and for the ability to perform a quantitative assessment of the impacts (see Section **Error! Reference source not found.**).
- Data on sales of passenger cars by label category that is publicly available for a number of countries. The study team focused on the ten case study countries identified (see Section 5.2.2 below) and contacted relevant national agencies in order to request data. Eventually, data were made available for France (annual data for period 2002-2014), UK (monthly data for 2001-2014), Germany (monthly data for 2012-2015), Netherlands (annual data for period 2001-2014) and Denmark (annual data for 2000-2014). The study team also sought data on vehicle car sales by label in Austria, Spain, Italy, Poland and the Czech Republic. However, such data are not available in any of these countries.
- Other relevant data (such as number new vehicle registrations by type, engine size, mass) were extracted from European Automotive Manufacturers Association (ACEA) and the Eurostat transport databases.
- We also extracted data from the tax guide produced ACEA⁵ and the Odyssee-Mure database⁶ to analyse the fiscal and other relevant policy measures introduced by Member States during the 2000-2015 period.

The study team also examined other relevant data sources that could be used for the analysis. More specifically, we reviewed data from the JATO 1995-2010 database on vehicle sales that covers every version sold of over 100 of the more common models available on the market for Germany, UK, Italy, Slovakia, Slovenia and Sweden. However, the reviewed database does not include data on number of sales per vehicle that is critical for calculating average emissions.

5.2.1.2 Desk research

We conducted an extensive analysis of existing studies, scientific publications, market research reports, web-based documents and other sources related to the implementation and its impacts of the Car Labelling Directive, as well as relevant fiscal measures, at the EU and national level. We also asked stakeholders interviewed and

⁵ <http://www.acea.be/publications/article/acea-tax-guide>

⁶ <http://www.odyssee-mure.eu/>

those that contributed to the public consultation to point to any other relevant sources linked to the Car Labelling Directive at national level.

For the studies identified, we used an analysis template to assess the relevance of each report identified for the evaluation questions examined, to review the country coverage provided and to extract relevant data.

5.2.1.3 Stakeholder engagement

Open Public consultation

A public consultation was organised by the European Commission's Directorate-General Climate Action with the support of the study team.⁷ It took place during the period October 19th 2015 to January 15th 2016.

In total, 179 responses from 67 citizens/consumers across 11 Member States and 114 organisations/authorities⁸ (EU wide and from 12 Member States) representing a wide range of stakeholders were received. Given the low number of responses received from citizens of which many appear to have been submitted by German car dealers no generalisable conclusions can be deduced from them.

One important issue that arose was the very high level of participation of vehicles dealers/traders from Germany (total of 55 responses as organisations). This is a specific group of stakeholders who appear to have been primarily motivated by a particular national issue (see also Section 7.4) and have therefore provided very similar answers to the questionnaire.

A summary analysis of the online public consultation is presented in Annex B. The overall synopsis of all the stakeholder input is provided in Annex I (in separate file).

Interview programme

The interviews with stakeholders represented an important source of information concerning the current status of the implementation of the Directive, and provided input in relation to a number of evaluation questions.

The initial target was for a total of 30 interviews. These included 2 stakeholders for each of the 10 Member States (one representative of national authorities and one more stakeholder, either a representative of the automotive sector or a consumer association) selected for case-studies and 10 more at EU level representing industry, consumers, publishers/advertisers and NGOs. The initial list of organisations that were invited for participation were suggested by the study team to the Commission, who then reviewed and agreed the final list.

Eventually, 26 in-depth semi-structured interviews were completed. A number of stakeholders declined or did not respond to our invitation. The study team extended the list adding alternative organisations, when relevant. However, this was not always possible since in some Member States there was only one relevant national authority, consumer organisation or industry representatives. In total, we contacted 45 stakeholders, of which 19 - including two Members of the European Parliament - declined or did not respond to our invitation.

Table 5-1 summarises the interview programme. Among the 10 Member States targeted, the study team was not able to secure any interview in the Czech Republic

⁷ http://ec.europa.eu/clima/consultations/articles/0027_en.htm

⁸ The actual number of responses submitted was 112. However, in two cases, stakeholders asked that a specific response should be considered as representing two separate organisations.

despite three rounds of contacts with a range of relevant entities (including industry representatives, consumer associations and national authorities). In some countries we were only able to complete one interview (ES, IT, PL) while in one case (NL) we completed 3 interviews. Detailed information of the interview programme is provided in Annex C.

Table 5-1: Summary of the interview programme

Type of Stakeholder	Completed	Declined / no response
EU level		
Advertising and publishing organisations	3	0
Consumer organisations and vehicle users	3	0
European Parliament Members	0	2
Industry - Associations	3	3
NGOs	1	2 ⁹
National level		
National authorities	8	3
Industry - Associations	4	4
Consumer organisations and vehicle users	4	5
Total	26	19

Survey of Member State authorities

In order to obtain a more complete picture of the implementation of the Directive across the EU-28, we conducted a survey of national authorities focusing on the 18 countries not covered through in-depth interviews. Authorities were contacted by email (with 3 additional reminders) and asked to respond to a brief questionnaire focusing on the implementation of the Directive, enforcement activities and levels of compliance recorded. In total, eight authorities (BE, EE, FI, IE, LT, RO, SE and SK) submitted their responses. Together with the input secured from 9 national authorities as part of the interview programme, the study stakeholder consultation covers 17 of the 28 Member States.

It should be noted that not all authorities responded to all questions raised in the survey. In some cases they indicated that the requested information was not available.

5.2.2 Case studies

A total of 10 country-specific case studies were conducted. They were largely based on the data collected through the research tools described in Section 5.2.1, complemented by additional desk research when needed. The case studies were selected on the basis of the following criteria:

- Priority was given to EU Member States with the largest number of new car registrations while ensuring a suitable geographical balance.

⁹ The 2 NGOs referred both to the NGO interviewed representing also their views on the topic.

- Coverage of the different ways that the Directive has been implemented on the basis of information available at the start of the project, particularly in relation to the type of label adopted (see Section 6.3).

Table 5-2 presents the 10 countries covered by the case studies.

Table 5-2: Case study countries

Label format	Absolute	Relative
Scaled, colour-coded comparative labels EU Energy Label design	France, UK, Denmark	Germany, Spain, Netherlands
Other scaled, colour-coded comparative labels	Austria	
Not specified	Czech Republic, Poland, Italy	

5.3 Limitations – robustness of findings

The methodology presented above has certain limitations that have implications to the capacity to provide comprehensive and robust findings to some of the evaluation questions. These limitations, as well as the mitigating measures taken, are discussed in the following paragraphs.

Lack of quantitative data

One limitation when it comes to assessing the impacts of the Directive is the absence of data concerning average CO₂ emissions and vehicle sales per label category covering the period prior to the adoption of the Directive at sufficient resolution. The main implication is that it is not possible to perform an econometric analysis that could lead to a quantitative assessment of the impact of the car label on consumer responses or on average CO₂ emissions. The study team considered alternative options – such as the use of hedonic pricing models and difference-in-difference approaches comparing average CO₂ reduction rate of new registrations in countries that have introduced labels compared to those that had not. However, in both cases the necessary data are not publicly available (see Section 5.3).

As an alternative, the analysis is based on a more qualitative assessment making use of input from stakeholders and focusing on the role of the mechanisms of the Directive and the causal chain developed in Section 3.2.2. We have used a case study approach that allows for a better tracking and analysis of the changes in the policy context over time and used input from key stakeholders and other secondary sources to determine whether the intended actions have taken place, and if there is evidence indicating that they can be linked to the identified outputs and results. Cross-case comparisons were used to assess whether specific outputs and results observed – or not observed – and are linked to a specific approach followed in specific Member States or whether they are more generally applicable.

Stakeholder input

One key tool to address the data limitations has been the use of input from stakeholders at the national and EU level. While the interview programme provides a wide coverage of interests at the EU and national level, there are still limitations and gaps (see Section 5.2.1.3). Most countries are covered with one or two stakeholders – including the authorities and either the national industry or a consumer association. This means that not all relevant stakeholders are covered in all Member States and that, in some cases, there is danger of relying on biased input from specific stakeholders.

Furthermore, since we asked stakeholders to provide their best estimates of levels of awareness or compliance there is also a danger that the information used is incorrect. We have attempted to address this as much as possible through the cross-checking of views of different stakeholders from different groups, as well as the use of additional desk research to identify other secondary sources and cross-check information provided. However, this has not been possible in all cases. We have clearly indicated such limitations, when applicable.

Public consultation

As already described in Section 5.2.1.3, the online public consultation has also certain limitations that need to be taken into consideration. A key limitation is that more than half of responses come from organisations and citizens from a single country (Germany) and, more specifically, from a specific stakeholder group (vehicle dealers). In order to address this problem, the responses have been analysed separately for this specific group.

More generally, by design (open consultation without any sampling method used), the responses to the open consultation cannot be considered as providing a representative view of consumers and stakeholders affected by the legislation. On the contrary, it should be expected that participating consumers are generally more informed than the typical consumer and that the organisations contributing to the consultation represent those that are particularly affected by the legislation, positively or negatively. In either case, there are clearly biases to the responses provided that need to be taken into account.

Whilst the submission to the public consultation provided relevant input to the evaluation, statements or positions brought forward by certain stakeholders have been clearly highlighted as such. Inputs to the public consultation have been used as a complementary source that may or may not corroborate the findings from other sources.

6 IMPLEMENTATION – STATE OF PLAY

6.1 Introduction

In this section we provide a description of the state of implementation of the Directive across all EU-28 Member States. The analysis provided is based on information collected through desk research, the interviews with national authorities and input from the survey of national authorities.

This section provides information on the following topics:

- Transposition of the Directive: Identification of the relevant national legislation and any recent amendments.
- Car label: Analysis of the design of the car label in each Member State, including the
- Type of information provided.
- Guide on fuel economy: Information on the distribution channels used and inclusion of any additional information beyond that required in the Directive.
- Poster.
- Promotional material.
- Enforcement structures and activities.

6.2 Transposing legislation

All Member States have transposed the Directive into their national legislation.

Table 6-1 summarises the information collected in terms of the date of transposition and of important amendments. Among the EU-15 Member States, only three had transposed the Directive by January 18th 2001, the date specified in the Directive, although most (10) had transposed it by the end of 2001. Only in Germany and Italy was the transposition delayed by more than 2 years. In a number of cases (DK, LT, LV, EE), together with the main piece of legislation transposing the Directive there are implementing measures that support the implementation. More detailed information is included in Annex D.

Seventeen Member States have introduced amendments to the national legislation since its initial transposition. The changes concern presentation requirements and the delivery channels through which information can be received. The UK adopted the EU Energy Labelling format for the car label in 2004; Ireland did the same in 2008. In 2013, the UK amended the legislation to include also alternatively fuelled vehicles (electric, electric plug-in vehicles and bi-fuelled vehicles) (VCA, n.a.). Denmark introduced three additional categories (A+, A++ and A+++) in 2012 and Germany one additional category (A+) in 2011. Since 2006 Austria has introduced changes in relation to the guidance document, on line as well as publishing it in physical copy. In Lithuania, the amendment introduced allows the use of monitors no smaller than 25cm x 32cm instead of posters.

Table 6-1: Transposition of Car Labelling Directive in national legislation and key amendments

Member State	Initial transposition date	Important Amendments
AT	30.3.2001	2006
BE	5.9.2001	30.9.2004
BG	30.6.2006	15.4.2010
HR	2007	2015
CY	2003	2004

Member State	Initial transposition date	Important Amendments
CZ	20.6.2005	No info
DK	28.3.2000	20.6.2012
EE	23.9.2005	2016
FI	09.11.2000	No amendment
FR	23.12.2002	16.07.2004 & 10.11.2005
DE	3.6.2004	2011
EL	25.1.2002	No amendment
HU	12.2002	01.05.2004
IE	19.7.2001	2008
IT	19.4.2003	No info
LV	23.7.2004	No info
LT	22.10.2003	16.4.2004
LU	06.4.2001	12.1.2004
MT	2002	No amendment
NL	30.11.2000	No amendment ¹⁰
PL	20.6.2001	No info
PT	26.11.2001	No amendment
RO	18.3.2004	No amendment
SK	01.7.2004	No amendment
SI	29.12.2003	2004, 2010 and 2014
ES	2.8.2002	18.3.2004
SE	19.2.2002	30.9.2010
UK	31.10.2001	2013

Source: MS Survey, interviews, (Eur-Lex, n.d.) and national sources (see Annex D)

Since 2001 the Commission has launched in total 18 infringement proceedings relating to the Directive. The most common was for non-communication of the transposing measures to the Commission (Article 12) by the date specified in the Directive. Two Member States (BE, LU) did also not comply with their reporting obligations¹¹, while in three cases (IT, BE, ES) the Commission initiated procedures for improper application of the Directive. These proceedings are all now closed and only four required a ruling of the Court.

Table 6-2: Summary of infringement cases relating to Directive 1999/94

MS	Subject	Last decision taken before closure	Date
LU	Non-communication of transposing measures	Letter of formal notice	6.4.2001
AT	Non-communication of transposing measures	Letter of formal notice	6.4.2001
SE	Non-communication of transposing measures	Letter of formal notice	6.4.2001

¹⁰ Modifications with regard to the CO₂-reference value for the energy label from A to G have taken place on a frequent basis.

¹¹ Article 9 stipulated that each Member State shall transmit to the Commission, by 31 December 2003, a report on the effectiveness of the provisions of this Directive, covering the period from 18 January 2001 until 31 December 2002.

MS	Subject	Last decision taken before closure	Date
BE	Non-communication of transposing measures	Reasoned Opinion	18.7.2001
IE	Non-communication of transposing measures	Reasoned Opinion	18.7.2001
PT	Non-communication of transposing measures	Reasoned Opinion	18.7.2001
EL	Non-communication of transposing measures	Referral to the Court	20.12.2001
ES	Non-communication of transposing measures	Referral to the Court	31.1.2002
UK	Non-communication of transposing measures	Referral to the Court	26.2.2002
FR	Non-communication of transposing measures	Ruling of the Court	19.6.2003
IT	Non-communication of transposing measures	Ruling of the Court	11.9.2003
DE	Non-communication of transposing measures	Ruling of the Court	25.9.2003
BE	Failure to comply with reporting obligations	Letter of formal notice	13.10.2004
EE	Non-communication of transposing measures	Reasoned Opinion	5.7.2005
LU	Failure to comply with reporting obligations	Ruling of the Court	14.12.2006
IT	Poor application of the Directive	Letter of formal notice	19.3.2009
BE	Poor application of the Directive	Letter of formal notice	14.4.2009
ES	Poor application of the Directive	Reasoned Opinion	28.1.2010

Source: Commission Services

6.3 Label

According to the Directive, the car labels should meet the following requirements:

- Comply with a standardised format in order to allow greater recognition by consumers
- Are of a size of 297mm x 210mm (A4)
- Contain a reference to the model and fuel type of the passenger car to which they are attached
- Contain the numerical value of the official fuel consumption and the official specific emissions of CO₂
- Contain specific text on the availability of the guide on fuel consumption and CO₂ emissions
- Contain specific text on other factors that affect fuel consumption (i.e. driver behaviour) and that CO₂ is the main GHG responsible for global warming

The method of display for the required information and the content on the labels varies by Member State. The main elements of differentiation are:

- Label design
- The use of absolute or relative scaling
- The inclusion of additional information beyond the minimum required.

In the following section we analyse the implementation of the label across the EU-28. A table summarising the characteristics of the car label for each Member State can be found in Annex D.

6.3.1 Label Design

Among the 28 Member States, 11 have adopted a car label design that is similar in design to the EU Energy label (see Table 6-3). Estonia moved to this design in the beginning of 2016¹². Austria, Belgium and Portugal's label is colour-coded, but is based on a different design to the standard EU energy label for household products (see case studies in Annex F). In Belgium, the labelling classes are also differentiated on the basis of the fuel (petrol/diesel). The remaining 14 Member States do not mandate a specific format of the label and simply require that the information is provided in the form.

Among the countries using the EU Energy label design, most use a 7 category system. Germany includes an A+ rating for the best in class. Since 2012, Denmark has introduced three additional categories: A+, A++ and A+++), and the UK aligns the categories to the car tax system that has 13 categories (but still has 7 coloured bands). Slovenia has 10 categories and 6 coloured classes.

Table 6-3–Summary of the car label design across the EU28

Label Format	Number of categories	Number of coloured classes	Number of Member States	Member States
EU-Energy Label Format	7 (A-G)	7	7	BG, FI, FR, IE, NL, ES, EE
	8 (A+-G)	8	1	DE
	10 (A-G + A+, A++ and A+++)	10	1	DK
	10 (A-J)	6	1	SI
	13 (A-M)	7	1	UK
Alternative categorised format	7	7	1	BE
	4	4	1	PT
Continuous Comparison Format	N/A		1	AT
No Specified Format	N/A		14	CZ, EL, LT, PL, HR, CY, HU, IT, MT, SE, SK, LV, LU, RO

Source: Own elaboration on the basis of desk research and MS survey

Examples of the labels for the 14 Member States that have a specified format is provided in Annex G.

6.3.2 Relative vs absolute comparison

An important differentiation amongst Member States is whether the comparison and categorisation of each car is made against all cars (absolute) or whether each car is categorised according to a comparison against cars in a similar class (relative).

¹² <http://www.envir.ee/et/eesmargid-tegevused/kliima/energiamaargis>

The majority of the Member States that have used scaled, colour-coded label formats have also adopted absolute emissions values to categorise the vehicle. However, three Member States (DE, ES and NL) used a relative format, grading the vehicle in comparison to a weighted average of other vehicles within that category (see Table 6-4). More specifically, Germany's scheme uses the weight of the vehicle in conjunction with the CO₂ emissions to determine its relative category. Spain has implemented a similar system but uses the vehicles' footprint to determine the vehicles relative CO₂ performance. The Netherlands use a dynamic relative scheme that identifies the weighted average of the CO₂ emissions of vehicles in that class (75%) and the average CO₂ emissions of all vehicles.

Table 6-4: Summary of Member State categorisation systems.

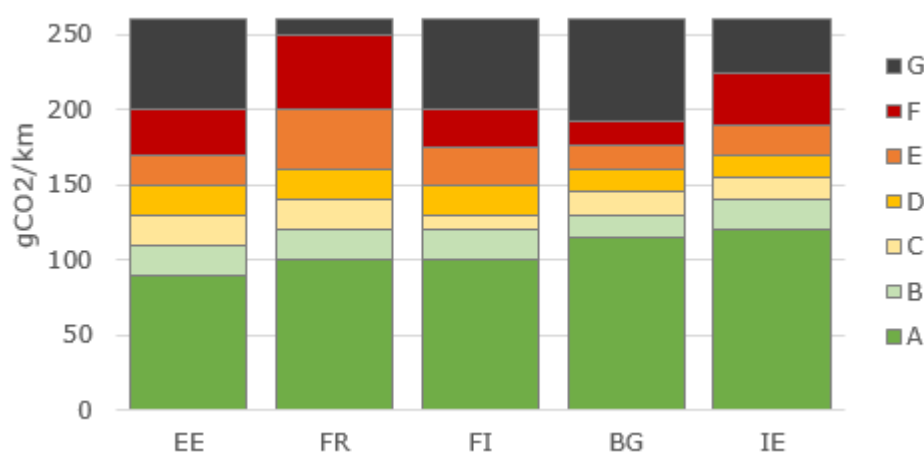
Categorisation	Number of Member States	Member state
Absolute	11	AT, BE, BG, DK, EE, FI, FR, IE, PT, SI, UK
Relative	3	DE, NL, ES
No categorisation so not applicable (stated emissions)	14	HR, CY, CZ, EL, HU, IT, LT, MT, PL, LV, LU, RO, SE, SK ¹³

Source: Own elaboration on the basis of desk research and MS survey

6.3.3 Differences in the definition of energy efficiency classes

Besides the difference between absolute and relative categorisation, there are also differences in the definition of the energy efficiency classes among those that have adopted an absolute comparison system. As already presented in Table 6-4 above, there are differences in the number of categories used in a number of countries. However, even among the absolute labels with 7 categories (BG, FI, FR, IE, and EE) all of them have adopted different class definitions (see Figure 6-1).

Figure 6-1: Definition of label categories: Member States using absolute labels with 7 categories



Source: MS survey and own desk research for BG¹⁴

¹³ The Slovak authorities indicated that the national legislation provides for a relative energy label format. However, our own review of the legal text suggests that the national legislation only includes the minimum provisions concerning the design of the label.

Similar variations can be seen in the case among the Member States that have opted for the relative label approach. As can be seen, the same car models can receive different grading depending on the country.

Table 6-5: Label category for specific vehicles in Member States using the relative label approach (indicated category correct as of April 2016)

Vehicle model	car	DE	NL	ES
Porsche Cayenne Diesel (179 CO ₂ /km)	g	B	F	C
Citroen C1 (99 CO ₂ /km)	g	B	C	B

Source: Own elaboration making use of relevant databases for Germany¹⁵, Netherlands¹⁶ and Spain¹⁷

6.3.4 Additional information in the label

Besides the minimum information required, a few Member States have included information that goes beyond the scope of the Directive (see

Table 6-6: .

A number of countries require the inclusion of information on running costs. The UK has included the running cost as a financial figure based on annual distance travelled of 12,000 miles (19,312km). Running costs also form part of the label in Denmark, Germany, Ireland, Estonia and Finland, although each of them uses different distance (DK and DE: 20,000 km, IE and FI: 18,000km, EE: 10,000 km). These countries – except FI –also include information about the vehicle tax, which in Denmark and the UK is the circulation tax, and in Germany is an annual tax (the UK has different rates for the first year and the years thereafter and these are also represented on the label)¹⁸.

Denmark also uses the label to provide safety related information making use of the European New Car Assessment Programme (EURO NCAP) ratings. In Austria additional pieces of information (including noise levels, vehicle weight, size and footprint, number of seats, information about biofuel sustainability and the usability of different fuels) may be included within a text box provided at the bottom of the label. Labels in other countries (NL, FI) also include similar type of information.

¹⁴<http://dv.parliament.bg/DVWeb/showMaterialDV.jsp;jsessionid=ADF01721FC70A6EBE45E4654C98A76E0?idMat=32165>

¹⁵ <http://www.pkw-label.de/uploads/media/DAT201602.pdf>

¹⁶ <https://www.rdw.nl/SiteCollectionDocuments/VT/Naslag/Brandstofverbruiksboekje%202016.pdf>

¹⁷ <http://coches.idae.es/portal/BaseDatos/MarcaModelo.aspx>

¹⁸ The UK has also announced changes to its circulation tax from 2017, which will have no differentiation beyond the first year. How this will link to the label in the future remains unclear.

In a number of Member States the label includes information on fuel efficiency using alternative measurement units (UK: miles per gallon, BG and ES: km/l). In seven countries (IE, DE, FR, BG, FI, SI, UK) the label also provides information on fuel efficiency for different drive cycles (urban, extra-urban and combined).

The label has also been extended beyond new passenger cars in a few countries. In Denmark, and Spain the label is mandatory for light commercial vehicles up to 3.5 tonnes (vans) since 2012 while in the UK it is also displayed on used cars in a voluntary scheme. Furthermore, in Finland and Slovenia, the car label also provides information on air pollutant emissions.

More detailed information has been collected for some of these schemes. Concerning the coverage of light commercial vehicles, the Danish authorities extended the label scheme to cover vans in 2009. The information in the label is the same to that provided in passenger cars. ...

Concerning the coverage of used cars, a voluntary car label to cover used vehicles was introduced in the UK in November 2009. It was a scheme developed jointly by the Low Carbon Vehicle Partnership (LowCVP) – a public private partnership organisation - with the support of the automotive sector (retailers and manufacturers)¹⁹ and the Department for Transport. Car dealerships that wish to label used cars in their showrooms can do so free of charge by downloading and printing a label unique to the specific vehicle from an existing database. The label has all the characteristics of the car label for new cars and includes information on fuel costs for 12,000 miles as well as the vehicle excise duty for one year. The database was hosted and maintained by the Vehicle Certification Agency up to 2012. Since then, data labels for used cars can still be provided free of charge by two external providers, supervised by the UK Department for Transport. In the first full year of the scheme, more than 0.33 million used-car labels had been displayed by around 1300 dealers that had registered and engaged in the scheme²⁰. According to the Low CVP representative, the number of dealers currently registered is 2450, out of a total of 5490 used car dealerships in the UK (Bursa, n.a.).

In Finland, a formal used car label scheme has not been introduced but the online database developed by the government²¹ covering new passenger cars also allows consumers to check their used car's consumption and emission data and print their own car label by providing the registration number. Data is provided for cars registered after 2002. The objective is to help consumers in their decision to purchase new cars with lower emissions and consumption.

Table 6-6: Summary table on additional information provided in the car label

Type of information provided	Number of Member States	Member States
Fuel consumption for different drive cycles ²²	7	IE, DE, FR, BG, FI, SI, UK
Running costs (annual fuel costs)	6	UK, DK, DE, EE, FI, IE

¹⁹ Retail Motor Industry Federation (RMI), the Society of Motor Manufacturers and Traders (SMMT)

²⁰ http://www.lowcvc.org.uk/news,feature-the-used-car-fuel-economy-label-ndash-a-valuable-addition-to-the-used-car-dealersquos-toolbox_1559.htm

²¹ <http://autovertaamo.trafi.fi/etusivu/index?lang=en>

²² Typically covering three drive cycles: urban, extra-urban and combined

Type of information provided	Number of Member States	Member States
National taxation and financial penalties/rewards	5	UK, DK, DE, FI, IE
Noise information	3	AT, FI, NL
Alternative unit measuring fuel consumption	3	UK, ES, BG
Label on Vans	2	DK, ES
Air pollutant emissions (NO _x , HC, CO)	2	FI, SI
Information on electricity consumption of electric and hybrid vehicles	2	DE, UK
Label on second-hand vehicles	2	UK, FI (both voluntary)
Biofuel sustainability	2	AT, NL
Achieved CO ₂ reduction on the basis of used technologies	1	DK
Safety rating	1	DK
Vehicle weight and footprint	1	AT
Usability of different fuels	1	AT

Source: (AEA and TEPR, 2011) (Ecologic et al., 2010) and interviews with authorities

Overall, the picture presented in Sections 6.3.1-6.3.4 verifies earlier conclusions (AEA and TEPR, 2011) and the input from consumer organisations (ANEC and BEUC, 2014) and industry representatives that the implementation of the EU car label varies greatly among EU Member States.

6.4 Guide on fuel economy

In relation to the guide of fuel economy, the Directive requires that the following elements are included:

- List all new passenger car models available for purchase within the Member States on a yearly basis, grouped by makes in alphabetic order
- For each model, the fuel type, the numerical value of the official fuel consumption and the official specific emissions of CO₂ should be given
- Prominent listing of the 10 most fuel-efficient new passenger car models ranked in order of increasing specific emissions of CO₂ for each fuel type
- Advice to motorists that correct use and regular maintenance of the vehicle and driving behaviour
- An explanation of the effects of greenhouse gas emissions, potential climate change and the relevance of motor a reference to the Community's target for the average emissions of CO₂ from new passenger cars and the date of which the target should be achieved
- A reference to the Commission's guide on fuel economy and CO₂ emissions on the Internet (when available)

It is also required that guide be portable, compact and available free of charge to consumers upon request both at the point of sale and also from a designated body within each Member State.

Table 6-7: summarises the key features of the implementation of the requirements on the guide for fuel economy in 19 Member States for which information was available.

In general, the review of the national legislation suggests that all Member States have met the minimum requirements set in the Directive.

In terms of its availability, while the guidance is still available in hard copy and printed in thousands of copies to be made available to dealerships in some Member States, nowadays all Member States make them available online. Some of them (AT, IT, BE, EE, FI, NL, PT, SE, SK) provide exclusively electronic copies. In the UK hard copies are only provided on demand. In Austria the guidance has been provided to the dealerships electronically since 2003 and each dealership will print one copy to have in the showroom. The feedback that the Austrian authorities received from the dealerships is that although they comply with this requirement the hard copy of the guidebook is rarely used. In Denmark, where printed copies are still available, according to the national authority the number of copies printed in 2015 was 60,000, down from 100,000 reported in 2010 (AEA and TEPR, 2011). The UK authorities indicated that they used to print around 500,000 printed guides per year, whereas now they currently distribute only a small number (5,000) of printed guides, in addition to 80,000 CD ROMs.

Most Member States have nowadays created fully searchable online databases (AT, BE, DK, FI, FR, EE, ES, NL, SE and UK). This allows users to more easily find the vehicles they are searching for rather than searching through hard copies. These databases allow for detailed comparison of vehicles. The UK authorities reported that they have 3.5 million unique hits on the website each year while, according to the traffic authority, the online car comparison service has had an average of around 60,000 visits since it was revamped in October 2015. Other national authorities were not able to provide similar statistics on the level of use of the online databases.

Table 6-7: Summary of approach to the guide on fuel economy in Member States

MS	Hard copy available	Frequency of update	No of copies /year (most recent year)	Available from internet	Online database ²³	Additional information provided
AT	NO ²⁴	Quarterly	N/A	YES	YES	NO
BE	NO	Annually	N/A	YES	YES	NO
CZ	No info	Twice a year	No info	YES	NO	No info
DK	YES	Annually	60,000	YES	YES	YES

²³ Web-Links to online databases (correct as of April 2016):

AT: www.autoverbrauch.at ; BE: http://www.energivores.be/Intro_Car.aspx?lang=FR

DK: <http://bilviden.dk/>; EE: <http://www.mnt.ee/index.php?id=10626>; ES:

<http://coches.idae.es/portal/BaseDatos/MarcaModelo.aspx>; FR: <http://www.carlabelling.ademe.fr/> ;

FI: <http://autovertaamo.trafi.fi/etusivu/index?lang=en> ; DE: <http://www.pkw-label.de> ; PL:

<http://mib.gov.pl/2-warunki-techniczne.htm> ; NL: <https://www.rdw.nl/Particulier/Paginas/Zuinig-en-milieuvriendelijk-voertuig-kopen.aspx>; SE: www.bilsvar.se; UK: <http://carfueldata.direct.gov.uk/>.

²⁴ Provide to dealerships electronically and require them to print one hard copy

MS	Hard copy available	Frequency of update	No of copies /year (most recent year)	Available from internet	Online database ²³	Additional information provided
EE	NO	Annually	N/A	YES	YES	NO
FR	YES	Annually	30,000	YES	YES	YES
FI	NO	TBC	TBC	YES	YES	YES
DE	YES	Quarterly	300,000	YES	YES	YES
IE	YES	Annually	No info	Not at the moment	Under construction	NO
IT	NO	Annually	N/A	YES	NO	YES
HU	YES	Up to 6 times a year	No info	YES	No info	No info
LT	YES	Annually	No info	YES	NO	NO
PL	YES	Annually	TBC	YES	YES	NO
PT	NO	Annually	N/A	YES	No info	No info
NL	NO	Twice a year	NO	YES	YES	YES
RO	YES	Annually	3,000	NO	NO	NO
ES	YES	Monthly	No info	YES	YES	YES
SE	NO	Annually	N/A	YES	YES	YES
SK	NO	Annually	N/A	YES	NO	NO
UK	No - CD-ROM (Hard copy on request)	Quarterly	80,000 CD-ROMS, 5,000 hard copies	YES	YES	YES

Source: (AEA and TEPR, 2011), Ecologic et al (2010) and input from interviews and MS survey

In nine Member States, additional information to the minimum required is provided in the guides (see also Table 6-8 for details). Furthermore, the review of some of online databases and the input from entities responsible for their development suggest that some of these databases (e.g. FI) are intended to be linked to commercial sites and other platforms for car sales where consumers can get information on fuel consumption as well as other features (e.g. running costs, safety). Besides new car models, many of the databases also provide similar information for older car models (e.g. FI, DK, NL).

Table 6-8: Additional information provided in in the guide on fuel economy in Member States

Member State	Additional information provided
FI	- The Finnish Transport Safety Agency (TRAFI) has developed a fully searchable online database 'Car Comparison Service' (http://autovertaamo.trafi.fi/)

Member State	Additional information provided
	<p>that allows consumer to search cars (new and used) by various features (category, size, fuel, price, consumption, engine power, safety).</p> <ul style="list-style-type: none"> - Consumers can also extract information for the specific vehicle they own by using their registration number. - The next step is to link the site to third party and commercial internet sites where basic information on energy consumption and the label will be provided.
FR	<ul style="list-style-type: none"> - Summary of current legislation and initiatives that affect car owners - Importance of reducing CO₂ emissions by selecting more environmentally-friendly cars - How to keep cars well-maintained so as to reduce CO₂ emissions. - How to calculate annual running costs for 15,000km as well as the Bonus/Malus figures - Provision of comparisons to show how much more (Malus) the consumer would have to pay for a more polluting car, and how much bonus (rebate amount) would be taken off for final purchase price of the car due to more environment-friendly features.
DE	<ul style="list-style-type: none"> - The guide lists data on CO₂ emission and energy consumption of the vehicles listed and provides comparative context for: <ul style="list-style-type: none"> o consumption of natural gas or biogas o the power consumption of pure electric vehicles and hybrid electric vehicles for external recharge (for more details see below) - Monetary example to consumers about the potential savings due to increased fuel efficiency. - Graph depicting the amount of CO₂ emissions in Germany (for 2009) – where passenger vehicles contribute 12% of total CO₂ emissions. - Explanation about the CO₂ saving potential of the various fuel types.
DK	<ul style="list-style-type: none"> - The guide includes tips for driving more efficiently, information on the tyre label, Euro NCAP safety rating. - The Danish Transport and Construction Agency was developed a website (http://bilviden.dk/) providing consumers with additional information about vehicles. Consumers can search an extensive database of cars (both new and older models) for information about CO₂ emissions, fuel efficiency, running costs, taxes and safety. The website also contains a calculator which can be used to determine annual running costs.
ES	<ul style="list-style-type: none"> - Provision of information on alternative clean technology vehicles and fuel, including hybrids, fuel cell and electric cars; and natural gas, LPG and bioethanol - Database of detailed information and comparative information on fuel consumption and characteristics of new cars offered for sale in Spain
NL	<p>The guide includes instructions for driving more efficiently, information on the tyre label, information on taxes related to the car label.</p> <p>An online database developed by the Royal Dutch Touring Club (http://www.anwb.nl/auto/zoekvergelijk/zoekauto) helps consumers search an extensive database of cars (new and older models) for information about CO₂ emissions, fuel efficiency, running costs, taxes and safety.</p>
IT	<p>A set of 10 “eco-driving” rules for more efficient driving is included,</p>
PL	<p>The guide includes:</p> <ul style="list-style-type: none"> - The code of the product according to the national code of products (PKWiU). - The volume of the car engine - The car engine’s power - The Guide is issued in two versions:

Member State	Additional information provided
	<ul style="list-style-type: none"> ○ comparison of every vehicle model available for sale; ○ rating of 20 car models, which have the least emission of CO₂.
	- Rating is presented for three types of fuel: diesel, fuel, CNG gas.
SE	- The guide includes information about monthly running costs, safety.
UK	<ul style="list-style-type: none"> - The guide states that fuel consumption shall be expressed either in litres per 100 kilometres (l/100km) or kilometres per litre (km/l), and quoted to one decimal place, or, to the extent compatible with the provisions of Council Directive 80/181/EEC(a) in miles per gallon (units recognised in the UK) - Includes information providing background and context. Vehicle listings also include data on other air pollutants such as HC, CO, NO_x and particulates, as well as noise emissions.

Source: (AEA and TEPR, 2011) (Ecologic et al., 2010) and interviews with MS authorities

Overall, it can be said that while many Member States have simply met the minimum requirements related to the guide on fuel economy, a few have moved well beyond. They have developed online and dynamic databases aspiring to become reference points for consumers providing much more information than the limited required. Unfortunately, there are not data available of the level of the use of those databases by consumers, except for the UK.

6.5 Poster

In relation to the poster, the Directive requires that the following elements are included:

- Poster / display has a minimum size (70 cm × 50 cm); its information is easy to read
- Screen size of any electronic display has a minimum size (25 cm × 32 cm)
- Models grouped and listed separately by fuel type. Within each fuel type, models are ranked in order of increasing CO₂ emissions, with the model with the best fuel economy first
- For each model, the make, official fuel consumption and specific CO₂ emissions are given
- Poster / display contains a specified reference to the guide and states that this is available free of charge at any point
- Poster / display contains specified text that other factors also influence a car's CO₂ emissions / fuel consumption and that CO₂ is the main greenhouse gas responsible for global warming
- Poster is to be completely updated at least every six months
- Between updates, new cars are to be added to the bottom of the list
- Poster / display may be substituted completely and permanently by an electronic screen that attracts the awareness of the consumer at least with the same intensity as a poster / display

Based on the review of the national implementing legislation and the input from the Member States authorities all of them have transposed the minimum requirements but only very few (DE, UK) have gone beyond those in some way (see Table 6-9). In Germany, the poster is to be updated every 3 months, rather than the Directive requirement of 6 months. In the UK, it is required that "a poster shall show the date on which it was published and display the date on which its assembly was completed" (AEA and TEPR, 2011).

According to the monitoring report (AEA and TEPR, 2011), the posters used by Member States typically include the same information as the labels in each of the

Member States in a list format (as required by Annex III). Among the Member State authorities interviewed, (AT, DE, ES, IT, UK, and FR) the view is that the poster is the least relevant part of the Directive. As a result there are no plans in these Member States for additional activities beyond the minimum requirements. In some cases (DE, NL) the implementation of the poster-related requirements is left to car dealers, as long as the necessary information is provided (Ecologic et al., 2010).

Table 6-9 - Summary of information provided in the poster in Member States

Categorisation	Number of Member States	Member state
National legislations limited to minimum requirements	26	AT, BE, BG, CY, CZ, DK, EE, ES, EL, FI, FR, IE, IT, HR, HU, MT, NL, LT, LU, LV, PL, PT, RO, SE, SK, SI
Additional elements beyond minimum requirements	2	DE, UK

Source: (AEA and TEPR, 2011; Ecologic et al., 2010), desk research and input from authorities (interview and survey)

6.6 Promotional materials

In relation to the promotional material, the Directive requires that the following promotion material is provided:

- Information on CO₂ emissions and fuel consumption should be easy to read and no less prominent than the main part of the information provided in the promotional literature.
- Easy to understand even on superficial contact.
- Official fuel consumption data should be provided for all different car models to which the promotional material covers. If more than one model is specified then either the official fuel consumption data for all the models specified is included or the range between the worst and best fuel consumption is stated.
- If the promotional literature only contains reference to the make, and not to any particular model, then fuel consumption data need not be provided.

On the basis of our own review of the national legislations, as well as the 2011 monitoring report (AEA and TEPR, 2011) and the interviews conducted, all Member States appear to have met the minimum requirements of the Directive, most often by a verbatim adoption of the requirements set in Annex IV of the Directive.

Table 6-10: Summary of information in relation to the national legislation concerning promotional material in Member States

Categorisation	Number of Member States	Member state
National legislations limited to minimum	23	AT, BE, BG, CZ ²⁵ , CY, EE, EL, FI, FR, IE, IT, HR, HU, LT, LV, LU, RO, MT, PL, PT, SK, SE, UK

²⁵ The Czech law association in the Czech Republic filed a complaint in June 2009 relating to the incorrect transposition of Annex IV of the Directive into Czech national law. This aspect relates to the requirement that information should be "easy to read and no less prominent than the main part of the information provided in the promotional literature". (Ecologic et al., 2010). We have not been able to identify additional information in relation to this case. Our own review

Categorisation	Number of Member States	Member state
requirements		
Additional mandatory elements beyond minimum requirements	5	DK, DE, ES, NL, SI

Sources: (Ecologic et al., 2010), desk research and input from authorities (interview and survey)

A few countries have gone beyond the Directive requirements with respect to promotional materials – either by introducing additional requirements (DE, ES, DK, SI), developing an advertising code to promote best practice or developing guidance documents and mechanisms for pre-screening of the promotional material to ensure compliance (UK) (see also Table 6-11). In Sweden, the Swedish Consumer Agency also indicated that is planning to issue new restrictions on car advertisements, particularly in relation to environmental claims.

Table 6-11: Elements/activities beyond the minimum requirements

Member State	Elements/activities beyond the minimum requirements
Mandatory	
DK	Colour-coded arrow indicating the cars' energy class/es should also be included in advertisements (since 2010)
DE	Implemented Recommendation 2003/217/EC recommending that information on CO ₂ emissions is made available when cars are offered for sale or lease by electronic means
NL	'Advertising Code' (Reclamecode), containing a number of specific items relating to passenger cars. The Reclamecode specifies the minimum size of letters and of the space to be used for this information on fuel consumption and CO ₂ emissions.
ES	Implemented Recommendation 2003/217/EC recommending that information on CO ₂ emissions is made available when cars are offered for sale or lease by electronic means
SI	Recent (2014) amendment requires that: <ul style="list-style-type: none"> - information should not be written in small print (font size not specified) - Information on NO_x and PM is also provided - Requires that general information on the impacts of CO₂ emission to climate change and air pollutants to air quality is also provided in general brand advertising (not specific model)
Voluntary	

of the national legislation, suggests that the wording used is less specific than that included in the Directive (Annex IV).

Member State	Elements/activities beyond the minimum requirements
BE	Voluntary advertising code (the Febiac code 15) interpreting the regulation in more detail and specifies, for example, font sizes to be used in promotional materials.
FI	All sales people have been provided with training on interpreting the information on the label and using this information in discussions with customers
UK	Pre-publication screening process for promotional materials Guidance document on the requirements of the UK regulations has also been prepared including marketing and advertising representatives and those responsible for regulating advertising). The guidance provides examples of good (and bad) practice to assist enforcement authorities, as well as industry. Additional guidance has also been published regarding best practice principles for environmental claims in automotive marketing to consumers, by the Low Carbon Vehicle Partnership (LowCVP), SMMT and IBA.

Source: (AEA and TEPR, 2011; Ecologic et al., 2010) desk research and input from authorities (interview and survey)

6.7 Enforcement

In this section we present information on activities by enforcement authorities for the enforcement of the Directive. Our analysis focuses on the entities responsible for enforcement and the types of activities undertaken by each Member State.

The information presented here is based on input provided by national authorities during the interviews and desk research and the survey. In some cases, national authorities were not able to provide detailed information, since enforcement activities are often responsibility of other entities within the country.

6.7.1 Enforcement responsibility

Responsibility for enforcement of the national legislation implementing the Directive lies at different levels of government across the Member States (see also Annex E). Furthermore, in some countries, responsibility is shared among two or even more authorities.

In the UK, Germany, Italy, Ireland and Spain local/regional authorities are, at least in part, responsible for the enforcement of the legislation. In the UK, the Vehicle Certification Agency (VCA; an agency of the national Department for Transport) enforces the provisions relating to promotional materials, while Trading Standards officers (employees of local authorities) cover the fuel economy label, guide and poster. In Germany, enforcement of the national legislation is the responsibility of the regional governments (Bundesländer). The federal government has no executive responsibility, but does offer information and support with respect to issues of interpretation. In Italy the provincial authorities are responsible for monitoring the correct implementation of the law (Ecologic et al., 2010). In other Member States enforcement responsibility is at national level.

Table 6-12 – Level of responsibility for enforcing the Directive

Level of gov't	Number	Member States
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National	23	AT, BE, BG, CZ, CY, DK, EE, EL, FI, FR, HR, HU, LT, LV, LU, PL, PT, MT, NL, RO, SE, SK, SI
Regional/local	4	DE, IE, IT, ES
Shared	1	UK

Source: (Ecologic et al., 2010), desk research and interviews

6.7.2 Enforcement activities

Enforcement activities vary among Member States, both in terms of intensity as well as the focus on specific information sources (see Table 6-13).

During interviews with Member States, national competent authorities were asked about the actions that they take to monitor and enforce the Directive at the national level, including the number of inspections that are undertaken on an annual basis and the penalties that are involved. From the responses received, enforcement activities are generally limited. Denmark, France, Belgium, UK and Romania reported regular inspections of showrooms and dealerships while in other countries (e.g. SE, LT) investigations are usually in response to specific complaints made either by consumers or, usually, consumer/environmental organisations. In Germany, available data for 2014 (Deutsche Umwelthilfe, 2016) show that the approach varies among Bundesländer. 11 out of a total of 16 Bundesländer did not perform any enforcement activity in 2014 while 5 others had a regular showroom inspection program.

According to the Austrian authorities there are no enforcement activities. Since 2003 the national authority entered into a collaborative "spirit of the law" situation on the basis that the levels of compliance. The Spanish, Slovakian and Irish authorities also indicated that there is no programme of inspection in showrooms and dealerships. In Austria and Spain, the main focus is on promotion activities of the label with focus on the online database that is used by consumers to compare vehicles.

In Germany, enforcement activities tend to focus on the promotional materials, while in France the focus is on the display of the label in the showrooms with coordinated visits to dealerships at various intervals. The 2011 report indicated that in Germany the level of enforcement was rather limited. Relevant surveys among Länder (federal states) found that only few of them actively engaged in enforcement activities and some Länder had not named the institution responsible for enforcement. In the UK, enforcement activities in relation to the label consist of unannounced showroom visits, while the VCA reviews samples of promotional material and also responds to concerns raised by individual consumers and consumer groups.

Table 6-13 - Enforcement activities in Member States

MS	Enforcement approach	Focus of inspections	Frequency of inspections
AT	No active enforcement since 2003	No inspections	N/A
BE	Regular monitoring	Label/poster/Promotional material	30 inspections/ year
DK	Regular monitoring	All aspects	75 inspections/year
DE	Depending on the Bundesländer (varying from regular inspection to no inspections)	No info provided	No information

MS	Enforcement approach	Focus of inspections	Frequency of inspections
FR	Regular monitoring	All aspects	No information
LT	Investigation in response to specific complaints	No info provided	No information
NL	Regular monitoring initially – not any more	Visits to car dealers to see whether labels and posters are available.	No information
RO	Investigation in response to specific complaints + Regular monitoring every 2 years	No info provided	No information
SK	No active enforcement	No inspections	N/A
SE	Investigation in response to specific complaints	Showroom inspections for all relevant material & advertisers	Latest regular monitoring in 2012. The activity covered 21 showrooms with a total market share of 6 %)
UK	Regular monitoring	reviewing a range of publications and promotional literature	No information

Source: Desk research and input from national authorities (interviews and survey)

The analysis of the cost of enforcement activities for authorities are presented in Section 7.7.

6.7.3 Penalties for non-compliance

As for other aspects already analysed, there is a variety in the approaches adopted by Member States concerning penalties for non-compliance. In most Member States for which information was available²⁶, the fines for non-compliance - concerning not-provision of one of the information sources or provision of incorrect information- are in the range of a €500- €5,000. However, higher fines are also applicable (e.g. NL, SE) and there is often the possibility of criminal proceedings. On the other hand, in a number of Member States (DE, ES, UK) there are no specific fines provided in the text of the legislation, which are determined on a case by case basis. Furthermore, in some Member States (e.g. Austria) the national authorities indicated that penalties are not imposed in practice.

Table 6-14 – Penalties applicable for non-compliance

Member State	Penalties applicable
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²⁶ The penalties for non-compliance are not always provided in the national implementing legislation. There is often reference to the general consumer protection legislation or the criminal code and it was not always possible to extract it. A question on the penalties for actual fees was not included in the questionnaire to national authorities. The data presented is based primarily on desk research.

Member State	Penalties applicable
AT	Administrative fine of €200-€ 2,000 (in case of recurrence up to €4,000)
BE	Infringements punishable according to law on trade practices and consumer protection
DK	Infringements punishable according to criminal code Penalty for not displaying the label: ca. € 340
EE	Infringements punishable on the basis of consumer protection law : €100 (individuals) and €2,600 for legal persons
FR	No specific fine provided in legislation
DE	No specific fine provided in legislation – court decisions
EL	€293- €2,930
IE	Up to €1,269 thereafter, or imprisonment for up to six months, or, combination of the two
IT	€250 - €1,000
LU	No info (fines applicable are those that apply to environmental pollution in general)
MT	€1,164- €2,332
NL	6 months detention or a fine of €18,500
PT	Administrative fine of €498-3740 (individuals) €2,493- €4,4891 (legal persons) and possible criminal procedures
SI	€4,000 - €40,000 to suppliers (legal persons) €3,000- €35,000 to sole traders €1,200- €4,100 to the person responsible within legal person
ES	Fines applicable to violations of consumer protection legislation – determined on a case by case basis
SE	€10,000 - €20,000
UK	Penalties for breaching the regulations are considered on a case-by-case basis

Sources: Desk research and Ecologic et al. (2010)

6.8 Compliance levels

There is rather limited information regarding compliance levels and the data tend to be rather patchy. Our analysis is based on a combination of sources, including the input from national authorities (interviews and survey) and earlier studies. More detailed information on the level of compliance reported in the case study countries is provided in Annex F.

Overall, the input from national authorities seems to suggest medium to high (50-90%) levels of compliance for the label, poster and guide in most countries (except Sweden where the reported compliance was less than 50%) but less so for the promotional material (Table 6-15 – Level of compliance according to input from national authorities (most recent data reported)). This level of compliance with the requirement to display the label is not dissimilar to those reported for the EU Energy Labelling Directive (Ecofys, et al., 2014). According to the study, some 20% of products are estimated to be offered for sale without the energy labels properly

displayed and some 15% of products are estimated to have the label displayed in an insufficient way (wrong placement, retailer made label, label hidden or covered).

In relation to the promotional material, the main issue reported concerns the clarity and prominence of the information provided. In Germany, a 2009 study by Friends of the Earth (an environmental NGO) found levels of compliance below 20% with CO₂ information missing or being smaller than the main information (AEA and TEPR, 2011). In Italy, a more recent study (2016) found that only 22% of adverts explicitly reported the model of the car to which the data referred (Scopa P., 2016). Non-compliance with the requirements for promotional material was also the reason for three official complaints for non-enforcement of the Directive lodged by NGOs in Belgium, Spain and Italy against the national authorities. The complaints were based on a review of many advertisements that did not include the official fuel consumption or the official CO₂ emission data of the car advertised. This also points to the lack of clarity of the relevant legal provisions which affects implementation and enforcement activities (see below).

Table 6-15 – Level of compliance according to input from national authorities (most recent data reported)

MS	Compliance levels reported ²⁷	Source	Violations reported
AT	Estimated compliance close to 100%	Interview	No info
BE	Medium to high - Label (85 %) - Poster (74%)	MS survey	No poster in the point of sale
CZ	>90%	(Ecologic al., 2010) et	missing labels, or absence of specific obligatory text on labels, such as numerical CO ₂ emissions and fuel consumption information
DE	Overall : 70% Label: 61-95%, Poster: 52-90%, Guide: 89-86%. promotional material: 8-14%	(AEA and TEPR, 2011) and (Deutsche Umwelthilfe, 2016)	CO ₂ information missing in 28% of adverts and 92% of billboards not including the fuel consumption and CO ₂ information
FR	Label: 83% -90% Poster: 90% Promotional material: 7%	Interview and (AEA and TEPR, 2011)	posters at points of sale not visible enough or updated on a regular basis
FI	75-95%	MS survey	Some newspaper advertisements include no consumption or emissions information
IT	81%	Interview	Adverts do not explicitly report the model of the car to which the CO ₂ /fuel consumption data refer
ES	90%	(AEA and TEPR, 2011)	No info

²⁷ Responders were asked to select among the following options: Low (<50%), Medium (50-75%), high (75-95%), Very high (>95%)

DK	75-95%	MS survey	Label missing from some vehicles in showroom
LT	50-75%	MS survey	No info
NL	>95%	MS survey	No info
PL	High specified)	(not (Ecologic al., 2010) et	No info
RO	75-95%	MS survey	No label/No guide/No poster
SK	>95%	MS survey	No info
SE	<50%	MS survey	CO ₂ /fuel consumption data not reported in advertisement. If reported, the size of the text too small. In showrooms wording of the posters follows the nomenclature of individual manufacturer. The posters were missing or hidden in the showroom
UK	>90% for label Lower for other sources	Interviews, (AEA and TEPR, 2011) and (Wallis, 2011),	less than half of showrooms display the poster prominently

Source: Desk research and input from national authorities (interviews and survey where available)

The relatively high levels of compliance with the label requirements are often linked with the higher level of awareness for the label and the fact that consumers expect to see the label on vehicles in the showrooms. Furthermore, the connection with financial instruments also plays a role. For example, France has linked its label to the Bonus Malus scheme, where vehicles are either taxed or awarded a 'bonus' when first purchased depending on CO₂ emissions of the vehicle. Due to this link, compliance tends to be high as consumers require this information when purchasing a vehicle. Similar linkage with tax schemes apply – in different degree- in Denmark and Finland.

In the case of Austria, the fact that manufacturers could be excluded from including their vehicle portfolio information from national database websites if they fail to submit annual information on time is also a reason. As consumers use the website regularly to compare vehicles prior to purchase, the excluded manufacture would be at a disadvantage, so they comply willingly.

In other cases (e.g. DK), high levels of compliance are linked (according to the industry association) with the high frequency of checks, particularly for those that have not complied in the past. It was also stated that the sizeable penalties also play a role. However, we should note that the applicable penalty in Denmark (2,500 kr. Penalty (ca. EUR 335), is among the lowest (see Section 6.7.3).

The rather strict monitoring approach adopted in Denmark does not seem to be followed more broadly in the EU, and the actual number of legal proceedings is rather low. The 2010 report to the European Parliament (Ecologic et al., 2010) had identified legal national action for infringements in a number of countries, including seven fines in the Czech Republic (based on a 2007 compliance survey), 16 cases that involved court proceedings in France (based on a 2005 survey) and 17 sets of legal proceedings in Germany (between 2006 and March 2010). As indicated in the report, the approach followed when non-compliance is identified is for notice to be provided and the violation to be subsequently corrected. The input from our own survey of national authorities pointed to only one infringement case in Belgium, in 2013. In addition, according to the German authorities and the German vehicle dealers association, a number of legal proceedings have resulted in fines of multiple million Euros following legal action taken by NGOs for non-compliance with label and promotional material requirements (see also Section 7.8.2).

7 ANSWERS TO THE EVALUATION QUESTIONS

This section sets out in turn, analysis for each of the evaluation questions presented under the general evaluation headings of relevance, effectiveness, efficiency, coherence and EU-added value.

7.1 Relevance (EQ1): To what extent do the (current) objectives of the Directive still respond to the needs in the EU considering current and expected technical, environmental and economic challenges?

7.1.1 Introduction

The evaluation of “relevance” aimed to assess whether the objectives of the Directive were (and will remain) relevant to the needs, problems and issues that led to the Directive being introduced. Drawing on the intervention logic in Figure 1-1, the evaluation of “relevance” needed to evaluate whether there was, is still and will continue to be a need to:

- Reduce GHG emissions from all sources, and those of the transport sector in particular;
- Reduce the CO₂ emissions and improve the fuel efficiency of new passenger cars; and
- Make information relating to the fuel economy and CO₂ emissions of new passenger cars available to consumers in order to enable consumers to make an informed choice.

As the Directive does not act in isolation, the evaluation also took account of relevant technical, environmental and economic challenges that exist, or might be expected to influence, the above needs. This also needed to take account of whether any new challenges have emerged, and whether any of the original needs have become less important.

7.1.2 Analysis

It is clear that there was and will continue to be **a need to reduce GHG emissions from all sources, and those of the transport sector in particular**. The Intergovernmental Panel on Climate Change (IPCC) was set up in 1988 and regularly reviews the scientific evidence for climate change and the need (or otherwise) to reduce GHG emissions. The United Nations Framework Convention on Climate Change (UNFCCC) was set up in response to the IPCC’s first assessment report, which was released in 1990, with the aim of setting a framework for global action to reduce GHG emissions (UNFCCC, 2015). This was the context in which the original 1995 Community strategy for reducing CO₂ from passenger cars (European Commission, 1995), which proposed the introduction of a fuel efficiency label for cars, was developed. Hence, EU action on passenger car CO₂, including the label required by Directive 1999/94, is clearly designed to address concerns about climate change that were present in the 1990s.

The IPCC’s most recent assessment of the evidence for climate change underlined that there is still a need to reduce GHG emissions, calling for “substantial and sustained reductions” as a result of more conclusive evidence that climate change is the result of increased concentrations of GHGs resulting from human activity (IPPC, 2013). This need was recognised politically in the Paris Agreement that was adopted in late 2015 (UNFCCC COP, 2015). In response to the evidence of the need to reduce GHG emissions, the European Commission set out a framework for action in its Low Carbon Roadmap to reduce the EU’s GHG emissions to at least 80% of 1990 levels by 2050 (European Commission, 2011a). In relation to transport, (IPPC, 2014) called for

“aggressive and sustained” mitigation policies to prevent transport’s GHG emissions globally from continuing to increase, let alone to decrease these. The Commission’s Low Carbon Roadmap concluded that the EU’s transport sector could deliver cost-effective GHG emission reductions of between 54% and 67% by 2050 (compared to 1990 levels) (European Commission, 2011a). The Commission’s 2011 Transport White Paper (European Commission, 2011b) took as its starting point the need to reduce transport’s GHG reductions by 60% by 2050 (compared to 1990 levels), which was the mid-point in the range of cost effective GHG reductions from transport identified by the Low Carbon Roadmap. More recently, both the 2030 Climate and Energy Policy Framework (European Commission, 2014c) and Energy Union Package (European Commission, 2015a) highlight the need to take further action to decarbonise the economy more generally, and to decarbonise transport in particular.

Work that has identified the potential implications for transport of delivering such GHG emissions reductions has concluded that there is **a need to reduce the CO₂ emissions and improve the fuel efficiency of passenger cars**, which is the information that is required to be communicated to consumers by the Car Labelling Directive. The preferred option for reducing transport’s GHG emissions that was identified in the Impact Assessment that accompanied the Commission’s 2011 White Paper required that CO₂ emissions from new passenger cars would be 20 g/km by 2050, which is just over a fifth of the EU’s target for 2021 of 95 g/km (European Commission, 2011c). In a report that explored the implications of the Transport White Paper’s GHG reduction target for different modes of transport and potential policy options, (Ricardo-AEA, TEPR and CE Delft, 2012) concluded that reductions in lifecycle CO₂ emissions of around 80% for cars would be needed by 2050. In order to deliver the levels of reduction required, there would also need to be improvements in vehicle efficiency for all of the other modes of transport, measures to decarbonise fuels and energy sources and actions to improve the operational efficiency of all modes.

The evidence also suggests that there is still **a need to make information relating to the fuel economy and CO₂ emissions of new passenger cars available to consumers in order to enable consumers to make an informed choice**. On balance it can be at least concluded that consumers are not using the information that they have as much as they could and that improved information would be useful. The Commission’s 1995 passenger car CO₂ strategy noted that the provision of information to consumers would enhance the effectiveness of CO₂-based vehicle taxation, which the strategy also advocated, and that standardised lifetime fuel cost information would also be useful to consumers. It did not explicitly provide evidence that there was a need to make information on fuel economy and CO₂ emissions available to consumers. The original proposal that led to the eventual Car Labelling Directive also did not provide evidence of a need to provide such information to consumers, but did note that information would help potential purchasers distinguish between cars in the same model range that had significant differences in fuel economy (European Commission, 1998). In its evaluation of the Directive, ADAC (2005) noted that Member States (in their respective implementation reports on the Directive) had reported that awareness of fuel economy and environmental issues relating to new cars was low, although this was growing as a result of increasing awareness about climate change. CO₂

Various EU barometer surveys have asked relevant questions about the behaviour that EU citizens have taken, or believe their compatriots should take, to reduce their impact on the environment or their contribution to climate change. When asked about the top three actions that people in their country should take in their daily lives to protect the environment, in 2014 only 13% of EU citizens included replacing their car with a more energy efficient one (even if it was more expensive), which was down from 16% in 2007 (European Commission, 2014a; 2008a). When asked about the actions that they had personally taken to address climate change, in 2013 only 11% of those surveyed said that the low fuel consumption of a new car was an important

factor in their choice, which was down from the 20% in 2009 that purchased a car that consumed less fuel (European Commission, 2013a; 2009). In 2013, more than three times as many people - 34% - took account of energy efficiency when buying new household appliances than when buying new cars (European Commission, 2013a), which might suggest that the EU Energy Label has been more effective than the car label in raising awareness.

A lot of the recent work on consumer awareness of cars' CO₂ emissions has been undertaken in the context of improving the design of the label required by the Car Labelling Directive. On the basis of their literature review, Codagnone *et al* (2013) concluded that consumers generally considered themselves to be aware of the environmental impacts of cars and to consider fuel economy to be important, but that this awareness often did not translate into the purchase of cleaner, more efficient vehicles. This is consistent with earlier research that suggested that a car's CO₂ emissions has little influence on car choice and that while environmental issues were important to consumers, other factors were more important to car buyers at the point of purchase (Lane & Banks, 2010) (IEEP, ABRL and COWI, 2006). Given that various reports, such as ADAC (2005), Ecologic *et al* (2010), AEA *et al* (2011) and Codagnone *et al* (2013), have all made similar proposals about the need to amend the way in which the Directive requires information to be presented to consumers, which implies that all consider that it is still important to make this information available. Consequently, it could be concluded that there is a need to reword the initial statement: there is a need to make information relating to the fuel economy and CO₂ emissions of new passenger cars available to consumers *in a way that best facilitates its use in enabling* consumers to make an informed choice. The EU level stakeholders that were interviewed for this report generally agreed that there was still a need to make information on fuel economy and CO₂ emissions available to consumers, as did a majority of organisations and authorities that responded to the online consultation (excluding those based in Germany; see Annex B, Section B.3.17). .

There are a number of technical, environmental and economic challenges that have implications for improving the fuel efficiency of passenger cars, and therefore potentially for the provision of information on fuel efficiency, that need to be mentioned. These have already been identified as external factors that influence the intervention logic (see Section 3.2.3), but will be discussed here in relation to their impact or otherwise on the relevance of the Directive's objectives. These issues are:

- Discrepancy between test cycle and real-world CO₂ emissions;
- Increasing number of alternatively-fuelled cars on the market, with the result that lifecycle GHG and embedded GHG emissions are increasing in importance;
- The ongoing air quality problem in many urban areas in the EU; and
- The increased use of the internet as a source of information.

As noted in Section 3.2.3, there is evidence of an **increasing discrepancy between real world and test cycle CO₂ emissions and fuel efficiency**. The implication of this for the Directive is that the information that is included in the various means of communication required by the Directive is increasingly less representative of the fuel efficiency that a driver experiences when using the car. As mentioned in Section 3.1, action is being taken that will address some of the main reasons for this discrepancy, including changing the test cycle on which CO₂ emissions and fuel efficiency are measured. Once introduced, the new test cycle will decrease the gap between real world and test cycle emissions. This will make the information on the label more relevant to consumers and so help to avoid undermining consumer confidence

The **increasing number of alternatively-fuelled cars on the market** poses a challenge to the Directive, as currently the Directive does not prescribe information requirements for such vehicles. Consequently, the Directive is not as relevant to potential purchasers of such vehicles as it should be.

The **ongoing air quality problem in many urban areas in the EU** is at least partially due to the fact that the real world emissions of the oxides of nitrogen (NO_x) are higher than those measured on the test cycle. This is a similar issue to that mentioned above with respect to CO₂ emissions, although the causes for the discrepancies are not the same. The relationship between poor air quality and the cars that people buy has led to calls for more, and more accurate, information on pollutant emissions to be communicated to consumers to enable them to make decisions that benefit their local environment. The inclusion of such information on the label would effectively imply an expansion of the objective of the label, and therefore of the needs that the Directive was developed to address. It is also worth noting that in some Member States, other initiatives are making more comprehensive environmental information available to consumers, e.g. the Ecoscore system in Belgium²⁸.

The final technical issue of relevance here is the **increased use of the internet as a source of information**. This will be covered in more detail in Section 7.2, as it is an issue that is currently not covered by the Directive, but which has the potential to bring added value.

While some of these issues risk undermining the credibility of the information on fuel economy and CO₂ emissions provided by the label, their existence does not undermine the need to reduce GHG emissions from, and to improve the fuel efficiency of, passenger cars or the need to make the information available to consumers. Indeed, the fact that consumers have not been provided with sufficiently accurate information on fuel efficiency and CO₂ emissions to date reinforces the need to make accurate information on the fuel efficiency and CO₂ emissions of cars available to consumers.

7.1.3 Conclusions

As a result of the analysis in this section, it can be concluded that the current objectives of the Directive have responded, and will continue to respond, to the wider needs in the EU. This conclusion is unambiguous with respect to the need to continue to reduce GHG emissions economy-wide and from the transport sector, as well as the need to reduce the CO₂ emissions and improve the fuel efficiency of new passenger cars.

It can also be concluded that there is still a need to make information on fuel economy and CO₂ emissions available to consumers in order to make informed choices. Indeed, given the fact that the information provided is not currently an accurate representation of what happens in the real world, and also the absence of information in relation to alternatively-fuelled cars, the importance of accurate information is arguably more urgent than ever. In this respect, the need might be amended to: there is a need to make *accurate* information available to consumers *in a way that best facilitates its use in enabling* consumers to make an informed choice.

7.2 Relevance (EQ2): What, if any, technological, economic, or administrative issues exist that are not covered by the existing legislation which could be introduced in view of their potential added value?

7.2.1 Introduction

The aim of this question was to identify whether there were issues that were not covered by the Directive, the inclusion of which might bring added value. The approach to answering this question was to draw on the evidence identified, and any

²⁸ <http://ecoscore.be>

comments received, that suggested that there were gaps in the Directive that would bring added value if addressed.

7.2.2 Analysis

As noted in Section 3 the requirements of the Directive are not very prescriptive, not least in relation to how the information on CO₂ emissions and fuel economy should be presented. As noted elsewhere, there have been four reports for the European institutions relating to the Directive: three reviews of the effectiveness or implementation of the Directive (ADAC, 2005); Ecologic *et al.*, 2010; AEA *et al.*, 2011); and one testing consumer responses to different potential designs (Codagnone *et al.*, 2013). The first three of these made recommendations to improve the design of the label in particular, while Codagnone *et al.* (2013) tested some of these proposals with consumers. Rather than discuss all of these recommendations in detail, this section will discuss those issues where there seems to be a clear added value, based on evidence from these and other reports.

The first issue that is not currently covered by the Directive, but which could add value would be a **greater specification of some of the elements of the design of the label**. The three reviews for the European institutions all recommended that the design of the car label be harmonised across the EU and that it should reflect the design of the EU Energy Label, which is the format that has been adopted in eleven Member States (see Section 6.3.1).. In other words, that the car label should contain colour-coded categories labelled A to G. A similar recommendation has been made by ANEC and BEUC (see Carroll *et al.* (2014)). This is consistent with Codagnone *et al.*'s (2013) observation that familiarity and trust in the label are important: as the EU Energy Label has been in use for many years, it will be familiar to consumers. In their tests, Codagnone *et al.* concluded that graphic colour-based ratings were more relevant to consumers, which is also consistent with Ecologic *et al.* (2010)'s observation from the literature that research on consumer behaviour suggests that consumers respond well to information when it is provided in a hierarchical format, such as the EU Energy Label. In a review of the experience with energy labels globally, Egan and Waide (2005) also noted that consumers can be strongly influenced by colour and understand comparative labels better than technical information. Hence, basing the car label on the design of the EU Energy Label would appear to bring added value.

Another issue that appears to have potential to bring added value if it were covered by the Directive is the **inclusion of information on running costs on the label**. This was recommended by all three of the reviews for the European institutions and by ANEC and BEUC (Carroll *et al.*, 2014), as well as by Codagnone *et al.* (2013) on the basis of their work with consumers. Information on running costs has also already been included in various Member State labels (see Section 6.3.1). The rationale for the inclusion of running costs is that these are generally more relevant to consumers than environmental information and were generally considered to be more important to consumers when buying a car (Lane, *et al.*, 2012; IEEP, ABRL and COWI, 2006). The mandatory inclusion of **information on vehicle taxation**, as proposed by some of the previous reports (ADAC, 2005); AEA *et al.*, 2011; ANEC and BEUC, 2014) would appear to be a logical step to accompany the inclusion of running costs, but was not suggested by Codagnone *et al.* (2013) on the basis of their work with consumers. In a review and evaluation of car labels around the world, the majority outside of Europe, Yang *et al.* (2015) concluded that linking a car fuel efficiency label to a financial cost or benefit, including running costs and fiscal information, could be considered to be good practice. Consequently, requiring information on running costs and vehicle taxation, where appropriate, has the potential to bring added value.

While the introduction of these elements in the Directive would increase the extent of harmonisation, particularly with respect to the label, more recent reports **have**

underlined that there should not be complete harmonisation across the EU (AEA *et al*, 2011; ANEC and BEUC, 2014). This conclusion is consistent with a wider review of energy labelling that concluded that the most appropriate design of a label will depend on local cultural factors (Egan & Waide, 2005). Within the EU, this should logically cover issues such as the use of country-specific languages and the use of metrics and information (e.g. to determine running costs) that are relevant to the respective national circumstances. The various reports were not in agreement with respect to extent of harmonisation of other elements, such as how to define the label's categories and the extent to which these should be defined at the EU or national levels.

Many of the EU level stakeholders interviewed for this report supported the greater specification – i.e. more harmonisation across Member States – of some elements of the Directive, as did various respondents to the public online consultation (see Annex B, Section B.3.8). Several of these stakeholders argued that the lack of a specification of the format of the label was a problem, as was the omission of information that is more relevant to consumers, such as running costs and vehicle taxation. Several online respondents noted that more harmonisation would reduce administrative costs (see Section 7.9). Stakeholders varied in their views as to the extent of the harmonisation needed to bring added value to the Directive: some argued for a common approach to the definition of the categories on the label, while others were less clear as to the extent of the harmonisation needed. Many national representatives also supported some level of harmonisation of the requirements of the Directive, as long as this was not too prescriptive. On the other hand, a couple of national stakeholders noted that in practice it might be difficult to reach an agreement on a common approach, partially as a result of the costs that have gone into developing the different national schemes.

The need to provide accurate information to consumers, as discussed in Section 7.1.2, also underlines the **importance of addressing the discrepancy between test cycle and real world information** through the introduction of the WLTP (as discussed in Section 3.1). The discrepancy was a cause for concern amongst several stakeholders, particularly those representing consumers and national organisations. It was also highlighted that the transition to the WLTP will increase the amount of data on CO₂ emissions that is available for each car, so that it was important to reach an agreement on what data should be communicated to consumers in order to avoid further confusion.

The inclusion of a **common approach to the presentation and calculation of information relating to cars using alternative powertrains**, i.e. electricity, plug-in hybrids and hydrogen fuel cells, also has the potential to bring added value as it is important to provide consumers with accurate information about such vehicles (see Section 7.1.2). In 2014, only 0.8% of new car registrations in the EU used these powertrains, and so currently, only a relatively small number of cars are affected by this issue (EEA, 2015). It can be anticipated that the proportion of the new car fleet that uses electricity (including plug-in hybrid vehicles) and hydrogen will increase in the future. For example, in their core reduction scenario that was consistent with the Transport White Paper 60% reduction target, (AEA and TEPR, 2011) assumed that around 25% of the new car fleet might be plug-in hybrid, electric or hydrogen by 2030, rising to 70% by 2050. The importance of providing meaningful and comparable information for alternatively-fuelled vehicles on car efficiency labels was also highlighted by Yang *et al* (2015). Several industry representatives and national stakeholders underlined the importance of providing appropriate information for such vehicles.

As noted in Section 7.1.2, there are **ongoing air quality problems in many urban areas**, in response to which there have been calls for the inclusion of information on air pollutant emissions on the car label. A number of national stakeholders in

particular called for the inclusion of information on air pollutant emissions to be included on the label, although others thought that there was a risk that the label would be less clear if more information of this type was added.

Finally the fact that the **internet is now the primary source of information for new car buyers** was noted as an issue that would bring added value if covered by the Directive. The extension of the Directive to cover the internet was proposed in many of the reports that have evaluated the Directive to date (AEA and TEPR, 2011; ANEC and BEUC, 2014; Ecologic et al., 2010). Research in the UK has suggested that, even in 2010, the internet was the most common source of information for potential car buyers (Lane and Banks, 2010). Yang *et al* (2015) recommend that information on vehicle fuel efficiency be provided on a user-friendly website and be required on promotional material online. The fact that the internet is now the primary source of information for new car buyers has different implications for the different elements of the Directive (see 7.4). The importance of including relevant information on the internet was highlighted by various stakeholders, particularly those representing consumers and national organisations.

7.2.3 Conclusions

This section has identified a number of issues that are not currently covered by Directive, but which have been identified in the literature and by stakeholders as having the potential to bring added value if introduced into the Directive. These issues will be discussed in further detail in later sections, particularly in Section 7.5.

7.3 Effectiveness (EQ3) - What have been the (qualitative and quantitative) effects of the intervention?

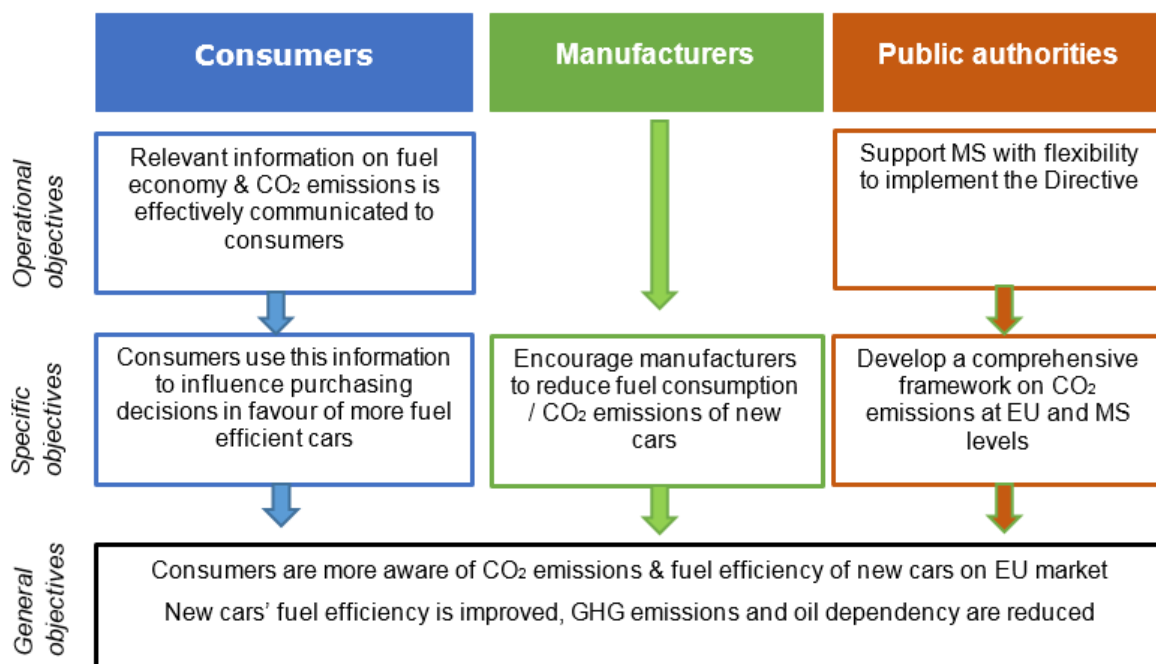
7.3.1 Introduction

In order to fulfil its objectives, the Directive needs to influence the actions and behaviours of three broad groups of stakeholders:

- Consumers on the demand side of the market;
- Manufacturers on the supply side; and
- Public authorities, who shape the policy and regulatory framework in which market agents operate.

These actions were described for each group in the causal chain (see Section 3.2.2). Since the evaluation of “effectiveness” refers to the objectives of the Directive, the actions in the causal chain are mapped and analysed against each of the relevant objectives for each group, building on the intervention logic developed in Section 3.2. This is summarised in Figure 7-1.

Figure 7-1: Overview of linkages between influences on stakeholder groups and the objectives of the Directive



A key source of information for the analysis of this Evaluation Question was the case studies (see Annex F in separate document), as well as literature review and input from stakeholders via the consultation exercises.

7.3.2 Analysis

7.3.2.1 Impacts on consumers

As explained in Section 3.2.2, the underlying causal chain for the Directive postulates that as a result of the Directive, consumers will have better access to and understanding of new cars CO₂ emissions and that this knowledge will enable them to integrate fuel efficiency and environmental considerations in their purchasing decisions. This in turn will lead to an increase in the purchase of less polluting cars and ultimately lower CO₂ emissions from road transport.

This section reviews whether the five key steps have actually taken place as a result of the Directive, namely:

- 1) Relevant information on fuel economy and CO₂ emissions of all new cars is provided to consumers;
- 2) Consumers see and read the information;
- 3) Consumers understand the information;
- 4) The information is used to inform purchasing decisions leading to increased purchases of cars with lower CO₂ emissions;
- 5) Average level of fuel consumption and CO₂ emissions from passenger cars is reduced.

Step 1: Relevant information on fuel economy and CO₂ emissions of all new cars is provided to consumers

The first aspect of ensuring that consumers are able to see the information on fuel economy and CO₂ emissions, at least in principle, is to ensure that the information is provided as required in the Directive. Section 6 on the implementation of the Directive showed that all Member States have transposed the Directive into their

national legislation. All information instruments (labels, guide, poster/displays and promotional materials) have been introduced, although there are differences in design, information formatting and content.

Section 6 also reviewed the actual level of compliance in the field. It found that compliance with the requirement to display the labels was generally high (>75% compliance reported in all but two²⁹ of the countries for which data are available). For the other informational elements (poster, guide, promotional materials), the evidence was much sparser. The limited data available suggests however that compliance with the requirements for the poster/displays and the guide is at a similar level as for the labels, whereas compliance with the requirements for promotional literature shows more variation, with very low numbers reported across a number of European countries according to a study in 2009 carried out by Friends of the Earth (an environmental NGO). The extent to which the compliance levels would still be low in 2016 is not clear, since up-to-date compliance figures were generally not available.

The review of compliance therefore suggests that in principle, for most of the countries for which data are available, consumers should be able to see the relevant information provided via multiple channels including the label, poster and guides. This in turn implies that the first step of the causal chain is working well.

Step 2: Consumers see and read the information

The second aspect to analyse is the extent to which consumers actually see and read the information. The case studies (see Annex F) included a section that focussed on analysing the level of consumer awareness. This indicates whether or not consumers have seen the information in practice (even if they have not paid particular attention to the details).

A 2013 survey of 8,000 consumers across 10 countries³⁰ found that there was moderate familiarity with existing car labels. Around half of respondents (49%) reported not being familiar with car labels³¹, 44.5% agreed that car labels in particular were unfamiliar to them³² while 40% disagreed with the statement that they are easily recognisable³³. (Codagnone et al, 2013).

Evidence at a national level comes from the case study countries. The level of consumer awareness is more difficult to assess comprehensively for all countries because it generally requires dedicated consumer surveys to be carried out on new car purchasers, and this is not typically part of routine national monitoring. The available data was collated on the basis of national consumer surveys where possible, or using estimations from national stakeholders where actual surveys were not available (summarised in Table 7-1). This shows that, according to estimates from national stakeholders in France, the UK, Denmark, the Netherlands and Austria, there is generally a high (>75%) level of recognition of the label among consumers. Conversely, a lower indication (<25%) was received for Poland. The interviewee

²⁹ Lower compliance of 50-75% in LT and less than 50% in SE according to responses from national authorities. 15 countries in total for which data are available.

³⁰ BE, DE, FR, IT, NL, PL, RO, ED, SE, UK

³¹ 26.5% totally disagreed and 22.5% somewhat disagreed with the statement: "I am familiar with car labels".

³² 24.6% totally agreed and 19.9% somewhat agreed with the statement: "I am unfamiliar with car labels".

³³ 19.6% totally disagreed and 19.8% somewhat disagreed with the statement: "car labels are easily recognizable for me".

explained that they felt the level of awareness in Poland is low because there are no tools or programmes to promote the label in Poland.

Table 7-1: Evidence regarding the percentage of consumers that recognise the labels

MS	Consumer surveys (where available)	Estimates gathered from interviews (referring to 2015/2016)		
		National authority	Consumer association	Industry association
UK	36% (2006) 37% (2007) 41% (2008) 49% (2009)	65%	75-100%	n/a
AT	n/a	75-100%	n/a	75-100%
PL	n/a	n/a	n/a	<25%
DK	n/a	n/a	n/a	75-100%
FR	67% (2011)	75-100%	n/a	n/a
DE	25% (2012) 35% (2014) 57% (2015)	n/a	n/a	n/a
NL	n/a	80%	75-100%	

Source: case study analysis – see Annex F for full details and references

Table 7-1 also provides some historical trends in the UK and Germany from surveys in multiple years, which clearly show that there has been a gradual and continuous growth in consumer awareness over the years since the introduction of the label (respectively in 2004 and 2012). The results in both countries suggest an increase in the level of awareness over time- particularly in Germany, even if there is a sizeable share (more than 40%) of consumers that were still unaware of the labels. This suggests that promoting awareness is a gradual process taking many years. The available data for Germany also provide support to the view that the much more visible and broadly recognised EU energy label is more effective in increasing awareness. The level of consumer awareness more than doubled since the adoption of the EU energy label format in Germany in 2011.

Evidence for consumer recognition and awareness of the poster was generally only available on the basis of stakeholder estimates gathered during the interviews – no formal studies could be located. The comments received during interviews with national stakeholders unanimously agreed that recognition of the poster was generally low, including comments from representatives of national ministries (DE, FR, NL, AT), industry (DE, NL, AT) and consumer associations (DE).

Although comments from stakeholders cannot usually be interpreted as concrete evidence on their own, the unanimous agreement among stakeholders from both industry, government and consumer organisations, in combination with the breadth of countries included, seems to suggest that there is limited recognition of the poster.

Similarly, there seems to be broad agreement among stakeholders interviewed that the guide in its paper format is not widely recognised among consumers, largely due to its format (whereas online versions are more widely used). For instance, the national authorities in Austria remarked during an interview conducted for this study that the online version of the guide is more frequently used compared to the printed version. This seems to coincide with details provided by the UK authorities, who

reported that there are 3.5 million unique visits to the website tool (online version of the guide), whereas they distribute only 80,000 copies of the CD-ROM version of the guide and 5,000 printed versions. The interviewees from a German national consumer organisation and the German ministry agreed that the printed guide was not particularly effective and demand was low. The representative of the French Ministry and ADEME agreed that the guide is becoming redundant as consumers find their information elsewhere. Similar comments were received from EU-level organisations during the interviews, including consumer associations and NGOs.

The above conclusions that the poster and printed guide are not well-recognised by consumers is also supported by the results of the public consultation. It should be noted that the respondents to the public consultation cannot be considered representative of the general population, as they were relatively few in number and are likely have a higher than average interest and awareness of the Directive. Nevertheless, in terms of the *relative* awareness among the respondents, the results suggest that awareness of the label is highest, while awareness of the poster and guide is substantially lower. For instance, regarding the poster, stated awareness for EU citizens was 12 percentage points lower compared to the label, and for the guide it was 34 percentage points lower. When asked more specifically about their most recent car purchase, the share of EU citizens indicating that they recall seeing the information provided was 19 percentage points lower for the poster compared to the label, and 28 percentage points lower for the guide compared to the label. This indicates that, even among consumers that are likely to be highly informed, the awareness of the poster and guide appear to be substantially lower compared to the label.

Evidence on promotional literature is even scarcer, and few direct comments could be elicited from the interviewed national stakeholders. However, the responses to the public consultation suggested a similar level of awareness of promotional material compared to the label, indicating that it is of similar prominence (1 percentage point higher compared to the label when asked about awareness in general, and only 6 percentage points lower compared to the label when recalling information related to their most recent car purchase). This suggests that, at least among relatively informed consumers, the awareness of information provided in promotional literature is similar to that provided in the label.

The picture of consumer awareness is therefore patchy, and can vary significantly across Member States. Evidence is strongest for the label element, and suggests that it has been improving steadily since the Directive was implemented and is now medium-to-high (>75%) in many countries. Conversely, for the other informational aspects the evidence is much weaker, but seems to suggest that the label is the most widely recognised aspect and others are less important.

Step 3: Consumers understand the information

This Evaluation Question considers the overall trends in consumer understanding of information provided on CO₂ and fuel economy with a view to assessing the functioning of the causal chain. At this stage, we do not consider extensively what the underlying reasons might be, as this is the subject of Evaluation Question 5 (Section 7.5), which considers the differing approaches in Member States in order to assess which have been the most effective.

Since the previous section already established that the label is the most recognised part of the Directive, we continue to examine this as the primary indicator of overall effectiveness. The other informational elements are assessed to the extent possible, but the analysis has been severely hampered by a general lack of studies, information and stakeholder views on these parts.

Table 7-2 summarises the evidence available on the level of consumer *understanding* of the information provided in the labels gathered in the case studies. "Understanding" is generally interpreted to mean the proportion of consumers that can correctly interpret the information as shown to them. Although the information is rather sparse, it can be seen that the level of understanding is generally assessed as being high in the UK (50-90%), Austria (75-100%) and Denmark ("very high"), whereas it is lower in Germany (45-52%) and the Netherlands (25-50%) and, even lower in Poland (<25%) where there is no specific mandatory format.

Table 7-2: Evidence regarding the percentage of consumers that understand the labels (share that are able to correctly interpret the label)

MS	Label type	Consumer surveys (where available)	Estimates gathered from interviews (referring to 2015/2016)		
			National authority	Consumer association	Industry association
UK	Absolute, Colour coded categories (energy label style)	90% (2010)	50-60%	50-75%	N/A
DK	Absolute, Colour coded categories (energy label style)	N/A	N/A	"very high"	"very high"
AT	Absolute, Continuous colour coded format	N/A	75-100%	N/A	75-100%
DE	Relative, Colour coded categories (energy label style)	45% (Jan 2012) 52% (Oct 2012) 17%* (2012)	N/A	N/A	N/A
NL	Relative, Colour coded categories (energy label style)	N/A	25 – 50%	N/A	<25%
PL	No specified format. Voluntary design based on absolute comparison & energy label.	N/A	N/A	N/A	<25%

* Survey in North Rhine-Westphalia only (other surveys are Germany-wide)

Source: case study analysis – see Annex F

This suggests two high level trends:

- Firstly, it seems generally true for all labels that a proportion of consumers that see the information will not comprehend it correctly. This points to a need to ensure that information is as simple and clear as possible (see Section 7.5 for further analysis of what this entails).

- On the basis of the case studies, it seems generally the case that relative labels are less well-understood than absolute labels, and that labels with no comparative format are the least well-understood of all.

These general trends seem to be confirmed in the more general literature. For instance, testing of different label designs conducted in Codagnone et al. (2013) showed that the (relative) German label is more confusing, since respondents shown the absolute systems ranked the car they saw in terms of CO₂ emissions more correctly than the respondents who were shown the German classification system. The results were statistically significant and hold when including other variables such as gender, age and country of the respondents.

Step 4: The information is used to inform consumers' purchasing decisions

This step is the crucial one in terms of affecting change in consumer behaviour and ultimately reducing CO₂ emissions: transforming knowledge (acquired through the information tools) into action (i.e. purchasing more fuel efficient cars).

The causal chain diagram depicts a rather direct flow of actions from consumer recognition/awareness to understanding and then to use of the information to inform their decisions. This is of course a simplification that was developed in order to structure survey evidence and literature review into the logic of the causal chain.

A more sophisticated model was explored in Codagnone et al. (2013) using experimental data gathered via a consumer survey with 8,000 respondents. The study used a Structural Equation Model that allows for both one-way influences (via regression weights) and two-way influences (via co-variances) between factors that influence the use of the label. The results showed that comprehension of labels plays only a small *direct* role in determining the use of the labels, but rather affects the use of labels *indirectly* via its relationship with familiarity and trust (in other words, low comprehension of the labels does not generate familiarity or trust). Therefore, the model predicts that improving comprehension by designing labels that are easier to understand will not affect usage in the short term, but will gradually improve familiarity and trust, which in turn will eventually translate into higher usage of the labels.

The study also indicates that familiarity has a direct impact on the use of the labels, but also that trust is another important factor. Trust is closely linked with comprehension and familiarity, so in this sense it is implicitly included in the causal chain analysis.

The issue of trust is also closely connected to the accuracy/reliability of the information, which is discussed further in the next Evaluation Question - considering in particular the accuracy of the information on CO₂ emissions and fuel economy. In general, it is also worth noting that the issue of lack of trust or confidence in the information was raised by several respondents during interviews (consumer associations, national ministries, NGOs). The problem has also been identified in the literature (e.g. (Kurani et al, 2002); (Wallis, 2011); (AEA and TEPR, 2011)) – with more recent references suggesting that mistrust may have been exacerbated by examples of misleading claims by some manufacturers (e.g. (Which, 2015)). A specific analysis of “trust” in car labels, conducted in Codagnone et al. (2013) found that perceived credibility is fairly high, although many respondents thought that the information contained in the label is not sufficient.

Information collected via the case studies suggests that there is a relatively high willingness among consumers to use the labels (again, the focus is mainly on labels due to the better availability of information and the higher awareness compared to other informational sources). As shown in Table 7-1, the majority of consumers in France and Germany state their willingness to consider the label in their decisions,

whereas estimates from stakeholders in all countries regarding the share of consumers that actually use the labels is generally lower.

Table 7-3: Evidence regarding the percentage of consumers that use the labels

MS	Label type	Consumer surveys (where available)	Estimates gathered from interviews (referring to 2015/2016)		
			National authority	Consumer association	Industry association
FR	Absolute, Colour coded categories (energy label style)	77% ^a (2007) 83% ^a (2008)	N/A	N/A	N/A
DE	Relative, Colour coded categories (energy label style)	58% ^b (Jan 2012) 63% ^b (Oct 2012) 65% ^b (2013) 67% ^b (2014) 73% ^b (2015)	N/A	N/A	N/A
UK	Absolute, Colour coded categories (energy label style)	<10% ^c (2006-2010) 25-35% (2010)	45-50%	<25%	N/A
DK	Absolute, Colour coded categories (energy label style)	N/A	N/A	"very high"	"particularly at lower end and middle of market"
NL	Relative, Colour coded categories (energy label style)	N/A	<5%	N/A	"unknown, but very low"
AT	Absolute, Continuous colour coded format	N/A	<25%	N/A	<25%
PL	No specified format. Voluntary design based on absolute comparison & energy label.	N/A	N/A	N/A	<25%

^a Consumers stating that the label (coupled with the bonus malus) was an incentive

^b Of consumers that are aware of the label, stating that the label was at least fairly important in their decisions

^c Consumers stating that they use the labels as a source of information

Source: case study analysis – see Annex F for full details and references

These views are supported by the literature evidence on consumer behaviour. The willingness to pay for energy efficiency can be used as an indication of the impact of the information provided on consumers' behaviour. A study published in 2014 estimated the willingness to pay for energy efficient vehicles in Spain using a hedonic pricing model (Galarraga, et al., 2014). It demonstrated that vehicles with A or B category labels are sold for prices 3.0 – 5.9% higher than similar vehicles in less efficient label categories, meaning that consumers value vehicles in these categories more highly. Analysis of the Swiss car market – where a car label similar to the EU Energy Label (see Annex H) is also in place – suggested that the A-label effect on car price is approximately 5% compared to B-label cars (Alberini, et al., 2014). More generally, the study found that the label has an effect on price above and beyond that of the fuel economy, of around 6-11%, meaning that consumers appear to be willing to pay more for an otherwise identical good once it received an A label.

However, the literature also points to the fact that there is not a linear relationship between the simple provision of information and consumer choices – the outcome is affected by a host of other issues. One important point raised by consumer associations NGOs and manufacturers is that the timing of the information provision can play an important role. According to the Directive, the car label is to be displayed in the showroom, which is most often at a rather late stage in the decision-making process. The provision of relevant information in promotional material can help address this gap. As already indicated the levels of recognition of this type of information is rather high although compliance is generally at much lower levels (<25%). Furthermore, as described in Section 6.4 there is an increasing level of provision of information on fuel consumption and CO₂ emissions information over the internet through the development of online databases that can be used by consumers at a much earlier stage in the decision making process.

Furthermore, there is a range of factors that affect consumer decisions such as perceptions, attitudes, experiences and other personal preferences. It is well-documented in consumer studies that many other factors besides fuel efficiency are important to consumers when purchasing new vehicles, such as price, reliability and engine power. The case studies have generally found that fuel consumption is an increasingly important decision factor for consumers, although not necessarily the most important one (see Annex F). Although CO₂ is clearly considered less important explicitly, its link to fuel efficiency is direct. Various surveys throughout the years have found that consumers express some willingness to reduce the environmental impact of their cars. For instance, in 2011, about two-thirds (68%) of EU citizens said they would compromise on a car's speed in order to reduce emissions; 62% would be likely to compromise on the car's size and 56% said the same about the car's range (Eurobarometer, 2011). Furthermore, in the case of second hand vehicles, recent studies seem to suggest that fuel efficiency is important for consumers (Transport and Mobility Leuven et al., 2016). The study found that more fuel efficiency tends to be valued by consumers and has a positive price premium in the second hand market which is passed on to subsequent car owners. However, there is a considerable and persistent gap between stated preference and revealed preference. Specifically, stated preferences regarding concerns over the environment or the importance of fuel economy do not seem to translate into actual purchasing behaviour for a host of reasons – including uncertainty and loss aversion³⁴, bounded rationality³⁵, short

³⁴ i.e. Paying upfront for increased energy efficiency is risk for consumers because of uncertainty about future fuel prices, the true in-use energy efficiencies of vehicles as opposed to their official ratings, future vehicle use, vehicle lifetime, and other factors

³⁵ i.e. consumers face limitations in terms of their cognitive abilities and the time available to make decisions – choosing among the thousands of options available is a complex task, especially considering the various attributes in terms of e.g., price, size, materials,

payback periods (Green, 2010). Other possible reasons are that consumers assume fuel consumption is similar for cars within the same class, or that they assume there is a trade-off with other parameters such as performance, safety and price efficiency (Anable et al, 2008); (Codagnone et al, 2013). Systematic reviews generally conclude that fuel economy and CO₂ emissions might be a secondary consideration, taken into account once consumers have narrowed down their choice to a class of vehicle (Ecologic et al., 2010); (Lane et al, 2005). It is also possible that consumers have little confidence in published fuel economy data, as mentioned previously.

In summary, research across several countries suggests that, while consumers state that fuel efficiency is an important buying criteria, there is little evidence that this leads to significant choice modifications in practice (Anable et al, 2008); (Green, 2010); (Codagnone et al, 2013). All of this means that evidence in terms of the influence of the labels on consumer behaviour is much stronger if it comes from empirical studies, which look at the revealed preferences of consumers (their actual actions). Unfortunately we were only able to locate a small number of studies of this nature.

Step 5: Evidence of impact on average CO₂ emissions

The last step in the process is the actual contribution towards reducing average fuel consumption and CO₂ emissions of new passenger cars. Evidence in that respect is even more limited and the overall connection between the role of the label and evolution of average CO₂ emissions can only be inferred on the basis of the analysis already provided.

Strong evidence on the impact of the car label on the evolution of new car CO₂ emissions in the period 2003-2008 is only available in the case of France on the basis of the analysis by D'Haultfoeuille et al. (2015). Making use of an econometric demand model the study concluded that 2.24g/km (14% of the total decrease in average new car CO₂ emissions between 2003-2008) was due to the Car Labelling Directive alone, along with a further contribution of 4.53g/km (29% of the total decrease) attributed to the shift in consumer preferences due to the combined effect of the label and the bonus-malus system on consumer preferences. The shifts in consumer preferences found in D'Haultfoeuille et al. (2015) are explained in the study as being due to the informational value of the label (which makes it easier for consumers to compare between models in terms of CO₂), as well as the signalling effect of the bonus-malus (which signals to consumers that choosing low-CO₂ vehicles is important). Other factors analysed include the pure monetary incentive effects of the bonus-malus system (31% of the total), manufacturer effects (16%) and fuel price effects (11%).

Similar quantitative analysis is not available in any of the other 9 countries that were examined in detail. However, on the basis of the qualitative analysis, certain conclusions can be drawn. In a number of countries (UK, Denmark, Netherlands) the data on average CO₂ emissions suggest better performance than the EU average in terms of the overall reduction achieved during the period under investigation. However, the connection between the label and the results achieved is not clear.

In the UK, the input from all stakeholders suggests that for each of the steps already analysed there has been a possible contribution of the Directive. On that basis, it can be concluded that the label has had some role in the overall reduction of average CO₂ emissions, particularly since the adoption of the colour coded EU energy label design in 2005, although it is not possible to say whether this is significant or not.

workmanship, styling, accessory features, fuel economy, warranty, acceleration, comfort, safety, reliability, and more

The level of reduction of the average level of CO₂ emissions in Denmark was substantial during the period under investigation. However, the case study analysis suggests that most of this reduction is due to the fiscal measures that were introduced. Nonetheless, stakeholders do identify a positive – even if secondary – role of the car label, especially in terms of raising environmental awareness among consumers.

The picture is less clear in the case of the Netherlands where a similar positive development in terms of average CO₂ emissions can be identified. The case study analysis suggests that the label on its own seems to have had little impact when it was initially introduced, as evidenced by stagnant sales of A- and B-class vehicles until 2006 – and even when paired with a bonus malus system there was only a small overall increase in sales of A- and B-labelled vehicles. This was in part due to the relatively low supply of A- and B-labelled vehicles at the time, as well as the low level of fiscal incentives (due to the relative scale used in the label, the price differentiation was compared to cars of similar sizes when the incentives were based on the label). Nevertheless, despite the relatively small impact, the scheme was considered to be a success given its low costs. However, the more recent and dramatic reductions in new car CO₂ emissions seen in the Netherlands (since 2009) cannot, most probably, be linked to the label. There was significant increase in the level of bonus for category A and B vehicles and of the malus for all D to G labelled vehicles. Furthermore, since 2010 the tax regime has gradually been disconnected from the car label while the level of average emissions has maintained a year-to-year decline of 7-8%. Thus, the label does not seem to have played a direct role in these developments. Nonetheless, the label may have had an indirect impact through the influence it has had in the company fleet. According to the Dutch automotive association, a large number of businesses require that any new passenger cars are either A –C labelled vehicles. Given that business cars represent up to one third of the new vehicles purchased, there is still a possible indirect contribution of the car label scheme in the significant level of reduction of average CO₂ emissions achieved.

For other case study countries (Germany, Austria or Spain), the evidence on the effectiveness of the Directive in terms of CO₂ emissions reduction is less clear. In Germany, the analysis suggests a positive role of the adoption of an EU energy label approach since 2011 in increasing awareness among consumers and, at increasing level, of making use of it. However, to this point, there is no evidence of an impact on the average level of fuel consumption and CO₂ emissions even though available consumer surveys (ANEC and BEUC, 2014; Codagnone et al, 2013) suggest that the use of the relative label is confusing and can lead them to misinterpreting the vehicle categorisation. While the evidence is not conclusive it does point to a rather limited impact of the label at this last critical step of the process.CO₂. In Austria and Spain, average CO₂ emissions during the period 2001-2014 have declined but at a slower rate than the EU average. The relatively limited evidence available points more towards the fiscal measures that were introduced at a later stage as the driving force behind the recent reduction in average CO₂ emissions. Car labels appear to have played, played a secondary and only minor role. CO₂

Finally, in those countries that have not used an EU energy label approach (Poland, Czech Republic and Italy), there is no evidence suggesting any measurable impact of the Directive towards the reduction of average CO₂ emissions. In all three countries the levels of CO₂ emissions reductions achieved have been well below the EU average. Taken together with the absence of relevant fiscal measures to promote fuel efficient vehicles in all three countries probably suggests that, on its own, the provision of CO₂ information is largely ineffective.

Overall, there is mixed evidence on the effectiveness of the Directive in terms of its ultimate impact on new car CO₂ emissions. While there is specific evidence of the impact in the case of France, there are only indications of possible contribution in most

other countries. The Directive appears to have the potential to influence consumer choices in a way that eventually reduces overall CO₂ to a degree. However, the realisation of this potential depends strongly on the national implementation, whether this refers to the synergies with relevant fiscal measures (discussed further in Section 7.3.2.3) or the design and enforcement of Directive (see next Evaluation Question).

7.3.2.2 Impacts on manufacturers

Although the Directive is primarily a demand-side (consumer) measure, it is also indirectly expected to influence manufacturers to produce more cars with low CO₂ emissions (supply-side effects), since it is expected that consumers may take the fuel efficiency of a car into account more when this information is provided.

Response in the supply of cars with lower CO₂ emissions

There is limited research on this aspect, as most studies focus on the demand side rather than on the supply side effects of labels – since ultimately it is the behaviour of consumers determines the effectiveness of labelling schemes. However, a small number of studies have tackled the supply-side of the equation by examining the response of manufacturers.

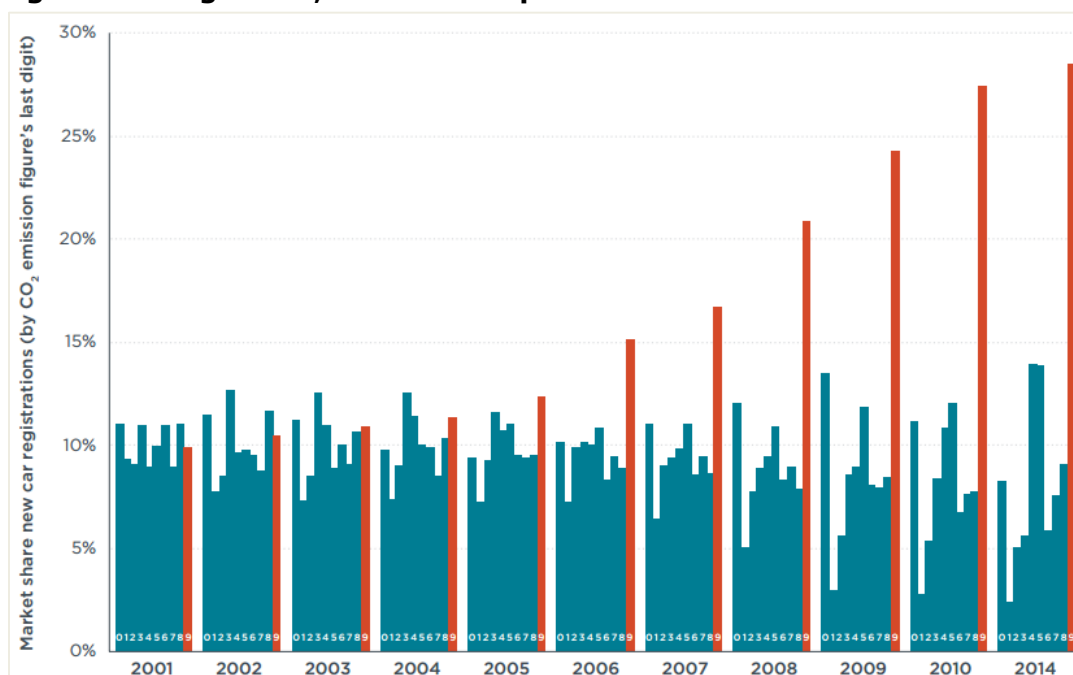
A study in **France** (D'Haultfoeuille, et al., 2015) found relatively constant reductions in CO₂ emissions of supplied cars over the period from 2003 to 2008 (around 5.5%), which was similar to the rate of reduction in other countries, and due to factors such as the long-term voluntary agreement to reduce CO₂ emissions, increases in fuel prices and evolving consumer preferences. There were no immediate changes to product offerings in reaction to either the car labelling policy, or the bonus-malus system (announced two months prior to its implementation). Similarly, another study found that there was not a significant effect on the models being supplied to the French market (D'Haultfoeuille, et al., 2013), even though the feebate had a particularly large impact on the market share of different label-classes of vehicles.

Two potential reasons were identified for this lack of change:

- Firstly, that manufacturers did not have a large enough incentive given that the thresholds for the fiscal incentives were only active in France, and
- Secondly that manufacturers needed a lead time to respond.

The first explanation – i.e. the size of the incentives – is called into question by the analysis of ICCT (ICCT, 2015), which indicates a strong clustering of vehicles in response to thresholds in tax incentives within the limitations imposed by engineering potential and manufacturing costs. The study looked at the number of vehicles with CO₂-emission figures ending in a “9” as an indicator of vehicles that are clustered at incentive points, and shows a remarkable increase in their share over time (Figure 7-2).

Figure 7-2: New car registrations in the EU, aggregated into CO₂ emission figure last-digit-bins, for the time period 2001–2014



Source: (ICCT, 2015)

The second explanation – i.e. lead times – therefore seems more realistic – i.e. that manufacturers may respond to policy measures (including the label) but require time to do so. Further support to this theory is given in Alberini, et al (2014), which concludes that label systems based on discrete categories incentivise suppliers to act strategically, either via changing supply to conform to the “notches” as described above, or via manipulation of prices. Weaker evidence that car manufacturers may change their portfolios is provided by a Dutch study (van der Vooren et al, 2013), which suggested that manufacturers reduced the CO₂ emissions of their vehicles substantially following the introduction of the label requirement in 2001. Changes involved an increase in the number of versions of vehicles/models, as well as an increase in the differentiation between versions when considering the price and CO₂ emissions of cars. Although the conclusions of the study link the provision of CO₂ information via the label to a strong reaction from manufacturers to offer more low CO₂ vehicles, the role of the CO₂ Regulation and taxes is not explicitly addressed. Thus, the study provides evidence of a supply side effect in general, but it does not seem possible to attribute this to the labels (or to any other specific developments).

The fact that there seems to have been a shift towards greater use of environmental information in car marketing in some countries suggests that manufacturers are aware of the potential benefits of a “greener” image. For instance, a review of advertising materials in the Netherlands showed that car companies became much more active in using the labels and financial incentives in their campaigns (Geerken & Borup, 2009), which seems to suggest there is some strategic role. A national industry association commented during an interview that manufacturers want to have a “green” image and hence try to supply greener cars; however, the effect was considered to be minor in terms of influencing strategic decisions. In France, ADEME noted during an interview conducted for this study that there has been a shift in the way in which vehicles are marketed, with more focus on fuel economy these days. Evidence from two surveys of car advertising in 2007 and 2010 (cited in Wallis (2011)) showed that there was considerable growth in the proportion of advertising focusing on lower carbon, fuel efficient cars.

Overall, these trends in advertising suggest that manufacturers may have attempted to differentiate on CO₂ performance, although it does not indicate whether supply of lower CO₂ emitting models increased nor whether these changes were linked explicitly to the Directive versus other policies (for instance, the car CO₂ Regulations is likely to have been important).

Among respondents to the public consultation, there was not a clear view of the role of the Directive in that respect. While 22% of stakeholders – representing both industry, authorities and some environmental groups – expressed the view that the Directive has encouraged manufacturers to supply more fuel efficient and led to an increase in the supply of more fuel efficient cars, a greater share – including industry representatives at EU and national level as well as consumer and environmental NGOs – considered that the Directive has not had any impact in that respect.

Overall therefore, it appears that the Directive has the potential to elicit a marginal supply side response, mainly in terms of optimising vehicles to meet threshold categories. There is no empirical evidence of a strong effect on supply of more efficient vehicles, which also seems supported by stakeholder views that seem to consider the Directive to be ineffective in this regard.

7.3.2.3 Impacts on public authorities

This section focuses on the role of national public authorities in supporting and maximising the effectiveness of the Directive. At Member State level, public authorities can maximise the effectiveness of the Directive in two main ways:

- By designing and implementing the information tools in ways which take into account national circumstances to ensure that they are most relevant and useful to consumers and that they relate to the way manufacturers operate.
- By enhancing the effectiveness of fiscal measures in favour of cars with lower CO₂ emissions.

Design and implementation of tools taking account of national circumstances

The Directive sets minimum requirements for each information tool, while still providing Member States with considerable flexibility as to how to implement them. Section 6 on the implementation of the Directive shows that a variety of approaches have indeed been adopted across the Member States while, at the same time, 14 Member States have decided not to go beyond the minimum requirements.

When considering the impact of these choices on the effectiveness of the Directive, all of the previous analysis above points to the particularly important role of the label design in influencing consumer recognition and understanding. Hence, the analysis in this section focusses in particular on this aspect. Other parts appear to be far less important when considering the potential for influencing overall effectiveness. In any case, there tends to be less variety in the implementation of the other elements (e.g. poster and promotional materials), since most Member States opted to only meet the minimum requirements set out in the Directive.

Coming back to the manner in which information is presented in the labels, the variety of approaches aligns with the Directive's objective to allow flexibility; however, the key question is whether these choices are based on a clear rationale in each Member State.

Little information has been found on the process by which Member States made decisions with regards to the format and design of the information tools. It has not been possible to establish whether Member States that chose to implement the minimum requirements did so following a thorough assessment of the national circumstances or not. It would be more reasonable to expect that such a process has not taken place. However, we should note that at least in one case – Sweden – the

adoption of a colour coded label was formally examined in 2009 but was not taken forward.

Among those that did go beyond the minimum requirements the picture is also mixed. For Denmark, the response of the national authorities was that the approach adopted followed the one already in use for the energy labelling for household appliances. The objective was to provide a consistent message across all product categories and make use of the potential synergies. The extension of the label classes to include A+, A++ and A+++ in 2012, as has been the case for a number of household appliances, is consistent with this approach. A similar logic applies in the case of Finland according to the responses to the Member States survey.

A more thorough assessment of the local situation in order to better respond to consumers' and align with the existing energy efficiency label can be found in the UK. Early experience in the UK with plain list-format labels had shown little impact. Consumer focus groups and surveys were commissioned by the national ministry in 2002-2003, which showed that the most accepted format for a new label was one based on the EU Energy label (MORI, 2003). The LowCVP brokered the design and rollout of a UK Fuel Economy Label which included an energy-efficiency style colour coded fuel economy scale linking CO₂ emissions design that was subsequently introduced in 2005. It also includes additional information on running costs, as well as allowing fuel economy to be expressed as mpg in order to reflect local preferences. The legislation was again updated in 2013 in order to enable zero tailpipe emission vehicles (battery electric and hydrogen vehicles) to be covered by the scheme. The design of the new label was developed via a collaboration between the national ministry, national competent authority, national manufacturers and traders association and the national consumer association.

In the **Netherlands**, a relative system was adopted because it was thought that car buyers go to the dealers with a well-defined wish list as to the car's main characteristics, and then compare the fuel efficiency of selected models with cars of similar characteristics (CE Delft, 2005). Similar reasoning was used when implementing the relative label in **Germany**, although the national ministry noted during an interview conducted for this study that there were no consumer studies carried out at the time to verify this³⁶. In comparison, in **Austria**, a formal discussion with manufacturers did take place which led to the rejection of a relative approach as this did not provide a reference point and was seen as less informative. However, rather than using the EU energy label, a continuous comparison format was selected offering absolute values but with a relative colour coding determined by national fleet averages.

Overall, some Member States did seem to have a clear rational for selecting a specific design and this has contributed to the broad range of designs currently in place. The presence of the EU energy label has had an important influence but questions concerning the relative merits of using absolute or relative labels led to different answers and approaches. It is less clear whether this flexibility in implementation has, by itself, enhanced the effectiveness of the Directive.

The stakeholder input does not provide strong evidence that this is the case. Among stakeholder consultation respondents there is a rather equal number of industry representatives that consider that it provides too much flexibility and those that consider that it is sufficient to meet national circumstances. Consumer and environmental NGOs consider that the current flexibility is excessive while most national authorities seem to think it is appropriate. Our own case study analysis

³⁶ The representative of the Spanish authority was not able to provide us with an explanation of the reason that a relative approach was adopted at that time (2002).

suggests that the introduction of the coloured classes for the UK and German label has been followed by a clearly increasing level of awareness and understanding, but there is no quantitative information on its effectiveness. However, available studies and consumer surveys in the Netherlands (Geerken & Borup, 2009) and Germany (Dena, 2012; Codagnone et al, 2013) also show that relative labels tend to be confusing for consumers although similar evidence is not available in Spain.

Overall, it can be said that the flexibility allowed some Member States have taken advantage of the flexibility to deliver better labels than required (making use of the color coded label). However, half of MS has not made use of the flexibility, while others have implemented labels that appear to be confusing for consumers. Thus, while there is some improved effectiveness as a result of the flexibility, some MSs have not used this flexibility as well.

Enhance the effectiveness of fiscal measures at national level

Most Member States have introduced a number of fiscal measures to encourage the purchase of cars with lower emissions and penalise less fuel efficient cars, before and since the Directive was implemented.

One way to investigate the interaction between fiscal measures and the Directive is to look at three types of situations:

- Countries where the label came first and clearly related fiscal measures were introduced later e.g. France and the Netherlands (before 2010).
- Countries where fiscal measures were already in place before the label was launched: the UK.
- Countries where there is no clear link between the label and taxes e.g. Denmark, the Netherlands (after 2010) and Germany.

The examples of these three situations are explored below.

Countries where the label came first and clearly related fiscal measures were introduced later

In the case of **France**, there was a clear increase in the rate of CO₂ emission reductions after the introduction of the label but this accelerated further with the introduction of the bonus-malus regime (which was linked to the equivalent label classes). This indicates that fiscal incentives and the label together had a far greater impact on consumer purchasing behaviour than the label alone. D'Haultfoeuille et al. (2015) estimated the impact for the combined bonus malus plus label to be more than double that of the label alone when looking at new car CO₂ reductions between 2003 and 2008. Interviews with stakeholders (French Government and ADEME) noted that while the label is needed for the bonus-malus system, financial measures are generally more effective at persuading consumers to alter their preferences.

In **the Netherlands**, the introduction of a relative label in 2001 did not have a significant impact on average CO₂ emissions of new cars on its own. There was a temporary BPM (vehicle acquisition tax) refund for environmentally-friendly cars introduced for one year in 2002, which resulted in a small increase in sales of both A and B class cars (ADAC, 2005). However, after abolishing the refunds in 2003, the percentage market shares of A and B class vehicles immediately decreased again.

A bonus-malus scheme was later introduced in 2006, which was closely linked to the label categories. This was explicitly intended to "add momentum" to the car labels – however, it is reported to have only had a small effect. This was partly due to the low availability of A- and B-labelled vehicles at the time, as well as the low value of the bonus malus (CBS, PBL, Wageningen UR, 2014b; van der Vooren, et al., 2013). In

addition, a study on the relative car labelling system based on consumer focus groups concluded that consumers did not understand the energy classes within the label and some of them even felt deceived by what was thought to be a confusing message (Geerken & Borup, 2009).

Since 2010 the BPM (vehicle acquisition tax) has been changed to be based on a combination of the absolute CO₂ emissions (not by car label category) and the list price of the vehicle (RAI Vereniging, 2013). Hence, there is no longer any linkage between the label and the tax incentives since the label categories are based on relative emissions whereas the taxes are based on absolute emissions. The main reason indicated during the interviews for abolishing the bonus-malus scheme linked to the label was that it was becoming financially unsustainable for the government budget. Thus, at least in the way it was implemented in the Netherlands, the linkage of the label with the tax system was not viable. According to the Dutch industry representatives and consumer associations, it is the fiscal incentives that have been the driving force behind the significant increase in the level of A and B labelled vehicles since 2010. The case of France shows the positive interaction between the label and the national fiscal measures, which increased the effectiveness of the information by more than 100%. The same result did not occur in the Netherlands – this appears to be due to several factors related to national implementation, namely the initial low supply of vehicles in the A- and B- categories but also, to some extent due to the fact that relative label approach appeared to confuse consumers. .

Countries where fiscal measures were already in place before the label was launched and the label was subsequently aligned to them

In the **UK**, the annual circulation tax, vehicle excise duty (VED) was reformed in 2001 to be entirely linked to CO₂ emissions. However, according to research carried out in 2003, “Understanding that VED is based on carbon emissions is patchy” and there is poor understanding of the link between CO₂ emissions and fuel consumption (MORI, 2003).

Later on, in 2005 the design of the label was changed to a format similar to the EU Energy Label, with 7 colour coded categories classes related to the VED categories. In 2001, A, B and C label categories accounted for less than 1% of new car registrations. By 2008, this figure had increased to 11%, while in 2014 A, B and C label categories represented 54% of the market. Although we are not aware of any studies explicitly quantifying the impact of the label using econometric techniques, both the UK authorities and the UK consumer association expressed positive views concerning the synergies between the VED and the Directive. In particular, consumer surveys suggest that when CO₂ emissions are considered by car buyers, they are most commonly done so in the context of the VED, because it is perceived as a cost issue (LowCVP, 2012; Anable et al, 2008), – that is, the VED may be successful in increasing consumer awareness of CO₂ because it provides a mechanism by which CO₂ emissions can be interpreted as direct costs.

Hence, the case of the UK suggests that the combination of the label with fiscal measures can contribute to increased consumer awareness of CO₂ where this is linked with costs.

Countries where there is no clear link between the label and taxes

In **Denmark**, registration tax and the “green owner tax” are not explicitly linked to the energy label but rather to fuel consumption. However, the interviews conducted for this study found that both the national consumer association and national car dealers association agreed that car labels and fiscal measures have worked together to increase consumer awareness of new car CO₂ emissions and have played a role in the reduction of new car CO₂ emissions in Denmark. In particular, since the labels provide fuel consumption information, consumers reportedly often use this information

to calculate how much tax will need to be paid and then use this information when deciding which car to buy.

In the case of **Austria**, the information available in the online version of the guide was cited in an interview with the national ministry as providing valuable information when designing the bonus malus scheme introduced in 2008. Little impact on CO₂ emissions was noted as a result of the Directive alone, whereas reductions started when the bonus-malus system³⁷ was introduced in 2008.

CO₂ Finally, in Poland, Italy or the Czech Republic, it is unlikely that the Directive would enhance the effectiveness of fiscal measures (and vice versa) which, to this point, are not related to CO₂ emissions or label categories.

Overall, the range of different cases have been presented show that there can be valuable synergies between national fiscal measures and the label, both in terms of the overall effectiveness in reducing CO₂ emissions (France), as well as in raising consumer awareness of CO₂ emissions and their link to national taxation (UK). Conversely, schemes using labels that confuse consumers or limit their choices appear to be ineffective (Netherlands, before 2010). Synergies between the Directive and national fiscal measures were identified in Denmark and Austria, even though there is no explicit link. The advantage in Denmark is mainly due to the informational value of the labels, which allows consumers to calculate the equivalent taxes, whereas in Austria the information provided in the online version of the guide allowed the ministry to design the bonus malus scheme.

7.3.3 Conclusions

Conclusions on objectives related to consumers

Objective: Ensure that relevant information on fuel economy & CO₂ emissions is effectively communicated to consumers.

Evidence suggests that awareness of the label has been growing over time been improving steadily since the Directive was implemented and is now medium-to-high (>75%) in many countries. The label is generally the most widely recognised aspect whereas the other informational aspects (poster, printed guide) are considered less important.

Consumer understanding is an important element that affects the level of familiarity and trust in the labels, which in turn have direct impacts on the use of the labels in purchase decisions.

In this regard, there is a clear indication that consumers in all countries find the use of colour coded labels – in the form of the EU energy label - easier to understand. This is supported by the surveys, stakeholder views and consumer research. The analysis from the case studies suggests that in those countries where a colour coded scheme is not in place, the level of awareness and understanding tends to be lower. In contrast, in Germany and the UK, the adoption of a colour coded scheme appears to have led to a clearly increasing level of awareness and use of the label.

In terms of the role of the classification approach used (absolute versus relative) the majority of national consumer surveys, stakeholder views and experimental consumer research suggest that the absolute label is more effective and contributes more to the understanding of the information provided. However, the available evidence on this specific point is not conclusive since there are stakeholders that consider a relative

³⁷ levied on the registration of new vehicles and is calculated based on the fuel consumption and purchase price of the vehicle, with a maximum rate of 32% of the list price for passenger cars.

approach as more relevant to consumers. In the evaluation of the EU Energy label it was concluded that both the absolute and the relative approach used in some products are useful - offering an absolute energy consumption value and a relative contextualised energy performance ranking. It is suggested that both approaches should continue to be conveyed, focusing more on the absolute or the relative value depending on the product (Ecofys, et al., 2014).

Objective: Influence consumer choice in favour of more fuel efficient/less CO₂ emitting cars

There is very mixed evidence on the effectiveness of the Directive in terms of its ultimate impact on new car CO₂ emissions. The available study in France provides rather strong evidence that the label has been rather effective on its own as an informational instrument as well as when combined with fiscal incentives. There is also CO₂ less direct evidence linking the implementation of the Directive with such outcomes in other countries. In other cases (UK, DK, DE, NL, AT) the evidence available suggest that the information provided is used by consumers – albeit at different levels – but a clear impact on average CO₂ emissions of new car registrations has not been possible to establish. In most of the cases, the relevant fiscal measures are generally considered more important in that respect. Finally, in the countries with no EU energy type label (IT, PL, CZ), there is limited evidence of any real impact of the label so far.

Overall, the analysis suggests that the Directive has the potential to influence consumer choices in a way that reduces overall CO₂ to a degree, but the realisation of this potential depends strongly on the national implementation and extent to which it is supported by fiscal measures.

Conclusions on objectives related to manufacturers

Objective: Encourage manufacturers to take steps to reduce the fuel consumption of new cars

The Directive has the potential to elicit a marginal supply side response, mainly in terms of optimising vehicles to meet threshold categories (i.e. adjusting a few gCO₂/km in order to reach an A-label category).

There is no empirical evidence of a strong effect on supply of more efficient vehicles, which also seems supported by stakeholder views that seem to consider the Directive to be ineffective in this regard.

Conclusions on objectives related to public authorities

Objective: Support Member States with flexibility to take account of national circumstances

The diversity of national label designs clearly demonstrates that Member States have taken advantage of the flexibility permitted in the Directive in order to implement their own schemes. However, this flexibility does not appear to have translated into greater effectiveness.

Objective: Support the effectiveness of MS fiscal measures

There can be valuable synergies between national fiscal measures and the label, both in terms of the overall effectiveness in reducing CO₂ emissions (e.g. in France), as well as in raising consumer awareness of CO₂ emissions and their link with national CO₂-related taxation measures (UK).

Conversely, schemes using labels that confuse consumers or limit their choices appear ineffective in supporting the role of the adopted fiscal measures (e.g. Netherlands, before 2010).

Other synergies have also been identified even where there is no direct link – for example, due to the informational value of the labels, which allows consumers to calculate the equivalent taxes (Denmark). Another example is that the information provided in the online version of the guide allowed the ministry to design the bonus malus scheme (Austria).

7.4 Effectiveness (EQ4): To what extent has the approach taken, in terms of both scope (e.g. the exclusion of used cars) and main elements in the legislation, ensured or hampered the achievement of the objectives?

7.4.1 Introduction

Having evaluated the overall impacts of the Directive in the previous section, this Evaluation Question delves deeper into the reasons behind the effectiveness or lack thereof of the Directive, by considering the individual elements of its scope and specifications (i.e. the information tools) in more detail.

Specifically, it assesses how each of the information tools has contributed to its effectiveness and how their impacts could be enhanced, with an emphasis on analysis at the general EU-level. It also investigates to what extent the current scope – in terms of vehicle and information coverage – has supported or limited the achievement of the Directive's objectives. This includes analysis of how including CO₂ emissions from other stages of the cars' lifecycle could benefit the effectiveness of the Directive and the possible difficulties in implementing such a change.

7.4.2 Analysis

7.4.2.1 The information tools

The Directive sets out requirements for four information tools. This section explores their role in supporting the effectiveness of the Directive at EU level, considering their role in a general sense. The next Evaluation Question (Section 7.5) analyses each information tool in more depth at the Member State level, in order to identify specific strengths and weaknesses of different approaches.

General findings

There were several general findings regarding the effectiveness of the Directive with respect to its information tools, which are not specific to an individual tool.

- **Ease of understanding:** Some consumers still find the information difficult to understand, especially with regards to the metrics used to convey the information on fuel consumption and CO₂ emissions. As discussed in Evaluation Question 3 (Section 7.3) and shown by the results of the public consultation (see Annex F), for all information tools, the level of understanding was lower compared to the level of awareness.
- **Fuel consumption and CO₂ emission figures are not representative of real life driving.** As discussed in Section 3.2.3, the discrepancy between test cycle and real world performance is well-known. This is an area of widespread concern across Member States authorities and stakeholders (representing both industry and consumers at EU and national level) who report that consumers do not trust that official fuel consumption and CO₂ emissions figures are representative of real-life driving conditions, which limits its impact on their purchase decisions. This confidence was further eroded following news that emissions test results may have been manipulated.

The following sections discuss the aspects that are specific to each of the information tools in turn.

Label

The public consultation, stakeholder interviews and case studies found that the label is generally ranked as the most effective both in terms of increasing awareness and influencing consumers' choices towards cars with lower CO₂ emissions. Across the case study countries where such information is available (France, UK, Denmark, the Netherlands, Austria and Spain) there is a consensus that the label is the most recognised and effective of the four tools. In contrast, the absence of a colour coded label (in IT, PL, CZ) has coincided with reduced effectiveness. Similar conclusions are reached from the public survey of both organisations and individuals.

This has also already been highlighted by the analysis under the previous question (Section 7.3), which pointed out that awareness of the label is generally high and that it is also the tool that influences consumers' decision the most. However the levels of understanding and use of the label are closely linked to how directly the label is aligned with fiscal measures and the extent to which these impact on the cost of the vehicle.

The label's success is likely due to the fact that it is the most visible instrument for consumers, as it is on the car itself. However, as noted previously, its effectiveness may reduce in future as consumers increasingly rely on online media for their research.

Guide

With regards to the **guide**, its value to the effectiveness of the Directive depends on its online availability and ability to provide up-to-date information. The printed version of the guide largely appears to be obsolete and demand for the physical copies is reducing (as previously discussed in Evaluation Question 3). The public survey found that the guide is consistently viewed as less effective than the label in terms of increasing awareness of CO₂ emissions and fuel consumption and influencing consumer behaviour: between 15-20% of respondents reported positive impacts from the guide in terms of awareness and behaviour change and between 39-62% attributed such positive effects to the label. A UK consumer group also suggested during an interview for this study that the guide could in fact be counterproductive, since it is out-dated, and found that the use of the guide has remained consistently low, with less than 5% of respondents reporting that they use it as a source of information in 2006-2010 (Hill, 2009); (LowCVP, 2010). A lack of interest in printed versions of the guide in Germany was previously highlighted in (AEA and TEPR, 2011), where it was reported that the paper versions available in dealerships were rarely picked up by consumers, and interviews conducted with the national ministry and dealer association indicate that interest is still extremely low.

On the other hand, where an online version of the guide is available (including as a fully searchable database which allows comparisons across models) it is seen as a useful tool. In Austria, the national authorities considered that the online guide is the most effective element, as the website statistics show that consumers typically check material online and download the guide after some time spent browsing. This indicates that consumers regularly use this tool to compare vehicles and help decide which car to buy. Similarly, the UK authorities note that there are 3.5 million unique visits to the website tool (online version of the guide – far more than the 80,000 physical copies distributed) every year and feel that it also has a significant role (along with the label) in driving consumer awareness. Results from a UK consumer survey also show a positive response to the use of websites – and welcomed the ability to compare information for a number of vehicles (LowCVP, 2010).

Although buyers refer to a wide range of sources (including third-party and manufacturers websites) the online version of the guide is seen as an important

resource, providing the source data on which other information sources can draw (Wallis, 2011).

Poster

The **poster** is generally agreed by all EU-level stakeholders (industry and consumer associations) and national authorities interviewed for the study to be the least effective tool in helping to achieve the Directive's objectives. As discussed in Evaluation Question 3, consumer recognition of the poster appears to be low and consequently it is ineffective at informing them or changing behaviour. This view has been supported by earlier studies (ADAC, 2005; Ecologic et al., 2010), which also suggest that the poster is not an effective tool. This is in part because it is not always clearly displayed and therefore is not visible to consumers; and also because consumers tend to come to showrooms having already undertaken research on the cars they might be interested in. As a result it is not of interest to the consumers and some stakeholders (manufacturers' associations from Austria and the Netherlands) pointed out that it can also be difficult for dealers to keep up to date.

Promotional material

The picture with regards to **promotional material** is unclear: studies of consumer behaviour tend to focus on the labels as a direct informational tool, whereas provision of the information in promotional materials may affect consumers more indirectly. The case studies do not provide any information to directly assess the effectiveness of the promotional materials – it can only be said that the track record of compliance is rather mixed depending on the country (and enforcement mechanisms in place). The results of the public consultation suggest that while a significant proportion of individuals (46%-55%) find it effective in terms of raising awareness and influencing purchasing decisions, this is not the case for organisations as only 18-29% of these respondents identified a positive effect from the promotional materials.

The overall results from organisations, are strongly influenced by specific issues raised by German dealers and their associations regarding the clarity of the requirements of the Directive in Germany; specifically that what is covered by 'promotional material' is not clearly defined and there is some ambiguity with regards to the meaning of information which is *'easy to read and no less prominent than the main part of the information provided in the promotional literature'*.

On the other hand, including the Directive's information in promotional materials can prove a useful tool to reach a larger audience and raise awareness amongst citizens, even if they are not looking to buy a car immediately. The increase in automakers emphasising low CO₂ models in adverts seen in some countries (discussed previously in Evaluation Question 3) suggests that at least some industry players believe that promotional materials have an impact, although there may also be spillover benefits of projecting a "greener" image. In Denmark the coloured classes are shown in advertisements, which is believed to aid consumer recognition. However, the Danish national consumer association pointed out that it can also be problematic if different variants of the same model are classified under different label categories. In these cases, the range of label categories (for example, A – C) is shown on the advert, to show that the label category varies depending on the optional extras, or engine type selected. In a similar vein, consumer associations in the UK warn about the inappropriate use of green claims in advertising that risks undermining the credibility of all such marketing and misleading consumers (Wallis, 2011).

Various advertising/publishing organisations responding to the public consultation were of the view that the Directive penalises the press with respect to other media sectors. They suggested that advertisements should be deregulated, leaving the task of informing customers about cars' fuel efficiency and emissions to manufacturers' and dealers' websites, posters in showrooms and promotional technical literature.

Overall, from the perspective of effectiveness, the impacts of promotional material seems to depend largely on how clearly the information is communicated to consumers.

7.4.2.2 Scope of the Directive

The scope of the Directive, is defined in terms of:

- The types of cars it applies to i.e. **new passenger cars for sale or lease**
- The minimum requirement of information to be provided to consumers i.e. on **fuel consumption and CO₂ emissions**.

In this section, we explore how this scope supports or hinders the achievement of its general objectives of raising consumer awareness, reducing CO₂ emissions and oil dependency and improving fuel efficiency.

Scope in terms of vehicles covered

The current scope of the Directive focuses on new cars and excludes second-hand cars and vans. Each of these dimensions is explored in turn drawing from the literature review as well as the stakeholder and public consultation.

'New car' definition

The Directive only applies to new cars. However, German dealers have raised concerns regarding what this term actually means. German trade associations and individual dealers have reported a negative impact due the lack of a clear definition of 'new cars', even though a definition is provided in the Directive. It is claimed that the German translation of this definition left too much room for interpretation and resulted in problems with the implementation.

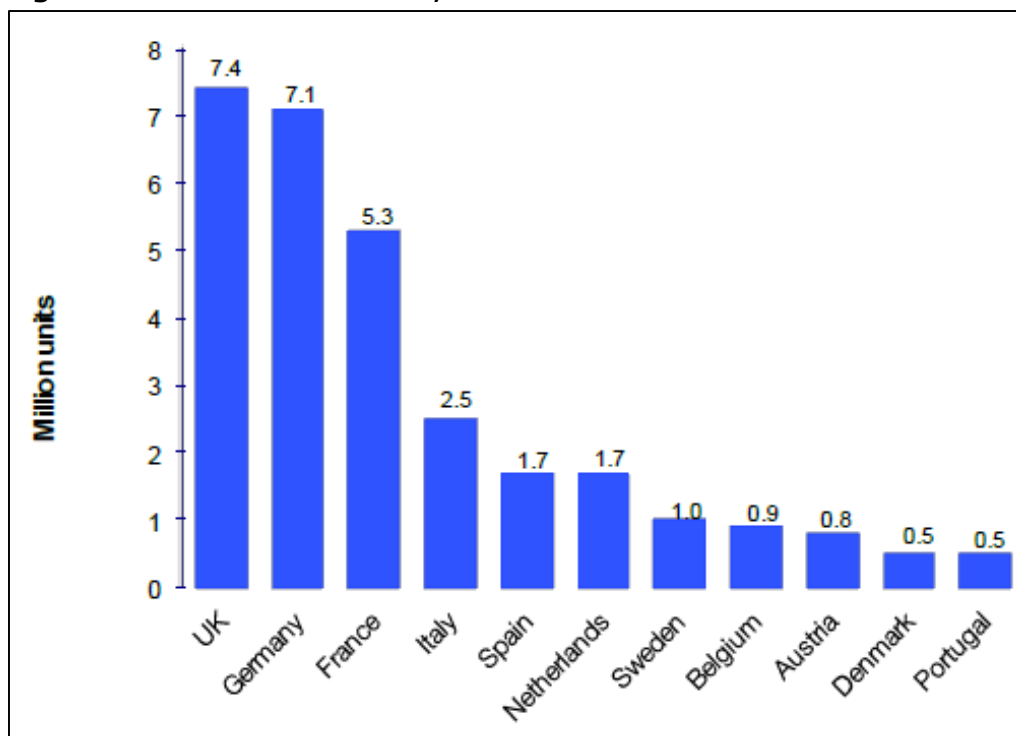
For instance, the status of a vehicle used by a vehicle manufacturer as a company car and sold on to a dealer is not clear; similar problems arise for vehicles that are sold which have previously been used as rental cars by the dealer. According to sales legislation, all afore-mentioned vehicles are undoubtedly to be qualified as used cars.

Exclusion of second-hand cars

The exclusion of second-hand cars has been identified by a couple of stakeholders (a European consumer association and Polish trade association) and some Member States stakeholders as a factor potentially limiting the effectiveness of the Directive as it excludes a large part of the market from the obligation of providing information on CO₂ emissions and fuel efficiency.

Europe's³⁸ new car registrations peaked at 16 million units in 2007, declined during the period 2007-2013 (12.3m in 2013), but have begun to recover to reach 14.2 billion in 2015 (ACEA, 2015b). In comparison, in 2013 the six biggest used car markets in the EU accounted for nearly 26 million used car sales (BCA, 2014) as illustrated in Figure 7-3 below, around double the level of new car sales.

³⁸ EU28 and EFTA countries.

Figure 7-3 Used car volumes, 2013

Source: National Trade Bodies (University of Buckingham, 2014)

Furthermore, a recent study for DG CLIMA (Transport and Mobility Leuven et al., 2016) examining imports and exports of used cars across the EU, found that imports of used cars exceed the number of domestic new registrations in a number of Eastern EU countries (LT, PL, LV, BG, SK, CZ). This is not including the domestic sales of used cars.

As stated in the monitoring report (AEA and TEPR, 2011), some dealers thought that customers assume that a new car would automatically have better fuel economy than an older car; therefore labelling used cars would improve consumer information and potentially increase the Directive's effectiveness by capturing all cars on the roads in the EU.

The UK is the only case study country with a (voluntary) used car labelling scheme in place (see also Section 6.3.4). The used car label is almost identical to the new car label. A survey of participating dealers found that 60% said the label aided or improved the sales process (LowCVP, 2011) and the more recent data from the LowCVP suggest that the level of uptake is significant (almost 50% of the dealerships use the label). Hence, although take-up is lower for used car labels compared to those for new cars (since there is no statutory basis for supplying this information), the response from industry was largely positive. Furthermore, two-thirds of used car buyers said the information had influenced their purchase decision, and more than half said that the label had enhanced their impression of the dealer (LowCVP, 2011). Overall, the experience in the UK suggests that the used car label was broadly successful in terms of gaining acceptance from industry and in influencing used car buyers. There is also some support in terms of the effectiveness of the similar scheme in Finland. The data provided by the Finish authorities suggest that consumer use of the online information tools for used cars. There were a total of 614,650 queries to portray the car label for used cars in 2015 – up from 250,632 in 2014.

During the first quarter of 2016 the number of requests was 428,572³⁹. This may be requests vehicle owners but, most often, used vehicle dealers.

Exclusion of vans

Labelling of light commercial vehicles (vans) is not mandatory under the car labelling Directive, although a few Member States (DK, ES) have introduced similar requirements for vans. Evidence on the impact of the inclusion of vans in Denmark and Spain was rather limited.

The input from the automotive association in Denmark – where the label has been extended to cover vans since 2009 – provides some positive indications. The industry representative considered the scheme successful and pointed to the important link between the information on fuel consumption that is provided by the label and the annual circulation tax, similar to the case for passenger cars. Similar input was not available in Spain and there is no data that could be used to assess the role of this information provisions.

At this stage there is no evidence available to properly assess the impact on the effectiveness of the Directive from the exclusion of light commercial vehicles. It should be pointed out that average number of registrations of light commercial vehicles during the period 2011-2015 was around 1.6-1.7 million, around 11% of the respective passenger car registrations over the same period (ACEA, 2015b). Although average emissions per vehicle (on a g/km basis) from light commercial vehicles are generally higher than those of passenger cars, their lower share in the total fleet means that total CO₂ emissions from this sector are less important compared to cars. Furthermore, the extent to which the inclusion of fuel consumption information would be relevant and useful in the case of LCV buyers is less clear than in the case of passenger cars given their greater knowledge about fuel consumption compared to private consumers. Literature highlights that LCV buyers place more importance on economic considerations when making vehicle purchasing decisions, including the cost of fuel (Ricardo-AEA and TEPR, 2015b).

7.4.2.3 Scope in terms of information required

This section assesses the scope of the Directive in terms of the minimum information required relating to fuel economy and CO₂ emissions. Consideration of other information that can be included voluntarily by Member States on the label is provided in the next Evaluation Question.

In terms of the scope of information required in the Directive, the aspect most often mentioned was the use of tailpipe measurements for CO₂ emissions instead of an approach based on the vehicle's lifecycle. More specifically, the information currently required in the Directive only captures tailpipe emissions, ignoring upstream or well-to-tank (WTT) emissions. As discussed in Section 3.2.3, CO₂ emissions from the manufacturing of vehicles and production of fuels can amount to a significant proportion of overall lifecycle emissions, and are especially important as a share of the total for alternatively-fuelled cars.

This also relates to the issue of how to deal with alternatively fuelled vehicles, which was mentioned by a number of Member State authorities and some manufacturers' associations, although it has not yet appeared as a concern across the majority of stakeholders consulted for this study. The Directive does not specifically reference cars' fuel types, and in particular it does not provide guidance on whether and how to provide the information for alternatively fuelled cars.

³⁹ This number does not necessarily reflect the number of vehicles for which a car label was requested. It is possible that more than one request was made for a single vehicle.

As a result, it is not clear how exactly to deal with these cars under the Directive. This has not yet appeared as a major concern across the stakeholders (consumer, national authorities, and trade) consulted for the study because the share of alternatively fuelled cars remains small. As a result, the impact on the Directive's effectiveness remains limited, but this issue should be expected to become more important in the future as their market share continues to rise. In order to deal with this issue and to enable like-for-like comparisons across all car types, new metrics may need to be considered for the label.

While total lifecycle emissions from alternatively fuelled cars typically remain lower than those for conventional cars, this approach would ensure that they are compared on the same basis and that the Directive has a wider reach. However, the method to calculate emissions would need to be very clear, robust and standardised across Member States for both manufacturers and consumers to avoid confusion, market disruption and errors which would undermine confidence in the reliability of the information provided. This will be complicated by several factors, particularly in the case of PHEVs and EREVs which can use either electricity or fossil fuels.

7.4.3 Conclusions

The analysis and consultation work undertaken as part of this study highlight a few strong and consistent messages with regards to the ability of the scope and specification of the Directive to support its effectiveness or hinder it.

With regards to the respective effectiveness of the **information tools**, there is a broad consensus in support of the label as the most successful tool to date. There is also a general consensus that the poster does not have any beneficial impacts and is probably now redundant. Similarly the printed guide is not found to be very useful although, on the other hand, its web-based version has seen high traffic in a number of countries (e.g. Austria, UK).

Generally, the main challenges faced by the tools and which limit their effectiveness are: the lack of trust in the measurement of fuel economy and CO₂ emissions, and the rise of the internet as the main source of information for consumers. Most European stakeholders consulted as part of the study stressed the need to provide the information online: this is both to adapt to changes in how consumers' collect and analyse information prior to a purchase and to ensure that consumers trust the information provided under the Directive (paper-based information rapidly becomes out of date which limits consumers' trust in the information supplied).

With regards to the **scope** of the Directive, the main conclusions are that:

- The current exclusion of used cars from the Directive limits its coverage and misses a large share of the market.
- There is limited evidence available at this stage in relation to impact of the exclusion of light commercial vehicles.
- The lack of guidance on how to deal with alternatively-fuelled cars and enable like for like comparison with other cars has had a limited impact on the effectiveness of the Directive to date due to the small market share of such vehicles but this will change in the future and should therefore be resolved as soon as possible. This may require a review of whether tailpipe measurements of CO₂ emissions will remain appropriate in the future or should be replaced by well-to-tank emissions. This would raise a number of complex methodological questions as well as practical issues (e.g. with regards to transitioning from one format to another) which would need to be addressed very cautiously to ensure that the information is reliable and that consumers understand it. It would also be important to understand what other relevant information needs

to be communicated to consumers in order for them to be properly informed about such vehicles

7.5 Effectiveness (EQ5): What factors have influenced the Directive's impacts, how and to what extent?

7.5.1 Introduction

While the previous section provided an EU-level overview of the information instruments' respective contribution to the Directive's effectiveness, this question focuses on the role of actions taken "on the ground", i.e. how the MS have implemented the Directive in practice. This is because the Directive is not prescriptive about the design of the label and this provides Member States with the opportunity to develop their own label designs. As a result, it is important to investigate the different approaches adopted by Member States with regards to instrument design and implementation (e.g. colour-coding, absolute vs relative scaling, additional information on cost) in order to assess whether some options have been more successful than others at increasing recognition, understanding and use of the information provided by the Directive.

7.5.2 Analysis

7.5.2.1 The label

As mentioned in Section 6, the methods of display for the required information and the content on the labels vary by Member State. The main elements of differentiation are:

- Label design
- The use of absolute or relative scaling
- The inclusion of additional information beyond the minimum required.

This section reviews how the various options chosen by the Member States have influenced the Directive's impacts in terms of information recognition, understanding and its ability to influence consumer purchasing decisions.

Label design

As presented in detail in Section 6.3.1, 11 of the 28 Member States have adopted a car label design that is similar in design to the EU Energy label (see Table 6-3). Among these, most use a 7 category system and all use coloured labelling classes. Germany includes an A+ rating for the best in class, Denmark includes three additional categories: A+, A++ and A+++), and the UK aligns the categories to the car tax system that has 13 categories (but still has 7 coloured classes). Slovenia has 10 categories and 6 coloured classes. The other Member States opted for other approaches (alternative categories, continuous comparison or no specified format).

There is broad support for the use of a label design similar to the EU Energy label, amongst stakeholders (industry and consumers) in countries who use it as well as some who do not (e.g. Portugal), as this design is already familiar to consumers and the Directive can therefore build on this awareness capital and benefit from the high level of recognition of the label's format. Such views are also supported in the literature (e.g. (LowCVP, 2012)).

With regards to **colour-coding**, 14 Member States have opted for this approach: all those which use the Energy label design as well as Belgium, Portugal and Austria. The evaluation of the Energy Labelling Directive found that consumers understand and appreciate the colour-code (Ecofys, et al., 2014) as it enables relatively technical information to be conveyed in an accessible manner, and this would apply to the car

label as well. The UK provides some anecdotal evidence on the importance of visual design for consumer understanding.

The experience in the UK suggests that in practice the use of colour-coding can improve the consumer understanding of the label. There were initially no requirements on the format of the label prior to 2005, and research suggests that this previous scheme was largely ineffective in reducing CO₂ emissions of new cars – average new car fuel consumption remained relatively stable between 1984 and 2000 (Boardman, et al., 2000) – during this period, the rates of tax were generally considered to be too low to significantly affect vehicle choice. Another assessment noted that the experience with the early labels was not promising, pointing out that the power rating of new cars in the UK increased faster than other Member States between the 1980s and 2000 (TRB, 2001). Other early research conducted in 2003 on the provision of information found most car buyers did not find this statutory, data-based information useful (Wallis, 2011). Since the introduction of the coloured classes on the label, subjective assessments of the effectiveness generally seem to have improved, highlighting the importance of visual aspects.

With regards to the choice of **label categories** – A to G vs the use of A+++, A++ and A+ additions – these categories are seen in some countries. For instance, Germany includes an A+ rating for the best in class, Denmark includes three additional categories: A+, A++ and A+++. The public consultation for this study does not provide specific answers on the use of such categories in relation to car labelling. However, findings from the Energy Labelling Directive's evaluation will be relevant here (Ecofys, et al., 2014). Consumer research on the Energy Label showed that both scales are well understood, however A+++ as the top of scale is less compelling than when A is at top (Waide and Watson, 2013) and that the difference between an A and a D is much faster for consumers to process than A+++ to A (Kubiak and Gronroos-Saikkala, 2013). As a result, consumers understand the scale but are not as motivated by differences in A+/++/+++ to the same extent as they are for differences between A/B/C.

Denmark is the only country to have implemented A+++, A++ and A+ categories for car labelling, and the representative from the Danish consumer association considered that these can be slightly more difficult to understand but on the whole are well understood by consumers, which aligns with the analysis described above. The association felt that some consumers (such as older people) may find these more difficult to understand but almost everyone is aware that A+ means that the car is more efficient than an A label vehicle.

Hence, consumer research suggests that the use of additional categories (A+, A++) does not confuse consumers, but it does seem to have the potential to reduce the effectiveness of the label because it provides a lower motivation to choose the highest-ranking vehicles.

Use of absolute vs relative scaling

Another important differentiation amongst Member States is whether the categorisation of each car is made against all cars (absolute) or against cars in a similar class (relative).

The majority of the Member States that use categorised labels (12 out of 14) have based them on absolute emissions. Three Member States (DE, ES, and NL) use a relative format, grading the vehicle in comparison to a weighted average of other vehicles within that category.

As already discussed in Evaluation Question 3, the advantage of the **absolute approach** is that it is straightforward to understand and allows easy comparison across all cars on the market.

On the other hand, the rationale behind the **relative approach** is that it recognises the existence of different segments in the market and the way in which consumers operate when choosing a car: they first decide on a type of car (e.g. large vs small) and then, within this category they use a number of factors to finalise their choice. The relative approach therefore enables a comparison of like with like and also encourages competition for greater fuel efficiency in each segment.

The relative approach is applied in different ways:

- In Germany, CO₂ emissions are combined with the weight of the vehicle in order to determine which relative category it belongs to. The cars are first categorised in different segments according to size, and within this are ranked according to their fuel efficiency and emissions.
- Spain classifies vehicle on the basis of their footprint (i.e. the area between the wheels of the vehicle).
- The Netherlands have a dynamic relative scheme that identifies the weighted average of the CO₂ emissions of vehicles of the same size (75%) and the average CO₂ emissions of all vehicles.

Generally, the relative approach seems to generate more confusion amongst consumers and therefore hinders understanding (as already reviewed in Section 7.3). More recently, testing of different label designs conducted in Codagnone et al. (2013) recommended that labels be based on absolute systems, as these are easiest to understand. These conclusions are also supported by UK consumer research, which found that while consumers might express a preference for a relative approach, in practice many participants were confused by the comparative labels that were discussed, the most common complaint being the lack of clarity regarding the basis of the comparison (LowCVP, 2012).

There is generally supportive evidence towards the higher effectiveness of an absolute scaling approach compared to a relative one in terms of influence on consumer understanding and purchasing behaviour. The absolute approach provides very clear and transparent information to consumers. Its main challenge however is in remaining relevant (which is also potentially a challenge for relative labels): the categories need to be updated periodically to reflect the gradual shift of vehicles towards lower emissions otherwise there will be too many vehicles in the A-C categories, which makes it difficult for consumers to differentiate between vehicles. In the case of the EU energy labelling, rescaling every 5-10 years has been proposed (European Commission, 2015d).

The inclusion of additional information beyond the minimum required

As reviewed in Section 6, additional information on cost is already included on a number of the Member States' labels.

The UK, Denmark, Germany, Estonia, Finland and Ireland provide information on running costs. All of these countries apart from Estonia also provide information on national taxation and financial incentives.

The relevance of including such information was discussed previously in Section 7.2, where it was concluded that requiring information on running costs and vehicle taxation, where appropriate, has the potential to bring added value.

Cost remains a critical consideration for consumers when purchasing a car – yet, focus groups with car buyers demonstrate that few engage in any calculations comparing the higher purchase prices with savings in overall fuel expenses over the ownership lifetime (Dumortier et al, 2014). One option to address this is to simplify the decision problem by including such information on the labels. Indeed, recent research suggests information on running cost in different formats (per mile/km and per five years) is

relatively more effective at influencing consumer choice compared to other information such as that based on CO₂ emissions (Codagnone et al, 2013).

In the UK, information on the first year rate of vehicle excise duty was introduced in 2010. The label also includes vehicle running costs based on annual mileage of 12,000 and displayed as a pounds (£) value. No research has been published on the contribution of this information to the label's impact but a study on the Fuel Economy Label (LowCVP, 2012) generated some useful findings: the basis on which running costs are calculated is not always well understood or accepted; there are also concerns about the assumptions made with regards to fuel prices and the fact that they change constantly quickly making the cost estimates obsolete; there is a poor understanding of the 'Vehicle Excise Duty' which limits the value of this information in the label. Moreover, a survey of UK consumers suggested that their attention was captured more by information on running costs than by information on CO₂ emissions (LowCVP, 2012).

In Denmark, the label includes information on average running cost and tax. This is deemed by the Danish dealers' association to help the recognition of the label as consumers understand the label both in terms of the tax that they will have to pay and also in terms of fuel consumption. Indeed, the main reason consumers are influenced by the label is because it gives an indication of the level of tax that they will have to pay.

In Germany, the label includes information on economic costs (annual road tax and typical energy costs). However, as seen in the previous section, understanding of the label remains poor in Germany although this is largely due to the use of a relative scale.

A number of different metrics and bases for the presentation of running costs and tax are therefore currently in place in Europe, each with different assumptions, and many more options could be implemented as identified in the 2010 study for the European Parliament (Ecologic et al., 2010).

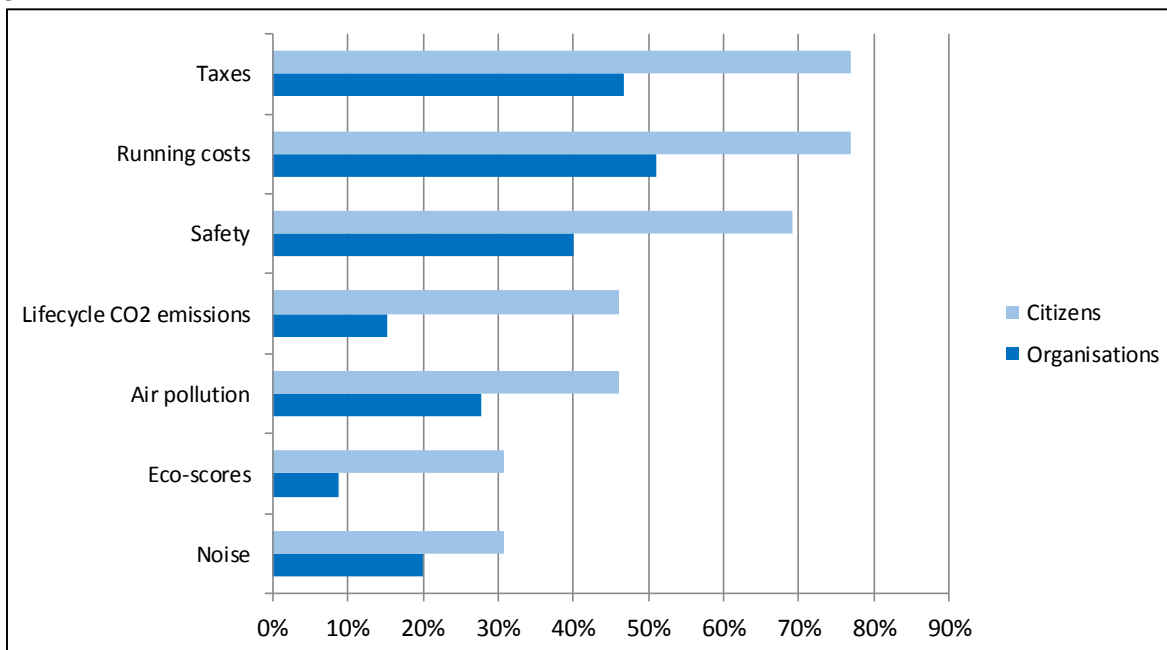
- Average annual fuel costs.
- Average fuel costs for an agreed distance. This approach has been adopted in some countries, e.g. the UK, Denmark and Finland. This varies among because average annual mileage tends to be different across the EU. For instance, estimated annual running costs are based on price per 20,000km in Denmark, 18,000 in Finland and 12,000 miles in the UK.
- Average costs over a three year period. This option was proposed as studies suggest that consumers take account of up to the first three years of fuel costs when considering the value of fuel economy when buying a car.
- Including both annual average fuel and vehicle taxation costs. In the UK, where the label is linked to the annual circulation tax, the annual circulation tax rate that applies to the specific vehicle is also displayed in order to reinforce the link between the label and the rates of circulation tax.
- Lifetime running costs. This is more challenging, as running costs and the levels of taxation change, and is arguably not useful or meaningful if consumers only take costs over shorter time periods into account when purchasing cars, as noted above

Each option would need to be assessed in depth in order to ensure that it provides transparent and relevant information for consumers while avoiding crowding the label.

Given that cost remains a key determinant of consumers' purchase decisions, adding cost information would therefore have the potential to enhance the Directive's effectiveness.

The public consultation conducted as part of this study confirms the existence of broad support for the inclusion of such information and that it is seen by both consumers and organisations as a way to increase the Directive's effectiveness.

Figure 7-4 : % respondents to the online consultation that consider the following additional information effective in terms of influencing consumers' purchase decisions



Source: public consultation (total of 67 citizens and 112 organisations)

Beyond the cost related aspects, information related to other parameters (including safety, noise or air pollution) is also provided in a couple of Member States. In Denmark, the label provides information on the EuroNCAP safety rating while the Finnish label provides an indication of the stationary and pass-by noise of the specific vehicle model. The level of other air emissions (NO_x, HC, CO) is also included in the Finnish label with an indication of the maximum permissible levels under the Euro 6 standards.

There are no studies in the respective countries considering the role and impact of the label in relation to any of these aspects. However, the Danish automotive association and the consumer association were supportive of the inclusion of safety information, indicating that it helps consumers to decide between two different cars with different safety features (e.g. number of airbags). The representative of the Danish consumer association was also supportive of the inclusion of air pollutant emissions in the label. Additional information from other Members States has not been made available.

The responses to the public consultation suggest that a significant share of consumer respondents (N = 67) consider safety related information as potentially useful while air pollution and noise are not given the same weight. It should be noted though, that there were no responses from any of the countries where such information is included on the label which suggests that responses reflect the opinion or wish of consumers rather than actual experience. Among organisations there appears to be greater scepticism of the role of this additional information, but again there were no responses from organisations in Denmark or Finland.

One common argument made against the inclusion of additional information is that it can lead to confusion and have a negative impact on effectively delivering the main message of the car label. Particularly in relation to the safety aspect, which is an important purchase criterion for consumers (Capgemini, 2015; Codagnone et al,

2013), some stakeholders (including consumer associations) suggested that there is a danger of mixing messages if additional aspects are included in the label. However, the Danish consumer representative suggested that the inclusion of additional information has not led to confusion.

We are not aware of studies addressing this issue – in relation to the car label or the household appliances – that could shed further light to our analysis. At this stage, it is not possible to conclude whether the provisions of additional information has had a positive or negative impact on the effectiveness of the label.

7.5.2.2 The guide on fuel economy

As consumers have changed the way in which they conduct research prior to buying a car, so the printed guide has gradually lost relevance and the potential to influence their choices.

In response to this evolution, most Member States (18 out of 20) made the guide available on the internet and 12 have turned it into a searchable online database. In the UK for instance, the website still gets approximately one million hits. Generally, the guide still has increasingly limited value if it provides static information (e.g. in pdf form) which is not regularly updated to keep up with changes in car performance and specifications.

The next, and more effective, level of implementation of the guide is therefore as a fully searchable online database (as in Denmark, France, Spain and the UK) which allows comparisons across cars and is more in line with how consumers now search for information.

7.5.2.3 The poster (or display)

As seen in Q4, the **poster** does not appear to add any value to the Directive: it is not viewed as useful by consumers or manufacturers, whatever the design options selected. It might therefore be timely to consider whether this requirement should be removed as part of the Directive.

7.5.2.4 Promotional literature

As established in Section 6, all Member States meet the minimum requirements set by the Directive. A few countries have gone beyond these requirements for a number of purposes: to extend the use of the information in advertisement of new cars (either on paper or online); to provide guidance to manufacturers on the requirements of the Directive and best practice principles for environmental claims; to provide more details and specification on the format to be used in promotional materials (e.g. font size, dimensions of the space to be used for the information).

There is little information to assess the effectiveness of the approaches listed above. The case study for Denmark highlights some potential challenges when using the label categories in **advertising/promotional material** if different variants of the same model are classified under different label categories. In these cases, the range of label categories (for example, A – C) is shown on the advert, to show that the label category varies depending on the optional extras, or engine type selected. This is quite common in Denmark; the consumer association commented that although this is not ideal from the point of view of the consumer.

7.5.3 Conclusions

There are a number of strong conclusions with regards to the most effective features of the label:

- The use of colour-coded categories similar to the EU Energy Label is well recognised and understood by consumers.

- Use of categories using ratings in the range of A-G (or A-M) range is more effective at influencing consumer choices compared to ranges including A+++, A++ and A+.
- Absolute scaling is more transparent and easier to understand for consumers than relative scaling, which improves both comprehension and trust and this in turn improves the effectiveness of the information.

Including running costs and/or taxes on the label may improve the effectiveness of the Directive as economic information tends to be of greater interest to consumers compared to environmental (i.e. CO₂) information. With regards to the other instruments, the poster and printed guide are largely felt to be redundant as previously mentioned, although there is some use for an online version of the guide.

Regarding promotional material, there is no concrete evidence for approaches that increase or decrease its effectiveness; however, good practice seen in some countries where steps have been taken to introduce advertising codes of conduct may help to limit misleading claims and therefor reduce confusion among consumers.

7.6 Effectiveness (EQ6) - What unintended or unexpected positive and negative effects, if any, have been produced?

7.6.1 Introduction

In this section we examine other impacts of the Directive – positive or negative - that were not intended or expected. We also assess whether these are a result of the design/implementation of the Directive or of market developments or as a result of the interaction with other policy measures in place.

We also considered whether there are impact on specific stakeholder groups (such as SMEs) and also examined whether the implementation of the Directive played any role in the adoption and use of similar information provision schemes in third countries.

The analysis is based on a combination of desk research, responses to the consultation and the interviews with stakeholders.

7.6.2 Analysis

Overall, the review of the literature and the input from stakeholders pointed to only a few issues that could be considered as representing unintended effects of the Directive, positive or negative.

From the positive side, the responses to the public consultation pointed to some indirect benefits from the use of the label. The automotive association in the Netherlands stated that the implementation of the car labelling has played a supportive role for the development of sustainable policies for company fleets. As explained, as part of their corporate social responsibility a number of companies nowadays require that all new cars purchased need to be in the top two or three label categories. Given that the company cars represent around 30% of the new vehicles sold, this is considered as having a significant impact. The extent that this can be linked to the label or to the beneficial taxes that apply is difficult to establish. However, in any case, the presence of the label have a facilitating role. Along similar lines, Spanish authorities indicated that the car label has also become a useful tool during the tendering process for the purchase of energy efficient state vehicles, with a certain percentage of vehicles expected to be 'A' category.

The proliferation of similar information provision schemes for vehicles outside the EU, particularly if they follow similar approaches to those of the Car Labelling Directive, could be considered a positive unintended impact of the Directive. Besides the possible contribution to the increase in the demand for more fuel efficient vehicles, the

adoption of similar labelling schemes may also lead to reduced implementation costs for EU car manufacturers that also sell vehicles internationally. The review of existing schemes outside the EU (see also Section 7.13) provides some supportive indications. The Global Fuel Economy Initiative report (UNEP, n.d.) identified that a number of countries have introduced labelling schemes since the adoption of the Directive (Australia in 2001, South Korea in 2006, South Africa and New Zealand in 2008, Brazil in 2009, China and India in 2010, Chile in 2013, Vietnam and Thailand in 2015 (UNEP, n.d.)). Some of the schemes have been directly influenced by the Directive. This is for example the case of South Africa where the label scheme adopted in 2009 was based on the EU scheme. Being a candidate for joining the EU, Turkey has transposed the Car Labelling Directive since 2008. While there is no information indicating direct influence, Brazil has also introduced a car labelling scheme since 2009 using a label design that follows the energy appliances label adopted in many EU countries. The car label used in Switzerland – including an energy label design – is also similar to that used by a number of Member States. Other countries have adopted rather different labelling schemes. Furthermore, in the relevant schemes in New Zealand and Chile, the fuel economy information provided is based on the European Combined Drive Cycle. Overall, while there is no evidence available of direct connection between the adoption of the EU car labelling scheme and similar schemes in other countries, it could be argued that by being among the first schemes to be developed, the EU car labelling scheme represented an example for other countries to use.

Beyond the label scheme, a transport NGO (ICCT) also suggested that the information on fuel efficiency and CO₂ emissions collected and made freely available as part of the EU scheme, also allowed the development of similar fuel efficiency databases in non-EU countries that import used vehicles from Europe. Such databases can help those countries to assess the fuel efficiency level of their fleet, which can support fuel efficiency related policymaking and improve the global market as a whole. However, no specific example was provided.

From the negative side, one common point made by a large number of stakeholders (representatives of the automotive sector, national authorities) concerns the waste of resources (paper, printing material) required for the hard copies of the guide on an annual basis. As indicated in Section 6.4, in many cases Member States print several thousand copies of the guide on an annual basis, which may never be used. However, this is expected to be less of a problem in the future since, as indicated, most Member States have gradually moved to electronic versions only or have significantly cut down the number of printed copies.

In terms of the representatives of the publishing industry – at both national and EU level – their main concern was that the inclusion of advertising in the definition of promotional material has, indirectly, led to a loss of revenues for advertisers, which, in turn, has negatively affected the publishing business. The main argument brought forward is that manufacturers may be more reluctant to take out adverts when obliged to include information on fuel consumption and CO₂ emissions leading to decreased attractiveness of printed advertising material and driving advertisers away from the printed press to other marketing solutions. While it is conceivable that there might be such a negative effect, there was no specific data or other evidence provided on the lost revenues for publishers associated with the Directive to help substantiate this claim.

The desk research and the input from stakeholders has not revealed any other unintended positive or negative impacts of the Directive.

7.6.3 Conclusions

Overall, the study has identified only a few unintended impacts – positive or negative – of the Directive. From the positive side, there are some indications of a contribution of the Car Labelling Directive to the broader proliferation of car labelling schemes globally. The EU approach appears to have been the basis for some schemes adopted outside EU in the last 5-10 years.

From the negative side, there is a waste of resources associated with the printing of the guide, in tandem with its limited use. In addition, publishers indicate that the promotional material requirements have the potential to have an adverse effect to the demand for advertisement in printed media. However, no specific evidence of the lost revenues have been provided to support this claim.

7.7 Efficiency (EQ7): To what extent are the costs resulting from the implementation of the legislation proportionate to the benefits that have been achieved as regards each main element of the Directive?

7.7.1 Introduction

The first part of the response to this question on efficiency aims to identify the cost categories and their magnitude with regard to the implementation and ongoing costs of the Directive. The second part aims to assess how proportionate these costs are with respect to the benefits achieved.

The analysis is based on stakeholder estimates of costs and benefits against different categories (provided via the interviews, public consultation and MS survey). The interview questions for each group of stakeholders contained specific questions on costs, with options for the interviewee to give quantitative or qualitative answers depending on the information they have available. The answers received have been cross checked with literature to the extent possible, or, as a minimum, cross-checked against inputs from other stakeholder groups.

7.7.2 Analysis

7.7.2.1 Implementation (one-off) costs

Implementation costs to national authorities

Regarding implementation costs it is worth recalling the specific elements of the Directive. Firstly, the minimum requirements for the label are that it is A4 size and contains the information outlined in Annex I of the Directive. There is no official requirement for any specific design, although several Member States have chosen to implement their own designs. Even so, none of the consulted national authorities identified the design of the labels as a significant implementation cost.

The second requirement of the Directive is for provision of a guide on fuel economy and CO₂ emissions. Most Member States initially implemented this as a printed guide, although a strict reading of the Directive suggests that an online-only version could satisfy the requirements, especially with modern electronic devices⁴⁰. The consulted national authorities were not able to estimate the costs of implementing requirements for the guide per the requirements of the Directive, suggesting that they were

⁴⁰ Article 4: The guide shall be portable, compact and available free of charge to consumers upon request both at the point of sale and also from a designated body within each Member State.

probably not significant. Conversely, where Member States have opted for a website to provide information to consumers, there have been some associated implementation costs for its **design and set up**. In Austria, the national authorities transferred the cost of implementation to the industry, which was estimated to be €20,000 to €35,000 for the initial set-up of the website⁴¹. ADEME (France) also indicated that there were initial costs associated with the design of the website, but were not able to provide an estimate. No other estimates of the set-up cost for websites were received.

Implementing the other requirements of the Directive (poster, promotional material etc.), were not identified by any of the consulted authorities as having a significant implementation cost.

Overall, the information received indicates that implementation costs were overall rather minor for national authorities, with the only potential cost being related to setting up a website, indicated at €20,000 to €35,000 by the Austrian authorities.

Implementation costs for industry

For industry, several national industry associations interviewed for this study stated that there were no significant one-off costs (Denmark, Netherlands, and Austria⁴²).

Conversely, representatives of industry (responding via interviews or the public consultation) in other countries indicated that they had been affected by implementation costs, as follows:

- In Poland, the national industry association is responsible for the guide on fuel economy. The representative of the association suggested that initial implementation costs were up to €100,000 for their organisation, but the specific activities that contributed to these costs could not be identified.
- Several implementation costs to manufacturers were mentioned by an EU-level representative of car manufacturers. Although the respondent could not quantify the impacts, it was suggested that these related to changes made in marketing, homologation, product management and IT departments;
- An OEM noted that there was a need for development of a database to identify CO₂ emissions; however, the respondent recognised that this was also required for the car CO₂ Regulations;
- Another OEM mentioned the need for training of their dealers, but did not quantify the costs.

Overall, in several countries (DK, NL, AT) were no significant one-off costs identified. Several comments were received regarding other possible implementation costs (e.g. due to setting up/changing internal systems), but these were mentioned by only one stakeholder in each case and could not be quantified. This suggests that, while there may have been some implementation costs to industry, they were not systematic. The lack of quantitative estimates, or even a qualitative comment on the scale of the costs, means that there is insufficient data to determine whether or not these implementation costs were significant.

7.7.2.2 Ongoing (annual) costs

Costs to national authorities

The main potential ongoing costs for Member State authorities were identified through consultations (interviews, Member State survey and public consultation) as follows:

⁴¹ Respectively by the national authority and a national industry representative

⁴² With the exception of setting up the website for Austria, as discussed above

- Monitoring and enforcement;
- Costs of information collection and maintaining the guides;
- Maintaining websites; and
- Printing guides.

Other cost categories were proposed to respondents as options for their comment (e.g. cost of responding to enquiries), but were not identified as significant.

Regarding **monitoring and enforcement costs** Member State authorities were asked to comment on these in various ways, in order to try to elicit some sense of the scale. The responses received were as follows:

- Several national authorities indicated that enforcement costs were negligible (Austria, Lithuania, Slovakia, Germany) – due to the low enforcement efforts in these countries⁴³.
- The Swedish and the Finnish national authorities indicated in their response to the Member State survey that annual enforcement costs were in the range of €1,000-10,000. However, in its response to the public consultation, the Swedish consumer agency and transport administration estimated a slightly higher figure, with total enforcement costs of €50,000. The Finnish authorities indicated that costs for enforcement have declined over time with limited human resources (less than 0.1 of Full time equivalent) allocated to the showroom checks during the last year.
- For the Netherlands, contradicting estimates were received from two different respondents at the same Ministry, indicating a high level of uncertainty. One respondent estimated overall annual enforcement costs of €10,000-100,000 while the second estimated them at €200,000. The reason for this discrepancy may be that the second respondent provided data for previous years, which may have incurred higher costs. The survey responses suggested that regular monitoring used to be carried out but is no longer done.
- All other responses received (Belgium, Denmark, Netherlands, Romania, UK) indicated that annual enforcement costs were in the region of €10,000-100,000. For the UK, this was estimated more precisely at €27,000.

Overall, this indicates that enforcement costs are typically in the range of €10,000-100,000 for most countries (BE, DK, RO, UK, SE), except for countries that give low priority to enforcement (where associated costs are negligible, e.g. AT, LT, SK, DE).

The cost of **collection and provision of information for the guides** was identified as a significant cost category by some respondents (all national authorities were asked about this category):

- €6,528 (excluding taxes) for data purchase (Belgium).
- €72,000 per year for data collection (France)
- €80,000 per year, with other costs related to producing the content of the guides amounting to €10,000 per year (Netherlands)

⁴³ In Austria, this is because no dedicated monitoring has been conducted by the Austrian national authority since 2003. In Lithuania, the authorities stated that, due to the absence of local manufacturers, they do not consider it so relevant to perform systemic continuous monitoring of the implementation of the Directive (the required information is typically obtained from other Member States) but only respond to specific complaints. The Spanish authority noted that there were generally not any annual inspections. The German ministry indicated that enforcement/monitoring is not carried out at federal level, whereas the interviewee did not think that the costs on monitoring were significant.

The Spanish and Italian representatives indicated that there is no separate cost for information collection – rather, this is included in the overall website costs.

The costs for **website maintenance and updates** were estimated during interviews conducted with national authorities for this study as follows:

- €6,000 contribution from the ministry in Austria (the remaining cost is borne by the industry).
- €40,000 (including information collection) per year in Spain.
- €140,000 per year (in 2015) in Germany. Expected to rise to €240,000 in 2016.
- €217,000 per year (including the underlying database) in the UK. However, it is not clear from the figures provided whether this cost is solely for the activities related to the Directive or whether it also includes the wider functions of the VCA database.

No other estimates have been provided.

The cost of **printing guides** has been estimated during interviews at €30,000 per year by a French authority (for 30,000 guides). Around 60,000 guides are printed in Denmark, which (assuming the same cost per guide as in France) approximates as €60,000. The UK has also indicated that it has moved from a physical guide to provision of a CD-ROM, of which 80,000 were distributed last year. The total cost of producing the CD-ROMs, along with a small number of printed guides, is estimated to be €36,000 per year. Several authorities also indicated that the guide is produced online only, hence there are no printed guides (AT, IT, BE, EE, FI, NL, PT, SE, SK).

The above costs seem to constitute the main elements of ongoing costs to national authorities. Respondents to the consultations were asked to identify any further possible costs – one further cost category was identified by a Dutch authority in their response to the public consultation. This was related to the cost of maintaining and updating labels and posters, and was estimated at around €250,000 per year. The respondent did not provide additional details, so it is not clear whether this is a general cost that could affect other countries, whether or not it also includes printing of labels (which can contribute significant costs, as discussed below) or whether it has to do with the specific calculation and regular updating of the relative label implemented in the Netherlands (see Dutch case study, Annex F, for more details). Furthermore, a second response from a different individual in the same ministry (which seems to refer to a more recent year, since it does not include the printing costs) did not identify any significant costs associated with updated labels and posters – hence it is not clear to what extent this input is representative of the true and current costs. Another potential cost was identified by the UK authorities – responding to enquiries and complaints, estimated at around €75,000 in 2015. This figure may be anomalously high – costs run at an average of €11,000 per quarter for the first three quarters of 2015, rising suddenly to €42,000 in the last quarter.

A summary of the data collected is presented in

Table 7-4. Overall it shows that possible ongoing costs in each category can be (close to) negligible in the low case, whereas high estimates of the ongoing costs are in the range of €10,000-250,000.

Table 7-4: Overview of ongoing costs to Member State authorities

Cost type	Low estimate	High estimate
Monitoring & enforcement	Negligible (AT, LT, SK, DE)	€10,000-100,000 (BE, DK, RO, UK, SE)
Collection of information	Nil – included in website maintenance costs (ES, IT)	€72,000 (FR); €90,000 (NL);
Website maintenance	€6,000 (AT – contribution only, rest of cost is borne by industry – an additional €13,000)	€140,000 – 240,000 (DE); €217,000 (UK)
Printing guides (if applicable)	Online only (AT, IT, BE, EE, FI, NL, PT, SE, SK)	€60,000 (DK – estimated cost for 60,000 copies)
Other	N/A	Maintaining and updating labels and posters: €250,000 per year (NL) – unclear how representative this estimate is. Enquiries and complaints: €75,000 (UK)

Source: interviews with national authorities conducted for this study, MS survey and public consultation, (AEA and TEPR, 2011).

Costs to industry

The main cost to industry that was identified appears to be that of printing the labels. In total, these costs were estimated on an annual basis at €0.5-1 million for the EU-28, based on the following calculation assumptions:

- A total of 192,000 enterprises selling cars and light motor vehicles across Europe (Eurostat, 2016)⁴⁴
- Data on the number of vehicles presented in the showrooms on an annual basis – for which a label should be displayed – are not available. Thus, we considered as a reasonable range a total of 10-25 vehicles annually.
- A compliance rate of attaching the label of approximately 90% (varies for individual countries – see Section 6.8); and
- A cost to print an individual label of €0.3 (European Commission, 2015c).

The information required for the label is derived from information already gathered in the course of vehicle type approval and testing – as formally required in the Directive itself, the figures should be based on the “official fuel consumption” and “official specific CO₂ emissions” derived from these tests. Hence, no additional costs are associated with the need to gather information required. A review of the available literature indicates that labelling products online involves little effort (European Commission, 2015c), hence information provided online was considered to incur a negligible cost.

⁴⁴ Data from the European council for Motor Trades and Repairs suggest that actual figure may actually be smaller, around 71,000 (CECRA, 2016).

Other potential cost categories were suggested, although only single estimates were provided, which does not allow for any cross-checking of information. The following comments were received during interviews with national industry associations:

- An annual cost per dealer of €1,000 associated with the time taken to print the labels and affix them to vehicles (Denmark).
- Around 5 days of effort is needed annually for collecting the data needed to compile the guide, at a cost of around €10,000 (Poland).
- €13,000 per year for hosting the website, collecting information and implementing it online (Austria).
- Fees paid for ICT services associated with information provision/website €275,000 for the industry. Other costs are estimated to be minimal at €250-500 (Netherlands).

In each case, the potential additional costs identified were different for respondents from different countries, which seems to suggest that additional costs depend very much on the way in which the Directive operates at a practice level in each country (e.g. which organisations are responsible for collecting and providing data). For instance, in the Netherlands a fee is paid to an ICT service who are responsible for information provision (an amount comparable to the annual website maintenance costs in the UK and Germany, as discussed above).

Additionally, German dealers identified the cost of printing the guide as significant (typically allocated to the national authorities as discussed above), although no specific estimates of the cost were given by these stakeholders.

Several issues were specifically raised by **representatives of dealers in Germany**, who responded to the public consultation. This refers to specific costs arising from what, in their view, are considered to be vague requirements of the Directive with regard to promotional materials. They refer to the requirement that information in promotional material should be “no less prominent than the main part of the information provided in the promotional literature”. This uncertainty in turn has reportedly led to two additional costs. Firstly, that larger advertisements may be required (at higher cost), in order to accommodate the required CO₂ and fuel consumption information. Secondly, a cost was associated with the (risk or fear of) high fines for non-compliance, including minor and unintentional infringements. According to a German trade magazine, violations of the Directive incur fines of €200 up to several thousand euros, which are levied against dealers (Focus, 2013). Representatives of dealers responding to the public consultation claim that the total fines against them have added up to €4 million since the year 2006. However, it should be noted that these issues were not mentioned by stakeholders from other countries, suggesting that the identified costs may not be significant elsewhere. Furthermore, the German legislation implementing the Directive has transposed the specific requirements without any additional provisions or other clauses. Given that the German implementing legislation does also not provide for specific fines for non-compliance, it is probably the general framework for enforcing fair commercial practices in Germany that is the reason for these costs, rather than the specific provisions of the Directive.

No further significant costs were identified. The finding that the main ongoing costs relate to the printing of the label is in line with findings for other sectors that have labelling requirements – for example, the Impact Assessment underlying the recast of the Energy Labelling Directive in 2010 found that for manufacturers, the administrative burden is limited to printing of the label and the strip, whereas the rest of the activities will take place as part of normal business (European Commission, 2008). Potentially, other costs are borne by industry in certain Member States that would otherwise be borne by the national authorities (e.g. website maintenance,

production of the guide, printing of the guide) – this appears to represent a transfer of effort rather than additional ongoing costs.

7.7.2.3 Benefits and cost-effectiveness

In terms of the potential benefits, the main benefit is thought to be the fuel cost savings to consumers, and concurrent CO₂ emission reductions. The limited quantitative information on the effectiveness of the label (see Section 7.5) means that a full cost-benefit calculation is not possible when considering the implementation of the minimum requirements of the Directive, versus any additional measures that Member States have chosen to implement. Nor is a quantitative analysis possible at a country level in most cases - only in France was there sufficient data to estimate the overall costs and benefits, although Nevertheless, it is an instructive example to examine the potential costs and benefits of a particular implementation.

One of the few studies that quantified the possible benefits of car labelling was carried out for France by D'Haultfoeuille et al. (2015) CO₂ savings were calculated by making use of an econometric study that examined the average reduction in new car CO₂/km in France between 2003 and 2008. The total average reduction in new car CO₂/km was 14.90g/km over the period 2003-2008, of which 2.24g/km was attributed to the effect of the label alone. Thus, in the absence of the label (the counterfactual), new vehicles sold in France in 2008 would, on average, have 2.24g/km higher emissions compared to 2003. It should however be noted that the implementation of the car labelling Directive in France goes beyond the minimum requirements by introducing a label with colour-coding and linked to fiscal measures. The achieved benefits may therefore have been higher compared to other countries. At the same time this may indicate the potential benefits of an effective car labelling scheme.

Even if the impact of the Directive could indeed be much smaller compared to that seen in France, the Directive would still be cost-effective. This view is supported by studies in the Netherlands, which considered the labels to be a success despite the small impact they had on sales, since the costs involved were so minor.

In contrast, there are Member States where the available evidence suggests a very limited – if any - impact of the Directive (e.g. Czech Republic, Poland, and Italy). In these countries the cost-effectiveness of the Directive should be expected to be much more limited, and the costs – even if reduced due to the absence of any monitoring activities and online databases - possibly greater than the relevant benefits. Given that these are all countries where a colour-coded EU energy label was not introduced, it is reasonable to expect that similar low levels of effectiveness would apply to the remaining 11 countries that have not adopted a similar approach.

For the remaining countries examined where a colour-coded label has been adopted, a formal analysis of the costs and benefits of the Directive has not been possible. However, in all cases, there are some indications of a certain contribution towards raising awareness and, to a lesser extent, of influencing consumer decisions towards purchasing more fuel efficient vehicles. Nonetheless, given the limited costs of the implementation of the Directive (in most countries less than a million Euros on an annual basis) and the potential fuel cost savings associated with even a minimum contribution towards reducing fuel consumption, it is reasonable to expect a significant benefit: cost ratio, even if specific figures are not possible to provided.

We should also note that the analysis does not take into consideration other possible benefits which do not seem to be significant or systematic. For example, stakeholders were asked during interviews whether there could be time savings for consumers when searching for information about fuel consumption and/or CO₂. The Austrian industry association and UK competent authority felt this was indeed a benefit, whereas other stakeholders felt it was not (i.e. the Dutch Environmental Assessment Agency, the Polish industry association) and the remaining interviewees did not

provide an answer. Stakeholders responding to the public consultation did not generally report additional benefit categories, although one respondent reiterated the potential fuel cost and emission savings.

The Italian and German ministries pointed to possible benefits of higher public awareness about fuel efficiency, although again these cannot be quantified and, to the extent that they affect vehicle choice, these effects may overlap with the previous discussion on fuel savings.

7.7.3 Conclusions

It appears that the implementation costs have not been major, either for national authorities and industry. Some initial set-up costs may have been associated with the websites, although only one estimate of this cost was received (€20,000 to €35,000 in Austria).

In terms of ongoing costs for national authorities, the overall magnitude of costs seems broadly similar across countries, although the division into specific activities reveals some differences:

- The monitoring and enforcement costs are typically in the region of €10,000-100,000 if enforcement is actively conducted, and negligible if no enforcement is carried out.
- Collection of information seems to constitute a major cost in some countries (e.g. France and Netherlands – amounting to €70,000-90,000), but was not identified elsewhere. In some countries (e.g. Poland), the industry is responsible for this activity and hence bears the associated cost.
- Website maintenance (where applicable) seems of the order of €140,000 – 240,000 (in Germany and UK), although other countries reported much lower costs. In some countries (e.g. Austria), the industry is largely responsible for this activity and hence bears the associated cost.
- The printing of guides (where applicable) makes up a significant share of overall ongoing costs (around €30,000-60,000 per year), although many Member States seem to have moved to an online-only version that circumvents the printing costs.

The main ongoing cost to industry is that of printing the labels, estimated at €0.5-1 million per year for the EU-28. The finding that printing labels is the major cost is in line with studies of other similar Directives in other sectors.

Overall, the Directive shows the potential to be cost-effective, but this depends largely on the national implementation and consequent effectiveness of the measures, with the main quantifiable benefit being in terms of fuel cost reductions for consumers. Given the relatively low cost of the Directive and the fact that cars are driven for many years after purchase, even relatively small contributions to reductions in new car fuel consumption can yield very attractive benefit: cost ratios. While specific data are not available, it appears reasonable to expect a significant benefit: cost ratio for all those countries where a colour-coded label has been used. It also seems possible that in the remaining countries (around 14 Member States) where only minimum requirements have been adopted, the benefits are much more limited. Despite the low costs associated with implementation, the cost-effectiveness in these countries could also be particularly low.

7.8 Efficiency (EQ8): To what extent do the different types of costs resulting from the implementation of the legislation vary based on the approach taken to implement the legislation (while achieving the same results)? Which approach was most efficient?

7.8.1 Introduction

This question on efficiency is concerned with determining how the costs have been influenced by the differing implementation choices made. The analysis draws on the assessment carried out in the previous evaluation question, with attention given in particular to areas where the identified costs differ across Member States and the reasons for these differences.

7.8.2 Analysis

The information collected and presented in the previous evaluation question reveals some differences in the costs in different Member States due to the approach to national implementation. Most importantly, these relate to:

- The decision as to whether or not to physically print the guide on fuel economy (or providing it online only as an alternative);
- The approach taken to monitoring and enforcement.

7.8.2.1 Provision of the guide in printed or online format

As already indicated in Section 6.4, several Member States indicated that they do not provide printed versions on the guide, but rather offer it online only (AT, IT, BE, EE, FI, NL, PT, SE, SK). Moving from printed guides to online-only versions may save several tens of thousands of Euros per year for the responsible organisation. For instance:

- The Italian ministry noted that the annual printing costs had been €60,000 before the guide was moved to an online-only version in 2008.
- In the Netherlands, the national ministry noted that up until 2010/2011 about 50,000 copies were printed each year – costing approximately €60,000⁴⁵.
- An estimate from Belgium referring to the year 2011 put the total cost of printing at €70,000-80,000⁴⁶ (AEA and TEPR, 2011), whereas the information received for this study suggests that currently the guide is online only.

Alternatively, the UK has moved to CD-ROMs, which the national competent authority estimates has approximately halved the costs compared to printing guides (currently the annual cost of producing the CD-ROMs is estimated to be €36,000 per year).

In general, the costs associated with printed guides seems to be falling away in most countries as consumers tend to rely more on online data sources – this suggests that the effectiveness of the Directive would not be significantly impacted by a switch to online-only versions. For instance, the estimated number of printed guides Denmark in 2011 was 100,000 (AEA and TEPR, 2011), compared to updated estimates received from the survey of 60,000 copies. UK authorities indicated that they used to print around 500,000 printed guides per year, whereas now they distribute only a small number (5,000) in addition to 80,000 CD ROMs. German dealers suggest that there is little demand among consumers for the printed guide.

⁴⁵ According to a response from a Dutch authority to the public consultation

⁴⁶ Approx. €2 per copy

7.8.2.2 Approach taken to monitoring and enforcement

As previously discussed in the section on implementation, the approach taken to monitoring and enforcement differs widely, whereas information on compliance rates generally indicates that compliance is high (generally 80% or more – see Section 6.8). Since the best examples of compliance are consistently high, the important factor that determines the benefit: cost ratio is therefore the cost side (i.e. the resources dedicated to enforcement by the competent authority).

In this regard, the approach taken in Austria since 2003 to enter into a collaborative agreement with industry is particularly interesting, as it means their enforcement costs are essentially zero. The ministry considers that compliance is extremely high – close to 100% for all parts of the Directive – without any need for monitoring (an infinite benefit: cost ratio). Information to consumers is displayed on a website and if manufacturers fail to provide the required information on time they are excluded, which potentially puts them at a competitive disadvantage (since the website is used by many Austrians to compare vehicles). The industry is therefore self-policing.

In countries that do conduct active monitoring, some scope for efficiencies seems possible. In particular, Denmark reported a higher number of annual inspections at similar or lower annual cost compared to other countries. Specifically, in Denmark, the estimated costs of enforcement were €10,000-100,000 per year, during which time around 75 inspections are carried out. In Belgium and Sweden, similar costs are reported for a lower number of inspections (respectively 30 and 21). The Danish authorities explained that they were able to keep costs low by combining checks of vehicle inspection companies with checks of dealers in the same cities. This suggests that exploiting synergies with other inspection responsibilities has the potential to reduce inspection costs.

7.8.2.3 Other costs

The other costs identified related to the Directive show some variation between Member States. To some extent, this is due to shifting of burdens between national authorities and industry, according to which organisations have responsibility for implementation. For instance, authorities from Belgium and France refer to direct costs for acquisition of data from manufacturer for the development of the guides and both suggested that costs could be reduced by making data available for free from public or EU authorities. However, in other countries these costs are shifted to industry (e.g. Poland).

7.8.3 Conclusions

The move from printed guides to online-only versions has the potential to save several tens of thousands of Euros per year for the responsible organisation. There is no reason to expect any appreciable impact on the effectiveness of the Directive from making this switch, especially since demand for printed guides seems to be falling away as consumers move to online information sources.

Specific approaches to monitoring and enforcement can alter the annual enforcement costs. In Austria, a high level of reported compliance is achieved by entering into collaborative agreements with industry, such that manufacturers are incentivised to comply. Alternatively, in cases where active monitoring is desirable, combining inspections with other enforcement activities seems to have the potential to reduce the ongoing costs.

Two further possible costs were identified by German dealers as being associated with uncertainty over the requirement to ensure that the information in promotional material should be “no less prominent than the main part of the information provided in the promotional literature”:

- Higher advertising costs due to the larger advertisements required in order to accommodate the required CO₂ and fuel consumption information.
- Risk of high fines for non-compliance, including minor and unintentional infringements.

These issues were not mentioned by stakeholders from other countries, suggesting that the identified costs may not be significant elsewhere, but are rather related to the German implementation of the Directive in combination with the approach to enforcement (via litigation). The national association suggests that clearer requirements over the positioning and minimum font size required for the information in promotional materials (as already implemented in other countries) would clarify the situation and avoid costly litigation.

No other significant national implementation aspects that affect the overall costs were identified.

7.9 Efficiency (EQ9): What are the major sources of inefficiencies? What steps could be taken to improve the efficiency of the Directive? Are there missing tools and/or actions to implement the Directive more efficiently?

7.9.1 Introduction

Evaluation Question 9 aims to identify any potential inefficiencies and ways to overcome these. In particular, it considered whether all of the implementation/ongoing costs were necessary, whether these could have been reduced or eliminated without reducing the benefits, and whether further cooperation between Member States could lead to higher efficiency. The analysis draws on the findings of the previous two evaluation questions, as well as specific questions put to stakeholders in the consultations (public consultation and interviews) regarding their suggestions to reduce costs.

7.9.2 Analysis

As reviewed in Evaluation Question 7 (Section 7.7), there do not appear to have been major implementation costs for national authorities or industry. Hence, the analysis of sources of possible inefficiencies concentrates on the ongoing (annual) costs.

The first and most important aspect to consider with regard to ongoing inefficiencies is an extension of the cost-benefit analysis provided in Section 7.7, which clearly shows that if the information provision is not effective, the costs are essentially wasted. This naturally leads us to consider recommendations that may improve the effectiveness of the Directive (see previous Evaluation Questions). In this respect, and as already discussed, there are certain general principles relating to the design/format that can improve the understandability of the information (and will consequently improve the effectiveness of the Directive) while having similar costs.

An extension of this argument could be to consider harmonisation of the label requirements, which would reduce inefficiencies further (for example, by avoiding duplication of effort involved in information collection, or by allowing attaching of labels at the factory). Many respondents, including French and Dutch national authorities, an EU-wide NGO and manufacturer and several industry organisations, agreed that having harmonised label definitions across Europe would lower administrative costs.

As discussed in Section 7.4, there seems to be a general situation across Member States that the poster and printed guides are growing increasingly obsolete. This suggests that the requirements for the poster and printed guide can be dispensed

with. As indicated in the previous Evaluation Question, the effectiveness of the Directive is unlikely to be compromised by a switch from printed guides to online-only versions. This would save several tens of thousands Euros per year for organisations that are responsible for printed guides. At the same time, considering the relatively low and declining demand for such guides, there does not appear to be scope for any substantial impairment of the effectiveness of the Directive. Although the quantification of the costs of the posters/displays was not possible on the basis of available data, abolishing the requirement would logically reduce costs to industry for compliance, as well as monitoring costs (where applicable). At the same time, consumers may find the information provided in the posters online, as well as in the labels (which tend to follow the same format). This, in combination with the low level of awareness about the posters among consumers (see Section 7.4) suggests that removing this requirement would not affect the effectiveness of the Directive.

7.9.3 Conclusions

The first and most important aspect to consider with regard to ongoing inefficiencies is to implement recommendations that may improve the effectiveness of the Directive (these follow from previous recommendations in Section xxx). There appear to be certain designs/formats that improve the understandability of the information and will consequently improve the effectiveness of the Directive while having similar costs.

A harmonised design at the EU level could reduce inefficiencies further (for example, by avoiding duplication of effort involved in information collection, or by allowing attaching of labels at the factory). This proposal would need to be considered in the context of an Impact Assessment in order to evaluate the possible trade-off with the need for flexibility, for instance in how information is presented to align with national fiscal measures, locally-preferred units of measurement etc.

The analysis suggests that the requirements for printed guides and the poster displays could be abolished, which would reduce costs of compliance and monitoring without scope to significantly affect the effectiveness of the Directive.

7.10 Coherence (EQ10): How well does the legislation fit with and complement other EU policies (e.g. air pollution) and their objectives (e.g. environmental, social or economic)?

7.10.1 - Introduction

The evaluation of 'coherence' is concerned with the extent to which the Directive is consistent and complementary to other policies and policy frameworks. This included the evaluation of the extent to which there are synergies with other policy areas, and how these might be further exploited, or alternatively whether there are any conflicts, overlaps or inconsistencies and how these might be resolved.

This question considered the 'coherence' of the Directive with parallel EU policy measures and their objectives, while Question 11 evaluated the Directive in the context of relevant EU strategies (see Section 7.11) and Question 12 evaluated the Directive in a wider policy context, including relevant international and national policies (see Section 7.12).

The policies of most relevance to this question were those that:

- Encourage more fuel efficient vehicles, such as the Passenger Car CO₂ Regulation (Regulation (EC) No 443/2009) and the Clean Vehicle Directive (Directive 2009/33/EC), as these should complement the Car Labelling Directive;

- Require an improvement in the environmental performance of transport fuels, e.g. the Renewable Energy Directive (Directive 2009/28/EC) and the Fuel Quality Directive (Directive 98/70/EC, as amended by Directive 2009/30/EC), and require the provision of appropriate infrastructure for alternative energy sources, such as electricity and hydrogen, as in the Alternative Fuels Infrastructure Directive (Directive 2014/94);
- Provide information on energy consumption to consumers on other products, such as the Tyre Labelling (Regulation (EC) 1222/2009) and the EU Energy Label (Directive 2010/30/EU), as these could provide synergies with the Directive; and
- Regulate other elements of the environmental performance of cars, including their emissions of air pollutant and noise, and their disposal at the end of their lives, in order to ensure that all such legislation works together to reduce the environmental impact of transport.

Each of these set of policies is discussed in detail in the section below.

7.10.2 - Analysis

The relationship between the Car Labelling Directive, the **Passenger Car CO₂ Regulation** and the **Clean Vehicle Directive** (CVD) has already been analysed and concluded to be coherent in the evaluations of the latter two pieces of legislation, both of which were finalised in 2015 (RICARDO-AEA and TEPR, 2015a; Ricardo-AEA and TEPR, 2015b). As noted in Section 3.1, the Car Labelling Directive and the Passenger Car CO₂ Regulation were developed as part of a package of measures that were put in place to reduce the CO₂ emissions of new passenger cars in the EU. The Regulation, which replaced the voluntary agreements with car manufacturers that were initially put in place, is a supply-side measure that ensures that manufacturers put more fuel efficient cars onto the market, while the Directive is the main EU measure that aims to stimulate the demand for such vehicles (also see the discussion of national vehicle taxation in Section 7.2). The CVD is also a demand-side measure, although its focus is narrower as it aims to utilise the potential benefits of public procurement in stimulating the market for clean vehicles. It does this by requiring that public authorities take account of the environmental performance of road transport vehicles, including their CO₂ emissions, when buying such vehicles for their fleets. While the scope of the CVD in terms of the type of vehicle covered is broader than that of the Car Labelling Directive, as the CVD also includes commercial vehicles and buses, passenger cars bought by public authorities, e.g. for the use of their representatives and employees, could be covered by the legislation (as long as the contract has a value higher than a set threshold). In the engagement with stakeholders and the online consultation, representatives of a number of EU level organisations and national ministries noted that the Directive was consistent and complementary to the Passenger Car CO₂ Regulation. Hence, the three pieces of legislation have similar objectives and all, at least have the potential to, contribute to the development of the market for more fuel efficient cars. Consequently, there is no reason to reach a different conclusion from the previous evaluations, i.e. that the Car Labelling Directive is coherent with the Passenger Car CO₂ Regulation and the CVD.

There are a number of other pieces of legislation that aim to improve the environmental performance of transport fuels and to require Member States to put in place appropriate infrastructure for alternative energy sources for transport. Two of these are closely related. The **Renewable Energy Directive** (RED) sets a minimum target of 10% for the proportion of final energy consumption in transport that should be from renewable sources by 2020. The **Fuel Quality Directive** (FQD) requires energy suppliers to reduce lifecycle GHG emissions (per unit of energy) by at least 6% by 2020, which could increase to 10% as a result of two additional indicative targets. Both of these requirements apply to a broad range of transport fuels and energy

sources, including those used by cars. However, the range of transport fuels and energy sources covered by the two Directives is different as energy used in other modes of transport can be taken into account for the RED target, while fuel used in non-road mobile machinery can be considered for the FQD target (Skinner & Kretschmer, 2010). The **Alternative Fuels Infrastructure Directive** (AFID) requires Member States to develop national policy frameworks to help to develop the market for the use of alternative fuels by transport in their respective countries. The respective national policy frameworks must include *inter alia* objectives and targets for the provision of electric recharging points, gas refuelling points and, where applicable, hydrogen refuelling points.

The RED and FQD do not have any direct impact on the Car Labelling Directive, as the specifications of the fuel used in the test on which the information on the label is based are set in the relevant type approval legislation and so any decarbonisation of the fuel used in the 'real world' will not affect the figures on the car label. The relationship between the AFID and the Car Labelling Directive is more direct as one of the impacts of the various pieces of legislation that are driving improvements in fuel efficiency in the passenger car market is the increased number of alternatively-fuelled cars on the market (although this is largely a result of the Passenger Car CO₂ Regulation and national legislation; see Section 7.12). Hence, requiring Member States to put appropriate levels of the relevant recharging and refuelling infrastructure in place is clearly complementary and consistent with the legislation focusing on vehicle efficiency, including the Car Labelling Directive.

A more general point for the legislation on alternative fuels and energy sources to be completely consistent with the legislation on vehicle efficiency, including the Car Labelling Directive, is that all would have to be ensuring that the least GHG-intensive fuel-vehicle combinations are being put on the market and purchased. The lack of consideration of WTW and embedded emissions for vehicles (as noted in Section 7.2.2), as well as the challenges of estimating the lifecycle GHG emissions for many fuels and energy sources, means that there is a risk that all of the legislation is not necessarily pushing the market in exactly the same direction, even though the general direction is similar. Even though the proportion of alternatively-fuelled cars on the market remains relatively small, various stakeholders mentioned that the lack of explicit consideration in the Directive of the information needs for cars with alternative powertrains is becoming an issue (see Section 7.2.2). The measurement of the efficiency of such vehicles in terms of their consumption of petrol or diesel is irrelevant in some cases, e.g. for battery electric and hydrogen cars, and misleading in others, e.g. in the case of plug-in hybrid cars. The lack of consideration of such issues within the Directive, particularly of an agreed approach with respect to what information should be presented for such vehicles and how this should be calculated, has become an issue that will only become more significant as the numbers of these vehicles on the market increases. It is important to ensure that the Car Labelling Directive works with the other pieces of EU legislation to ensure that the best fuel-vehicle combinations from the perspective of decarbonising transport are being promoted. In this respect, it is perhaps worth noting that UNECE Regulation 101 (UNECE, 2013), which is the basis of the determination of CO₂ emissions and fuel consumption of new passenger cars in the EU (see Annex XII of Commission Regulation (EC) No 692/2008), makes a reference to the provision of information about electric vehicles. This Regulation *inter alia* sets out the way in which the electric range of vehicles should be measured, and notes that only information measured using this method should be included in promotional material.

The Tyre Labelling Regulation and the EU Energy Labelling Directive are both complementary to the Car Labelling Directive, as they have similar objectives, but for different product types. The **Tyre Labelling Regulation** is wider in scope than the Car

Labelling Directive as it applies to tyres to be used on buses and commercial vehicles, as well as on cars. It aims to ensure that information on a tyre's fuel efficiency, as well as on its noise and wet grip performance, are communicated to end users in order to help them make informed choices. The **EU Energy Labelling Directive** is a framework Directive, which is complemented by product-specific Commission Delegated Regulations that harmonise the approach taken to the labelling of various energy consuming products (but explicitly not means of transport). Again, the ultimate aim is to enable consumers to make informed purchasing decisions. The labels required by these two pieces of legislation have the same design. Indeed, the preamble of the Tyre Labelling Regulation explicitly notes that the same design should be used for the tyre label as for the EU Energy Label, as the latter is well-known by consumers and has proved to be successful. In this respect, particularly in light of the observation by (Codagnone et al, 2013) that familiarity and trust are important for a label (see Section 7.2.2), the fact that the Car Labelling Directive does not require the use of the same design as the household products energy label suggests that a potential for synergy between different pieces of EU legislation is being missed. It is worth noting at this point that the Commission has proposed that the EU Energy Labelling Directive be replaced by a Regulation, which would also update some aspects of the legislation, including rescaling of labels back to an 'A to G' format (i.e. no longer use A+, etc.) (European Commission, 2015b).

This issue was mentioned explicitly or implicitly by a number of stakeholders in the course of the engagement that was undertaken as part of this project. Some national stakeholders, including representatives from some national ministries, in countries in which a EU Energy Label style, colour-coded label has been introduced, noted that this approach had been taken as a result of consumers' awareness of the EU Energy Label. An industry representative in a country that has not implemented a household-products style label argued that it would be better to change the label in their country to such a label. Many EU level stakeholders also supported the use of colour-coded labels to implement the Car Labelling Directive, along the lines of the EU Energy Label and that used on tyres.

With reference to the conclusion in Section 7.2.2 that the inclusion of the internet in the Car Labelling Directive would have brought added value, it is worth noting that both the Tyre Labelling Regulation and the EU Energy Labelling Directive both make reference to the internet. The former includes 'websites' in its definition of the 'technical promotional material' in which the fuel efficiency class of tyres has to be stated, if the website is used for the purpose of marketing tyres. The latter requires Member States to ensure that information relating to the consumption of energy is brought to the attention of end-users with respect to products offered for sale or displayed to end users, including on the internet.

As it complements the Passenger Car CO₂ Regulation and the CVD, the analysis of the coherence of the Car Labelling Directive with **other legislation that regulates the environmental performance of cars** will be similar to that undertaken in the 2015 evaluations of these other pieces of legislation (RICARDO-AEA and TEPR, 2015a; Ricardo-AEA and TEPR, 2015b). With respect to air pollution, the two most relevant pieces of legislation are Regulation 715/2007/EC that sets limit values on pollutant emissions from cars (and light commercial vehicles) in the form of "Euro standards", including for NO_x, and Directive 2008/50/EC that sets air quality standards for a range of pollutants. With respect to the car label and air pollution, there are two potentially relevant elements for coherence: the consistency of the aims of the Car Labelling Directive with air pollution legislation; and whether the omission of information on air pollutant emissions on the label affects its coherence with these other policies. The previous evaluations concluded that the objectives and approach taken in the respective legislation were complementary, but both reports also noted that there was a potential conflict as a result of the way in which the respective legislation was

implemented. Many urban areas in the EU are struggling to meet the requirements of Directive 2008/50 (see Section 3.2.3), which is at least partially due to the fact that the real world emissions of NO_x are higher than those measured on the test cycle as regulated by Regulation 715/2007. The increased use of diesel cars in particular has been identified as one of the contributory factors, which is relevant as the evaluation of the Passenger Car CO₂ Regulations concluded that the dieselisation of the car fleet was responsible for around 2% of the CO₂ reductions from new passenger cars between 2006 and 2013. However, the problem lies with the emissions testing under Regulation 715/2007, rather than in a lack of coherence of the respective legislation. If previous Euro standards had delivered real world emissions reductions to the extent suggested by test cycle measurements, there would not be as much of an issue with respect to air pollution and so fewer questions would be asked about policies, such as the Car Labelling Directive and related legislation, that have contributed to the increasing market share of diesel cars. It is also worth noting that an agreement has been reached on the introduction of real driving emission (RDE) tests, which will require real world emissions of air pollutants to be within a fixed range of the test cycle emissions (European Commission, 2015c). Once implemented, this legislation should reduce the discrepancy between test cycle and real world NO_x emissions.

Of relevance to the assessment of the coherence or otherwise of the omission of information on air pollutant emissions on the label is the weight that the public gives to such issues. The public's awareness of the link between air pollution, fuel efficiency and emissions testing increased significantly in the second half of 2015 as a result of the adverse publicity surrounding Volkswagen (Economist, 2015). A number of national stakeholders that were interviewed explicitly linked these issues, while others called for the inclusion of information on air pollutant emissions on the car label, as a minority of online consultees (see Section 7.2.2 and Section B.3.13 of Annex B).. Before concluding on the coherence or otherwise of the legislation under discussion, it is important to note that the regulation of CO₂ emissions (and fuel efficiency) and of air pollutants from cars is undertaken differently. The CO₂ emissions of new cars, as measured on the test cycle, are used each year to calculate whether a manufacturer has met its CO₂ reduction target; if not, a financial penalty can be imposed. For air pollutants, the outcome of the emissions test is essentially a pass or fail, i.e. does the car have emissions less than the specified limit values; if not, the car cannot be put on the market in the EU. As long as the emissions of air pollutants are less than the required limit value, the actual level of such emissions is not relevant for the purpose of existing policies, e.g. as it is not used for the purpose of assessing compliance with a target.

Having said that, the EU certificate of conformity for a car does include information on the vehicle's actual emissions of air pollutants, as well as its CO₂ emissions, so information on a car's air pollutant emissions could be included on a label, as is the case in a couple of Member States (see Table 6.6). It is also worth noting that a recent DG Environment project has explored the possibility of introducing a voluntary EU low emissions standard for cars (Cortvriend, 2014). However, it is not clear that requiring that information on the air pollutant emissions of new cars is included on the car label would bring much in the way of added value, as it would probably not be sufficient in most cases to influence the market in favour of cars with fewer air pollutant emissions.

With respect to noise and recycling legislation, the evaluations of the Passenger Car CO₂ Regulation and the CVD concluded that in the short-term there were no conflicts between measures to reduce the CO₂ emissions of cars and those that regulated car noise and the disposal of cars. Both, however, noted that in the longer-term, there was the potential for conflicts depending on the materials used to reduce CO₂ emissions and the extent to which these affected the potential to recycle cars. There is

no reason to reach a different conclusion with respect to the coherence of the Car Labelling Directive and these pieces of legislation.

7.10.3 - Conclusions

The Car Labelling Directive is coherent with other EU policies that aim to increase the uptake of fuel efficient cars, such as the Passenger Car CO₂ Regulation and the Clean Vehicle Directive. The lack of consideration in the Directive of how to best communicate information that is more relevant to potential purchasers of alternatively-fuelled cars undermines the coherence of the Directive with other legislation that promotes such fuels and energy sources for cars. Additionally, as the Car Labelling Directive focuses only on tailpipe emissions, while other legislation focuses on the carbon intensity of fuels and energy sources, there is a risk that all of the legislation is not pushing the market in exactly the same direction, i.e. towards the least carbon-intensive fuel-vehicle combinations. As the number of alternatively-fuelled vehicles on the market continues to increase, as far as is possible, the best fuel-vehicle combinations from the perspective of decarbonising transport are being promoted by all relevant legislation.

An opportunity for synergy is arguably being missed as the design of the label required by the Car Labelling Directive does not have to be based on that of the EU Energy Label. The potential for such synergy was recognised in the preparation of the EU Tyre Labelling Regulation and also by several Member States in the design of their national labels, which were based on the EU Energy Label. The analysis concluded that currently the Car Labelling Directive was coherent with legislation that regulates other elements of the environmental performance of cars. While there are issues with respect to the implementation of EU vehicle air pollutant emissions legislation, as there is a discrepancy between test cycle and real world NO_x emissions, this is not indicative of a lack of coherence with the Car Labelling Directive. It is not clear that including information on a new car's air pollutant emissions on its label would be sufficient to influence the market in favour of cars with fewer air pollutant emissions. Finally, in the longer-term there was the potential for conflicts relating to the disposal of vehicles, depending on the materials that were used in the future to contribute to reducing the CO₂ emissions of cars.

7.11 Coherence (EQ11): To what extent are objectives and achievements coherent with the Europe 2020 strategy and Europe 2030 policy goals?

7.11.1 - Introduction

Question 11 focuses on the coherence of the Directive in the context of the wider EU policy frameworks of relevance. Given the objectives of the Directive, the transport and climate policy frameworks, such as the Transport White Paper and Low Carbon Roadmap, are clearly relevant. However, it was also important to explore the wider EU strategies that set a higher level policy framework, such as Europe 2020 and the emerging policy framework for 2030. Consideration of other environmental and consumer policy frameworks was also useful.

7.11.2 - Analysis

As discussed in Section 7.1.2, the Commission's **Low Carbon Roadmap** and the **Transport White Paper** provide, respectively, the long-term framework for actions to reduce the EU's GHG emissions and the transport measures that might be put in place to reduce transport's GHG emissions to the required levels. The **2030 Climate and Energy Policy Framework** (COM (2014) 15) provides the shorter-term policy framework and refers to the Transport White Paper to highlight the need to reduce

transport's GHG emissions. The 2030 policy framework builds on the climate policy framework for 2020, which set out the EU's climate targets for 2020 and were included as a headline target in the Commission's **Europe 2020 strategy** (COM (2010) 2020). Finally, the **Energy Union Package** (COM (2015) 80) identified five sets of actions to deliver more energy security, sustainability and competitiveness, including energy efficiency and decarbonising the economy. As part of the implementation of these actions, the strategy committed the Commission to take further actions to decarbonise the transport sector.

The Car Labelling Directive is consistent with the objectives of these strategic documents, as it aims to contribute to the reduction of CO₂ emissions from transport. Indeed, initiative 28 of the Transport White Paper is to review the Car Labelling Directive in order to make it more effective, and to consider extending its scope and to harmonise the label throughout the Member States.

The Car Labelling Directive is also consistent with the **Seventh Environmental Action Programme** (7th EAP; Decision No 1386/2013/EU). With respect to the need to reduce CO₂ emissions, the 7th EAP refers to the policy frameworks sets out within the Low Carbon Roadmap and the Transport White Paper. It also notes the importance of the provision of accurate, easy-to-understand and reliable information to consumers, although it only made reference to the EU Energy Label in this context, not the car label. The review of the **EU's Sustainable Development Strategy** (COM (2009) 400) noted many of the pieces of legislation mentioned in Section 7.10.2 as part of the progress that has been made in terms of making transport more sustainable, but noted that more needed to be done to move towards a low carbon economy, including in transport.

The Car Labelling Directive is also consistent with the Commission's **Energy Security Strategy** (COM (2014) 330). The latter notes that the EU's energy security is inseparable from the need to decarbonise the economy and also highlights the need to reduce oil dependency in the transport sector. One of the ways of achieving the latter was to ensure that energy efficiency gains were delivered in "priority sectors", which includes transport. There were few stakeholder comments relating to the coherence of the Directive with the respective strategic documents, and no source of conflict was identified other than potentially with the Commission's wider agenda to reduce administrative burdens.

7.11.3 - Conclusions

In summary, the Car Labelling Directive is coherent with the EU's strategic policy framework, as it contributes to the reduction of CO₂ emissions from, and oil use in, the transport sector.

7.12 Coherence (EQ12): How does the legislation interact with other EU/ national/ international initiatives which have similar objectives (e.g. actions in the field of environment, single market, climate action)?

7.12.1 - Introduction

As noted above, this question, the final one on 'coherence', evaluated the Directive in the wider policy context, i.e. international policy frameworks and complementary national policy measures. While the issues explored are the same, i.e. the consistency and complementarity (or otherwise) of the Directive with these other policies, the approach taken was less detailed as it was not possible with the resources available to be fully aware of all relevant national measures in particular. Hence, the evaluation drew on other reports in which relevant national policies are reviewed and discussed.

Of particular relevance to this question was the global climate policy framework and measures in EU Member States that aim to encourage the uptake of more fuel efficient cars, such as the vehicle taxation policies, as well as the approach taken to the implementation of car fuel efficiency labels elsewhere in world.

7.12.2 - Analysis

As discussed in Section 7.1.2, the IPCC (2014) has argued for “aggressive and sustained” mitigation policies globally to prevent transport’s GHG emissions from continuing to increase, which was taken forward politically by the adoption of the 2015 Paris Agreement. The need for urgent action to combat climate change was also recognised as an explicit action in the **UN’s Sustainable Development Goals for 2030** (UNDP, 2015b). Another of the UN’s 2030 goals relates to “Responsible Consumption and Production” and includes a reference to the need for labelling to assist consumers in making more sustainable purchasing decisions (UNDP, 2015a). The need for mechanisms to ensure that sufficient product information is provided to consumers to enable them to make informed environmental choices was also recognised by the **1998 Aarhus Convention** (UNECE, 1998). All of the EU’s Member States, and the EU itself, are parties to the Convention and have ratified it. The Car Labelling Directive is consistent with these international actions.

As noted in Section 3.1, the Commission’s original 1995 strategy noted that the provision of information to consumers has the potential to enhance the effectiveness of **CO₂-based vehicle taxation**. The strategy foresaw that promoting vehicle efficiency would be one of the objectives of a Community-initiative on vehicle taxation, but no legislation was implemented in this respect as it was not possible to reach an agreement between Member States (Section 3.1). Nonetheless, many Member States have introduced a CO₂ component to vehicle taxation. In 2015, 20 of the EU’s 28 Member States had a CO₂ element in at least one of their motor vehicle taxes (ACEA, 2015a). As noted in Section 7.3.2 some Member States directly link car taxation to the respective categories of a colour-coded label, i.e. the same level of tax is payable for each car in the same label category. However, even if such a direct link between the label and tax rates does not exist for all taxes with a CO₂ component, the existence of the information required by the Car Labelling Directive allows consumers to make a link to, and potentially to better understand, which vehicles will be subject to which levels of tax. The existence of information on cars’ CO₂ emissions has also been used by Member States to ensure that **scrappage schemes** have been targeted at high CO₂-emitting cars (Leheyda & Verboven, 2014) and by local authorities as the basis of **local incentives for low emission vehicles** (Urban Foresight, 2015). Consequently, the Directive helps to facilitate a range of national and local measures in favour of fuel efficient cars.

The potential for the car label to complement other national policies, particularly those related to vehicle taxation, was noted by many representatives of national and EU stakeholder groups that were interviewed for this project, as well as some of the online consultees. The general message was that taxation policies that were in some way linked to a car’s CO₂ emissions were a stronger driver than the label of the uptake of fuel efficient cars, but that the label often played a supporting role,, even if it was difficult to separate out the respective contributions. The potential complementary link between the label and other measures was also mentioned by various contributors, including with public procurement, taxi licencing, subsidies and scrappage schemes. However, in some countries stakeholders and consultees noted conflicts between the aims of the label and transport taxation, including fuel taxes differentiating in favour of diesel, as well as with national vehicle taxation generally and with company car taxation in particular. A conflict that was mentioned frequently with respect to Germany was the way in which a ‘new passenger car’ is defined in the Car Labelling Directive compared to the equivalent definition in other national legislation.

As a result of the Car Labelling Directive, the approach in the EU is consistent to that taken in other major economies, as many countries have a new car label that provides information to consumers on fuel consumption, and to a lesser extent on CO₂ emissions and potential cost savings (see Table 7-5 for a comparison of the information covered and Annex H for selected examples). However, in spite of the conclusion with respect to energy labels more generally that consumers are strongly influenced by colour and understand comparative information better than technical information (Egan & Waide, 2005) (see Section 7.2.2), by no means all car labels in other countries use colour-coded comparative labels. Of the examples shown, those of the US, China and Australia do not use a colour-coded comparative label. On the other hand, the labels used in Brazil and Switzerland would be familiar to a European consumer as they are similar in design to the EU Energy Label. The various approaches perhaps reflect another of Egan and Waide's conclusions: that the most appropriate design of a label depends on local cultural factors.

Table 7-5: Summary of information presented in labels in third countries

Type of information	New Zealand	USA	South Korea	China	Brazil	Switzerland	Australia
Rating based on	Fuel economy	1) Fuel economy/ GHG; 2) smog	Fuel economy	No rating scale	Fuel economy	1) CO ₂ emissions ; 2) energy efficiency	No rating scale
Fuel consumption	✓ litres per 100km	✓ miles per gallon, combined, plus city and highway	✓ km per litre, combined, plus city and highway	✓ litres per 100km, integrated, plus urban and suburban	✓ km per litre, city and highway	✓ litres per 100km	✓ litres per 100km, combined plus urban and extra urban
CO ₂ emissions	×	×	✓	×	×	✓	✓
Fuel type	✓	✓	?	✓	?	✓	✓
Running costs	✓ per year, average fuel price, plus road user charges for diesel vehicles	✓ Annual fuel costs	×	×	×	×	×
Additional information of interest	-	Range of similar cars for comparison; saving	-	-	Fuel consumption also using ethanol	Euro emissions level; average CO ₂ of all new cars	

Type of information	New Zealand	USA	South Korea	China	Brazil	Switzerland	Australia
		over 5 years compared to average new vehicle				is indicated on CO ₂ scale	

Note: Most labels also have further text on CO₂ emissions, including the factors that influence CO₂ emissions. Tick (✓) indicates that the label in the respective country includes the specified issue. A question mark (?) indicates that we could find no confirmation either way.

7.12.3- Conclusions

The Car Labelling Directive is coherent with international agreements on climate change, access to environmental information and sustainable consumption. The Directive is also potentially coherent with other national policies measures, particularly national vehicle taxation when the latter is related to a car's CO₂ emissions, although conflicts can also exist depending on the design of the national measures. The Car Labelling Directive has the potential to facilitate complementary national and local measures that also aim to contribute to the development of a market for fuel efficient cars. The fact that the EU requires new cars to have a fuel efficiency label is consistent with the approach taken in many of the other major economies of the world, as these have similar labels, although there is no consistency globally with respect to the design, or even the content, of the label.

7.13 EU added value (EQ13) - What has been the EU added value of the legislation?

7.13.1 Introduction- overview

In order to assess the EU added value of the Directive we considered the specific benefits arising from the adoption of legislation at the EU level, in comparison to possible action at national level or through other instruments, such as voluntary standards or guidelines.

From a quantitative perspective, we considered the number of Member States that already had relevant legislation or that were planning to introduce similar measures and whether the level of coverage achieved as a result of the Directive is greater (or not) from what would have been expected.

From a qualitative perspective, we also assessed whether there are –benefits arising from the adoption of the specific types of tools. We also refer to existing experience with alternative information provision schemes (i.e. voluntary) in other product markets, where we considered the level of coverage achieved from such approaches and costs of implementation (administrative burdens).

7.13.2 Analysis

As already discussed in Section **Error! Reference source not found.**, at the time of the adoption of the Directive only two Member States had already introduced legislation requiring the provision of information on fuel consumption (UK, SE) and our research revealed that in a few more Member States (AT, FI, DE, DK, NL) some voluntary initiatives concerning the provision of information to consumers were

adopted in the period prior to the adoption of the Directive. Furthermore, judging from the relative delay in the transposition of the Directive in some Member States and the fact that many of them have opted for introducing the minimum requirements (14 in the case of the label, even more for the other information sources; see also Section 6.2), suggests that only a small number of Member States would have introduced relevant national legislation. It is safe to conclude that the adoption of the Directive has led to a much broader adoption of the car labelling scheme across the whole of the EU, ensuring that a minimum level of information on fuel efficiency is available to all consumers across the EU.

Representatives of national authorities (FR, DE, and ES) also suggested that a national approach would most probably face greater difficulties in terms of practical implementation. They considered that there would be greater level of resistance from manufacturers to the introduction of legislation that would apply to a single country and could be seen as disadvantaging the local industry against competition.

Beyond ensuring that information is available across the EU, the presence of the EU-wide legislation in the form of the Directive has had a number of advantages, as indicated by a number of stakeholders. It ensured a minimum level of harmonisation and avoided the adoption of multiple and different approaches in terms of the key information to be provided (fuel consumption and CO₂ emissions). According to an EU stakeholder, in the absence of EU legislation, the result would be a patchwork of national legislation with potentially even more diverging requirements. This view is supported by other stakeholders (automotive sector in NL, UK authorities). There are important benefits by ensuring that minimum common information requirements apply across the EU and avoiding costs of complying with highly divergent schemes –for manufacturers and vehicle dealers.

On the other hand, as already indicated in Section 6, the Directive in its current form does not include a detailed specification– particularly in relation to the label. Indeed, the majority of stakeholders that responded to this question do not consider the use of a Directive as the most effective. As already described in Section 6, there is still great variation in terms of the design of the label, the additional information requirements and, in some cases, the interpretation of certain provisions of the Directive. Indeed, a large number of stakeholders (representing EU, non-EU and national automotive sector, European and national consumer associations and environmental groups, ministries) argue for a greater level of harmonisation through the use of an instrument (Regulation) that will ensure greater uniformity and which, according to EU consumer associations and environmental groups, will be based on an colour-coded absolute labelling scheme. The organisations responding to the public consultation also appear to agree with this view. More than half (54%) stated that Directive is too flexible and would prefer a more harmonised approach.

However, at the same time, most stakeholders (representing all groups) pointed to the importance of a flexible approach allowing Member States to provide information according to the specific national circumstances. This is primarily linked with the need to accommodate the differences in taxation among Member States that should not be expected to be addressed any time soon. In addition, there is a need to reflect locally preferred metrics (e.g. mpg versus l/100km) in order to aid consumer engagement and understanding (ANEC and BEUC, 2014). As discussed in Section 7.4, provision of relevant national information in the label is generally considered as desirable and effective.

Concerning the potential of using other alternative policy instruments, such as voluntary standards, several interviewees were sceptical. The French authorities pointed to the even more limited transparency of such schemes, while the Austrian authorities suggested that manufacturers would be even less willing to participate. Only the UK authorities indicated that voluntary standards would also have been a

viable alternative, but also pointed out that the uptake of voluntary standards in the UK is generally high.

In that respect, the experience from the use of voluntary labelling schemes in other product areas appears to be supportive of the added value of EU legislation. For instance, a recent study on food labelling across Europe (Ipsos and London Economics, 2013) identified a total of 901 different schemes, with most countries having more than 5 - and up to 45 in some cases - schemes covering a range of food products. Across the EU, the labelling schemes covering meat products was over 450 (the largest) while in the case of fish products (the smallest) it was close to 255. At the same time, the market share (in terms of value) covered by schemes was no more than 40% of the products and the proportion of products affiliated with a labelling scheme ranged between 4 and 32%. While a direct comparison of such schemes with passenger cars cannot be made, it can still be derived that reliance on a voluntary approach would have carried the risk that a greater number of different labelling car schemes may have been introduced, possibly even more than one in each Member State. This would lead to higher administrative costs in the case of manufacturers/dealers seeking to comply, and less clarity for consumers. At the same time, on the basis of the experience from food products, one would also expect lower level of coverage of vehicles across the EU (in comparison to the full coverage ensured by the Directive). This is also supported by the recent experience with the introduction of a voluntary scheme in Brazil where all but one manufacturers and all importers have refused to comply (UNEP, 2016a). Concluding, while a single voluntary scheme covering the whole of the EU and all new passenger cars would be possible in theory, this seems rather unlikely to have been a realistic occurrence in practice.

The stakeholders interviewed did not provide any views in relation to the possible use of a guidelines instead of a Directive. Given the general preference to the use of a legal instrument – including possibly the use of Regulation – relying on non-binding guidelines cannot be expected to bring the wide coverage and minimum information provision ensured by the Directive. In general, the role of guidelines is complementary to legislation and, in this context, they are considered quite effective (Ballesteros, et al., 2013) . In the context of the Car Labelling Directive, guidelines could be used to ensure greater consistency in the implementation of the Directive and address unclear aspects. As discussed in Section 7.4 these could include those concerning the definition of new vehicles or to clarify the meaning of the provisions related to promotional material⁴⁷.

7.13.3 Conclusions

The analysis points to a clear added value of the EU action in introducing the Car Labelling Directive. The available evidence and input from stakeholders suggests that, in the absence of the EU legislation only some countries would have introduced mandatory labelling schemes. This would mean that only part of the consumers would benefit from the minimum level of information secured through the implementation of the Directive across the EU. Furthermore, the introduction of a minimum framework across the EU has had certain benefits for manufacturers in avoiding the introduction of diverging national legislation in different EU countries.

Considered against the introduction of voluntary schemes, the existing experience indicates that the adoption of a single scheme that would secure high level of participation from industry and ensure EU-wide coverage and information provision to

⁴⁷ Point 1 in Annex IV stating that promotional material have to be “easy to read and no less prominent than the main part of the information provided in the promotional literature”.

all consumers across the EU is highly unlikely. In that respect, the adoption of EU Directive has had clear benefits in relation to such alternatives.

On the other hand, the majority of stakeholders that contributed to the study (representing industry, consumers and authorities) suggested that the use of EU Regulation would be more effective in ensuring harmonisation and reduce the significant variation in the implementation of the Directive, particularly in relation to the label. However, such a change needs to be balanced against the need to ensure flexibility to take into account national parameters, particularly in relation to national fiscal measures.

7.14 EU added value (EQ14): To what extent do the issues addressed by the intervention continue to require action at EU level?

7.14.1 Introduction

In order to address this question, we considered the extent that EU intervention is still justified and considered necessary in order to target the main issues addressed by the Directive (i.e. the high level of contribution of the EU road transport sector to total GHG emissions and its dependence on oil, as well as the fact that consumers are not fully aware of the level of fuel efficiency and CO₂ emissions when purchasing vehicles). We also examine whether there are possible future developments that might affect the EU added value of the Directive, either positively or negatively.

For this analysis we are based on the input from earlier question (Sections 7.1, 7.3-7.5 and 7.13) and input from stakeholders concerning the continuous need (or not) of action at EU level.

7.14.2 Analysis

When asked to indicate the continuing need for action at EU level, almost all stakeholders (with the exception of motor traders and repairers at EU and national level) stated that EU level involvement is still necessary. As already discussed in Section 7.13 most stakeholders consider that there a need to move to an EU Regulation – thus an even greater level of responsibility at EU level - would be more appropriate to ensure greater level of harmonisation in the implementation of the Directive. Among the respondents to the public consultation, 67% expressed the view that there is still need for EU intervention. German vehicle dealers expressed a much more negative view (73% strongly disagreed and 15% slightly disagreed), but this is probably affected by their specific experience in the implementation of the Directive discussed in Section 7.8.2.

In combination with the conclusion on the relevance of the objectives of the Directive (see Section 7.1) with respect to the three needs identified in the intervention logic⁴⁸, it can be concluded that EU action is still very much needed.

Particularly in relation to the need for the provision of information to consumers, the identified problems of inaccurate representation of real world performance and that the information provided in relation to alternatively-fuelled cars is misleading, taking relevant action at EU level is still necessary. This is related to the importance of ensuring that the CO₂ emission values derived from the new test cycle (WLTP) are

⁴⁸ 1. Reduce GHG emissions economy-wide and from the transport sector;
2. Reduce the CO₂ emissions and improve the fuel efficiency of new passenger cars;
3. Make information on fuel economy and CO₂ emissions available to consumers in order to make informed choices

used across the EU. This is action that is still in progress and requires that a common approach is adopted, rather than leaving Member States to decide how and when to implement the transfer to the new test cycle – and the reference to the new values in the car label – will take place. Given the need to increase the trust of consumers to the information provided – EU action is necessary.

Similarly, the analysis in Section 7.1 also pointed to challenge for the Directive and the credibility of the label from the **increasing number of alternatively-fuelled cars on the market** and the fact that information on the CO₂ emissions of such vehicles as required by the Directive is potentially misleading. Developing the appropriate approach that will account for lifecycle GHG and embedded GHG emissions to ensure that accurate information is provided should be expected to increase in importance. Adopting a common approach at the EU level – rather than leaving this to Member States – will be important for ensuring that all consumers receive similar information in an appropriate format and that the information is all calculated in a comparable manner for different technologies and in different countries. However, there will be a need to allow countries to take account of national information, as the energy mix, and therefore CO₂ emissions from electricity production, varies between Member States.

Even further, the analysis in Sections 7.3-7.5 have pointed to a number of other areas where revisions and changes to the Directive may be needed in terms of its scope, the type and design of the label and the role of other instruments. Once more, EU level action will be needed to set a minimum common framework, promote comparability and avoid confusion of consumers.

Overall, we can conclude that in order to address all the challenges identified and ensure that the Directive remains relevant and provides accurate information to consumers, action at EU level that will set the common framework will be needed. The large majority of stakeholders appear to support the continued EU role.

7.14.3 Conclusions

The great majority of stakeholders consulted are supportive of the continued importance and relevance of EU level action towards addressing the needs and issues that the Directive is set to address. The analysis of the key challenges facing the Directive in order to ensure its continued relevance and effectiveness point to the need of possible changes (including the use of the new test cycle, better coverage of alternative fuelled vehicle, changes to the information tools) that would not be possible or effective without coordination at EU level.

8 CONCLUSIONS

In this section we bring together the findings and conclusions of the analysis presented in the previous sections and present the overall conclusions of the evaluation. Following a summary of the current status of the implementation of the Directive we present the conclusions to the evaluation, the conclusions are presented thematically by key evaluation question.

8.1 Status of the implementation of the Directive

The Directive has been transposed in the legislation of all Member States but with important variations, particularly in relation to the car label. 11 Member States (BG, FI, FR, IE, NL, ES, EE, DE, DK, SI, UK) have adopted a colour-coded design similar to that of the EU energy label applicable to household appliances while three more (BE, PT, AT) have implemented alternative – and different – colour-coded formats. In the remaining countries (CZ, EL, LT, PL, HR, CY, HU, IT, MT, SE, SK, LV, LU, RO) there is no format specified.

Among those countries that have adopted the EU energy label format, there are significant variations in terms of the number of categories – with a few countries using more categories (10 in SI and 13 in the UK) or adding additional categories at the top (A+ in Germany; A+, A++ and A+++ in Denmark). Three Member States (DE, ES, and NL) have adopted a relative categorisation approach, rating vehicles in comparison to a weighted average of other vehicles, although each of these three Member States uses a different weighting method.

A number of Member States have introduced additional information provision requirements on the label. The most common type of additional information is cost-related information – including fuel consumption for different drive cycles (IE, DE, FR, BG, FI, SI, UK) vehicle running costs (UK, DE, IE, FI, DK, EE, FI) and taxes applicable to the specific model (UK, DE, IE, FI, DK,). Other types of information required in some Member States include safety ratings (DK), noise (AT, NL, FI), air pollutant emissions (FI, SI), and information on electricity consumption for electric and hybrid vehicles (DE, UK). The label has also been extended to cover new vans in two countries (DK, ES) and used cars in the UK and Finland (both on a voluntary basis).

In relation to the other information tools (poster, guide and promotional material), there is much less variation from the minimum requirements, particularly in the case of the poster (only two Member States have minor additional requirements) and promotional material. In relation to the latter, only a few Member States have implemented Recommendation 2003/217/EC, which recommended that information on CO₂ emissions is made available when cars are offered for sale or lease by electronic means (ES, DE). Other Member States have developed best practice codes (NL, BE) or developed promotional material pre-screening services (UK). In DK, the promotional material also has to include the colour-coded arrow from the respective label, while a recent amendment of the national legislation in SI also requires the provision of information on air pollutants.

Finally, in the case of the guide, while a few Member States continue to print hard copies to be distributed to consumers in showrooms, many have already moved to the provision of exclusively electronic copies (AT, IT, BE, EE, FI, NL, PT, SE, SK). In the countries where hard copies are still printed, their numbers are gradually decreasing, due to declining demand. At the same time, many Member States have created fully searchable online databases (AT, BE, DK, FI, FR, EE, ES, NL, SE and UK) that allow users to easily find the vehicles they are searching and to make detailed comparisons of vehicles on the basis of fuel consumption and CO₂ emissions, as well as a wide range of other vehicle features. There is limited data on the use of these databases

(only the UK authorities reported that they have 3.5 million unique hits on the website each year).

In terms of the enforcement of the Directive, the information provided suggests that only a few countries have regular enforcement activities organised (DK, FR, BE, RO, UK and five German Länder), including visits in showrooms and reviewing promotional material. In some cases (e.g. SE, LT), the authorities respond to reports of non-compliance from organisations or individual consumers while in Austria the authorities have entered into a collaborative agreement with industry and there are no formal enforcement activities.

Finally, in terms of compliance levels, the available data throughout the period suggest that compliance rates with the label requirements are high in the majority of countries for which data are available (80%-90%); although with a few variations (e.g. in SE compliance is reported to be less than 50%). Compliance with the poster is reported to be slightly lower (e.g. poster is not always visible) while the most common area of non-compliance seems to be related to promotional material, the main issue being the clarity and prominence of the information provided.

8.2 Relevance

The Car Labelling Directive was and continues to be relevant. Climate change and energy security were issues when the Directive was originally adopted and are still issues that need to be addressed. Consequently, there is still a need to reduce GHG emissions from all sources and from transport in particular, and a need to reduce CO₂ emissions and to improve the fuel efficiency of new passenger cars.

There also remains a need to make information on fuel economy and CO₂ emissions available to consumers. This was widely supported by stakeholders, and there is evidence that consumers still do not take account of a car's fuel efficiency as much as they might when purchasing a new car. Since the Directive was adopted, developments such as the increasing discrepancy between real world and test cycle emissions and the increasing number of alternatively-fuelled cars on the market, have led to concerns about the relevance of the information that the Directive requires to be communicated to consumers. If the information on fuel consumption that the Directive requires to be communicated to consumers had better reflected the fuel consumption that drivers experience in the real world, the Directive would have been more relevant to consumers. Additionally, if the Directive had set out requirements for the information to be communicated about alternatively-fuelled vehicles, it would also have been more relevant for consumers. In this respect, it might be more appropriate to say that there is still a need to make *accurate* information available to consumers *in a way that best facilitates its use in enabling* consumers to make an informed choice.

There are various issues that might have contributed to making the Directive more relevant to consumers, if they had been addressed in the original Directive. A more prescriptive requirement with respect to the design of the label, e.g. to require this to reflect the design of the EU Energy Label, could have brought more added value, as would have a requirement to include information on running costs (and taxes where relevant), which are of more relevance to most consumers. However, full harmonisation would have lessened the potential additional added value, as there would still have been a need for some Member State flexibility to reflect national circumstances, culture and policies. Flexibilities that would have been needed include the use of country-specific languages, the use of metrics and information (e.g. to determine running costs) that are relevant to national circumstances and references to relevant national policies, such as vehicle taxes.

The focus of the Directive on non-electronic media has made it become less relevant. Consumers are now much more informed before going to the showroom as a result of

being able to undertake research using the internet, so the inclusion of the internet within the scope of the Directive would have made it more relevant to consumers.

8.3 Effectiveness

Achievement of objectives

Concerning the contribution of the Directive to enabling consumers to make informed decisions, the available evidence is mixed. The level of compliance with the Directive suggests that the relevant information is generally provided to consumers. There is supporting evidence that awareness of the information on fuel economy and CO₂ emissions has been improving steadily since the Directive was implemented and is now medium-to-high (>75%) in many countries. The label is generally the most widely recognised aspect whereas the recognition of the other informational aspects (poster, printed guide and promotional material) is generally lower. Consumer understanding is an important element that affects the level of familiarity and trust in the labels, which in turn has direct impacts on the use of the labels in purchase decisions. In this regard, there is a clear indication that consumers find absolute labels easier to interpret. This is reflected rather consistently in national consumer surveys, stakeholder views and experimental consumer research.

There is, however, more mixed evidence on the effectiveness of the Directive in terms of its ultimate impact on new car CO₂ emissions. In France, the label appears to have been effective on its own as an informational instrument (and even more so when combined with fiscal incentives). However, in other countries there are only indications of lesser contributions. The Directive appears to have the potential to influence consumer choices in a way that eventually reduces overall CO₂ to a degree. However, the realisation of this potential depends strongly on the national implementation, including synergies with relevant fiscal measures and the design of the label and the enforcement of the Directive.

In terms of the role of the Directive in **encouraging manufacturers to take steps to reduce the fuel consumption of new cars**, the Directive has the potential to elicit a marginal supply side response, mainly in terms of optimising vehicles to meet threshold categories (i.e. adjusting a few gCO₂/km in order to reach an A-label category). However, there is no empirical evidence of a strong effect on the supply of more efficient vehicles, while most stakeholders considered that the Directive has not had any impact in this respect.

Concerning the role of national implementation in supporting and maximising the effectiveness of the Directive, several Member States went beyond the minimum requirements of the car labelling Directive. By doing so, they often increased the effectiveness of the Directive, e.g. in terms of awareness raising as a result of using colour-coded labels similar to the EU energy label or by adding relevant information such as running costs. At the same time relative classification schemes, as implemented in some Member States, may have weakened the effectiveness of the Directive.

There appear to be valuable synergies between national fiscal measures and the label, both in terms of the overall effectiveness in reducing CO₂ emissions (e.g. in France), as well as raising consumer awareness of CO₂ emissions (UK). However, there are also cases (e.g. Netherlands, before 2010) where the car label did not work well with the fiscal measures adopted because the relative labelling confused consumers and the supply of cars in the most efficient (hence most subsidised) categories was limited.

Other synergies have also been identified even where there is no direct link – for example, due to the informational value of the labels, which allows consumers to calculate the equivalent taxes (Denmark). Another example is that the information

provided in the online version of the guide was used by the relevant ministry to design the national bonus malus scheme (Austria).

Parameters that drive the effectiveness of the Directive

There are a number of conclusions from the analysis with regards to the drivers and barriers of the effectiveness of the Directive:

- With regards to the effectiveness of the **information tools**, there is a broad consensus in support of the label as the most successful tool to date. There is also a general consensus that the poster does not have any beneficial impacts and is probably now redundant. Similarly the printed guide is not found to be very useful, although an online version of the guide can be effective.
- Almost all European and national stakeholders consulted as part of the study stressed the need to provide the **information online**, adapting to changes in how consumers collect and analyse information prior to a purchase and to ensure that consumers trust the information provided under the Directive. Paper-based information rapidly becomes out of date and limits consumers' trust in the information supplied.
- In terms of the **design of the label**, the use of colour-coded categories similar to the EU Energy Label, as applied in some Member States, is well recognised and understood by consumers. This is especially the case for categories using A-G (or A-M) range compared to A+++, A++ and A+ range. Furthermore, absolute scaling is more transparent and easier to understand for consumers than relative scaling, although a car class specific rating can also provide useful guidance for consumers.
- In terms of the **information provided on the label**, as cost is a key determinant of purchase decisions, certain countries provide additional information on running costs (including taxes) on the label. The absence of this information in other countries limits the effectiveness of the Directive. Currently the label does not require this important information to be communicated to consumers. Consequently, they tend to largely base their choice on the upfront investment cost of the vehicle, discounting longer term savings. Similarly, the analysis has shown that the Directive is most effective if coupled with fiscal measures – hence this information is also useful to have on the label. However, the experience of Member States which have included such information shows that it needs to build on a label categorisation system that is understood and trusted by consumers.
- With regard to the **scope** of the Directive, the current exclusion of used cars from the Directive limits its ability to inform the majority of consumers (since used car market volumes are greater than new car market volumes), thereby limiting its effectiveness.
- The **lack of guidance on how to deal with alternatively-fuelled cars** and enable like-for-like comparison with other cars has had a limited impact on the effectiveness of the Directive to date due to the small market share of such vehicles. However, this will change in the future, as the number of such vehicles increase. For the Directive to be effective with respect to such vehicles, it should ensure that the appropriate metrics are used for communicating CO₂ emissions and other relevant information to consumers (such as the energy efficiency and range of electric vehicles), in a way that is simple, meaningful and understandable. CO₂
- The diversity of national label designs clearly demonstrates that Member States have taken advantage of the **flexibility permitted** in the Directive in order to implement their own schemes. However, this flexibility does not appear to have translated into greater effectiveness in all cases as only a limited number of countries have adopted a labelling scheme which consumers finds easy to

understand. At the same time, the consensus from stakeholders across the market (manufacturers and consumers alike) is that a more harmonised approach would enhance the effectiveness of the Directive by aiding recognition and understanding of the label.

There appear to be a few **unintended impacts of the Directive**. From the positive side, the fact that since the Car Labelling Directive was adopted there has been a broad proliferation of car labelling schemes globally suggests that the approach in the EU might have been seen as an example to follow. An approach similar to the one adopted in the EU has been followed by some countries (e.g. Brazil, South Africa) in the last 5-10 years. It has also served as a very useful source of data for the development of relevant policies in third countries.

On the negative side, the requirement for printed guides, which are not considered to be effective, is arguably a waste of resources. Publishers also argue that including advertising in the definition of promotional material has the potential to have an adverse effect on the demand for advertisements in printed media.

8.4 Efficiency

The **costs** of the implementation of the Directive are mainly linked to ongoing annual costs for authorities and industry. Implementation costs appeared to be rather minor. The overall magnitude of costs for authorities seems broadly similar across countries:

- The monitoring and enforcement costs are typically in the region of €10,000-100,000 if enforcement is actively conducted. However, in a number of Member States no enforcement is carried out.
- Collection of information seems to constitute a major cost in some countries (e.g. France and Netherlands – amounting to €70,000-90,000), but was not identified elsewhere. In some countries (e.g. Poland), the industry is responsible for this activity and hence bears the associated cost.
- Maintenance of the online databases is of the order of €140,000 – 240,000 (in Germany and UK), although other countries reported much lower costs. In some countries (e.g. Austria), the industry is largely responsible for this activity and hence bears the associated cost.
- The printing of guides (where applicable) makes up a significant share of overall ongoing costs (around €30,000-60,000 per year), although many Member States have moved to an online-only version that circumvents the printing costs.
- For industry, main ongoing cost to industry is that of printing the labels, estimated at between €0.5 and €1 million per year for the EU-28. The finding that printing labels is the major cost is in line with studies of other similar Directives in other sectors.

Further costs were identified by German dealers associated with uncertainty over the requirement to ensure that the information in promotional material should be “no less prominent than the main part of the information provided in the promotional literature”. These include higher advertising costs due to the larger advertisements required in order to accommodate the required CO₂ and fuel consumption information and greater risk of high fines for non-compliance. However, similar issues were not mentioned by stakeholders from other countries and they seem to be a result of the broader implementation of competition law in the country in combination with the approach to enforcement (via litigation).

Considering the **benefits** of the Directive, the available data do not allow for a comprehensive quantification of the benefits, which are primarily in the form of fuel and CO₂ savings. Nonetheless, given the relatively low cost of the Directive and the fact that cars are driven for many years after purchase, even significantly small

contributions to reductions in new car fuel consumption can yield high benefit: cost ratios. While specific data are not available, it appears reasonable to expect a significant benefit: cost ratio for all those countries where a colour-coded label has been used. Conversely, it also seems possible – but has not been possible to quantify – that in the remaining countries, where only the minimum requirements have been implemented, the benefits are much more limited, and the cost-effectiveness much lower.

The analysis also points to certain aspects of the implementation of the Directive that are not considered particularly efficient. These include:

- The costs for printed guides, when still used, are not justified by the low level of use and effectiveness of the specific information tool. Many Member States have already moved to electronic guides and online-only version that have the potential to save several tens of thousands of Euros per year for the responsible organisation.
- There is also scope for increasing the efficiency of monitoring and enforcement and reduce the annual enforcement costs. In Austria, a high level of reported compliance is achieved by entering into collaborative agreements with industry, such that manufacturers are incentivised to comply. Alternatively, in cases where active monitoring is desirable, combining inspections with other enforcement activities seems to have the potential to reduce the ongoing costs.

8.5 Coherence

The Car Labelling Directive is broadly coherent with other EU strategies and policies, with relevant international agreements and with approaches taken at the Member State level and in countries outside of the EU, although there are a number of issues. The first issue relates to the coherence of the Directive with other EU legislation that promotes the use of alternative fuels and energy sources for transport. The Car Labelling Directive does not require that accurate and relevant information about cars that use electricity and hydrogen as energy sources is provided to consumers. This is not coherent with other legislation that was adopted subsequently, such as the Renewable Energy Directive, the Fuel Quality Directive and the Alternative Fuels Infrastructure Directive, which aim to promote the use of such energy sources in the transport sector. As the number of vehicles using these energy sources increases, it will be important to ensure, as far as is possible, that the Car Labelling Directive works with these other pieces of legislation to promote the best fuel-vehicle combinations from the perspective of decarbonising transport.

The second issue that adversely affects the coherence of the Directive with other EU legislation relates to a missed opportunity for synergy. When it was adopted in 2009, the label required by the Tyre Labelling Regulation used the same design as that which had been used for many years by the predecessor of the EU Energy Labelling Directive, as it was already well-known by consumers. Even though the Car Labelling Directive's requirements are less prescriptive than these two other pieces of legislation, several Member States have based their own car labels on the design of the EU Energy Label. The potential synergies between the car label and EU Energy Label are therefore being exploited in some countries, but not in others. An additional difference between the approaches taken in the three pieces of labelling legislation is that both the Tyre Labelling Regulation and EU Energy Labelling Directive cover the internet, whereas the Car Labelling Directive does not.

The analysis concluded that currently the Car Labelling Directive was coherent with legislation that regulates other elements of the environmental performance of cars. While there are issues with respect to the implementation of EU vehicle air pollutant emissions legislation, as there is a discrepancy between test cycle and real world NO_x

emissions, this is not indicative of a lack of coherence with the Car Labelling Directive. It is not clear that including information on a new car's air pollutant emissions on its label would be sufficient to influence the market in favour of cars with fewer air pollutant emissions.

The requirement of the Directive that information on the CO₂ emissions and fuel efficiency of new passenger cars is presented and communicated in a consistent manner has the potential to complement other national policies that promote the uptake of more fuel efficient and low CO₂ cars.

8.6 EU added value

The analysis points to a clear added value of the EU action in introducing the Car Labelling Directive. The available evidence and input from stakeholders suggests that, in the absence of the EU legislation only some Member States would have introduced mandatory labelling schemes, meaning that only part of the EU consumers would benefit from the minimum level of information secured through the implementation of the Directive across the EU. Furthermore, the introduction of a minimum framework across the EU has had certain benefits for manufacturers in terms of avoiding the need to comply with diverging national legislation across the EU, and thus reduce their costs.

Considered against other alternatives, such as voluntary schemes and non-binding guidelines, the adoption of the Directive had significant advantages. The experience indicates that the adoption of a single scheme that would secure high level of participation from industry and ensure EU-wide coverage and information provision to all consumers across the EU is highly unlikely in the absence of EU legislation.

At the same time the analysis indicates that there is still scope for EU action. The majority of stakeholders that contributed to the study (representing industry, consumers and authorities) agreed that there is need for achieving greater harmonisation, particularly in terms of the design of the label. This could further reduce costs. In that respect the use of an EU Regulation is often suggested as a more appropriate tool, even though it is also accepted that here is a need to allow flexibility to take into account national parameters, particularly in relation to fiscal measures. There are also key challenges concerning the future of the Directive (including the transition to the new WLTP test cycle, better coverage of alternatively fuelled vehicles, changes to the information tools) that need to be addressed in to ensure its continued relevance and effectiveness. All these clearly point to a continuing importance of EU level action to ensure consistency across the EU on the basis of a common framework.

9 GLOSSARY

ACEA	European Automobile Manufacturers Association
AFV	Alternatively fuelled Vehicles
Biofuels	A range of liquid and gaseous fuels that can be used in transport, which are produced from biomass. These can be blended with conventional fossil fuels or potentially used instead of such fuels BEV Battery Electric Vehicle. Also referred to as a pure electric vehicle (EV). A vehicle powered solely by electricity stored in on-board batteries, which are charged from the electricity grid
BEV	Battery Electric Vehicle. Also referred to as a pure electric vehicle (EV). A vehicle powered solely by electricity stored in on-board batteries, which are charged from the electricity grid
CO₂	Carbon dioxide, one of the principal greenhouse gases
EC	European Commission
EV	Electric vehicle
FCEV	Fuel cell electric vehicle. A vehicle powered by a fuel cell, which uses hydrogen as an energy carrier
GHG	Greenhouse gases. Pollutant emissions from transport and other sources, which contribute to the greenhouse gas effect and climate change
ICE	Internal combustion engine, as used in conventional vehicles powered by petrol, diesel and natural gas
LCV	Light Commercial Vehicle, also known as vans
NEDC	New European Driving Cycle
NGOs	Non-governmental organisations
NO_x	Oxides of nitrogen. These emissions are one of the principal pollutants generated from the burning of fossil and biofuels in transport vehicles.
OEM	Original Equipment Manufacturer. Refers to car manufacturers in this document
PHEV	Plug-in hybrid electric vehicle, also known as extended range electric vehicle (ER-EV). Vehicles that are powered by both a conventional engine and an electric battery, which can be charged from the electricity grid. The battery is larger than that in an HEV, but smaller than that in a BEV
WLTP	Worldwide Harmonised Test Protocol
WTT emissions	Well to tank emissions, also referred to as fuel cycle emissions. The total emissions generated in the various stages of the lifecycle of the fuel prior to combustion, i.e. from extraction, production and distribution.
WTW emissions	Well to wheel emissions

10 REFERENCES

- ACEA, 2014. ACEA Tax Guide 2014. [Online], Available at: <http://www.acea.be/publications/article/acea-tax-guide>, [Accessed 01 02 2016].
- ACEA, 2015a. CO2 based motor vehicle taxes in the EU in 2015. [Online], Available at: https://www.acea.be/uploads/publications/CO2_tax_overview_2015.pdf, [Accessed 1 2 2016].
- ACEA, 2015b. Statistics on new car registrations. [Online] , Available at: <http://www.acea.be/statistics>, [Accessed 01 01 2016].
- ADAC, 2005. Study on the effectiveness of Directive 1999/94/EC relating to the availability of consumer information on fuel economy and CO2 emissions in respect of the marketing of new passenger cars - A report to DG Environment. [Online] , Available at: http://ec.europa.eu/clima/policies/transport/vehicles/labelling/docs/final_report_en.pdf, [Accessed 1 02 2016].
- ADEME, 2008. Consommations conventionnelles de carburant et émissions de gaz carbonique des véhicules particuliers en France. [Online] , Available at: <http://www.ademe.fr/sites/default/files/assets/documents/consommations-emissions-vehicules-particuliers-2008-6321.pdf>, [Accessed 15 01 2016].
- ADEME, 2011. Véhicules particuliers vendus en France. Evolution du marché, caractéristiques environnementales et techniques. ÉDITION 2011. [Online], Available at: <http://www.ademe.fr/evolution-marche-caracteristiques-environnementales-techniques-vehicules-particuliers-neufs-vendus-france>, [Accessed 15 01 2016].
- ADEME, 2014. Consommations de carburant et émissions de CO2. Véhicules particuliers neufs vendus en France. ÉDITION 2014, [Online], Available at: <http://docplayer.fr/3227862-Edition-2014-consommations-de-carburant-et-emissions-de-co-2-vehicules-particuliers-neufs-vendus-en-france-guide-officiel.html> , [Accessed 15 01 2016].
- ADEME, 2015. Évolution du marché, caractéristiques environnementales et techniques. Véhicules particuliers neufs vendus en France. Edition 2015. [Online], Available at: <http://www.ademe.fr/evolution-marche-caracteristiques-environnementales-techniques-vehicules-particuliers-neufs-vendus-france>, [Accessed 19 01 2016].
- AEA and TEPR, 2011. Report on the implementation of Directive 1999/94/EC relating to the availability of consumer information on fuel economy and CO2 emissions in respect of the marketing of new passenger cars. [Online] , Available at: http://ec.europa.eu/clima/policies/transport/vehicles/labelling/docs/final_report_2012_en.pdf, [Accessed 01 02 2016].
- AIRUSE, 2015. DRAFT - Proposed Eco-label for Passenger Cars and Vans in Central and Northern Europe. [Online] , Available at: http://airuse.eu/wp-content/uploads/2015/02/18_B8_DRAFT-Proposed-Eco-label-Passenger-Cars-and-Vans-Central-and-Northern-Europe.pdf, [Accessed 15 02 2016].
- Alberini, A., Bareit, M. & Filippini, M., 2014. Does the Swiss Car Market Reward Fuel Efficient Cars? Evidence from Hedonic Pricing Regressions, a Regression Discontinuity Design, and Matching. Nota di Lavoro 16.2014
- Anable et al, 2008. Car buyer survey: from 'mpg paradox' to 'mpg mirage'. [Online], Available at: <http://www.lowcvp.org.uk/assets/workingdocuments/PCWG-P-08-27a%20Car%20buyer%20survey%202008%20Key%20findings.pdf>, [Accessed 15 01 2016].

ANEC and BEUC, 2014. Empower EU consumers through visible and clear labelling information on CO2 emissions from new passenger cars: ANEC & BEUC call for a review of the car labelling Directive 1999/94. [Online], Available at: http://www.beuc.eu/publications/beuc-x-2014-053_cca_cars_co2_labelling-2014_anec-beuc_position_paper_long_version.pdf, [Accessed 15 01 2016].

AXA, IPSOS, 2009. Italiani: bassi consumi e sicurezza ai primi posti nella scelta di un'auto. [Online] , Available at: https://www.axa.it/documents/14601/108647/20090708_Consumi_sicurezza.pdf/7b6e143b-95cd-4e1c-ac13-83ef926be7cb, [Accessed 15 01 2016].

Ballesteros, M., Mehdi, R., Eliantonio, M. & Petrovic, D., 2013. Tools for Ensuring Implementation and Application of EU Law and Evaluation of their Effectiveness - Study for the European Parliament - Policy Department Policy Department C: Citizens' Rights and Constitutional Affairs. [Online], Available at: [http://www.europarl.europa.eu/RegData/etudes/etudes/JOIN/2013/493014/IPOL-JURI_ET\(2013\)493014_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/etudes/JOIN/2013/493014/IPOL-JURI_ET(2013)493014_EN.pdf), [Accessed 20 01 2016].

bilviden.dk, 2015. [Online] , Available at: <http://www.bilviden.dk/>, [Accessed 20 01 2016].

Boardman, B., Banks, N. & Kirby, H., 2000. Choosing Cleaner Cars - The Role of Labels and Guides. [Online] , Available at: <http://www.eci.ox.ac.uk/research/energy/downloads/cleanercars.pdf>, [Accessed 25 01 2016].

Bursa, M., n.a.. Dealers' familiar tune. [Online], Available at: <http://www.motor.org.uk/magazine/articles/dealers-familiar-tune-320.html>, [Accessed 08 04 2016].

Cambridge Econometrics, 2013. The effectiveness of CO2-based 'feebate' systems in the European passenger vehicle market context. [Online], Available at: <http://www.theicct.org/effectiveness-co2-based-feebate-systems-european-passenger-vehicle-market>, [Accessed 18 01 2016].

Capgemini, 2015. Cars online. [Online] , Available at: <https://www.uk.capgemini.com/resources/cars-online-2015-the-selfie-experience-the-evolving-behaviour-of-the-connected-customer>, [Accessed 25 01 2016].

Carroll et al, 2014. Empower EU consumers through visible and clear labelling information on CO2 emissions from passenger cars. [Online], Available at: http://www.beuc.eu/publications/beuc-x-2014-053_cca_cars_co2_labelling-2014_anec-beuc_position_paper_long_version.pdf, [Accessed 15 12 2015].

CBS, PBL, Wageningen UR, 2014a. CO2-emissie per voertuigkilometer van nieuwe personenauto's, 1998-2013. [Online], Available at: <http://www.compendiumvoordeleefomgeving.nl/indicatoren/nl0134-Koolstofdioxide-emissie-per-voertuigkilometer-voor-personenauto%27s.html?i=5-20>, [Accessed 23 November 2015].

CBS, PBL, Wageningen UR, 2014b. Energielabels voor personenautos, 2001-2014. [Online], Available at: <http://www.clo.nl/indicatoren/nl0537-energielabels-personenautos?i=9-53>, [Accessed 25 01 2016].

CE Delft, 2005. Cool cars, fancy fuels. [Online] , Available at: www.cedelft.eu/publicatie/cool_cars_fancy_fuels/372, [Accessed 19 01 2016].

CECRA, 2016. Voice of Europe. [Online] , Available at: <http://www.cecra.eu/page/voiceofeurope>, [Accessed 08 04 2016].

Codagnone et al, 2013. Testing CO2/Car labelling options and consumer information. [Online] , Available at:

http://ec.europa.eu/clima/policies/transport/vehicles/labelling/docs/report_car_labelling_en.pdf, [Accessed 15 01 2016].

Cortvriend, J., 2014. "EULES: Preparing the legal and technical background for a (future) voluntary EU Low Emission Standard for combustion cars". [Online] , Available at: http://www.polisnetwork.eu/uploads/ModuleXtender/PublicEvents/306/1_EU_Low-emission_cars_standard -EULES- - J. Cortvriend DG Environment.pdf, [Accessed 25 01 2016].

Danish Transport and Construction Agency, 2010. Danske personbilers energiforbrug, Trafikstyrelsen, Center for Grøn Transport.

Danish Transport and Construction Agency, 2015. Udvikling i nye bilers EU-typogodkendte forbrug. [Online] , Available at: https://www.trafikstyrelsen.dk/~media/Dokumenter/06%20Center%20for%20groen%20transport/Publikationer/Publikation%202014_Udvikling%20i%20nye%20bilers%20br%C3%A6ndstofforbrug.ashx, [Accessed 14 01 2016].

Dena, 2012. Pkw-Energieverbrauchs-kennzeichnung: „Ein Jahr neues Pkw-Label".. [Online] , Available at: http://www.pkw-label.de/fileadmin/dokumente/Dateien/121123_Auswertung_Umfrage_Presse.pdf, [Accessed 18 01 2016].

Dena, 2014. Informationsplattform Pkw-Label Repräsentativbefragung von Neuwagenkäufern und Händlern.. [Online] , Available at: http://www.pkw-label.de/uploads/media/141202_Auswertung_Umfrage.pdf, [Accessed 14 02 2016].

Dena, 2015. Umfrage: Pkw-Label ist Autokäufern wichtiger denn je. [Online], Available at: <http://www.pkw-label.de/presse/pressemitteilung/dena/dena-plaedierte-fuer-staerkerung-der-verbraucherinformation-ueber-kraftstoffverbrauch-und-co2-emissionen.html>, [Accessed 19 01 2016].

Dena, 2016. Informationen. [Online], Available at: <http://www.pkw-label.de>, [Accessed 5 April 2016].

Deutsche Umwelthilfe, 2016. Market surveillance of German Bundeslander in 2014 (in German) - Report submitted during the Car labelling evaluation stakeholder workshop (17/3/2016)

DfT, 2016. The Environmental label explained. [Online], Available at: <http://www.dft.gov.uk/vca/accessibility/description-of-the-new-car-environmental-label.asp>, [Accessed 19 01 2016].

D'Haultfoeuille, X., Durrmeyer, I. & Février, P., 2016. Disentangling Sources of Vehicle Emissions Reduction in France: 2003-2008. International Journal of Industrial Organization, Volume 47, pp. 186-229.

D'Haultfoeuille, X., Givord, P. & Boutin, X., 2013. The Environmental Effect of Green Taxation: The Case of the French "Bonus/Malus". The economic journal, 124(578), pp. 444-480.

Dumortier et al, 2014. Effects of Life Cycle Cost Information Disclosure on the Purchase Decision of Hybrid and Plug-In Vehicles. Transportation Research Part A: Policy and Practice , Volume 72, p. 71-86.

Ecofys, et al., 2014. Evaluation of the Energy Labelling Directive and specific aspects of the Ecodesign Directive- Final technical report. [Online], Available at: http://www.energylabel-evaluation.eu/tmce/Final_technical_report-Evaluation_ELD_ED_June_2014.pdf, [Accessed 22 01 2016].

Ecologic et al., 2010. Study on consumer information on fuel economy and CO2 emissions of new passenger cars. [Online], Available at:

http://www.ieep.eu/assets/660/Study_on_consumer_information_on_fuel_economy_and_CO2_of_new_cars.pdf, [Accessed 16 01 2016].

Economist, 2015. "A mucky business", 26th September 2015, pp. 23-25.

EEA, 2014. Monitoring CO2 emissions from passenger cars and vans in 2013. EEA Technical Report No 19/2014, European Environment Agency. [Online], Available at: <http://www.eea.europa.eu/publications/monitoring-co2-emissions-from-passenger> , [Accessed 18 01 2016].

EEA, 2015. "New cars' CO2 emissions well below Europe's 2015 target",. [Online], Available at: <http://www.eea.europa.eu/highlights/new-cars2019-co2-emissions-well>, [Accessed 18 01 2016].

Egan, C. & Waide, P., 2005. A Multi-Country Comparative Evaluation of Labelling Research. [Online], Available at: http://www.eceee.org/library/conference_proceedings/eceee_Summer_Studies/2005c/P_anel_4/4190egan/paper, [Accessed 25 01 2016].

Eur-Lex, n.d.. National Implementing Measures (NIM) communicated by the Member States concerning Directive 1999/94/EC of the European Parliament and of the Council of 13 December 1999 relating to the availability of consumer information on fuel economy and CO2 emissions. [Online] , Available at: <http://eur-lex.europa.eu/legal-content/EN/NIM/?uri=CELEX:31999L0094&qid=1448293678135>, [Accessed 15 01 2016].

Eurobarometer, 2011. The Future of Transport: Analytical Report. [Online], Available at: http://ec.europa.eu/public_opinion/flash/fl_312_en.pdf, [Accessed 18 01 2016].

European Commission, 1995. Commission Communication: A Community strategy to reduce CO2 emissions from passenger cars and improve fuel economy. [Online], Available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:1995:0689:FIN:EN:PDF>, [Accessed 15 01 2016].

European Commission, 2003. Commission Recommendation 2003/217/EC on the application to other media of the provisions of Directive 1999/94/EC concerning promotional literature. [Online] , Available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:082:0033:0034:EN:PDF>, [Accessed 13 02 2016].

European Commission, 2005. Proposal for a Directive on passenger car related taxes, COM(2005)261. [Online], Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:l31004>, [Accessed 19 01 2016].

European Commission, 2007a. Commission staff working document - Accompanying document to the Communication: Results of the review of the Community Strategy to reduce CO2 emissions from passenger cars -Impact Assessment [SEC(2007) 61]. [Online], Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52007SC0060>, [Accessed 19 01 2016].

European Commission, 2007b. Results of the review of the Community Strategy to reduce CO2 from passenger cars and light commercial vehicles [COM(2007) 19]. [Online], Available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0019:FIN:EN:PDF>, [Accessed 18 01 2016].

European Commission, 2008a. Attitudes of European citizens towards the environment. [Online], Available at: http://ec.europa.eu/public_opinion/archives/ebs/ebs_295_en.pdf, [Accessed 19 01 2016].

European Commission, 2009. "Europeans' attitudes towards climate change". [Online], Available at: ec.europa.eu/public_opinion/archives/ebs/ebs_322_en.pdf, [Accessed 28 01 2016].

European Commission, 2011a. A roadmap for moving to a competitive low carbon economy in 2050, COM(2011) 112 final. [Online], Available at: <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52011DC0112>, [Accessed 12 01 2016].

European Commission, 2011b. White Paper: Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system (COM/2011/0144). [Online], Available at: http://ec.europa.eu/transport/themes/strategies/2011_white_paper_en.htm, [Accessed 18 01 2016].

European Commission, 2011c. Commission staff working document accompanying the White Paper - Roadmap to a Single European Transport Area. SEC(2011) 391 final. [Online], Available at: http://ec.europa.eu/transport/themes/strategies/doc/2011_white_paper/white_paper_working_document_en.pdf, [Accessed 19 01 2016].

European Commission, 2013a. "Climate Change". [Online], Available at: https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKewj0_tfnr7nNAhWELMAKHfRBAYoQFggcMAA&url=http%3A%2F%2Fec.europa.eu%2Fpublic_opinion%2Farchives%2Fefs%2Fefs_409_en.pdf&usq=AFQjCNGmsGI3rSlxhkAxK0MyqgwZMIY8qA&sig2=Gvz0, [Accessed 29 01 2016].

European Commission, 2014a. "Attitudes of European citizens towards the environment". [Online], Available at: https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKewj075XQr7nNAhVJLsAKHS4iAk0QFqghMAA&url=http%3A%2F%2Fec.europa.eu%2Fpublic_opinion%2Farchives%2Fefs%2Fefs_295_en.pdf&usq=AFQjCNF-ywrr0c5E8RLm6EZRtE4NcEcwbw&sig2=A_U, [Accessed 19 01 2016].

European Commission, 2014b. COMMISSION DELEGATED REGULATION (EU) No 518/2014 of 5 March 2014 with regard to labelling of energy-related products on the internet-. [Online], Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2014.147.01.0001.01.ENG, [Accessed 15 01 2016].

European Commission, 2014c. A policy framework for climate and energy in the period from 2020 to 2030, COM (2014) 15, Brussels. [Online], Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52014DC0015>, [Accessed 19 01 2016].

European Commission, 2015a. A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy, COM (2015) 80, Brussels. [Online], Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2015%3A80%3AFIN>, [Accessed 01 02 2016].

European Commission, 2015b. "Proposal for a Regulation setting a framework for energy efficiency labelling and repealing Directive 2010/30/EU", COM(2015) 341. [Online], Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2015%3A341%3AFIN>, [Accessed 13 01 2016].

European Commission, 2015c. Commission welcomes Member States' agreement on robust testing of air pollution emissions by passenger cars", European Commission press release IP/15/5945, 28th October 2015. [Online], Available at: http://europa.eu/rapid/press-release_IP-15-5945_en.htm, [Accessed 18 01 2016].

European Commission, 2015d. Commission staff working document - Impact assessment accompanying the proposal for a Regulation of the European Parliament and of the

Council setting a framework for energy efficiency labelling and repealing Directive 2010/30/EU; {COM(2015) 341 final}

European Commission, 2015e. Infringement cases. [Online], Available at: http://ec.europa.eu/environment/legal/law/press_en.htm, [Accessed 15 01 2016]

Eurostat, 2016. Annual detailed enterprise statistics for trade [sbs_na_dt_r2]. [Online] , Available at: http://ec.europa.eu/eurostat/en/web/products-datasets/-/SBS_NA_DT_R2, [Accessed 15 01 2016].

Focus, 2013. Protest macht Kasse. [Online] , Available at: http://www.focus.de/magazin/archiv/politik-und-gesellschaft-protest-macht-kasse_id_5146396.html, [Accessed 12 01 2016].

Freire-González, J. & Puig-Ventosa, I., 2013. Efectos económicos y ambientales del impuesto especial sobre determinados medios de transporte. Gestión y Análisis de Políticas Públicas, Volume 10, pp. 33-42.

Galarraga, I., Ramos, A., Lucas, J. & Labandeira, X., 2014. The price of energy efficiency in the Spanish car market. Transport Policy, Issue 36, pp. 272-282.

Gazzetta Ufficiale, 2003. DECRETO DEL PRESIDENTE DELLA REPUBBLICA 17 Febbraio 2003, n. 84. [Online] , Available at: <http://gazzette.comune.jesi.an.it/2003/92/3.htm>, [Accessed 08 01 2016].

Geerken & Borup, 2009. System Innovation for Sustainability 2: Case Studies in Sustainable Consumption and Production — Mobility. [Online] , Available at: <https://www.greenleaf-publishing.com/system-innovation-for-sustainability-2>, [Accessed 19 01 2016].

Green, 2010. Why the market for new passenger cars generally undervalues fuel economy. [Online] , Available at: http://www.oecd-ilibrary.org/transport/stimulating-low-carbon-vehicle-technologies/why-the-market-for-new-passenger-cars-generally-undervalues-fuel-economy_9789282102978-3-en, [Accessed 12 01 2016].

Hill, D. &, 2009. Car Buyer Attitude Survey. [Online] , Available at: <http://www.lowcvp.org.uk/assets/reports/LowCVP.pdf>, [Accessed 15 02 2016].

House of Commons Environmental Audit Committee, 2009. Environmental labelling. [Online] , Available at: <http://www.publications.parliament.uk/pa/cm200809/cmselect/cmenvaud/861/861.pdf>, [Accessed 19 01 2016].

ICCT, 2013. A global comparison of fiscal incentive policy for electric vehicles. [Online] , Available at: http://www.theicct.org/sites/default/files/publications/ICCT_EV-fiscal-incentives_20140506.pdf, [Accessed 12 02 2016].

ICCT, 2015. Optimizing to the last digit: How taxes influence vehicle CO2 emission levels. [Online] , Available at: <http://www.theicct.org/how-taxes-influence-vehicle-co2-emission-levels>, [Accessed 15 02 2016].

IDAE, n.d. [Online], Available at: <http://pive.isdefe.es/Bases/Etiquetaenergetica.html>, [Accessed 21 January 2016].

IEEP, ABRL and COWI, 2006. "Improving the knowledge base on car purchasing decision mechanisms and the environmental impact of company car taxation", - Final Report. Background report for the Expert Workshop of 20 and 21 June, Brussels, for the European Commission's DG Environment (contract reference: ENV.C.1/SER/2006/0014r), May 2006.

Ifop, AramisAuto.com, 2011. 2eme édition du baromètre « Les Français & l'automobile ». [Online], Available at: http://www.ifop.com/media/poll/1509-1-study_file.pdf, [Accessed 12 01 2016].

Ifop, AramisAuto.com, 2012. 3ème édition du baromètre « Les Français & l. [Online] , Available at: http://www.ifop.fr/media/poll/1902-1-study_file.pdf, [Accessed 12 01 2016].

Ifop, 2010. Les Français et l'automobile. Résultats détaillés. Mai 2010. [Online] , Available at: http://www.ifop.com/media/poll/1175-1-study_file.pdf, [Accessed 12 02 2016].

InterAutoNews, 2009. Mercato dell'auto & ecologia. [Online], Available at: <http://www.h2roma.org/2008/files/2009/presentazioniirelatori/h2romainterauto2009def.pdf>, [Accessed 12 02 2016].

IPPC, 2013. Summary for Policymakers - 'Climate Change 2013: The Physical Science Basis'. [Online], Available at: http://www.climatechange2013.org/images/report/WG1AR5_SPM_FINAL.pdf, [Accessed 18 01 2016].

IPPC, 2014. Climate Change 2014: Mitigation of Climate Change.. [Online] , Available at: https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_full.pdf, [Accessed 19 01 2016].

Ipsos and London Economics, 2013. Consumer market study on the functioning of voluntary food labelling schemes for consumers in the EU. [Online] , Available at: http://ec.europa.eu/consumers/consumer_evidence/market_studies/food_labelling/docs/final_report_food_labelling_scheme_full_en.pdf, [Accessed 16 01 2016].

KBA, 2015a. Neuzulassungsbarometer. [Online] , Available at: http://www.kba.de/DE/Statistik/Fahrzeuge/Neuzulassungen/neuzulassungen_node.html;jsessionid=63F1803C0F2E94B86839845E7A41B5AC.live1041#rechts, [Accessed 19 01 2016].

Kieboom & Geurs, 2009. Energielabels en autotypekeuze. [Online] , Available at: <http://www.pbl.nl/sites/default/files/cms/publicaties/500076010.pdf>, [Accessed 19 01 2016].

Kubiak and Gronroos-Saikkala, 2013. Energy labelling – State of plan and conceptions for future. Rehva Journal.

Kurani et al, 2002. Marketing Clean and Efficient Vehicles. [Online], Available at: <https://trid.trb.org/view.aspx?id=664405>, [Accessed 7 January 2015]

Lane et al, 2005. Car buyer research report. [Online] , Available at: [http://www.lowcvp.org.uk/assets/reports/LowCVP%20car-buyer%20report%20-%20final%20report%20\(non%20confidential\).pdf](http://www.lowcvp.org.uk/assets/reports/LowCVP%20car-buyer%20report%20-%20final%20report%20(non%20confidential).pdf), [Accessed 15 01 2016].

Lane, B. & Banks, N., 2010. LowCVP Car Buyer Survey: Improved environmental information for consumers:. [Online] ,Available at: <http://www.lowcvp.org.uk/assets/reports/LowCVP-Car-Buyer-Survey-2010-Final-Report-03-06-10-vFINAL.pdf>, [Accessed 15 02 2016].

Leheyda, N. & Verboven, F., 2014. Scrapping Subsidies during the Financial Crisis – Evidence from Europe”, University of Leuven. [Online] , Available at: <ftp.zew.de/pub/zew-docs/dp/dp13079.pdf>, [Accessed 19 01 2016].

LowCVP, 2010. Car buyer survey : Improved environmental information for consumers, Research conducted by Ecolane & Sustain on behalf of the Low Carbon Vehicle Partnership. [Online] , Available at: <http://www.lowcvp.org.uk/assets/reports/lowcvp-car-buyer-survey-2010-final-report-03-06-10-vfinal.pdf>, [Accessed 19 01 2016].

LowCVP, 2011. The used car fuel economy label: a valuable addition to the used car dealer's tool-box. [Online], Available at: <http://www.lowcvp.org.uk/news,feature-the->

[used-car-fuel-economy-label-ndash-a-valuable-addition-to-the-used-car-dealerrsquos-toolbox_1559.htm](#), [Accessed 01 03 2016].

LowCVP, 2012. LowCVP Car buyer survey - Testing alternative fuel economy labels. [Online] , Available at:

<http://www.lowcvp.org.uk/assets/reports/LowCVP%20Car%20Buyer%20Survey%202012%20Final%20Report.pdf>, [Accessed 13 02 2016].

Milieu Centraal, 2016. Energielabel auto. [Online], Available at: <https://www.energielabel.nl/autos>, [Accessed 12 April 2016].

MORI, 2003. Comparative colour-coded labels for passenger cars. [Online] , Available at: http://www.lowcvp.org.uk/assets/reports/DfT_-_MORI_-_Comparative_colour-coded_labels_for_passenger_cars.pdf, [Accessed 18 01 2016].

Netherlands Tax and Customs Administration, 2015a. Bpm tariff. [Online] , Available at: http://www.belastingdienst.nl/wps/wcm/connect/bldcontenten/belastingdienst/individuals/cars/bpm/calculate_and_pay_bpm/bpm_tariff/bpm_tariff, [Accessed 18 01 2016]

Netherlands Tax and Customs Administration, 2015b. Tariffs list. Old bpm tariffs (from 1993). [Online], Available at: http://download.belastingdienst.nl/belastingdienst/docs/old_bpm_forms_bpm651z1fdeng.pdf, [Accessed 16 01 2016].

Odussee-Mure, 2011c. GER37 - Ordinance on Energy Consumption Labelling of new vehicles. [Online] , Available at: http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/GER37.PDF, [Accessed 15 01 2016].

ODYSSEE-MURE, 2011a. FRA32 Tax on company vehicles - CO2 basis. [Online] , Available at: http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/FRA32.PDF, ODYSSEE-MURE, 2011b. NLD5: Energy labelling of vehicles/tyres, [Online] Available at: <http://www.odyssee-mure.eu/publications/br/energy-efficiency-trends-policies-transport.pdf>, [Accessed 7 January 2015]

ODYSSEE-MURE, 2014a. DK-9 Taxes on registration of a new cars (transport). [Online] , Available at: http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/DK9.PDF, [Accessed 19 January 2016].

ODYSSEE-MURE, 2014b. NLD27: Other transport taxes (Motor Vehicle Tax/Private Car and Motorcycle Tax, CO2 differentiation, Car and Motorcycle Tax, CO2 differentiation, (Overige transportbelastingen (MRB/BPM, CO2-differentiatie, lease-auto's)). [Online] , Available at: http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/NLD27.PDF,

ODYSSEE-MURE, 2014c. AU11 - Tax on motor vehicles. [Online], Available at: http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/AU11.PDF, [Accessed 14 January 2016].

ODYSSEE-MURE, 2014d. UK27_Fuel Economy Labels for new and used cars. [Online] , Available at: http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/UK27.PDF, [Accessed 18 01 2016].

ODYSSEE-MURE, n.d. AU9 – Consumer information on fuel consumption of passenger cars. [Online] , Available at: http://www.measures-odyssee-mure.eu/public/mure_pdf/transport/AU9.PDF, [Accessed 7 January 2015].

OECD, 2008. OECD Environmental Performance Reviews OECD Environmental Performance Reviews: Denmark 2007. OECD Publishing.

OpinionWay, BforBank, L'Express, 2011. Le baromètre BforBank. [Online], Available at: http://www.opinion-way.com/pdf/bj7418-l_express_bforbank-barometre_top10_va.pdf, [Accessed 14 02 2016].

Overheid.nl, 2000. [Online], Available at: http://wetten.overheid.nl/BWBR0011761/geldigheidsdatum_02-12-2015, [Accessed 27 01 2016].

Polish Automotive Industry Association (PZPM), 2016. Used Passenger Car Import to Poland. [Online], Available at: <http://www.pzpm.org.pl/en/Automotive-market/Used-Passenger-Car-Import-to-Poland>, [Accessed 7 January 2015]

Polish Automotive Industry Association, 2015. Registrations - Passenger Cars & Light Commercial Vehicles. [Online], Available at: <http://www.pzpm.org.pl/en/Automotive-market/Registrations-Passenger-Cars-Light-Commercial-Vehicles>, [Accessed 7 January 2015]

RAI Vereniging, 2013. Automotive taxation in the Netherlands. [Online], Available at: <http://www.ft.dk/samling/20131/almdel/sau/bilag/11/1286965.pdf>, [Accessed 23 November 2015].

RDW, 2014. de kleur is aan u brandstof verbruiks boekje. [Online], Available at: <https://www.rdw.nl/SiteCollectionDocuments/VT/Naslag/Brandstofverbruiksboekje%202016.pdf>, [Accessed 19 01 2016].

retsinformation.dk, 2000. Bekendtgørelse om energimærkning m.v. af nye personbiler. [Online], Available at: <https://www.retsinformation.dk/Forms/R0710.aspx?id=21936>, [Accessed 7 January 2015]

retsinformation.dk, 2009. Bekendtgørelse om energimærkning m.v. af nye person- og varebiler. BEK nr 1437 af 11/12/2009. [Online], Available at: <https://www.retsinformation.dk/Forms/R0710.aspx?id=128887>, [Accessed 7 January 2015]

retsinformation.dk, 2012. Bekendtgørelse om energimærkning m.v. af nye person- og varebiler. BEK nr 655 af 20/06/2012 Gældende. [Online], Available at: <https://www.retsinformation.dk/Forms/R0710.aspx?id=141787>, [Accessed 7 January 2015]

Ricardo-AEA and TEPR, 2015b. Evaluation of Regulations 443/2009 and 510/2011 on CO2 emissions from light-duty vehicles", report for the European Commission's DG Climate Action. [Online], Available at: http://ec.europa.eu/clima/policies/transport/vehicles/docs/evaluation_ldv_co2_regs_en.pdf, [Accessed 01 12 2015].

Ricardo-AEA, TEPR and CE Delft, 2012. Further development of the SULTAN tool and scenarios for EU transport sector GHG reduction pathways to 2050. [Online], Available at: <http://www.eutransportghg2050.eu/cms/assets/Uploads/Reports/EU-Transport-GHG-2050-II-Task-6-FINAL-8Jun12.pdf>, [Accessed 19 01 2016].

Ricardo-AEA, 2015. Evaluation of Regulations 443/2009 and 510/2011 on CO2 emissions from light-duty vehicles. [Online], Available at: http://ec.europa.eu/clima/policies/transport/vehicles/docs/evaluation_ldv_co2_regs_en.pdf, [Accessed 18 01 2016].

RIS, 2001. Personenkraftwagen-Verbraucherinformationsgesetz. [Online], Available at: <https://www.ris.bka.gv.at/Dokument.wxe?Abfrage=Bundesnormen&Dokumentnummer=NOR30001305>, [Accessed 14 January 2016].

Samar, 2016. [Online], Available at: <http://www.samar.pl/>, [Accessed 19 January 2016].

Scopa P., 2016. The greenhouse gas advertisement study, Transport policy 45 (2016) 77-85., Scopa, P. et al., 2016. The greenhouse gas automotive advertisement study. Transport Policy, Issue 45, pp. 77-85.

SKAT.dk, 2016. Vægtafgift, grøn ejerafgift og andre afgifter. [Online] , Available at: <http://www.skat.dk/SKAT.aspx?oId=1817286>, [Accessed 19 January 2016].

Skinner, I. & Kretschmer, B., 2010. The interactions between European policy driver for increasing the use of biofuels in transport. [Online] , Available at: http://www.ieep.eu/assets/751/Biomass_Futures_briefing_RED_and_FQD_final_17_12_10.pdf, [Accessed 22 01 2016].

The Danish Ecological Council, 2015. Fact Sheet: The Danish motor vehicle taxes. [Online] , Available at: www.ecocouncil.dk/documents/.../1733-150417-motor-vehicle-taxation, [Accessed 7 January 2015]

TNO, IEEP and LAT, 2006. Service contract to review and analyse the reduction potential and costs of technological and other measures to reduce CO2 emissions from passenger cars: Report undertaken for the European Commission's DG Environment. [Online] , Available at: http://ec.europa.eu/clima/policies/transport/vehicles/docs/report_co2_reduction_en.pdf, [Accessed 17 01 2016].

TNS Sofres, AramisAuto.com, 2013. Baromètre AramisAuto.com "Les Français et l'Automobile" Vague 4 - Mai 2013. [Online] , Available at: <http://www.tns-sofres.com/sites/default/files/2013.06.03-automobile.pdf> , [Accessed 18 01 2016].

TNS Sofres, AramisAuto.com, 2014. Baromètre AramisAuto.com Les Français et l'Automobile - vague 5. [Online] , Available at: <http://www.tns-sofres.com/sites/default/files/2014.06.05-automobile.pdf> , [Accessed 01 02 2016].

TNS Sofres, AramisAuto.com, 2015. Baromètre AramisAuto.com "Les Français et l'Automobile" Vague 6. [Online] , Available at: https://cms.aramisauto.com/wp-content/uploads/2015/06/Resultats_Barom%C3%A8tre-AramisAuto_201506011.pdf, [Accessed 01 02 2016].

Transport and Mobility Leuven et al., 2016. Data gathering and analysis to improve the understanding of 2nd hand car and LDV markets and implications for the cost effectiveness and social equity of LDV CO2 regulations - Draft document. [Online] , Available at: <http://www.tmleuven.com/project/pricingandtradessecondhandcars/home.htm>, [Accessed 19 01 2016].

TRB, 2001. Transportation, Energy & Environmental Policy- VIII Biennial Asilomar Conference Proceedings discuss critical and emerging issues in transportation, energy, and environmental policy. [Online] , Available at: <http://www.trb.org/Main/Blurbs/153214.aspx>, [Accessed 18 01 2016].

UK DfT, 2015. Statistical data set. Table VEH0206. Licensed cars by CO2 emission band, Great Britain, annually from 2000. [Online] , Available at: <https://www.gov.uk/government/statistical-data-sets/veh02-licensed-cars>, [Accessed 23 November 2015].

UNDP, 2015a. "Goal 12: Responsible Consumption and Production". [Online], Available at: <http://www.un.org/sustainabledevelopment/sustainable-consumption-production/>, [Accessed 30 November 2015].

UNDP, 2015b. Sustainable Development Goals 2030. [Online] , Available at: <https://sustainabledevelopment.un.org/post2015/transformingourworld>, [Accessed 14 01 2016].

UNECE, 1998. "Convention on Access to Information, Public Participation in decision-making and access to justice in environmental matters",. [Online] , Available at: <http://www.unece.org/env/pp/treatytext.html>, [Accessed 30 11 2015].

UNECE, 2013. Uniform provisions concerning the approval of passenger cars powered by an internal combustion engine only, or powered by a hybrid electric power train with regard to the measurement of the emission of carbon dioxide and fuel consumption. [Online] , Available at: <https://www.unece.org/fileadmin/DAM/trans/main/wp29/wp29regs/updates/R101r3e.pdf>, [Accessed 19 01 2016].

UNEP, 2016a. Brazil's Developing Automotive Fuel Economy Policy. [Online] , Available at: http://www.unep.org/transport/gfei/autotool/case_studies/samerica/brazil/cs_sa_brazil.asp, [Accessed 1 2 2016].

UNEP, n.d.. Global Fuel Econom Initiative - Vehicle labelling for improved fuel economy. [Online] , Available at: <http://www.unep.org/transport/gfei/autotool/approaches/information/labeling.asp#southafrica>, [Accessed 8 2 2016].

UNFCCC COP, 2015. Adoption of the Paris Agreement. Proposal by the President", FCCC/CP/2015/L.9/Rev.1;. [Online] , Available at: <http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>, [Accessed 12 02 2016].

UNFCCC, 2015. Background on the UNFCCC: The international response to climate change. [Online] , Available at: http://unfccc.int/essential_background/items/6031.php, [Accessed 25 11 2015].

University of Buckingham, 2014. The used cars market report 2014 - A report for BCA. [Online] , Available at: <http://www.buckingham.ac.uk/wp-content/uploads/2014/11/pnc-2014-usedcar.pdf>, [Accessed 01 02 2016].

UNRAE, Istituto Piepoli, Confcommercio, 2008. ANALISI DELLE MOTIVAZIONI ALL'ACQUISTO DELL'AUTO. Ricerca qualitativa. [Online] , Available at: http://www.unraeservizi.com/dati/bk_o/file_pdf_unrae/Indagine_Piepoli.pdf, Urban

Foresight, 2015. Local measures to encourage the uptake of low emission vehicles. [Online] , Available at: <http://www.lowcvc.org.uk/assets/reports/LEVs.pdf>, [Accessed 15 01 2016].

van der Vooren et al, 2013. Energy Labels and Firm Strategies in the Dutch Automotive Sector. [Online] , Available at: http://druid8.sit.aau.dk/acc_papers/p1mlasfpqo7oj6bs6oo6ltiif4n5.pdf, [Accessed 16 01 2016].

VCA, n.a.. The passenger car (fuel consumption and CO2 emissions) Regulations. [Online] , Available at: <http://www.dft.gov.uk/vca/additional/files/fcb--co2/enforcement-on-advertising/vca061.pdf>, [Accessed 2 12 2015].

VCD, 2011. CO2-Label für Pkw. [Online] , Available at: <https://www.vcd.org/themen/auto-umwelt/autokaufberatung/co2-label-fuer-pkw/>, [Accessed 19 01 2016].

Volkswagen, 2016. Volkswagen up!. [Online] , Available at: <http://www.volkswagen.dk/da/models/den-nye-up-/velkommen.html>, [Accessed 12 April 2016].

Wallis, 2011. Informing and influencing car buyers to support market growth for low carbon cars. [Online] , Available at:

[http://lowcvp.org.uk/assets/viewpoints/NeilWallis%204-418%20ecccc%20paper%20final%20\(Mar%2011\).pdf](http://lowcvp.org.uk/assets/viewpoints/NeilWallis%204-418%20ecccc%20paper%20final%20(Mar%2011).pdf), [Accessed 12 02 2016].

Walud, Z., 2013. New vehicle fuel economy in the UK: Impact of the recession and recent policies. Energy policy, Volume 74, pp. 215-223.,

Which, 2015. New fuel efficiency tests needed to rebuild trust. [Online] , Available at: <https://press.which.co.uk/whichpressreleases/new-fuel-efficiency-tests-needed-to-rebuild-trust/>, [Accessed 15 01 2016].

Yang, Z. Z. L. a. B. A., 2015. "A Review and Evaluation of Vehicle Fuel Efficiency Labelling and Consumer Information Programmes", a report produced for the Asia-Pacific Economic Cooperation Energy Working Group. [Online] , Available at: <http://slideplayer.com/slide/5748833/>, [Accessed 19 01 2016]

Annex A : STRUCTURE OF THE EVALUATION

Success criteria	Sub-questions	Indicators	Key data sources	
Question 1: RELEVANCE- To what extent do the (current) objectives of the Directive still respond to the needs in the EU considering current and expected technical, environmental and economic challenges?				
1.1	The objectives of the Directive are still relevant and proportionate, i.e. the objectives still address the problems and needs of the sector today.	<ul style="list-style-type: none">Are the needs, problems and issues identified in the intervention logic are still valid today?Are the objectives of the Directive appropriately targeted to the needs/problems of the sector today?Are there any new needs/problems that are not being addressed?Are any of the needs/problems no longer relevant or become less important?Are the objectives of the Directive (including scope) still relevant based on the answers to the above questions?	<p>Evidence of the continuing issues in terms of climate change impacts from cars include:</p> <ul style="list-style-type: none">Evolution of tailpipe gCO₂/km from new carsContribution of CO₂ from cars to total transport/EU emissions <p>Indicators of the need to meet general objectives relating to reducing GHG emissions from the road transport sector, and in particular from cars</p> <ul style="list-style-type: none">Costs of climate change;Fossil fuel consumption due to car activity;Energy security impacts due to fossil fuel consumption <p>Indicators of the need to meet specific objectives relating to the complementary role that the Directive plays in supporting national and other EU legislation including:</p> <ul style="list-style-type: none">Level of consumer awareness of car CO₂ information / extent to which consumers take notice of this type of informationExtent to which the labels are used in conjunction with national taxes	<p>Literature sources LSE <i>Testing CO₂/Car labelling options and consumer information</i> (2013). From 2010, car CO₂ monitoring data in accordance with Regulation (EC) No 443/2009, available from the EEA. Data from earlier years is available from other databases that will be collated as part of Task 1 – e.g. Commission’s Decision 1753/2000 Monitoring of CO₂ emissions database Existing reports and studies in this area including the Transport White Paper (2011), as well as potentially from other analysis for the Commission.</p> <p>Also, draw on evidence from the recently completed ex-post evaluation of the car and LCV CO₂ Regulations that Ricardo-AEA and TEPR carried out for DG CLIMA Interviews with stakeholders</p>
1.2	The operational objectives are still	<ul style="list-style-type: none">How might the current needs/problems change in the	<p>Analysis of the evolution of the problem, and of underlying drivers of the problem</p>	<p>Reports that contain projections of the CO₂ reductions required in the</p>

Success criteria		Sub-questions	Indicators	Key data sources
	needed, appropriate and fit-for-purpose when considering expected technical, environmental and economic challenges, as well as market developments.	<p>future, given the expected developments in terms of market, technology, and environmental, economic and social challenges?</p> <ul style="list-style-type: none"> Is it likely that the objectives of the Directive will remain appropriately targeted to the needs/problems of the sector? 	<p>including:</p> <ul style="list-style-type: none"> Projected contribution of car activity to overall EU transport sector and economy-wide GHG emissions Projected contribution of car activity to overall EU transport sector and economy-wide GHG emissions without further policy action; Projected increases in costs to consumers of fuel consumption <p>Drawing on quantitative indicators above that show the extent of the problem(s) and trends</p> <ul style="list-style-type: none"> The extent to which the objectives are matched to the problems (drawing from other evaluation questions) 	<p>transport sector to 2020 and beyond, such as:</p> <ul style="list-style-type: none"> The IA for the Transport White Paper (2011), Evaluation of the car and LCV CO₂ Regulations (Ricardo-AEA and TEPR study for DG CLIMA) <p>Interviews of stakeholders for their views on the relevance of the Directive</p>
Question 2: Relevance- What, if any, technological, economic, or administrative issues exist that are not covered by the existing legislation which could be introduced in view of their potential added value?				
2.1	Very little need for improvement of existing the legislation as it is sufficient to address the technological, economic, or administrative issues that exists	<ul style="list-style-type: none"> Technical: Is there any discrepancy between test cycle and real world emissions, or how the Directive deals with the diverging technologies that are increasingly being used in new cars Economic: Is there a need for the information provided to consumers to also cover economic information, e.g. the cost of use and associated tax vehicle tax levels. Environmental: What is the accuracy and relevance of the emissions presented on the 	<p>Evidence of the added-value technological issues that are not covered by the existing legislation</p> <ul style="list-style-type: none"> Increasing market penetration of alternatively fuelled cars where tailpipe emissions are not the major source of CO₂ (e.g. electric vehicles) Increasing divergence between real-world and test cycle CO₂ emissions (the label is based on quoting NEDC emissions performance) <p>Evidence of the added-value of economic issues that are not covered by the existing Directive</p> <ul style="list-style-type: none"> Consumer response to information on 	<p>Desk research</p> <p>Public consultation</p> <p>Interviews with stakeholders</p> <p>The inclusion of additional types of vehicles has been investigated in some of the literature, as has expanding the scope of the Directive to include internet-based media.</p>

Success criteria		Sub-questions	Indicators	Key data sources
		<p>label, e.g. the lack of reference to WTT emissions (e.g. see Section 2.1.3).</p> <ul style="list-style-type: none"> Administrative: Is there scope for of extending the coverage of the Directive in relation to vehicles (e.g. new vans or used cars) and/or media (e.g. the internet). 	<p>vehicle fuel economy vs information on CO2 emissions</p> <ul style="list-style-type: none"> Consumer response to information on annual or whole-life running costs <p>Evidence of the added-value of administrative issues that are not covered by the existing Directive</p> <ul style="list-style-type: none"> Market uptake of low CO2 cars in countries that use a colour-coded label compared to market uptake in countries without a colour-coded label Market uptake of low CO2 cars in countries that use absolute labelling schemes vs uptake in countries using relative labelling schemes Inclusion of second-hand vehicles and/or LCVs in the Directive Requiring internet-based media to be covered within the scope of the Directive 	
Question 3: Effectiveness - What have been the (qualitative and quantitative) effects of the intervention?				
3.1	The specific objectives of the Directive that are defined in the intervention logic have been effective	<ul style="list-style-type: none"> When (what year) was the Directive been implemented fully in each Member State? What effect has the Directive had in terms of influencing consumer choice towards more efficient vehicles? What has the impact been in terms of car sales and CO2 emissions? Has the label improved consumer awareness of CO2 emissions and fuel economy? Are consumers familiar with the 	<p>Evidence that the Directive has supported the market uptake for low CO2 cars</p> <ul style="list-style-type: none"> Changes in the percentage of new cars sold each year that meet specific emissions criteria (e.g. sub-100 g/km, 100-120 g/km, etc.) consistent with emission categories introduced in Member States – with larger increases seen in the more efficient categories Correlation between introduction of 	<p>Data sources that cover the topic of market uptake of low CO₂ cars: annual statistics on the new car market and annual CO₂ monitoring report for new cars, datasets for selected EU Member States</p> <p>Data on changes in national labelling schemes will be gathered through web-based research and discussions with Member State stakeholders.</p> <p>Consumer survey data undertaken in different Member States</p>

Success criteria		Sub-questions	Indicators	Key data sources
		labels/posters/guidance? <ul style="list-style-type: none"> Has the Directive stimulated manufacturers to design more fuel efficient vehicles? To what extent? Has the Directive enhanced the effectiveness of Member States fiscal measures aimed at encouraging the market uptake of low CO₂ cars? To what extent? Did the introduction of the label make it easier to introduce fiscal incentives for low CO₂ cars? 	labels and/or changes in the design of the label in particular Member States and changes in the market uptake of low CO ₂ cars. Evidence that the label has informed consumer decisions prior to purchasing a car: <ul style="list-style-type: none"> Percentage of consumers indicating that they are aware of the car CO₂ label and understand its aims Percentage of new car buyers indicating that the label affected their purchasing decision Evidence that the Directive has influenced manufacturers' decisions to produce more fuel efficient vehicles <ul style="list-style-type: none"> Change in the type of vehicles offered for sale in different countries, following the implementation of the Directive A majority of industry stakeholders confirm that the Directive had an impact on their decisions 	Several studies on the extent to which consumers understand the labels and influence of CO ₂ and energy labels have been carried out in the literature specifically for car CO ₂ labels and more generally for product labels. Public consultation Interviews with consumer associations Interviews with manufacturers and associations Detailed national datasets (where available) may also show if there have been changes in the supply side (range of cars offered) in response to the Directive
Question 4: Effectiveness - To what extent has the approach taken, in terms of both scope (e.g. the exclusion of used cars) and main elements in the legislation, ensured or hampered the achievement of the objectives?				
4.1	The impact on the effectiveness of the scope of the Directive has been satisfactory and a different scope would not make it	<ul style="list-style-type: none"> To what extent has the current focus on new cars limited the overall effects of the Directive? Would a different scope of the Directive lead to significantly higher benefits? Would extending the scope to 	Evidence to what extent the approach taken has ensured or hampered the achievement of the objectives: <ul style="list-style-type: none"> Specific elements identified by stakeholders Typical consumers that make purchases in the affected segments do not already 	Public consultation Interviews with stakeholder. Desk research - Review of the feasibility of extending the scope in terms of the availability of the required information and the feasibility of required calculations.

Success criteria		Sub-questions	Indicators	Key data sources
	more effective	<p>used cars improve the effectiveness of the Directive?</p> <ul style="list-style-type: none"> To what extent would inclusion of emissions at other stages of the lifecycle impact the effectiveness of the Directive – for example, upstream (WTT) emissions, or lifecycle (embedded) emissions? Are all of the elements of the Directive contributing to its effectiveness – e.g. label, poster, guidance? Are the proposed media for dissemination of information appropriate? 	<p>have access to the information by other means</p> <ul style="list-style-type: none"> At least 50% (TBC) of consumers understand the element/changes proposed, as tested in experimental settings and feel it would affect their purchasing decisions (literature evidence) <p>Indicators of the share of total CO₂ emissions that are included/excluded under the various configurations</p> <ul style="list-style-type: none"> Share of lifecycle emissions included / excluded per average car (for inclusion of different lifecycle aspects) Share of total road transport emissions included / excluded by mode (for inclusion of LCVs and/or used cars) 	<p>Literature sources on consumer responses and the effectiveness of different label designs and types of information. Studies have been carried out for example in the USA, as well as in Europe.</p> <p>Data on well-to-tank emissions from the JEC/CONCAWE Well-to-Wheels study</p> <p>Data on typical emissions per vehicle for LCVs (recently been reviewed by Ricardo-AEA in support of the evaluation of the LDV CO₂ Regulations).</p>
Question 5: Effectiveness - What factors influenced the achievements observed, how and to what extent?				
5.1	Optimal label design and identification of factors that influence the effectiveness of the Directive	<ul style="list-style-type: none"> Is there any evidence of differences in the effectiveness of the Directive in countries that: <ul style="list-style-type: none"> Use colour-coded labels vs countries that don't? Provide comparative labels vs those that provide only consumption data in isolation? Have absolute labelling schemes vs relative labelling schemes? Provide separate labels for different fuel types (e.g. petrol and diesel)? 	<p>Evidence on differences in the effectiveness of the label:</p> <ul style="list-style-type: none"> Differences in the percentage market share of low CO₂ cars in countries with different labelling schemes. Differences in the evolution of sales of highly rated efficient cars (e.g. A/B label ratings) compared to lower rated cars Differences in the price premiums attached to highly rated cars <p>Evidence on differences in the level of acceptance and consumer familiarity</p> <ul style="list-style-type: none"> Differences in the percentage of consumers that recognise the label 	<p>Case study analysis will identify and compare the different experiences in Member States.</p> <p>Literature sources referring to the relative effectiveness of different label designs & types of information in terms of influencing consumer decisions.</p> <p>Public consultation</p>

Success criteria		Sub-questions	Indicators	Key data sources
		<ul style="list-style-type: none"> ○ Provide information on other aspects such as costs, lifecycle emissions etc. • Have there been any national measures that have had an impact in terms of: <ul style="list-style-type: none"> ○ Label recognition (e.g. level of consumer recognition / familiarity)? ○ Label understanding (consumers understanding the terminology)? ○ Label effectiveness in influencing consumer purchasing decisions? • Is there any difference in the evolution of new car CO₂ emissions in countries that have introduced national fiscal measures linked to car CO₂ performance? • On the basis of the answers to the previous sub-questions, what are the most important factors that influence the effectiveness of the labels? 	(from surveys) <ul style="list-style-type: none"> • Percentage of consumers that understand the different label types (from literature / surveys) • Percentage of consumers that agree different label types would influence their purchasing decisions 	
Question 6: Effectiveness - What unintended or unexpected positive and negative effects, if any, have been produced?				
6.1	Identification of positive and negative effects of the Directive and evaluation of the causes and impacts of these on the effectiveness of the	<ul style="list-style-type: none"> • What positive or negative impacts associated with the Directive have different stakeholder groups experienced, that have not already been considered under other evaluation questions? • To what extent are these a 	Indicators that the Directive has contributed to other positive or negative unintended impacts, e.g. unexpected changes in competitiveness of different segments of the market. For example: <ul style="list-style-type: none"> • Additional costs or savings • Additional impacts on competitiveness 	Public consultation Interviews with stakeholders Relevant literature Data on GDP and transport activity (Eurostat)

Success criteria		Sub-questions	Indicators	Key data sources
	Directive	<ul style="list-style-type: none"> result of the design/implementation of the Directive? To what extent are these a result of market developments? Are there cumulative impacts of the Directive on stakeholders that were not expected, including interactions with other policies? Do any stakeholder groups (e.g. SMEs) face any specific problems and challenges? Has the Directive had significant impacts on third countries? Have there been any other unexpected impacts on other stakeholders? 	<ul style="list-style-type: none"> Disproportionate impacts on specific stakeholder groups 	
Question 7: Efficiency - To what extent are the costs resulting from the implementation of the legislation proportionate to the benefits that have been achieved as regards each main element of the Directive?				
7.1	Quantification the costs associated with the Directive and arrive at the estimate of the efficiency	<ul style="list-style-type: none"> What are the main identifiable cost categories and their magnitude in implementing the specific provisions of the Directive? How proportionate are these cost categories with respect to the benefits achieved? Were the costs in line with what was expected? To what extent has the implementation of the measures of the Directive required the creation of new 	<ul style="list-style-type: none"> Cost of familiarising with new information obligations (one-off), record-keeping, time spent cooperating with other administrations Cost to design the system and collect required data Costs of ensuring correct documentation / calculations Cost of producing, printing, distributing, maintaining and updating labels, posters, guides etc. Costs of monitoring compliance 	<p>Interviews with manufacturers, dealers, traders to support a standard cost model approach</p> <p>Literature on the potential scale of certain cost elements, such as printing and design.</p> <p>Data on wage rates for the SCM from Eurostat and other published sources.</p> <p>Back-up sources from studies of administrative costs of labels in other areas, such as tyres and appliances</p>

Success criteria		Sub-questions	Indicators	Key data sources
		procedures or mechanisms, or has it relied on existing structures in place?		
Question 8: Efficiency - To what extent do the different types of costs resulting from the implementation of the legislation vary based on the approach taken to implement the legislation (while achieving the same results)? Which approach was most efficient?				
8.1		<ul style="list-style-type: none"> To what extent do implementation costs differ across MS? How does this relate to their decisions on how to implement the Directive? What is the cost: benefit ratio (where possible)? 	<p>Similar indicators as for the previous question, but identified according to specific design/implementation aspects.</p> <ul style="list-style-type: none"> Cost of familiarising with new information obligations (one-off), record-keeping, time spent cooperating with other administrations Cost to design the system and collect required data Costs of ensuring correct documentation / calculations Administrative costs to produce information Costs of monitoring compliance 	<p>Interviews with manufacturers, dealers, traders to support a standard cost model approach</p> <p>Literature on the potential scale of certain cost elements, such as printing and design.</p> <p>Data on wage rates for the SCM from Eurostat and other published sources.</p> <p>Case studies</p> <p>Back-up sources from studies of administrative costs of labels in other areas, such as tyres and appliances.</p>
Question 9: Efficiency - What are the major sources of inefficiencies? What steps could be taken to improve the efficiency of the Directive? Are there missing tools and/or actions to implement the Directive more efficiently?				
9.1	Identification of inefficiencies and ways to overcome them	<ul style="list-style-type: none"> Were all of the implementation costs necessary? Could any costs have been reduced or eliminated without reducing the benefits? Are there any further synergies that could lead to cost savings? Could further cooperation between Member States lead to high efficiency? 	<p>Similar indicators as for the previous question, but identified according to specific design/implementation aspects:</p> <ul style="list-style-type: none"> Inventory of potential sources of inefficiency Feasibility and impact of implementing potential options to reduce inefficiency 	<p>Interviews with manufacturers, dealers, traders to support a standard cost model approach</p> <p>Literature on the potential scale of certain cost elements, such as printing and design.</p> <p>Data on wage rates for the SCM from Eurostat and other published sources.</p> <p>Case studies</p> <p>Back-up sources from studies of administrative costs of labels in other areas, such as tyres and appliances.</p>
Question 10: Coherence - How well does the legislation fit with and complement other EU policies (e.g. air pollution) and their objectives				

Success criteria		Sub-questions	Indicators	Key data sources
(e.g. environmental, social or economic)?				
10.1	The objectives of the Directive are coherent and complement other EU policies and their objectives	<ul style="list-style-type: none"> Are there any conflicts, overlaps or inconsistencies with related EU policies? Are they direct or indirect? How might these conflicts or inconsistencies be resolved? Are there any synergies with related EU policies? Is there scope for further harmonisation or greater synergies? 	<p>Qualitative indicators showing areas of complementarity, overlap and contradictions between different instruments, focusing on the general, specific and operational objectives of the Directive:</p> <ul style="list-style-type: none"> Economic impacts (costs and benefits to different operators in EUR) – drawing from questions on efficiency Social impacts (safety, working conditions, compliance with social legislation) – drawing from questions of effectiveness Environmental (emission reductions and fuel efficiency) – drawing from questions on effectiveness 	<p>Literature: Text of relevant EU policies, supporting impact assessments where available, and recent evaluations.</p> <p>Public consultation</p> <p>Interviews with stakeholders</p>
Question 11: Coherence: To what extent are objectives and achievements coherent with the Europe 2020 strategy and Europe 2030 policy goals?				
11.1	The objectives of the Directive are coherent with larger Europe policy goals	<ul style="list-style-type: none"> How have the impacts of the Directive contributed to the goals of EU transport policy and wider economic, social or environmental challenges? Is there scope for greater synergies? Are there any conflicts, overlaps or inconsistencies with regard to wider EU transport policy goals? Are they direct or indirect? How might these conflicts or inconsistencies be resolved? 	<p>Qualitative indicators showing areas of complementarity, overlap and contradictions between different instruments</p>	<p>Texts of EU policies (EU2020 Strategy, Transport white paper, CARS 2020, Sustainable development strategy) supporting impact assessments and evaluations, where available.</p> <p>Interviews with stakeholders</p>
Question 12: Coherence: How does the legislation interact with other EU/ national/ international initiatives which have similar objectives (e.g. actions in the field of environment, single market, climate action)?				

Success criteria		Sub-questions	Indicators	Key data sources
12.1	The objectives of the Directive interact effectively with other EU/national/international initiatives		Qualitative indicators showing areas of complementarity, overlap and contradictions between different instruments	Text of relevant national/international policies. Interviews with stakeholders
Question 13: EU added value - What has been the EU added value of the legislation?				
13.1	Assessment and evaluation of the value addition of the Directive and identification of areas for improvement	<ul style="list-style-type: none"> What have been the extra benefits (or costs) of the Directive compared to action at a different level? Could the results have been achieved in another manner – for example, national legislation, guidelines, voluntary standards? If so, how effective/efficient/relevant would that have been? Are there case studies (e.g. particular Member States) that could provide good examples? 	<p>The counterfactual degree of coverage achieved by alternative information schemes, e.g.</p> <ul style="list-style-type: none"> Number of MS likely to have implemented national schemes Extent of coverage of (potential) national and/or voluntary schemes Benchmarking with international legislation 	<p>National legislation (at the time and after implementation of the Directive)</p> <p>Interviews with stakeholders</p> <p>Public consultation</p> <p>Assessment of previous experience with voluntary schemes, especially in non-EU countries and in other product markets (e.g. voluntary certification schemes for appliances, food, biofuel etc.).</p>
Question 14: EU added value: To what extent do the issues addressed by the intervention continue to require action at EU level?				
14.1	Identification of issues that will require future intervention at the EU level.	<ul style="list-style-type: none"> What is the continued added value of setting EU level rules compared to different level of legislation? Was action at the EU level required and justified? Is action at the EU level still needed? Are there any future developments that might affect the EU added value of the Directive, either positively or 	<p>Evidence for future EU level action:</p> <ul style="list-style-type: none"> Assessment of indicators of previous questions indicate the relevance, effectiveness and efficiency of EU legislation Stakeholders' demand/support for continued EU level action 	<p>Desk research</p> <p>Interviews with EU stakeholders</p> <p>Input from Previous evaluation questions</p>

Success criteria		Sub-questions	Indicators	Key data sources
		negatively?		

Annex B : ANALYSIS OF RESPONSES TO PUBLIC CONSULTATION

B.1 - Introduction

The public stakeholder consultation for the Car labelling Directive 1999/94/EC was launched on October 19th 2015 and was open for responses until January 15th 2016 (12 weeks). The questionnaire was available in three languages (English, French and German) and consisted of 35 questions; these were primarily multiple choice questions, although respondents were given the opportunity to provide comments alongside their answers. The analysis of the public stakeholder consultation is intended to provide an overall view of the responses to the questionnaire.

Please note that the views presented can only be associated to respondents to this specific consultation and may not be considered representative of the views of all or specific groups of stakeholders.

B.2 - Analysis of respondents' profile

Two types of stakeholders participated in the survey: individual citizens/consumers and organisations (representing European and national business associations, individual firms, national/local authorities, consumer groups, NGOs and think tanks). A total of **179 responses**⁴⁹ to the questionnaire were received, 67 from citizens/consumers and 112 from organisations/authorities. This report aims to summarise the views of stakeholders within these two groups, although it is useful to note that analysis of the survey responses showed that a large number of responses were received from Germany in both categories (70% of citizens/consumers and 68% of organisations/authorities). In particular, a large number of responses were received from German car dealers/traders, both under the category "citizen/consumer" and "organisations/authorities".

Table B-1: Classification of stakeholders responding to the questionnaire

Stakeholder category	Number of responses	% of responses
Citizens/Consumers: EU, excluding German respondents	18	10%
Citizens/Consumers: Germany	49	27%
Citizens/Consumers total	67	37%
Organisations/Authorities: EU, excluding German car dealers/traders	57	32%
Organisations: German car dealers/traders.	55	31%
Organisations/Authorities total	112	63%
Questionnaire total	179	100%

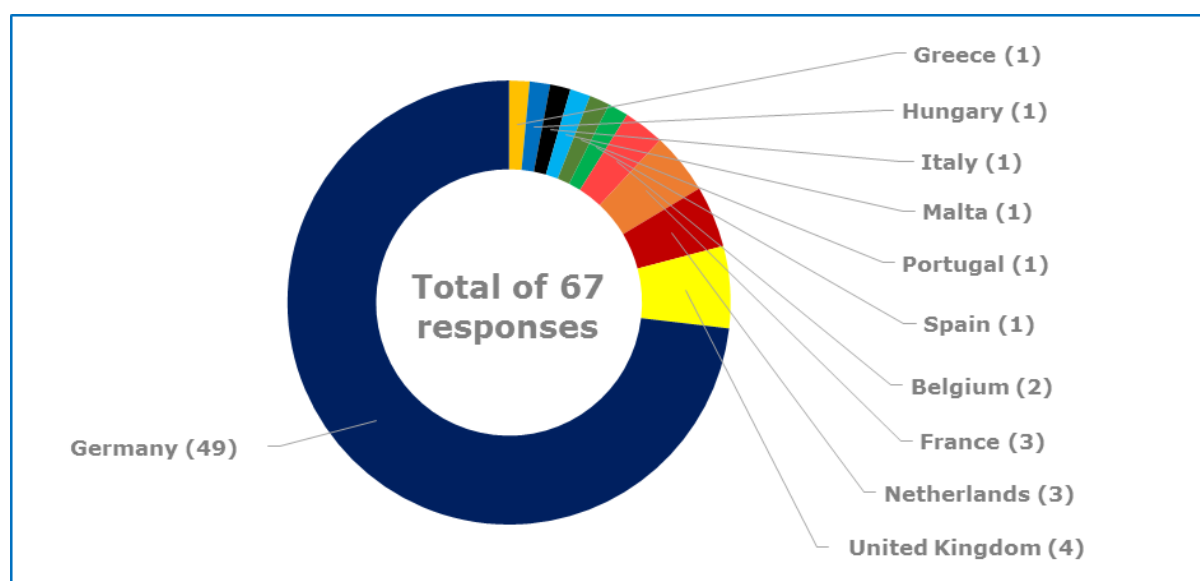
⁴⁹ This number includes responses that were submitted in the form of a narrative, outside of the online portal

B.3 - Analysis of responses by citizens/consumers

Responses were received from citizens in 11 countries (Belgium, France, Germany, Greece, Hungary, Italy, Malta, the Netherlands, Portugal, Spain and the United Kingdom), as shown in Table B-2.

Table B-2: Distribution of responses by Member State for citizens/consumers

Member State	Number of responses	% of responses in the citizens/consumers group
Belgium	2	3%
France	3	4%
Germany	49	73%
Greece	1	1%
Hungary	1	1%
Italy	1	1%
Malta	1	1%
Netherlands	3	4%
Portugal	1	1%
Spain	1	1%
United Kingdom	4	6%
Total: citizens/consumers	67	100%



Due to the considerable number of responses from German citizens/consumers (of which half were estimated to have been submitted by car traders/dealers), percentages of consumer responses have to be carefully interpreted. German respondents often expressed contrasting views to citizens from other EU countries. The differences in respondents' opinions are highlighted where relevant.

B.3.1 Consumer's experience of the Directive

In this section the input from stakeholders in relation to the consumer experience is presented and the impact on consumer behaviour of providing information on CO₂ performance and fuel consumption (including the extent that consumers had difficulties interpreting the information provided). For answers to questions in the online

consultation, the percentage ranges reported refer to the different information media provided in the Directive (label, guide, poster, promotional material).

The questionnaire initially sought to establish whether consumers are aware that information about the CO₂ performance and fuel consumption of new cars is available. Consumer awareness of the different elements of the Directive (i.e. label, guide, poster, or promotional material) ranges between 65% and 85%⁵⁰, with the highest awareness observed for the label and promotional material, while the lowest awareness observed for the guide.

To put the questionnaire responses into context, consumers were also asked if they had been involved in the purchase of a new car since the introduction of the Directive in 2001. 88% of respondents answered that they had bought a car in this timeframe. Private cars accounted for 85% of purchases, with the remaining 15% being company cars.

When asked to refer back to their most recent new car purchase since 2001, 57%-85% of consumers regarded the information to be visible/available, depending on the information medium considered. However, only 11%-30% read the information, 11%-30% considered the information provided to be clear/understandable, 7%-13% considered the information to be useful and 8%-19% claimed that the information influenced their purchase decision. For all response options the highest percentages were reported for the label, while the lowest percentages were observed for the guide and for the poster.

The percentage of respondents who considered the information to be visible/available while buying a new car was similar to: a) the percentage of respondents who stated that they are aware that information about the CO₂ performance and fuel consumption of new cars is available in the introductory questions (65%-85%), and b) the typical compliance rates reported in this project. A major factor affecting the influence of the Directive on consumer behaviour appears to be the low percentage of consumers that read the information; if the information is not read, it cannot have an impact.

Another factor influencing the impact of the Directive may be consumer understanding of the information provided. The most frequently specified reason (30%-41%) was that the metrics (e.g. CO₂/km) were not understandable. Additional comments from consumers mainly regarded the quality of information on CO₂ emissions and fuel economy of new cars, and the label design. For example, one citizen from France and one from Malta suggested that the test procedures to measure fuel economy need to be more precise and more representative of real driving conditions, while citizens from Portugal and the UK suggested that the labels should follow a similar approach to Energy Efficiency labels.

B.3.2 Effectiveness of the Directive

Specific questions were asked in the questionnaire to understand the opinions of companies/ organisations, although citizens/consumers were able to answer these questions if they wished to do so. These questions focussed on the effectiveness of the Directive in terms of:

- a) increasing consumer awareness of CO₂/fuel consumption and influencing purchase decisions; and
- b) the introduction, supply and price of more fuel efficient vehicles.

⁵⁰ Please note that all percentages included in this report are calculated based on the number of responses received for that question. Not all respondents answered every question in the questionnaire, therefore the number of responses received varies by question.

In general, answers were very similar for whether the Directive has increased consumer awareness of CO₂ emissions or fuel consumption. The label was viewed the most positively among all respondents, while the guide was considered to be the least effective. Overall, only 22% of respondents viewed the label to be 'effective', or 'very effective', however these percentages are influenced by the responses from German citizens, who were significantly more negative than other EU citizens.

Similarly, German citizens assigned very poor ratings when asked how effectively each element of the Directive has influenced consumer car purchasing behaviour. Citizens from other EU countries answered more positively: over 50% of respondents stated that all elements of the Directive except the guide (which received 15%) were 'effective' or 'very effective'.

Public opinion on the impact of the Directive on the new car market was also requested. Only 12% of respondents considered the Directive to have been 'very effective' or 'effective' in terms of encouraging manufacturers to introduce more fuel efficient cars, while 26% believe that it has led to increased consumer choice of more fuel efficient cars. With regards to the price of more efficient cars, 36% believe that the Directive has led to an increase, 31% believe it has had no impact, 5% believe it has led to a decrease and the remaining 28% were unsure of the impact.

B.3.3 Member State implementation of the Directive

The implementation of the Directive varies depending on the Member State, therefore inputs were requested on this topic.

Consumers are generally not aware of whether additional elements (such as information on noise or lifecycle CO₂ emissions) are included in their national legislation, however over 40% rated information on running costs, taxes and safety to be 'very effective' or 'effective' in influencing purchase decisions. Furthermore, just under 25%⁵¹ of respondents feel that the Directive would have been more effective if information on air pollutants was included. A mixture of comments were also received on this point. For example, several citizens from Poland, Germany and the UK believe that air pollutant information is not a prime consideration in purchase decisions, or that consumers are not interested and/or would not understand this information, therefore it would add little value. Meanwhile, other citizens (from Spain and Malta) indicated that this information is important to understand the full environmental impact of the car, however it was noted that information should only be included if it is representative of real world driving.

Questions were also asked about whether the Directive allows for sufficient flexibility on label design and whether there were any issues between the requirements or the practical implementation of the Directive and those set by other relevant policy tools. Answers from consumers indicated that the majority do not know, however a few relevant comments were received. A Dutch consumer mentioned that energy labels for electric cars are difficult to compare to conventional cars while a Spanish citizen noted that national support programmes/incentives can only be implemented for the 'best in class' vehicles, however the label categories are currently too broad.

B.3.4 Costs and benefits of the Directive

The costs and benefits for different stakeholder groups that are associated with the Directive are important when evaluating its impact. A number of consumers noted that there are potential fuel cost savings (9%) and time savings while looking for fuel

⁵¹ Significant differences were observed between German citizens and those from other EU countries. Over 50% of respondents in other EU countries felt the Directive would have been more effective if air pollutant information was included, compared to 23% for German citizens

consumption information (7%). No comments were received in relation to any costs to consumers.

B.3.5 Impacts of the Directive and final remarks

At the end of the questionnaire, respondents were asked about other positive and negative impacts of the Directive and the need for legislation. Only 2% are aware of other positive effects (although these were not specified), while 42% stated that there are other negative effects. Among these, a Spanish citizen raised the point that many consumers mistrust the label because the system used to categorise vehicles in different in each Member State and in some countries, large, powerful vehicles can obtain the most efficient label category. A citizen from the UK also has concerns about the accuracy of information on car labels.

Whereas the majority of German consumers (of which approximately half are likely to be car dealers) disagreed that there is still a need for EU legislation, the consumer respondents from other Member States agreed to the need for EU legislation (62%). A few consumers reiterated their concerns that the information is not representative of real world driving performance and is therefore misleading when deciding which car to purchase, while others suggested that there is a need to evolve the system to improve consumer trust. Some of the improvements suggested included a uniform labelling system across the EU and information based on reliable real world performance.

Individuals responding to the online public consultation on behalf of organisations were also given the opportunity to answer questions regarding the consumer's experience of the Directive (summarised in Section B.3.1 for citizens/consumers) in their capacity as individuals. Overall, the responses were very similar to citizens/consumers, however when assessing understanding of the information provided, a slight difference was observed between the responses from citizens/consumers and from organisations. In the citizens/consumers group the most frequently specified reason for poor understanding was that the metrics (e.g. CO₂/km) were not understandable. In addition to this reason, many respondents (30%-45%) in the organisations group felt that the presentation was poor/confusing.

B.4 - Analysis of responses by organisations/authorities

112 responses were received representing the views of 114 organisations⁵². In total, 12 countries of operation were listed (Austria, Belgium, France, Germany, Italy, Luxembourg, the Netherlands, Poland, Portugal, Romania, Spain and Sweden). A number of organisations/authorities listed multiple countries of operation, or stated that they operate EU wide. The distribution of responses by the type of organisation is shown in Table B-3.

Table B-3: Distribution of responses by organisation type

Organisation type	Number of responses	% of responses in the organisations/authorities group
Vehicle trader/dealer	56	50%
Industry or business association	25	21%
Environmental/energy NGO	6	5%
Not stated	6	5%
Advertising/publishing organisation	4	4%
Consumer NGO	5	4%
Local/regional public authority or agency	4	4%
Member State competent authority	5	4%
Transport NGO	4	4%
Automotive supplier	2	2%
Vehicle manufacturer	2	2%
Consultancy	1	1%
Another national authority or agency	1	1%
Total	114	100%

Note: A number of organisations identified with multiple categories, therefore the columns do not add up to n=112, or 100%.

Again, due to the considerable number of responses (55) from German traders/dealers, percentages stated in this section have to be carefully interpreted. Where relevant, the differences in opinions from this specific group are indicated.

B.4.1 - Consumer's experience of the Directive

This section focussed on consumers' experiences and was optional for organisations and authorities. However, respondents were given the opportunity to answer the questions in their capacity as individuals. These opinions are summarised in Section B.3.5 of the citizens/consumers section above.

⁵² In 2 cases the provided response represented the views of two organisations.

B.4.2 - Effectiveness of the Directive

In this section the input from organisations in terms of the effectiveness of the Directive is analysed.

Organisations were asked to rate how effective the various elements of the Directive have been in terms of increasing consumer awareness of CO₂ emissions and fuel consumption of new cars, and the effect on the new car market. According to the responses to the public consultation, the label is seen to be the most effective element of the Directive, while the guide is rated the least effective element. Responses were similar for both information on CO₂ emissions and on fuel efficiency. Concerning the different stakeholder groups, German traders/dealers were overwhelmingly more negative than other respondents, 81%-89% (depending on the element of the Directive) viewed the Directive to be ineffective, compared to 37%-60% for other respondents. Interestingly however, for all elements of the Directive, three out of the four consumer NGOs responding to this survey consider the Directive to be ineffective in terms of increasing consumer awareness of CO₂ emissions. In relation to fuel consumption, responses were slightly more positive, with the consumer groups generally being more neutral.

In terms of influencing consumers' decisions to purchase more fuel efficient cars, organisations generally consider the Directive to be ineffective (67%-75% of respondents), while again the label is viewed as the most effective element. Again, the consumer groups answering this survey were generally neutral, or consider the Directive to be ineffective at influencing consumer choice.

Concerning the effect on the new car market, online consultation respondents generally believe that the Directive has been ineffective at encouraging manufacturers to introduce more fuel efficient cars (59% of respondents stated 'very ineffective' or 'ineffective'). Overall, only 22% of respondents believe that the Directive has led to an increase in the supply of more fuel efficient cars, although there were significant differences between responses from German traders/dealers and other organisations (7%, compared to 40%). Concerning the price of more fuel efficient cars, respondents generally agree that the Directive has had no impact. Responses from industry respondents (those that classified their organisation as an automotive supplier, industry or business association or vehicle manufacturer – 25 respondents in total) were similar to the overall averages. Just 14% believe that the Directive has effectively encouraged manufacturers to introduce more fuel efficient cars (43% stated 'very ineffective' or 'ineffective'), 30% say the Directive has increased the supply of more fuel efficient cars and 65% stated that there has been no impact on the price of more fuel efficient cars.

B.4.3 - Member State implementation of the Directive

Understanding how Member States decided to implement the Directive and any issues (conflicts, overlaps, trade-offs or inconsistencies) between the requirements or the practical implementation of the Directive and those set by other relevant policy tools (e.g. legislation, standards, tax incentives, financial support programmes) may allow for future improvements. Overall, 50% of respondents to the online consultation stated that there have been issues in relation to the implementation of the Directive and a wide range of explanatory comments were provided. The most frequent points referred to the inconsistency in the implementation of the Directive across Member States, inconsistencies with other EU labelling schemes (such as the energy efficiency labels), inconsistencies between label categories and CO₂ based taxation (the thresholds are not always the same), the failure to consider other pollutant emissions and the discrepancy between the values stated on the labels and those observed during real world driving conditions. Several respondents (including two consumer NGOs, a Transport NGO, and two industry organisations) also questioned the effectiveness of relative classification systems.

Member States are provided the flexibility to design their own national labelling systems, which has resulted in a number of countries including additional elements in their labelling systems. The survey considered 10 of these additional elements (running costs, taxes, air pollution, noise, safety, eco-scores, lifecycle CO₂ emissions, labelling of second-hand cars, labelling of light commercial vehicles and provision of information through electronic media). On average, for each element over 50% of respondents were not aware whether such information is provided. When asked how effective the inclusion of each of these additional elements is in terms of influencing consumers' car purchase decisions, responses stating that the information is effective ranged between 6% and 34%, while for 'ineffectiveness' scores were between 49% and 67%. However, three elements stood out due to their higher than average ratings for effectiveness and lower than average ratings for ineffectiveness. These were running costs, taxes and safety information. A few organisations and authorities provided additional comments to explain their answers on the effectiveness of the elements considered. Running costs and taxes were considered highly effective and important to be displayed by both industry organisations and NGOs across the EU. In addition to information on running costs, taxes and safety, consumer NGOs responding to this question consider information on labelling of second hand cars and provision of information through electric media (internet, television, cinema and radio) to be effective to be effective at influencing consumers' car purchase decisions.

The questionnaire specifically asked respondents whether the Directive would have been more effective if information on air pollutants was included. Similarly to the responses from consumers, only a small percentage of organisations (17%) responded positively to this question⁵³. Comments received on this question revealed that both viewpoints are supported by diverse groups of stakeholders. Respondents in favour of including this information encompass public authorities from Germany, Belgium and the Netherlands, environmental and transport NGOs and a number of European industry or business associations. Some organisations claimed that data on air pollutants emissions (specifically NO_x and PM) is of great interest for consumers, given the very high levels of pollution experienced in many European cities. However, organisations asserted this information would only be effective if it is representative of real driving emissions. On the contrary, other organisations (including German and Dutch industry associations, a German public authority, a consumer NGO and an EU-wide vehicle manufacturer) discouraged the inclusion of air pollutants information. Comments frequently stated this information is already conveyed by the Euro standard and that air pollution data might add too detailed information, thereby making labels too complex. Finally, a consumer NGO suggested that further analysis is needed to determine the extent to which consumers are interested in this information.

A number of different label designs are currently used within the EU, therefore assessing stakeholders' opinions concerning the flexibility of the Directive is important when considering its implementation. Overall, opinions were mixed, however the averages were affected by a significant percentage of German traders/dealers answering to say they did not know. If German traders/dealers are excluded, 54% of respondents consider the legislation to be too flexible, while 35% view the Directive to be sufficiently flexible.

B.4.4 - Costs and benefits of the Directive

A number of questions were asked to understand the costs and benefits associated with the implementation of the Directive. Respondents were also invited to comment on each

⁵³ This average figure was affected by the large number of German vehicle traders/dealers responding 'no'. 4% of German traders/dealers responded 'yes', compared to 33% of organisations in the remainder of the sample.

aspect, which helped to understand the specific costs and benefits incurred by organisations and if/how the costs could be reduced.

Overall, 78% of organisations reported that their organisation had incurred costs as a consequence of the implementation of the Directive, however the responses and type of costs were dependent on the type of organisation. 95% of vehicle traders and dealers (who made up half of the organisations sample) reported costs of producing, printing, distributing, maintaining and updating information required by the Directive (labels, guides, posters etc.), compared to 54% for the other organisations in this group. Overall, 76% of organisations reported costs of producing, printing, distributing, maintaining and updating information required by the Directive, 49% reported costs of information collection and record-keeping and 39% reported costs of monitoring compliance for authorities (local/regional/national). Analysis of the free text answers further revealed the type of costs incurred by specific sectors/organisations. For example, a number of advertising/publishing organisations raised the issue of indirect costs faced by newspapers and magazine publishers, while national authorities reported annual costs in the range of €50,000-€600,000. This large variation is likely due to the extent of compliance monitoring, how frequently the information is updated and whether maintenance of an online system is required.

When asked whether any costs could have been reduced, 33% of respondents answered 'none'. 59% thought that the cost of producing, printing, distributing, maintaining and updating information required by the Directive could have been reduced, compared to 39% for the costs of information collection and record-keeping and 29% for costs of monitoring compliance for authorities (local/regional/national). Analysis of the free text answers allowed a more in depth understanding of organisations' viewpoints and provided cost estimates for specific aspects of the implementation of the Directive in the Netherlands, Belgium and Germany. Many respondents, including French and Dutch national authorities, a Transport NGO, a manufacturer and several industry organisations, agreed that having harmonised label definitions across Europe would certainly lower administrative costs. A single comprehensive European database storing all fuel consumption and CO₂ data would also be possible, thus reducing the costs of information collection and record-keeping. It was also suggested that printing costs could be reduced by providing information in a digital format.

In relation to the benefits/cost savings associated with the implementation of the Directive, responses were not overly positive, with 87% reporting no benefits for their organisation. Responses were again dependent on the type of organisation, however overall 6% of organisations reported fuel cost savings and 10% reported time savings, as a result of having easy access to information on fuel efficiency and CO₂ emissions.

B.4.5 - Impacts of the Directive and final remarks

Finally, organisations were asked about any other positive or negative impacts and whether they thought there is a continued need for legislation.

The majority of respondents to the online consultation were not aware of any other positive impacts of the Directive (78% answered no). Four additional positive impacts were listed by respondents. According to two environmental NGOs the Directive has raised consumer awareness of the connection between CO₂ emissions, fuel consumption, running costs and taxes, while a Dutch industry association stated that it has provided support to sustainable company car policies. Furthermore, an EU transport NGO added that it has allowed the development of fuel efficiency databases in countries outside the EU (who import vehicles from the EU). Meanwhile, a German industry association considered that the relative labelling system implemented in Germany has the additional advantage of incentivising research and technical development for both small cars and for larger vehicles.

On the other hand, 61% of survey respondents were aware of additional negative impacts of the Directive. Regarding these additional negative impacts, a consumer NGO and a European car manufacturer stated that the differences in the label systems designed in each Member State has led to confusion and ambiguity, while a group of European industry associations, advertising/publishing companies and a Belgium car dealer reported the lost revenues for advertisers. As highlighted by a Dutch industry association, the requirement to produce printed guides and posters has resulted in a waste of paper and resources, as consumers are often not interested in printed versions of this information. Finally, in Germany, confusion has been reported surrounding the rules for car dealers on how to present information on the internet and in print media; this led to numerous warnings from environmental and consumer organisations and, in some cases, to lawsuits thus increasing the burden on these businesses.

When asked about the need for EU legislation to inform consumers of the CO₂ performance and fuel consumption of new cars, rather different answers were received from German traders/dealers and from other organisations. 88% of German traders/dealers strongly disagreed, or slightly disagreed, while 67% of other organisations either strongly agreed or slightly agreed. Among those that strongly agreed to the need for EU legislation are representatives of the automobile industry (ACEA), consumer organisations (BEUC, ANEC, VZBV), environmental and transport NGOs (T&E, ICCT, Deutsche Umwelthilfe e.V.) and national authorities from Germany, Netherlands, Sweden and Belgium.

B.4.6 - Additional comments by organisations/authorities

Numerous organisations also submitted additional comments on the Directive in the public consultation. Responses covering additional aspects to those already discussed are summarised here. Several organisations, including two European vehicle manufacturers, a German industry association and a Dutch public authority, showed some concern about the transition of CO₂ regulation from the New European Driving Cycle (NEDC) to the Worldwide harmonized Light vehicles Test Procedure (WLTP). According to the comments received, the transition of the labelling system should be coordinated with that of the regulation, in order to avoid confusion and ambiguity in emissions data. Moreover, a consumer NGO claimed that the label ranking system should be revised periodically in order to avoid complex notations (such as A+++), when moving towards higher efficiency technologies. Finally, an EU-wide industry association (the European Small Volume Car Manufacturers Alliance – ESCA) suggested the creation of a universal internet platform where manufacturers can upload the relevant data used by retailers to produce labels; in addition to that, the association proposed the introduction of an XML data input sheet to be used by retailers to easily create label masters.

Annex C : INTERVIEW PROGRAMME

	Type of Stakeholder	MS	Name of the organisation	Completed	No response-Declined
1.	National authorities	AT	Federal Ministry of Agriculture, Forestry, Environment and Water Management	X	
2.	National authorities	AT	Austrian Energy Agency		X
3.	Industry - Associations	AT	Austrian Vehicle Industry Association		X
4.	Industry - Associations	AT	Car dealers association	X	
5.	Industry - Associations	CZ	Association of dealers and repairers		X
6.	National authorities	CZ	Ministry of Industry and Trade		X
7.	Consumer organisations and vehicle users	CZ	dTest		X
8.	Consumer organisations and vehicle users	DE	Federation of German Consumer Organisations- VZBV	X	
9.	National authorities	DE	Federal Ministry for Economy and Technology	X	
10.	Industry Association	DK	Autobranchen – Danish car dealers association	X	
11.	Consumer organisations and vehicle users	DK	Danish Consumer Council	X	
12.	National authorities	ES	IDAE: Institute for Diversification and Saving of Energy	X	
13.	Industry - Associations	ES	Spanish car dealers association		X
14.	National authorities	FR	Agence de l'Environnement et de la Maîtrise de l'Energie	X	
15.	National authorities	FR	Ministry of ecology	X	
16.	Consumer organisations and vehicle users	IT	Altroconsumo		X
17.	National authorities	IT	Ministry of Infrastructure and Transport	X	
18.	Industry - Associations	NL	Raivereniging – Car importers and manufacturers association	X	
19.	Consumer organisations and vehicle users	NL	Consumentenbond	X	
20.	National authorities	NL	PBL Netherlands Environmental Assessment Agency	X	
21.	Consumer organisations and vehicle users	PL	Polish Consumers Association - SKP		X
22.	Consumer organisations and vehicle users	PL	The National Council of Consumer Federation		X

23.	National authorities	PL	Ministry of Economy		X
24.	Industry - Associations	PL	Polish Automotive Industry Association	X	
25.	Industry - Associations	PL	Polish Chamber of Automotive Industry and Dealer Council		X
26.	National authorities	PL	Institute for Sustainable Development - Department of Road Transport		X
27.	Consumer organisations and vehicle users	UK	Which?		X
28.	Consumer organisations and vehicle users	UK	LowCVP	X	
29.	National authorities	UK	UK - Department for Transport	X	
30.	Advertising organisations	EU	European Association of Communication Agencies	X	
31.	Consumer organisations and vehicle users	EU	The European Consumer Organisation (BEUC)	X	
32.	Consumer organisations and vehicle users	EU	Federation of international automobiles	X	
33.	Consumer organisations and vehicle users	EU	European Consumer Voice in Standardisation (ANEC)	X	
34.	European Parliament	EU	Michael Cramer, Chair of the Transport Committee		X
35.	European Parliament	EU	Giovanni la Via, Chair of the ENVI Committee		X
36.	Industry - Associations	EU	ACEA - The European Automobile Manufacturers' Association	X	
37.	Industry - Associations	INT	Japanese Automobile Manufacturing Association	X	
38.	Industry - Associations	INT	Korean Automobile Manufacturing Association		X
39.	Industry - Associations	EU	Association of small volume automotive manufacturers	X	
40.	Industry - Associations	EU	European Association of Automotive Suppliers	X	
41.	Industry - Associations	EU	European Council for Motor Traders and Repairers	X	
42.	NGOs	EU	European Federation for Transport and the Environment	X	
43.	NGOs	EU	European Environmental Board		X
44.	Publishing	EU	European Magazine Media Association		X
45.	NGOs	EU	Greenpeace		X
Total				26	17

Annex D : SUMMARY OF NATIONAL LEGISLATION IMPLEMENTING DIRECTIVE 1999/94/EC

MS	Name of Transposing National Legislation	Initial transposition	Amendment(s)
AT	"Federal Act on the availability of consumer information of the marketing of new passenger cars BGBl. Teil I, NR. 26	30/3/2001	2006 ⁵⁴
BE	Royal decree of 05.09.2001	5/9/2001	3/9/2004
BG	Law on Consumer Protection	30.06.2006	15.4.2010 ⁵⁵
	Ordinance on labelling requirements for new passenger cars in terms of fuel consumption and carbon dioxide emissions	15.09.2006	No info
HR	Regulations on the availability of data on fuel economy and CO ₂ emissions of new passenger cars" and	2007	2015
	"The Environmental Protection Act	2007	2015
CY	Decree on commercial information (energy guide-passenger cars ⁵⁶	2003	2004
CZ	Provisions in the Law on conditions for operating vehicles on roads (56/2001)	20/6/2001	2005 ⁵⁷
DK	Order No. 216 of 28 March 2000 on energy labelling, etc. of new passenger cars)"	28.03.2000	6.20.2012 ⁵⁸
	Law on energy labelling of energy-related products	27.02.2003	18.05.2001 ⁵⁹
EE	"Ambient Air Protection Act"	2004	2005
	" notification procedure for new passenger car fuel consumption and emissions of carbon dioxide	2005	No info
FI	"Notifying government regulation of fuel consumption and carbon dioxide emissions N. 938/2000""	09.11.2000	12.2.2004 ⁶⁰

54

<https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20001212>

55

<http://dv.parliament.bg/DVWeb/showMaterialDV.jsp;jsessionid=ADF01721FC70A6EBE45E4654C98A76E0?idMat=32165>

56

[http://www.moa.gov.cy/moa/environment/environment.nsf/69E3B0E74C4A5110C225793C002CD199/\\$file/NSDS_revised.pdf](http://www.moa.gov.cy/moa/environment/environment.nsf/69E3B0E74C4A5110C225793C002CD199/$file/NSDS_revised.pdf), p.35

⁵⁷ Ordinance 245/2005 Sb. On the requisites of safety signs and posters with information on fuel consumption and CO₂ emissions in new passenger car sales)

⁵⁸ <https://www.retsinformation.dk/Forms/R0710.aspx?id=141787>

⁵⁹ <https://www.retsinformation.dk/Forms/R0710.aspx?id=137105>

⁶⁰ <http://www.finlex.fi/fi/laki/alkup/2004/20040109>

MS	Name of Transposing National Legislation	Initial transposition	Amendment(s)
FR	Décret n° 2002-1508,"	23.12.2002	11/2005
	"Arrêté, 10.04.2003",	10.4.2003	-
DE	Regulation on consumer information on fuel consumption and CO ₂ emissions of new passenger cars	3.6.2004	2011
EL	"Common Ministerial Decision 90364"	25.01.2002	No info
HU	"Joint regulation of the new passenger car fuel economy and carbon dioxide emissions data "	12.2002	01/05/2004
IE	Consumer Information on Fuel Economy and CO ₂ emissions of new passenger cars S.I. No. 339/2001	2001	2008 ⁶¹
IT	"Decree of the President of the Republic n. 84 - Regulation for the implementation of Directive 1999/94 - GURI - general Series n. 92 "	19.04.2003	No info
LV	The rules for the labelling and advertising publications consumer information for new passenger cars in the fuel consumption and CO ₂ emissions "	23.07.2004	No info
	Amendments to the Advertising Law	28.04.2004	
LT	Order No. 493, for information on fuel economy and CO ₂ emissions in respect of the sale to consumers of new passenger cars procedures	22.10.2003	No amendment
LU	Ordinance of 06 April 2001 on the availability of fuel consumption information and CO ₂ emissions during the marketing of new passenger cars	06.04.2001	12/1/2004 ⁶²
MT	Legal notice 235/2002, Availability of consumer information on fuel economy and carbondioxide emissions	2002	No amendment
NL	"Labelling Decree of the energy usage of passenger cars"	30.11.2000	No amendment
PL	Environmental protection law	20.06.2001	No info
PT	"Decreto n° 304/2001"	26.11.2001	No info
RO	"Decision on providing information on fuel consumption and CO ₂ emissions of new cars to buyers	18.03.2004	No amendment
SK	"Slovak Government Regulation no. 384/2004 Coll. the availability of consumer information on fuel economy and CO ₂ emissions in the sale and leasing of new passenger cars"	01.07.2014	No info
SL	Regulation on consumer information on fuel economy and CO ₂ emissions of new passenger cars".	29.12.2003	2004, 2010 and 2014

⁶¹ <http://www.irishstatutebook.ie/eli/2008/si/230/made/en/print>

⁶² <http://eli.legilux.public.lu/eli/etat/leg/rqd/2001/04/06/n1>

MS	Name of Transposing National Legislation	Initial transposition	Amendment(s)
ES	Royal decree 837/2002,	2002	18/3/2004
SE	Consumer Agency's guidelines for information on the new passenger car fuel consumption, carbon emissions and environmental (KOVFS 2002:2)	19.2.2002	2008 ⁶³
UK	"Statutory Instrument 2001 No. 3523 - The Passenger Car (Fuel Consumption and CO ₂ Emissions Information) Regulation 2001"	2001	2004

63

http://www.konsumentverket.se/Global/Konsumentverket.se/Best%C3%A4lla%20och%20ladda%20ner/kovfs/2010/kovfs_2010_3_allm%C3%A4nna_r%C3%A5d_personbilars_br%C3%A4nself%C3%B6rbrukning.pdf

Annex E : SUMMARY INFORMATION ON CAR LABEL BY MEMBER STATE

	MS	Label type	Number of coloured bands	Relative/absolute	Running costs	Other info	Applicable to other vehicles
1.	AT	Continuous comparative label	N/A	Absolute	No	Noise Vehicle weight and footprint Usability of different fuels	No
2.	BE	Alternative categorised format	N/A	Absolute	No		No
3.	BG	EU Energy Labelling style	7 (A to G)	Absolute	No	Fuel consumption for different drive cycle	No
4.	CY	No specified Format	N/A	N/A	No		No
5.	CZ	No specified Format	N/A	N/A	No		No
6.	DE	EU Energy Labelling style	8 (A+ to G)	Relative	Yes	Fuel consumption for different drive cycle Tax info Electricity consumption of electric/hybrid vehicles	No
7.	DK	EU Energy Labelling style	10 (A+++ to G)	Absolute	Yes	Tax info Achieved CO ₂ reduction on the basis of used technologies Safety rating Air pollutant emissions (NOx, HC, CO)	Vans under 3.5 tonnes

	MS	Label type	Number of coloured bands	Relative/absolute	Running costs	Other info	Applicable to other vehicles
8.	EE	EU Energy Labelling style	7 (A-G)	N/A	No	Tax info	No
9.	EL	No specified format	N/A	N/A	No		No
10.	ES	EU Energy Labelling style	7 (A to G)	Relative	No		Vans under 3.5 tonnes
11.	FI	EU Energy Labelling style	7 (A to G)	Absolute	Yes ³³	Fuel consumption for different drive cycle Tax info Noise Air pollutant emissions (NOx, HC, CO)	Vans under 3.5 tonnes Used cars (voluntary)
12.	FR	EU Energy Labelling style	7 (A to G)	Absolute	No	Fuel consumption for different drive cycle	No
13.	HR	List format	N/A	N/A	No		No
14.	HU	No specified Format	N/A	N/A	No		No
15.	IE	EU Energy Labelling style	7 (A to G)	Absolute	Yes	Fuel consumption for different drive cycle Tax info	No
16.	IT	No specified Format	N/A	N/A	No		No
17.	LT	No specified format	N/A	N/A	No		No
18.	LU	No specified format	N/A	No	No		No
19.	LV	No specified format	N/A	N/A	No		No

	MS	Label type	Number of coloured bands	Relative/absolute	Running costs	Other info	Applicable to other vehicles
20.	MT	No specified format	N/A	tbc	tbc		tbc
21.	NL	EU Energy Labelling style	7 (A to G)	Relative	No	Noise Biofuel sustainability	No
22.	PL	No specified format	N/A	N/A	No		No
23.	PT	Alternative categorised format	4 categories	Absolute	No		No
24.	RO	No specified format	N/A				
25.	SE	No specified format	N/A	N/A	No		No
26.	SK	No specified Format	N/A	N/A	No		No
27.	SI	EU Energy Labelling style	10 (A to J)	Absolute	No	Fuel consumption for different drive cycle Air pollutant emissions (NOx, HC, CO)	No
28.	UK	EU Energy Labelling style	13 (A to M)	Absolute	Yes	Fuel consumption for different drive cycle Tax info	Used cars (voluntary)

Annex F - CASE STUDIES

F.1 - France⁶⁴

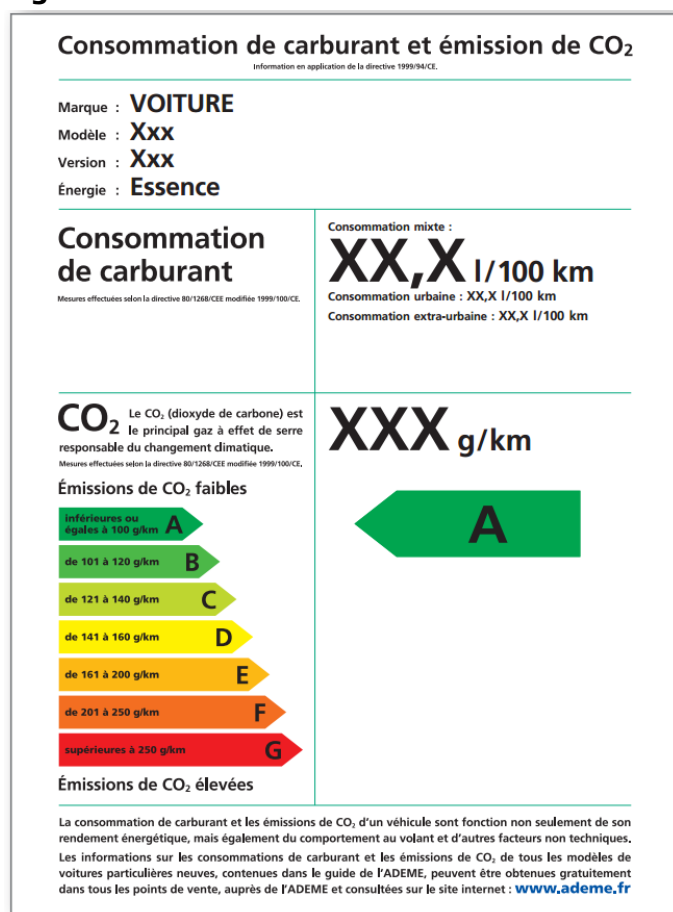
F.1.1 Implementation of the Directive in France

Directive 1999/94/EC was transposed into national legislation in France under Decree n° 2002-1508 of 23 December 2002, implemented by the "Arrêté" of the 10th April 2003. This was amended in November 2005.

F.1.1.1 Car label

France has opted for an absolute CO₂ emissions labelling system to classify vehicles. The label design was adopted in November 2005 and manufacturers were given six months (i.e. until May 2006) to conform. The design is similar to the EU Energy Label, with seven categories ranging from A– G (Figure F-1). There have been no changes to the label categories since introduction of the label.

Figure F-1: Car label - France



Source: (ADEME, 2014)

⁶⁴ To support this case study interviews were carried out with a French Ministry and The French Environment Energy Management Agency (Agence de l'environnement et de la maîtrise de l'énergie – ADEME).

Table F.1-1 shows the car label categories shown on the label in France.

Table F.1-1: Car label categories - France

Label category	CO ₂ Emissions (g/km)
A	<100
B	101 – 120
C	121 – 140
D	141 – 160
E	161 – 200
F	201 – 250
G	>250

Source: (ADEME, 2014)

F.1.1.2 Guide

The French Environment Energy Management Agency (Agence de l'environnement et de la maîtrise de l'énergie), ADEME, which falls under the Ministry of the Environment, is responsible for the development of the guide on fuel economy and publishes this information online. There have not been any additional requirements set in the French legislation in relation to the guide.

The guide is updated annually. An interview carried out with French authorities revealed that there have been no changes to the format of the guide (whether hard copies are published, or whether it is published online) but the printed guide is becoming redundant as customers now research information online.

According to an interview with ADEME, 30,000 printed guides are currently distributed per year. This is a reduction on the figure of 40,000, which was stated in the monitoring report (AEA and TEPR, 2011). Discussions with a French Ministry indicated that manufacturers no longer use the printed guide as ADEME publishes information online that is easier to use.

F.1.1.3 Poster

The requirements for the poster are also as per the Directive. For each type and variant of models it is required to show the name of the model, the type (CNIT), the CO₂ value, mixed fuel consumption (urban, motorway) and the main technical characteristics (AEA and TEPR, 2011).

F.1.1.4 Promotional material

Similarly, there are no additional requirements beyond those set out in the Directive (AEA and TEPR, 2011).

F.1.1.5 Enforcement activities and compliance

Monitoring and enforcement

Monitoring and enforcement of the Directive is the responsibility of the DGCCRF (General Directorate for Competition Policy, Consumer Affairs and Fraud Control), while ADEME is responsible for compiling and publishing the guide on fuel economy and CO₂ emissions.

Compliance

Available data suggests that overall compliance level appear to have improved over time. According to (Ecologic et al., 2010) the percentage of violations decreased from

55% in 2004 to 31% in 2005 with a subsequent investigation in 2009 showing a significant improvement compared to the situation in 2005.

Specific data on compliance with the **label** for 2007 and 2008, suggests that around 90% of dealers were compliant and there were no registered legal proceedings (i.e. offenses were relatively minor – such as not displaying the label in colour or missing information on price) (AEA and TEPR, 2011). Another study carried out by Friends of the Earth (an environmental NGO) in 2009 also supports the conclusion that compliance with requirements to display the label is high – finding 83% of showrooms were compliant (AEA and TEPR, 2011). Due to the link to the bonus-malus scheme (see below), the label is generally shown, since consumers will be claiming the incentive linked to label content.

In terms of the poster in showroom, the 2008 survey found that they were generally present and presented in a correct manner. Around 10% of non-compliance concerned problems of proper display of **posters** at points of sale, which were often not visible enough or updated on a regular basis. This represents a significant improvement over findings from 2005, which found violations of the requirements for posters in 19% of cases (Ecologic et al., 2010). However, during discussions with the French authorities it was suggested that the posters are not currently used in France, indicating that compliance has subsequently declined.

In contrast to the label, compliance with requirements for **promotional literature** appears to be low. The Friends of the Earth study in 2009 found only 7% of reviewed adverts and 5% of billboards were fully compliant. The French authorities also reported in 2011 that there had been incidents of complaints from consumers and consumer associations in this regard (AEA and TEPR, 2011). The French authority interviewed for this study commented that a number of cases of non-compliance have been referred and dealt with via written reminders to the concerned manufacturers, who then corrected the information. Finally, no quantitative information is available on compliance with the **guide**. However, the French authorities commented that the majority of consumers use the online version, although the printed version is still produced per the requirements of the Directive.

Overall, data from earlier surveys suggest that compliance with the Directive appears to be high, having improved from initially low levels. The latest estimates for compliance with the label requirement from 2008 are at around 90% – potentially because this is where the majority of enforcement activities are targeted. The current view of the French authorities is that they are very highly confident that the required information is published but not as high that the information provided is accurate.

F.1.2 Other relevant measures

Since the Directive was implemented in France, a number of other relevant measures have been introduced which may have had an impact on car CO₂ emissions. These included:

- June 2004: additional tax for second hand cars with CO₂ emissions greater than 200g/km
- November 2005: Amendment to the French legislation to require a label design similar to the EU energy efficiency labels
- January 2007: EU car CO₂ Regulation announced
- January 2008: Introduction of a bonus-malus system for the purchase of new cars, which is linked to the car label categories
- January 2008: €300 scrapping subsidy introduced if replacing vehicles over 15 years old
- January 2009: Scrapping subsidy raised to €1000 and extended to include vehicles 10 – 14 years old

- January 2009: Annual tax of €160 introduced for all high-emission vehicles registered in France. The threshold has been revised several times since introduction
- April 2009: EU car CO₂ Regulation entered into force

Of these measures, of particular relevance are the fiscal measures that are analysed further below.

Bonus-malus system

A bonus-malus⁶⁵ tax scheme intended to promote fuel efficient cars was introduced by the French authorities in 2008 and has been in force since then.

The level of the bonus is based on a scale, according to the CO₂ emissions per kilometre and the value of the car. While not explicitly linked with a vehicle's label category, there is a strong link. In 2008, all new vehicles emitting less than 130 g/km (which encompasses A to midway through the C label category) benefitted from a one-off bonus payment (bonus écologique), whereas the registration of vehicles emitting above 160 gCO₂/km (Categories E-G) incurred a malus (écotaxe) (see Table F.1-2).

Moreover, the impacts are relatively large relative to the size of the fiscal incentive (although the incentive still represents an important share of the purchase cost). For instance, a rebate of €700 given to class B vehicles represents, on average, a 4.8% reduction of price but led to an increase by almost 100% of the market share of this class between 2007 and 2009-.

Table F.1-2: French bonus-malus scheme in 2008

CO ₂ emissions (g/km)	Equivalent label category	Bonus/malus (€)	Average price (2007)	Market share (2007)	Market share (2009)
≤ 60	A	5,000	—*	0.02%	0.06%
61 – 100	A	1,000	12,500	19.89%	38.40%
101 – 120	B	700	15,500	10.33%	9.53%
121 – 130	C	200	19,000	19.74%	18.57%
131 – 140	C	0	23,000	2.90%	2.04%
141 – 160	D	0	29,000	3.66%	1.38%
161 – 165	E	-200	40,000	1.44%	0.54%
166 – 200	E	-750	60,500		
201 – 205	F	-1,600			
≥ 250	G	-2,600			

* electric cars only, which had negligible share in France

Source: (D'Haultfoeuille, et al., 2016)

The scale for the bonus-malus has been adjusted each year and bonus payments and thresholds have reduced over time (see Table F.1-3 below for the values in 2015)

In 2015, a change was made to the system so that only hybrid or electric vehicles are eligible for a bonus, if their emissions are below 110 gCO₂/km (details of the 2015

⁶⁵ Bonus-malus schemes operate by providing a reward (bonus) or a penalty (malus). In the case of car purchases, bonus-malus schemes have generally been used to incentivise the uptake of low emission vehicles by providing a bonus for the purchase of low CO₂ cars, while purchases of car with emissions above a certain threshold are penalised.

bonus-malus system are shown in Table F.1-3). Previously, petrol and diesel vehicles were given a bonus if their emissions were below 90 gCO₂/km.

Table F.1-3: France 2015 bonus-malus scheme

CO ₂ emissions (g/km)	Equivalent label category	Bonus / Malus (€)
≤ 20	A	Bonus (only for electric vehicles or hybrids) - maximum 27% of the cost of the vehicle up to a limit of €6,300
21 – 60	A	Bonus (only for electric vehicles or hybrids) - maximum of 20% of the cost of the vehicle up to a limit of €4,000
61 – 110	A/B	Bonus (only for electric vehicles or hybrids) - maximum of 5% of the cost of the vehicle, up to €2,000 (the value of the bonus must also be above €1,000)
131 – 135	C	-150
136 – 140	C	-250
141 – 145	D	-500
146 – 150	D	-900
151 – 155	D	-1,600
156 – 175	D/E	-2,200
176 – 180	E	-3,000
181 – 185	E	-3,600
186 – 190	E	-4,000
191 – 200	E	-6,500
> 200	F/G	-8,000

Source: (ADEME, 2015)

Since the 1st April 2015, buying or leasing a new hybrid or electric vehicle to replace a diesel vehicle can result in an additional bonus payment; including the bonus payment from the bonus-malus system, total support for buying a new electric vehicle could amount to up to €10,000, as shown by Table F.1-3 and Table F.1-4.

Table F.1-4: France - supplementary scrapping bonus to replace a diesel vehicle

Type of vehicle	Supplementary scrapping bonus (€)	Maximum bonus from the bonus-malus system (€) (see Table F.1-3)	Total aid available (€)
Electric vehicle (emitting less than 21 gCO ₂ /km)	3,700	6,300	Maximum of 10,000
Plug-in hybrid vehicle (emitting between 21 – 60 gCO ₂ /km)	2,500	4,000	Maximum 6,500

Source: (ADEME, 2015)

Other fiscal measures

Beyond the bonus-malus scheme several complementary measures to the bonus-malus system have been introduced during the period 2008-2015. For example:

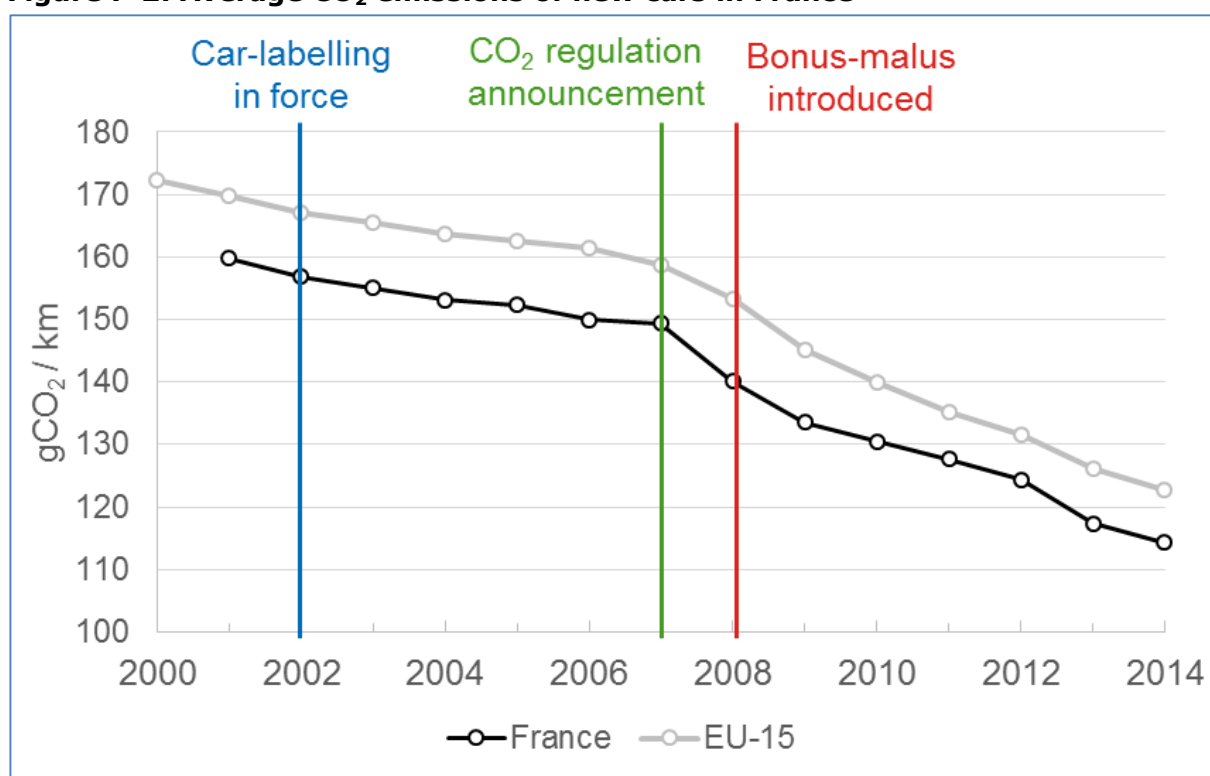
- **Scrapping subsidy “super bonus”.** On January 1st 2008, a scrapping subsidy of €300 was introduced if replacing a car more than 15 years old, and purchasing a new vehicle emitting less than 160g of CO₂. In 2008, this super bonus concerned only 5.4% of vehicle purchases benefiting from a rebate (D’Haultfoeuille, et al., 2013). In 2009, the scrapping bonus was raised to €1,000 and extended to include vehicles 10 – 14 years old in order to dampen the economic impact of the crisis on the automobile industry (D’Haultfoeuille, et al., 2013). This clearly had an influence on total vehicle sales, as shown in Figure F-3.
- **Vehicles fuelled with bioethanol-E85.** Vehicles receive a 40% reduction on their measured CO₂ emissions level. This does not apply to vehicles whose CO₂ emissions exceed 250 g/km. Further to this, if the reduction takes the vehicle into a bonus category a bonus is not paid.
- **Annual tax for polluting (personal) vehicles.** From January 2009, an annual tax of €160 has applied to all high-emission registered in France. The CO₂ limits have gradually decreased from 250 g/km at first introduction to 190 g/km.
- **Company car tax** has been based on carbon dioxide emissions and fuel type since 2006 (ODYSSEE-MURE, 2011a).
- **EU car CO₂ Regulation.** This Regulation entered into force in April 2009 and has the objective of reducing the CO₂ emissions of new light duty vehicles in Europe.

F.1.3 Trends in new car registrations

In this section available data on the average CO₂ emissions from new cars sold in France is presented, as well as data on the sales of passenger cars by label category.

F.1.3.1 Average CO₂ emissions of new cars

Figure F-2 presents data on the level of average CO₂ emissions of new cars sold in France, while also indicating key dates concerning the adoption of the car labelling legislation and the introduction of the bonus-malus scheme. As can be seen the average CO₂ emission have gradually decreased, from 159.8 g/km in 2001 to 114.2 g/km in 2014. The trend generally mirrors that seen at an EU-15 level, although in 2008 – the year of the adoption of the bonus-malus scheme - a more significant decrease in average CO₂ emissions can be seen in France compared to other EU-15 countries. In the following period, the average level of decrease has been slightly below the EU-15 average.

Figure F-2: Average CO₂ emissions of new cars in France

Source: (EEA, 2014)

Table F.1-5: France - Year on year reduction in average new car CO₂ emissions

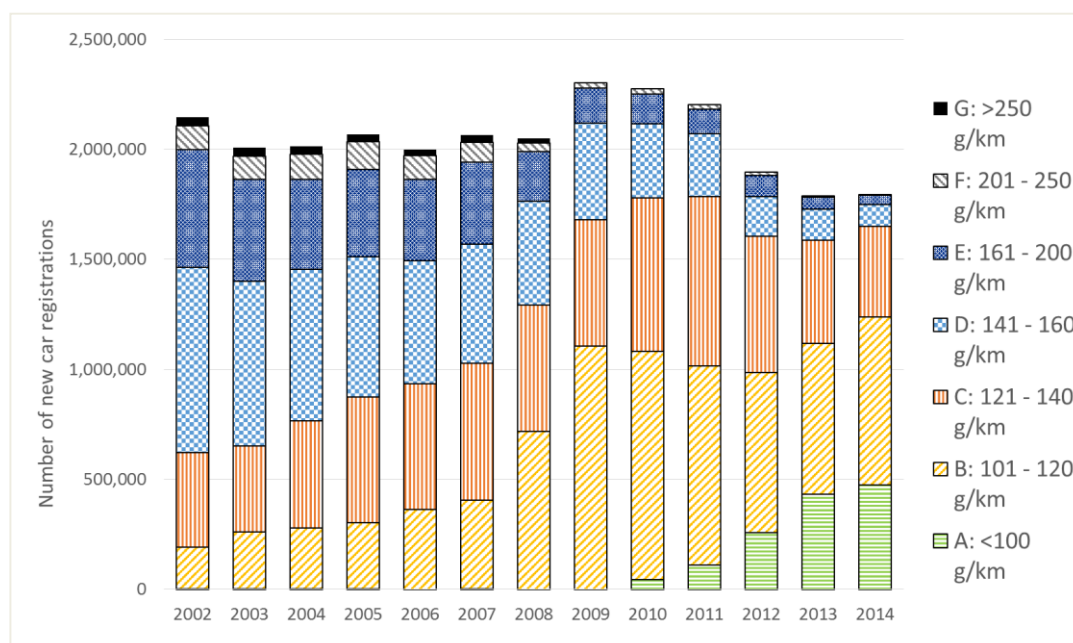
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EU-15	1.5 %	1.0 %	1.1 %	0.7 %	0.7 %	1.7 %	3.5 %	5.3 %	3.7 %	3.4 %	2.6 %	4.2 %	2.6 %
France	1.9 %	1.1 %	1.2 %	0.5 %	1.6 %	0.3 %	6.2 %	4.7 %	2.2 %	2.1 %	2.6 %	5.6 %	2.7 %

Notes: Green text indicates a percentage change greater than 0.5% above the EU-15 average; red text indicates a percentage change greater than 0.5% below the EU-15 average.

Source: (EEA, 2014)

F.1.3.2 New car registrations by label category

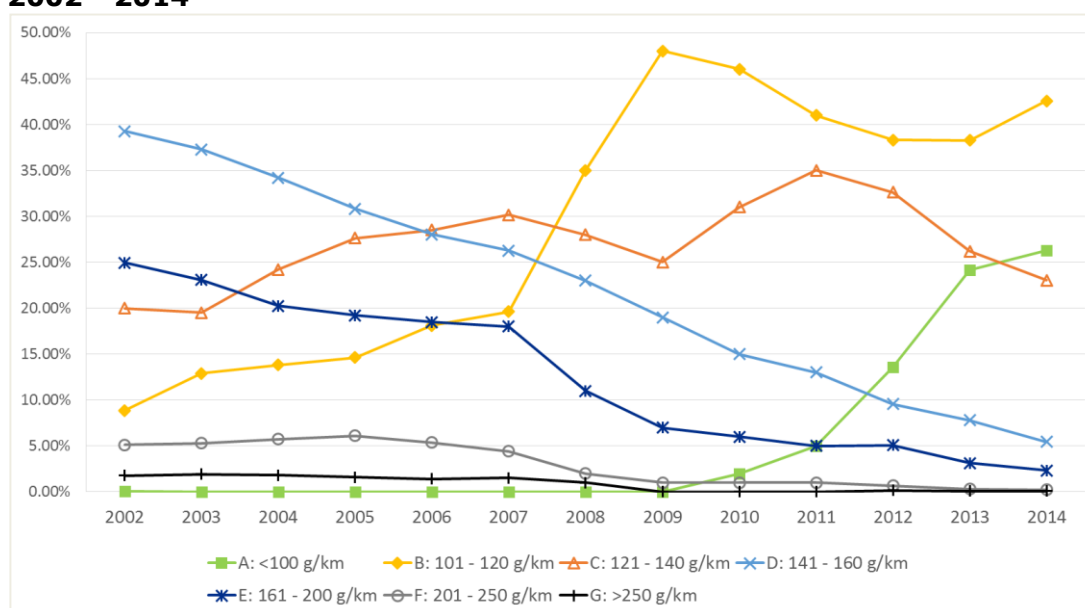
From 2002 – 2014, the number of newly registered low CO₂ emitting cars in France has risen, as shown by the significant increase in newly registered vehicles in the A (<100 g/km) and B (101 – 120 g/km) categories (Figure F-3). Sales of A category vehicles were minimal until 2010, after which the number of new registrations in this category began to increase. This may have been because the A category was set at an ambitious level. Sales of category C (121 – 140 g/km) labelled cars remain relatively constant, while the number of newly registered D (141 – 160 g/km), E (161 – 200 g/km), F (201 – 250 g/km) and G (>250 g/km) labelled cars generally decrease from 2002 – 2014 (see Figure F-3).

Figure F-3: Number of new car registrations in France by label category 2002 - 2014

Sources: (ADEME, 2008; ADEME, 2011; ADEME, 2015)

In percentage terms, the share of A and B labelled cars has significantly increased, while the share of the higher emissions categories has gradually decreased over time (

Figure F-4). In 2002, A category cars accounted for only 0.04% and B category cars 9% of new car registrations, while in 2014 these categories accounted for 26% and 43% respectively. The share of the more polluting classes has also gradually decreased. For example, in 2002, D label cars accounted for approximately 40% of new cars, whereas in 2014 this had decreased to 5.5%.

Figure F-4: Percentage of new car registrations in France by car label category 2002 - 2014

Sources: (ADEME, 2008; ADEME, 2011; ADEME, 2015)

F.1.4 Consumer response

F.1.4.1 Consumer recognition/awareness of the information

Recent market studies examining the level of consumer awareness and recognition of the car label in France are not available. However, representatives from the French Government interviewed as part of this study suggested that between 75% and 100% of consumers would currently recognise the **car label**. The high level of recognition is in their view because the French label has a similar design to the label produced for white goods. The estimate from the French Government compares well with an older study conducted in 2008, which found that 67% of consumers recognised the label as an indicator of CO₂ emissions (AEA and TEPR, 2011).

The level of awareness among consumer of the other informational elements of the Directive (poster, guide etc) has not been subject to any formal studies. Qualitatively, the representative of the French Ministry and ADEME indicated during interviews for this study that the posters are generally not displayed (thereby implying that awareness would necessarily be low). Similarly, both agreed that the guide is becoming redundant as consumers find their information elsewhere – suggesting that demand for the guide is rather low and consequently that familiarity with it may also be low.

F.1.4.2 Interpretation and understanding of the information

There are no formal studies on the level of understanding of the information provided by the label among French consumers. The national stakeholders interviewed for this study were not able to provide any estimates of the share of consumers that were likely to understand the label.

Without specific studies on the French label, it is only possible to say that, in general, the use of an absolute scale is likely to have facilitate better understanding. This is based on the results of consumer testing conducted in Codagnone et al (2013), which found that absolute comparisons were the easiest to understand.

F.1.4.3 Utilisation of the information

In general, the available information provides some indication that the French consumers do make use of the information provided in the label and that this has a certain influence in consumer decision when coupled with the bonus-malus system.

A French consumer study conducted in 2008 found that label -coupled with the bonus-malus system-) has influenced purchasing behaviour. 83% saw it as an incentive compared to 77% in 2007 (AEA and TEPR, 2011). The same study found that the importance of CO₂ emissions in decision making also appears to have increased: the share of consumers rating it as “very important” rose from 33% in 2007 to 41% in 2008 (AEA and TEPR, 2011). More recent surveys (from 2010-2015, see Table F.1-6) found that between 60%-70% of consumers consider fuel consumption to be important when buying a new car, whereas 30% consider environmental performance to be an important factor.

Table F.1-6: Share of French consumers that consider that specific attribute as important in car purchasing decision

Year	Fuel consumption	Env. performance
2010	63%	31%
2011	64%	31%
2012	62%	28%

Year	Fuel consumption	Env. performance
2013	71%	Not evaluated
2014	66%	Not evaluated
2015	64%	Not evaluated

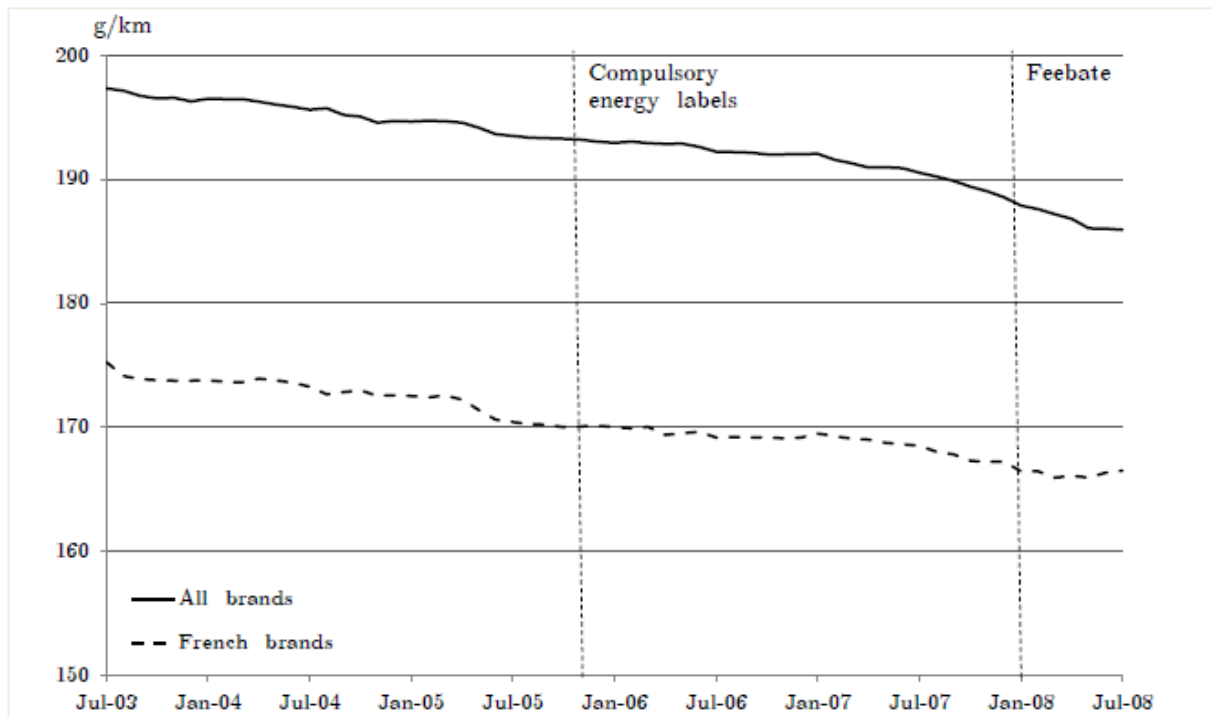
Sources: (Ifop, 2010; Ifop, AramisAuto.com, 2011; Ifop, AramisAuto.com, 2012; TNS Sofres, AramisAuto.com, 2013; TNS Sofres, AramisAuto.com, 2014; TNS Sofres, AramisAuto.com, 2015; OpinonWay, BforBank, L'Express, 2011)

The above figures are based on stated preferences of the surveyed consumers. Stronger evidence comes from empirical work (revealed preference), which suggest that CO₂ emissions have grown in importance as a factor in vehicle purchase decisions between 2003 and 2008. Observed shifts in purchase decisions coincided firstly with the introduction of the label (as a stand-alone measure) and secondly with the introduction of the bonus-malus (with similar magnitude of effects for both policies) (D'Haultfoeuille, et al., 2013). An econometric analysis suggested that willingness to pay for a reduction of 10 grams of CO₂ per kilometre rose by €151 between 2006-2007 compared to 2003-2005 (corresponding with the label), with the effect increasing to €562 in 2008, compared to 2003-2005 (due to the combination of the label and bonus-malus system) (D'Haultfoeuille, et al., 2016).

However, whilst the combination of the bonus-malus system and car labels are thought to have been effective in France, there are also concerns that the label categories now need updating, as there are too many vehicles in the A-C categories, which makes it difficult for consumers to differentiate between vehicles.

F.1.5 Manufacturer response

In terms of the response of manufacturers to the Directive, the analysis of relevant input does not suggest that there was any impact. The average CO₂ emissions of the range of new cars offered by manufacturers in France reduced by approximately 5.5% in the period from 2003 – 2008 (see Figure F-5), with similar trends between French and other manufacturers. According to the analysis performed by D'Haultfoeuille et al. (2016) these reductions were driven by the long-term voluntary agreement to reduce CO₂ emissions, increases in fuel prices and evolving consumer preferences. The study found a distinct lack of any immediate changes to product offerings in reaction to either the car labelling policy, or the introduction of bonus-malus system (announced two months prior to its implementation). The authors suggest two reasons for this lack of change, firstly, that the manufacturers' incentives were not that large because the incentives only applied in France, and secondly because it takes several years to develop and incorporate CO₂ saving technologies into new vehicles (D'Haultfoeuille, et al., 2016).

Figure F-5: Average CO₂ emissions of vehicles offered to consumers

Source: (D'Haultfoeuille, et al., 2016)

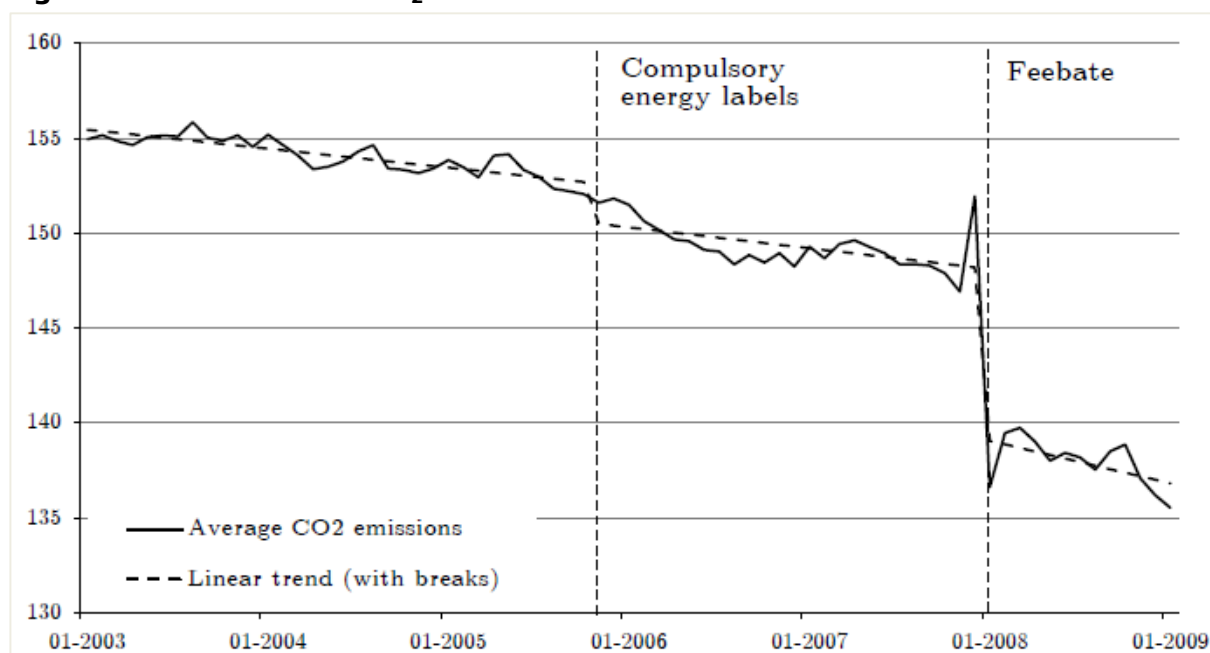
Furthermore, according to the representative of ADEME interviewed for this study, the fact that the label is based on CO₂ emissions may have led manufacturers in France to concentrate on promoting diesel vehicles, rather than other fuel types. This may have detrimental environmental effects at a local level. Although this effect is possible, it should be noted that there are other measures in France, including fiscal measures that promote diesel relative to petrol.

ADEME also noted that there has been a shift in the way in which vehicles are marketed in France. Previously, the emphasis may have been primarily on speed and performance but now there is a strong focus on fuel economy.

F.1.6 Impact of the Directive on CO₂ emissions

As already presented in Section F.1.3, average new car CO₂ emissions decreased from 159.8 g/km in 2001 to 117.4 g/km in 2013.

Looking at the trends in overall CO₂ emissions, it can be seen that the rate of CO₂ reductions clearly intensified after the introduction of the bonus-malus (feebate) as can be seen in Figure F-6 is based on monthly data (Figure F-2 above is based on annual data and the sudden change just before 2008 is smoothed out). In comparison, the effect of introducing the labels in 2006 was clearly smaller. This indicates that fiscal incentives and the label together had a far greater impact on consumer purchasing behaviour than the label alone. This effect on consumer purchasing behaviour is further emphasised in Figure F-5 above, which shows that the average CO₂ emissions of vehicles offered to consumers did not change significantly in this period.

Figure F-6: Evolution of CO₂ emissions from cars in France

Source: (D'Haultfoeuille, et al., 2013).

The impact of the car label on the evolution of new car CO₂ emissions in the period 2003-2008 has been analysed in D'Haultfoeuille et al. (2016), based on an econometric demand model that incorporates consumer heterogeneity and valuation of vehicle CO₂. The study concludes that environmental policies implemented between 2003 and 2008 (namely the car labelling Directive and the French bonus-malus system) have effectively contributed towards changing consumer preferences.

More precisely, in their analysis D'Haultfoeuille et al. (2016) attribute **2.24g/km (14% of the total decrease between 2003-2008) to the car labelling Directive alone**, along with a **further contribution of 4.53g/km (29% of the total decrease) attributed to the shift in consumer preferences due to the combined effect of the label and the bonus-malus system on consumer preferences**. Other factors analysed include the pure monetary incentive effects of the bonus-malus system (31% of the total), manufacturer effects (16%) and fuel price effects (11%).

The shifts in consumer preferences found in (D'Haultfoeuille, et al., 2016) are explained in the study as being due to the informational value of the label (which makes it easier for consumers to compare between models in terms of CO₂), as well as the signalling effect of the bonus-malus (which signals to consumers that choosing low-CO₂ vehicles is important).

To our knowledge, no quantitative studies have been carried to assess the impact of the car label after 2008, although there have been no major changes to the implementation of the Directive in France during these years.

The interviews with authorities (the French ministry of ecology and ADEME) support the view that the bonus-malus system is closely linked to the car label. ADEME emphasised that the label is required for the bonus-malus system even if financial measures are considered more effective at persuading consumers to alter their preferences.

F.1.7 Conclusions from the French case study

The analysis of the information gathered for this case study points to the following main conclusions:

- The average CO₂ emissions of new cars in France have generally decreased in line with the EU-15 average. Over the period 2001-2014 average new car CO₂ emissions in France have decreased 29%, compared to 28% for the EU-15. However, average emissions have remained below the EU-15 average. In 2001, the average CO₂ emissions of new cars in France were 159.8 g/km, while in 2014 the average was 114.2 g/km. For the EU-15, the average was 169.7 g/km in 2001 and 122.8 g/km in 2014.
- Based on stakeholder consultation, the level of recognition/awareness of the information on the car label is thought to be high (>75%). This is aided by having a similar design to that for appliances. Consumer surveys conducted between 2008 and 2014 have shown that over 60% of respondents consider fuel consumption to be an important factor when deciding which new car to buy, however only 25% consider the environmental performance of a vehicle to be an important factor.
- No significant manufacturer response has been observed in France since the introduction of the Directive, however the average CO₂ emissions of new cars offered have steadily decreased.
- Since 2008, the car labelling Directive has been supported by the introduction of a bonus-malus tax system for new car registrations. The bonus malus-system is based on CO₂ emissions.
- The effect of the bonus-malus system and the car labelling Directive in France have been estimated econometrically based on revealed preferences, which provide more robust evidence than stated preference studies. Econometric analysis showed that both informational and fiscal incentives play an important role in terms of affecting consumer choices. Specifically:
 - The effect of the label alone between 2003 and 2008 was a reduction of 2.24 grams (14% of the total decrease between 2003 and 2008)
 - A further contribution of 4.53g (29% of the total decrease) was attributed to the shift in consumer preferences due to the combined effect of the label and the bonus-malus system on consumer preferences (a further 29% of the total).
- As the label categories in France have not been updated since their introduction, French stakeholders agree that there are now too many vehicles in the A-C categories. This makes it difficult for consumers to differentiate between vehicles – in the future a more dynamic system may be appropriate, where the label categories are regularly updated.

F.2 - Germany⁶⁶

F.2.1 Implementation of the Directive in Germany

Directive 1999/94/EC was transposed into national legislation (The Fuel Efficiency Labelling of Passenger Cars Regulations, known as "Pkw-EnVKV"), which became effective on 1 November 2004 and was the responsibility of The Federal Ministry for Economic Affairs and Energy. The Pkw-EnVKV was later amended in 2010, with the changes entering into force in December 2011 (Dena, 2016).

F.2.1.1 Car label

When it was initially introduced, the German label did not have colour coding or graphical content, as shown in Figure F-7. Only the absolute CO₂ emissions per km were shown, and vehicles were not classified into efficiency categories.

Figure F-7: First version of German label (from 2004 until 2011)

Information
Über Kraftstoffverbrauch
und CO₂-Emissionen gemäß
Richtlinie 1999/94 EG

Marke:	Leistung:
Modell:	Getriebe:
Hubraum:	Kraftstoff:

Kraftstoffverbrauch	kombiniert:	/100 km
	innerorts:	/100 km
	außerorts:	/100 km
CO₂-Emission	kombiniert:	g/km

Die angegebenen Werte wurden nach den vorgeschriebenen Messverfahren (BS, BS-126/15/16 in der gegenwärtig geltenden Fassung) ermittelt. Die Angaben beziehen sich nicht auf ein einzelnes Fahrzeug und sind nicht Bestandteil des Angebotes, sondern dienen allein Vergleichszwecken zwischen den verschiedenen Fahrzeugtypen.

Hinweis nach Richtlinie 1999/94/EG:

Der Kraftstoffverbrauch und die CO₂-Emissionen eines Fahrzeugs hängen nicht nur von der effizienten Ausnutzung des Kraftstoffs durch das Fahrzeug ab, sondern werden auch vom Fahrverhalten und anderen nichttechnischen Faktoren beeinflusst. CO₂ ist das für die Erderwärmung hauptsächlich verantwortliche Treibhausgas.

Ein Leitfaden über den Kraftstoffverbrauch und die CO₂-Emissionen aller in Deutschland angebotenen neuen Personenkraftfahrzeugmodelle ist unentgeltlich an jedem Verkaufsort in Deutschland erhältlich, an dem neue Personenkraftfahrzeuge ausgestellt oder angeboten werden.

Source: (VCD, 2011)

The Pkw-EnVKV was amended in 2011, at which time a label design based on the EU Energy Label was introduced (see Figure F-8). The label includes 8 colour coded categories ranging from A+ to G. The categories are calculated using a relative CO₂ emissions labelling system, based on the CO₂ emissions and weight of the car.

⁶⁶ To support this case study interviews were carried out with a German Ministry and a German consumer association

Figure F-8: Car label (2011 onwards) - Germany

**Information über Kraftstoffverbrauch,
CO₂-Emissionen und Stromverbrauch i. S. d. Pkw-EnVKV**

Marke:	Kraftstoff:	
Modell:	andere Energieträger:	
Leistung:	Masse des Fahrzeugs:	

Kraftstoffverbrauch	kombiniert:	/100 km
	innerorts:	/100 km
	außerorts:	/100 km
CO₂-Emissionen	kombiniert:	g/km
Stromverbrauch	kombiniert:	kWh/100 km

Die angegebenen Werte wurden nach vorgeschriebenen Messverfahren (§ 2 Nr. 5, 6, 6a Pkw-EnVKV in der gegenwärtig geltenden Fassung) ermittelt. CO₂-Emissionen, die durch die Produktion und Bereitstellung des Kraftstoffes bzw. anderer Energieträger entstehen, werden bei der Ermittlung der CO₂-Emissionen gemäß der Richtlinie 1999/94/EG nicht berücksichtigt. Die Angaben beziehen sich nicht auf ein einzelnes Fahrzeug und sind nicht Bestandteil des Angebotes, sondern dienen allein Vergleichszwecken zwischen den verschiedenen Fahrzeugtypen.

Hinweise nach Richtlinie 1999/94/EG:
Der Kraftstoffverbrauch und die CO₂-Emissionen eines Fahrzeugs hängen nicht nur von der effizienten Ausnutzung des Kraftstoffs durch das Fahrzeug ab, sondern werden auch vom Fahrverhalten und anderen nichttechnischen Faktoren beeinflusst. CO₂ ist das für die Erderwärmung hauptsächlich verantwortliche Treibhausgas. Ein Leitfaden für den Kraftstoffverbrauch und die CO₂-Emissionen aller in Deutschland angebotenen Personenkraftfahrzeugmodelle ist unentgeltlich an jedem Verkaufsort in Deutschland erhältlich, an dem neue Personenkraftfahrzeugmodelle ausgestellt oder angeboten werden.

CO₂ Effizienz	Auf der Grundlage der gemessenen CO ₂ -Emissionen unter Berücksichtigung der Masse des Fahrzeugs ermittelt.
Jahressteuer für dieses Fahrzeug Euro Energieträgerkosten bei einer Laufleistung von 20.000 km: Kraftstoffkosten () bei einem Kraftstoffpreis von Euro/Abrechnungseinheit Euro Stromkosten bei einem Strompreis von Euro/Abrechnungseinheit Euro <div style="text-align: right;">Erstellt am:</div>	

Source: (Dena, 2016)

Label categories are calculated using a formula to determine the percentage deviation from a reference value.

The reference value (in g CO₂/km) is calculated by Equation 1, where $a = 0.08987$ and M is the mass of the vehicle in kilograms.

Equation 1: Calculation of reference value for the German car labelling system. Source (Dena, 2016)

$$\text{Reference value} \left(g \frac{\text{CO}_2}{\text{km}} \right) = 36.59079 + a \times M$$

The deviation of the car's official CO₂ emission from the reference value is calculated as a percentage difference of the two values, as shown in Equation 2. CO₂ Ref represents the reference value of the vehicle-specific CO₂ emissions, and CO₂ PKW represents the official specific CO₂ emissions of the vehicle. The deviation is presented as a percentage to two decimal places.

Equation 2: Calculation of deviation from the reference value for the German car labelling system. Source (Dena, 2016)

$$\text{Percentage deviation} (CO_{2\text{diff}} \text{ in } \%) = \frac{CO_{2\text{PKW}} - CO_{2\text{Ref}}}{CO_{2\text{Ref}}} \times 100$$

The bands for each label category are shown in Table F.2-1. An additional A++ category for cars greater than 46% below the reference value will be introduced if at least five percent of newly registered vehicles in a calendar year meet this level. To date, this category has not been introduced.

Table F.2-1: Car label categories - Germany

Label category	Relative scale (deviation from the reference value)
A+	$\leq -37\%$
A	-36.99% to -28%
B	-27.99% to -19%
C	-18.99% to -10%
D	-9.99% to -1%
E	-0.99% to +8%
F	+8.01% to +17%
G	$> +17.01\%$

Source: (Dena, 2016)

The label also includes information on economic costs (annual road tax and running costs) and takes into account other fuels such as electricity (electricity consumption and running costs) and hydrogen (Dena, 2016).

The rationale for introducing a relative grading scheme in Germany was to improve consumer information by showing the CO₂ performance and potential for improvements in all vehicle segments. That is, it was considered that an absolute label would put smaller cars at a consistent advantage and reduce pressure to optimise energy efficiency in these segments (AEA and TEPR, 2011). Hence, the relative grading scheme ensures that consumers could find an A rated vehicle in every category. The approach was further justified as being in line with the relative labelling approach taken in the appliance energy labels.

F.2.1.2 Guide

The guide on fuel economy needs to be updated once a year but is voluntarily updated four times per year by car manufacturers and is available online⁶⁷. National legislation requires the guide to include additional information beyond the Directive such as:

- A reference to the current objective of the European Union regarding average CO₂ emissions from new passenger cars as well as the deadline for achieving this objective.
- A reference to the drivers that fuel consumption, CO₂ emissions and electricity consumption depend on the production and supply of other energy sources and that the vehicle user, through the use of low carbon fuels and energy, can contribute to the further reduction of CO₂ emissions.

A website⁶⁸ has also been set up by the German Energy Agency (Dena) to provide additional information for consumers and dealers about the revised implementation of the Directive in Germany. The website contains comprehensive information about the

⁶⁷ The 2016 Q2 guide is available at <http://www.pkw-label.de/uploads/media/DAT201602.pdf>

⁶⁸ <http://www.pkw-label.de/>

Directive, detailed information on the energy efficiency of vehicles, the latest version of the guide, and a number of other of tools to assist buyers (including company car fleet operators) to select new vehicles. Car labels can also be printed via this website.

F.2.1.3 Poster

National legislation requires the guide to include additional information beyond the Directive such as (AEA and TEPR, 2011):

- The poster is to be titled with "poster under Directive 1999/94/EC"
- Models for sale are to be listed in groups distinguishing between fuel type and other sources of energy
- The poster must be updated every three months, as opposed to six months outlined in the Directive

F.2.1.4 Promotional material

The Commission Recommendation (2003/217/EC) has been transposed into German national legislation. The Recommendation is to provide CO₂ emissions information available by electronic means wherever a car is available for sale or lease. This is also extended to where electronic, magnetic or optical storage media are used in the marketing advertising and promotion of new passenger cars.

F.2.1.5 Enforcement activities and compliance

Monitoring and enforcement

In Germany, enforcement of the national legislation is the responsibility of the Bundesländer. The federal government has no executive responsibility, but does offer information and support with respect to issues of interpretation.

However, only few Länder actively engage in enforcement activities and often proceedings are initiated in response to complaints from consumer organisations (AEA and TEPR, 2011). In its own market surveillance report for 2014 based on the information provided by the German authorities, Deutsche Umwelthilfe (DUH) collected data on the number of enterprises/showrooms controlled and promotional material, levels of non-compliance and fines imposed (Deutsche Umwelthilfe, 2016). In 11 of the 16 Bundesländer there were no checks performed in showrooms – and as result no fines imposed in 2014. The remaining 5 Bundesländer conducted 929 checks in 2014. Overall, the DUH characterises the market surveillance and enforcement as rather cautious with limited sanctioning of violations.

It should be also noted that enforcement through competition law plays an important role. Legal challenges brought by competitors, or consumer or business groups can result in a verbal warning and a letter, which is followed by a fine (after subsequent court proceedings) if the non-compliance is not addressed.

Compliance

According to the information collected from Deutsche Umwelthilfe (DUH) in the 5 Bundesländer where regular check did take place in 2014, the level of compliance was around 70% (276 cases of non-compliance out of 929 checks). It is worth noting that more than half of the check took place in only one Bundesland (Hessen). Fines were imposed in only 28 cases.

The 70% average compliance rate is similar to compliance data from a small number of earlier surveys in 2010-2011, which show the compliance levels as follows (depending on the region) (AEA and TEPR, 2011):

- Label: 61-95%,
- Poster: 52-90%,
- Guide: 89-86%.

Since these surveys were carried out in only a few Länder it is difficult to generalise with much confidence. The results suggested that compliance in some regions is very good, whereas for the poster and label in particular it may be lower in other regions.

Regarding promotional material, a study by Friends of the Earth (an environmental NGO) published in 2009 found a low level of compliance. They examined 71 press advertisements (newspapers and magazines) and 13 billboards in Germany over a three-month period in 2009 to assess their compliance: The CO₂/fuel consumption information was present/compliant in only 14% of advertisements, with the CO₂ information missing in 28% and the information being smaller than the main information in 58% of cases. None of the billboards were fully compliant, with 92% missing CO₂ information and 8% having the CO₂ information smaller than the main information (AEA and TEPR, 2011).

The position paper submitted to the study team by the national association of dealers (Zentralverband Deutsches Kraftfahrzeuggewerbe, ZDK) suggests that, currently, the main compliance problems are with the promotional literature, which is potentially due to the vague wording of the requirement. They indicated that more than 70% of all warnings and lawsuits regarding incorrect implementation of the Directive in Germany are due to the requirements that information in promotional literature should be "no less prominent than the main part of the information provided in the promotional literature", which is considered to be an unclear requirement.

F.2.2 Other relevant measures

A number of other measures have been introduced in Germany which may have had an impact on car CO₂ emissions. Relevant fiscal measures introduced between 2001 and 2014 are listed below.

- Jan 2001: increase in the rate at which circulation taxes increase with emissions
- Nov 2004: Implementation of Car labelling Directive: requirement for display of (simple) numerical information car CO₂ emissions and fuel consumption on a label enters into force
- Jan 2007: EU car CO₂ Regulation announced
- April 2009: EU car CO₂ Regulation entered into force
- July 2009: Circulation tax restructured to include a CO₂ component
- Dec 2011: Amendment to the Car labelling Directive : Requirement for a relative car CO₂ label enters into force

Significant changes were made to ownership tax in Germany in 2009. Prior to 2009, annual circulation tax was based on cylinder capacity and EURO emissions standard group. From July 2009 onwards, this changed to a calculation based on absolute CO₂ emissions and cylinder capacity. The new tax only applies to vehicles registered from July 2009 onwards. The CO₂ element of the tax has been revised several times since its introduction. In 2014, ownership tax was calculated as follows (ACEA, 2014):

- CO₂ component
 - Tax free base margin of 120 g/km for vehicles registered from July 2009, 100 g/km for vehicles registered from July 2012, 95 g/km for vehicles registered from 2014
 - €2 per g/km above the tax free margin
- Engine capacity component
 - €2.0 for each 100 ccm for Petrol engines
 - €9.5 for each 100 ccm for Diesel engines

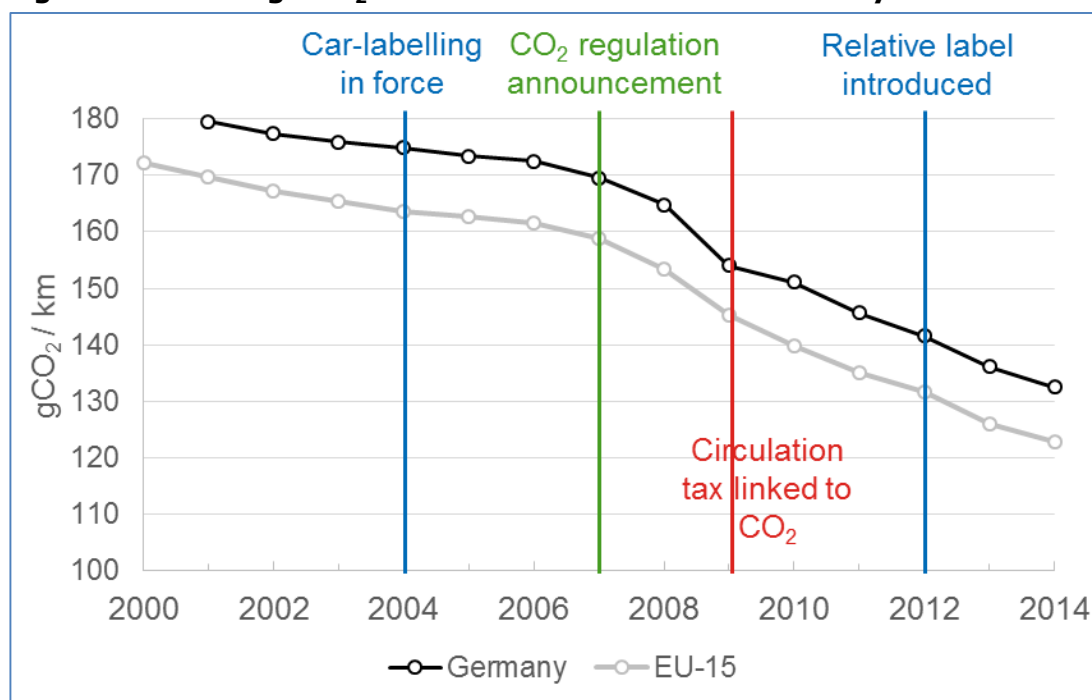
In addition to this, electric vehicles are eligible for tax exemptions in the first 10 years of ownership.

F.2.3 Trends in new car registrations

F.2.3.1 Average CO₂ emissions of new cars

Since 2001, the average CO₂ emissions of new cars in Germany have gradually decreased, from 179.5 g/km in 2001 to 132.5 g/km in 2014. The overall trend closely tracks that seen at an EU-15 level (Figure F-9), although throughout this period average new car CO₂ emissions in Germany have remained above the EU-15 average.

Figure F-9: Average CO₂ emissions of new cars in Germany



Source: (EEA, 2014)

Table F.2-2: Germany - Year on year reduction in average new car CO₂ emissions

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EU-15	1.5 %	1.0 %	1.1 %	0.7 %	0.7 %	1.7 %	3.5 %	5.3 %	3.7 %	3.4 %	2.6 %	4.2 %	2.6 %
Germany	1.2 %	0.8 %	0.6 %	0.9 %	0.5 %	1.7 %	2.8 %	6.6 %	1.9 %	3.6 %	2.7 %	3.9 %	2.7 %

Notes: Green text indicates a percentage change greater than 0.5% above the EU-15 average; red text indicates a percentage change greater than 0.5% below the EU-15 average. Source: (EEA, 2014)

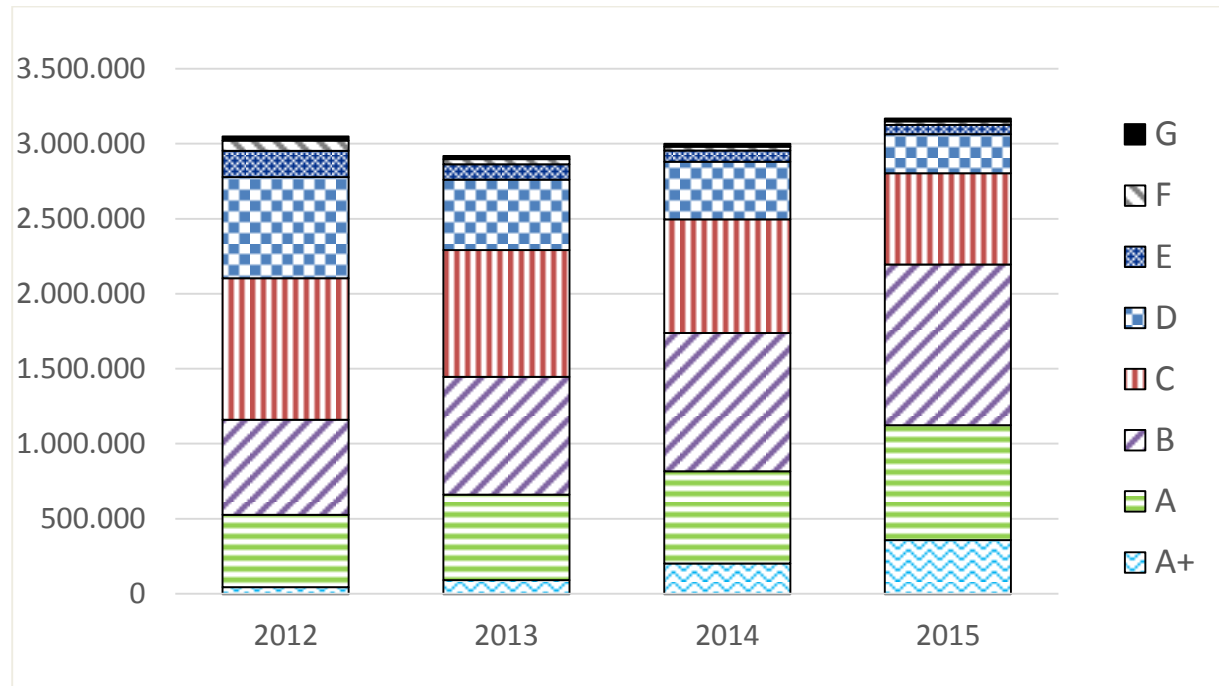
F.2.3.2 New car registrations by label category

Data for new car registrations by label category is available for January 2012 – October 2015 for Germany. In this period, the number of new car registrations in the A+ category steadily rises (Figure F-10) from 0.7% to 13%. The number of registrations in the A and B categories also see slight increases, while a decrease in the number of registrations in each of the C – G label categories is seen.

In terms of the percentage of new car registrations, the most significant changes are seen in the A+, B and D categories. In January 2010, A+ cars accounted for 1% of new registrations, while in October 2015 this had risen to 13%. B label category cars saw a rise from 20% in January 2012 to 35% in October 2015, whereas D label category cars saw a decrease from 23% in January 2012 to 7% in October 2015. By October 2015,

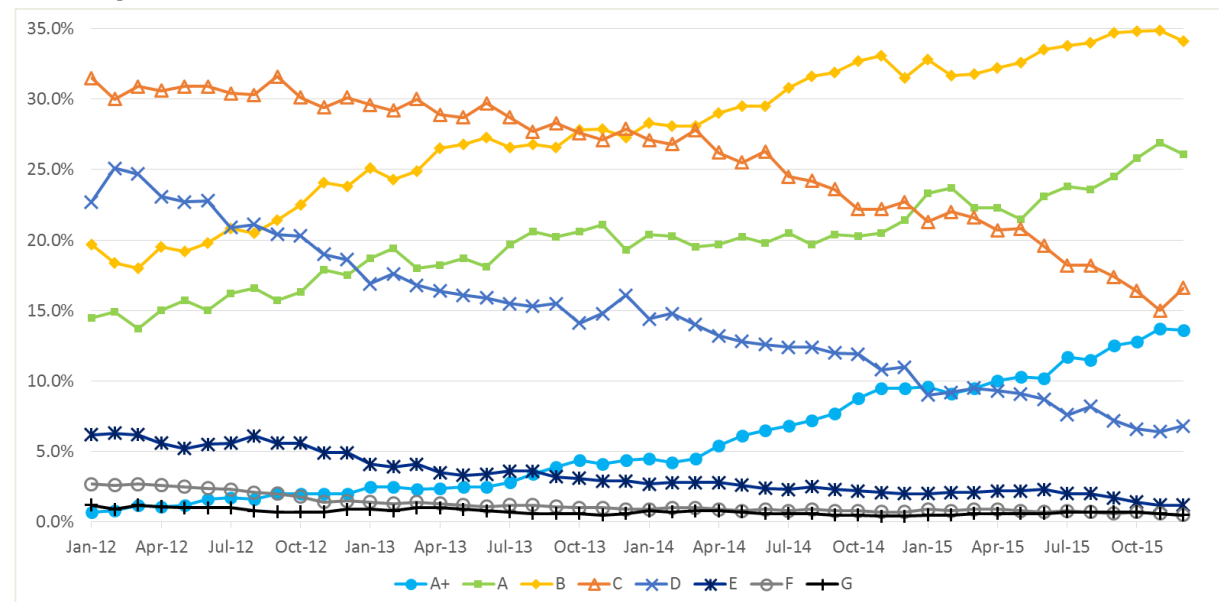
A+, A and B label categories accounted for 74% of new car registrations (compared to just 35% in January 2012).

Figure F-10: Number of new car registrations in Germany by label category 2012 – 2015



Source: (KBA, 2015a)

Figure F-11: Percentage of new car registrations in Germany by label category January 2012 - December 2015



Source: (KBA, 2015a)

F.2.4 Consumer response

F.2.4.1 Consumer recognition/awareness of the information

Surveys of consumer awareness were conducted following the introduction of the revised label in 2011, in order to monitor its effectiveness. No formal evaluations were carried out prior to this. Initially and as might be expected, awareness among consumers of the label was relatively low. According to a survey of around 1,000 car buyers conducted in January 2012, most buyers (around three-quarters) were not aware of the label (Dena, 2012). In 2014, a similar survey was carried out with almost 1,500 new car buyers. This showed that awareness of the label had improved but still the majority of respondents (65%) were not aware of the label (Dena, 2014). In 2015, awareness appears to have grown further, with only 42% of buyers reporting that they were unaware of the labels (Dena, 2015).

Overall, this shows that awareness of the label has been gradually increasing reaching similar levels recorded in France (see Section Consumer recognition/awareness of the information) or the UK (see Section F.3.4.1) for the same period since the adoption of the colour coded scheme. Nonetheless, it remains below awareness levels reported in most countries at this stage, a result of the absence of a color coded scheme up to 2011.

Regarding the other aspects of the Directive, there is less information available and no formal studies have been conducted. A lack of interest in printed versions of the **guide** was previously highlighted in (AEA and TEPR, 2011), where it was reported that the paper versions available in dealerships were rarely picked up by consumers – this suggests that the guide is not an important source of information for consumers. The interviewees from a national consumer organisation and the ministry agreed that the guide was not particularly effective as not many consumers read it.

Concrete information on the **posters** was not available; however, stakeholders from industry, government and consumer organisations agree that it is less prominent than the label. For instance, the position paper submitted by the national association of dealers (Zentralverband Deutsches Kraftfahrzeuggewerbe, ZDK) suggested that it could be abolished since its usefulness is limited. The representative of the German Ministry commented during the interview for this study that he felt the poster was less noticeable, although this was based on his own experience and not any formal evaluation. A national consumer organisation, also interviewed for this study, agreed that the poster was less effective.

F.2.4.2 Interpretation and understanding of the information

Studies of consumer understanding of the German relative label consistently show that it causes confusion and incorrect interpretation of the meaning of the categorisations. Soon after the introduction of the label in January 2012, only around 45% of consumers were able to correctly identify what the efficiency classes meant (Dena, 2012). Although the share of consumers able to correctly interpret the label subsequently rose to 52% of consumers by October 2012, this still shows that nearly half of consumers were misinterpreting the categorisation (Dena, 2012).

Another survey conducted in 2012 by the consumer centre of North Rhine-Westphalia with 1,006 German consumers also showed that a large share of consumers were misinterpreting the relative label. More than two thirds of the respondents thought that the A+ class stands for an overall very low level of fuel consumption of the car, whereas only 17% of the respondents correctly identified that the A+ rating stands for a low level of fuel consumption compared on the basis of similar cars weight (ANEC and BEUC, 2014).

More recently, testing of different label designs conducted in (Codagnone et al, 2013) showed that the German label is clearly confusing, since respondents shown the absolute systems ranked the car they saw in terms of CO₂ emission more correctly than the

respondents who were shown the German classification system. The results were statistically significant and hold when including other variables such as gender, age and country of the respondents.

F.2.4.3 Utilisation of the information

Surveys conducted with new car buyers in Germany have indicated that the stated importance of the label in purchasing decisions has steadily increased over time. Soon after the label was introduced, 58% of consumers who were aware of it rated it as at least fairly important in their decisions – rising to 63% in October 2012, 65% in October 2013 and 67% in November 2014 (Dena, 2014). In 2015, around 73% of those who know the labels regarded it as at least fairly important for their purchase decision (Dena, 2015).

From the dealers' perspective, the share of surveyed car dealers who indicated that they at least sometimes mentioned the label in their sales pitches has remained relatively steady above 50% from 2012 until 2014 (Dena, 2014).

There is less information concerning the use of the posters, guides and promotional material. Qualitatively, both the national ministry and a national consumer association felt that the label was the most important piece of information whereas the other elements are not particularly used by consumers.

F.2.5 Manufacturer response

There have not been any formal studies on the response of manufacturers. However, consumer organisations have suggested that the German relative classification provides a lower incentive to manufacturers to invest in lightweighting (which is seen as a very efficient way of achieving CO₂ reductions) (ANEC and BEUC, 2014). The effect could even work in reverse, as using mass as the parameter to assign cars to efficiency classes might have the unintended negative consequence that manufacturers increase the mass of the cars in order to achieve a better rating without actually improving the CO₂ performance of the car (ANEC and BEUC, 2014). Rather in contrast to the above views, according to a German industry representative, the relative approach incentivises research and technical development for all vehicle categories since it provides a comparison with each market segment.

F.2.6 Impact of the Directive on CO₂ emissions

The representative of the German ministry interviewed for this study indicated that there have not been any formal evaluations of the Directive in Germany. For the implementation prior to 2011, it was however assumed that the impact, if any, was considerably lower than comparable labelling in other sectors (such as appliances), since Germany only implemented the minimum requirements of the Directive (i.e. a label only showing energy consumption and CO₂ emissions per km) (Odussee-Mure, 2011c).

Concerning the impact since the adoption of the color coded relative scheme, again there has been no specific study that has examined this aspect. The available data on registration by label category show an increase in the top categories A+, A and B while CO₂ emissions have declined since 2011 largely in line with the EU average. The evidence presented earlier on the use of the information in the label could probably indicate a certain level of contribution. However, at the same time, the questions raised on the effectiveness of the relative label raise doubts for the level of contribution. As already indicated earlier, there are important concerns as to the clarity of the information provided by the relative label. Environmental groups like DUH claim that the German calculation model has a bias towards inefficient heavy vehicles (contribution to the stakeholder consultation). On the other hand, as indicated the industry representatives (VDA) consider that the relative label adopted is more effective in promoting the purchase of fuel efficient vehicles within each vehicle segment. The absence of specific data does not allow for any clear conclusions on the effectiveness of the

German label. While it seems reasonable to conclude that the adoption of the color coded label design has had a positive contribution, this is not the case when it comes to the relative design.

F.2.7 Conclusions from the German case study

- The average CO₂ emissions of new cars in France have decreased largely in line with the EU-15 average. Over the period 2002-2014 average new car CO₂ emissions have decreased 26%, compared to 28% for the EU-15. However, average emissions have remained above the EU-15 average.
- Prior to 2011, Germany had only implemented the minimum requirements (i.e. provision of absolute CO₂ emissions and fuel efficiency information without categorisation of vehicles into efficiency classes and no graphical content). The label was revised in 2011 with the intention of improving consumer information by providing relative grading – under the German scheme, vehicles are classified relative to other vehicles of similar weights. This has been rather controversial, with the approach being criticised as misleading by various stakeholder groups (environmental organisations, consumer associations and some automakers) but being supported by the automotive sector.
- Since the adoption of the color coded label design in 2011, the level of awareness among consumer and the level of use of the information in the purchase of vehicles have increased towards levels similar to those in most other countries.
- Moreover, the label is thought to be the most important informational aspect, whereas the other elements of the Directive (poster, guide etc) are not thought to be very visible or important to consumers.
- The evidence available indicates that the relative label does indeed cause significant confusion - surveys of car buyers show that between half to three-quarters of respondents are not able to interpret the meaning of the categories in the label correctly. That is, they do not understand that the categories are relative and refer to vehicles of similar mass. However, there are again different views as to the impact on the effectiveness of the label.

F.3 - United Kingdom⁶⁹

F.3.1 Implementation of the Directive in the United Kingdom

Consumer information was in place in the UK prior to the Directive (since 1993), albeit with no specified format – manufacturers were required to show fuel consumption and CO₂ information in promotional literature when claims about fuel economy were made.

Directive 1999/94/EC was implemented in the UK by UK S.I. 2001 No. 3523, 'The Passenger Car (Fuel Consumption and CO₂ Emissions Information) Regulations 2001'.

In 2004, it was amended by UK S.I. 2004 No. 1661, 'The Passenger Car (Fuel Consumption and CO₂ Emissions Information) (Amendment) Regulations 2004' following the publication of Directive 2003/73/EC.

In 2005, the UK legislation was updated to require the Energy label style and Vehicle excise duty (VED) bands in order to make it more accessible for consumers. Initially vehicles were segmented into 7 bands (A to G), whereas from 2010 the bands were modified to accommodate 13 VED classes (A to M), although still with 7 coloured bands.

In the UK, the Vehicle Certification Agency (VCA; an agency of the national Department for Transport) enforces the provisions relating to promotional materials, while Trading Standards officers (employees of local authorities) cover the fuel economy label, guide and poster.

F.3.1.1 Car label

In the UK an absolute CO₂ emissions labelling system is used to classify vehicles. The current label design is similar to the EU Energy Label, with 7 colour coded categories. The colour coded bands are linked to the 13 Vehicle Excise Duty classes (A – M), which are also displayed on the label (Figure F-12).

Colour coding was first introduced to the UK car label in 2005. In April 2010 a further slight revision was made to the label to show a new 'first year rate' of vehicle excise duty which was introduced. The UK also includes vehicle running costs based on annual mileage of 12,000 and displayed as a pounds (£) value.

⁶⁹ To support this case study, interviews were carried out with a national competent authority and a consumer association

Figure F-12. Car label - United Kingdom

Fuel Economy		VED band and CO ₂													
CO ₂ emission figure (g/km) 		C g/km													
Fuel cost (estimated) for 12,000 miles <small>A fuel cost figure indicates to the consumer a guide price for comparison purposes. This figure is calculated by using the combined drive cycle (town centre and motorway) and average fuel price. Re-calculated annually, the cost per litre as at Mar 2012 is as follows - petrol 130p, diesel 147p, LPG 74p.</small>		VED for 12 months <small>Vehicle excise duty (VED) or road tax varies according to the CO₂ emissions and fuel type of the vehicle.</small>													
		1 st Year rate*	Standard rate*												
Environmental Information A guide on fuel economy and CO ₂ emissions which contains data for all new passenger car models is available at any point of sale free of charge. In addition to the fuel efficiency of a car, driving behaviour as well as other non-technical factors play a role in determining a car's fuel consumption and CO ₂ emissions. CO ₂ is the main greenhouse gas responsible for global warming.															
Make/Model:		Engine Capacity (cc):													
Fuel Type:		Transmission:													
Fuel Consumption: <table border="1"> <thead> <tr> <th>Drive cycle</th> <th>Litres/100km</th> <th>Mpg</th> </tr> </thead> <tbody> <tr> <td>Urban</td> <td></td> <td></td> </tr> <tr> <td>Extra-urban</td> <td></td> <td></td> </tr> <tr> <td>Combined</td> <td></td> <td></td> </tr> </tbody> </table>				Drive cycle	Litres/100km	Mpg	Urban			Extra-urban			Combined		
Drive cycle	Litres/100km	Mpg													
Urban															
Extra-urban															
Combined															
Carbon dioxide emissions (g/km): <small>Important note: Some specifications of this make/model may have lower CO₂ emissions than this. Check with your dealer.</small>															
<div style="display: flex; justify-content: space-between; align-items: center;"> <div> </div> <div> To compare fuel costs and CO₂ emissions of new cars, visit http://carfueldata.direct.gov.uk/ </div> <div> </div> </div>															

Source: (DfT, 2016)

Table F.3-1: Car label categories 2015 - United Kingdom

Label band	VED included in band	bands in colour	CO ₂ Emissions (g/km)
1 (top of the label, lowest CO ₂ emissions)	A		<100
2	B, C		101 – 120
3	D, E		121 – 140
4	F, G		141 – 165
5	H, I		166 – 185
6	J, K		186 – 225
7 (bottom of the label, highest CO ₂ emissions)	L, M		>226

Source: (DfT, 2016)

The labels for petrol and diesel cars are the same. National legislation amended to allow for EVs and PHEV (Feb 2013). Labels for these vehicles include:

- m/kWh
- Range of vehicle
- Annual energy cost (12,000 miles)
- Annual combined fuel and energy cost (12,000 miles)

It should also be noted that a used car label has also been adopted on a voluntary basis in the UK since November 2009. It was a scheme developed jointly by the Low Carbon Vehicle Partnership (LowCVP) – a public private partnership organisation - with the support of the automotive sector (retailers and manufacturers)⁷⁰ and the Department for Transport. Car dealerships that wish to label used cars in their showrooms can do so free of charge by downloading and printing a label unique to the specific vehicle from an existing database. The label has all the characteristics of the car label for new cars and includes information on fuel costs for 12,000 miles as well as the vehicle excise duty for one year. The database was hosted and maintained by the Vehicle Certification Agency up to 2012. Since then, data labels for used cars can still be provided free of charge by two external providers, supervised by the UK Department for Transport.

F.3.1.2 Guide

In the UK the Vehicle Certification Authority (VCA) is responsible for collecting and publishing fuel consumption and CO₂ information. From 2000 – 2010 printed copies were made available annually. From 2011, the guide is published in a physical format, CD-ROM and online and is distributed on demand to dealerships, showrooms, stakeholders and the public. There were 500,000 copies printed in the UK but demand for these copies has reduced now that the website is available. Although it is still published on CD ROM the total number distributed is only 80,000.

The database is fully searchable and so it can offer faster and more convenient comparison between vehicles that would not be available in hard copy.

F.3.1.3 Poster

Guidance is not provided for posters specifically, but for promotional material in general including posters by the VCA (AEA and TEPR, 2011). The legislation has also been updated to allow for 3 dimensional displays and to include the publication date of the information included in the display as well as the date the display was assembled.

F.3.1.4 Promotional material

Guidance is provided on the requirements of the UK regulations. It was developed by the Department for Transport, the VCA, the Society of Motor Manufacturers and Traders (SMMT) and other industry stakeholders such as marketing and advertising representatives and national bodies responsible for regulating advertising, such as Trading Standards. The VCA also offer a pre-publication screening service to manufacturers to ensure that promotional materials meet their obligations,

F.3.1.5 Enforcement activities and compliance

Inspections are carried out in the UK by Trading Standards officers on behalf of local authorities. The first response is often triggered by a report from the public, although unannounced showroom visits also take place. Anecdotal evidence identified in the literature review suggest that the frequency of these visits have now declined. The VCA monitors compliance with the requirements through reviewing a range of publications and promotional literature and responding to specific concerns raised by consumers or other groups. Additionally, a pre-publication vetting service is offered and a number of

⁷⁰ Retail Motor Industry Federation (RMI), the Society of Motor Manufacturers and Traders (SMMT)

manufacturers and their agencies take advantage of this opportunity to get a view on compliance in advance of publication.

The UK authorities believe that compliance with the Directive is high (estimated at 93%). The relatively high level of compliance reported by the authorities seems to be confirmed when looking at surveys conducted independently by LowCVP – in particular for the **label element**. For instance, in 2009, 88% of vehicles and 94% of dealers participated in the label scheme (Wallis, 2011), up from 86% in 2007 and 74% in 2006 (House of Commons Environmental Audit Committee, 2009). The authorities also report that the LowCVP has regularly undertaken mystery shopper audits at UK car dealerships to determine the uptake of the label, with over 93% found to be using the label (AEA and TEPR, 2011).

Concerning the voluntary used car label, there is no monitoring enforcement activity. However, according to the data from the LowCVP in the first full year of the scheme, more than 0.33 million used-car labels had been displayed by around 1300 dealers that had registered and engaged in the scheme (LowCVP, 2011) and there was particularly strong support from the UK automotive sector (SMMT) and among certain brands (Ford, Toyota, VW, Honda and BMW) (Wallis, 2011). According to the Low CVP representative, the number of dealers currently registered is 2450, out of a total of 5490 (44%) used car dealerships in the UK (Bursa, n.a.). A number of benefits were recognised in relation to the used car label. According to a survey among used car dealers, nearly 60% said that the presence of the label aided or improved the sales process. Noted benefits reported by dealers were that the labels gave clear, accurate and simple information at the point of sale that are both independent and specific to the vehicle (LowCVP, 2011).

In relation to the other information tools, anecdotally, compliance with the requirement to provide the **fuel economy guide** is reportedly the most common violation (AEA and TEPR, 2011), leading to overall only 25% of trade premises being fully compliant. For the **poster**, the available evidence suggests that compliance may be lower. According to studies in 2006/2007, less than half of showrooms displayed the poster prominently (AEA and TEPR, 2011), and the UK consumer association interviewed for this study felt that even now the posters are not necessarily displayed prominently. Finally, monitoring data reported by VCA in 2010 suggest that compliance with **advertising requirements** is around 93% based on 1185 adverts inspected (AEA and TEPR, 2011). An investigation conducted by Friends of the Earth (an environmental NGO) in 2009 reported lower levels of compliance (76% of advertisements and 43% of billboards being fully compliant) (AEA and TEPR, 2011).

Overall, compliance with the label element appears to be the highest, and has shown an increasing trend over time to a current estimated level of 93%. Information on compliance with the other requirements (poster, guide, advertising) is more patchy, but the available evidence suggests that compliance is typically lower, especially for the requirement to provide the guide at the premises (although as noted earlier, demand for physical copies of the guide has dropped, with consumers preferring to access the online version).

F.3.2 Other relevant measures

A number of other measures have been introduced in the UK which may have had an impact on car CO₂ emissions.

Relevant fiscal measures introduced between 1999 and 2014 are listed below, along with details of the implementation of the car labelling Directive in the UK.

- 1999: VED (Vehicle Excise Duty/road tax) becomes linked to engine size
- 2000: reduction in VED for certain vehicles with smaller engines
- March 2001: VED reformed to become entirely linked to CO₂ emissions
- Nov 2001: UK labelling regulation enters into force

- 2002: VED reformed to create stronger incentives for lower CO₂ emitting cars
- 2002: Company car tax reformed to link to CO₂
- 2005: colour coded label (in the style of EU Energy Labels) introduced in the UK
- 2006: VED bands amended
- Jan 2007: EU car CO₂ regulation announced
- 2008: VED bands amended
- April 2009: EU car CO₂ Regulation entered into force

April 2010: VED system changed, whereby a different rate of VED is payable in the first year the vehicle is registered. This has been referred to as the 'showroom tax'.

The UK VED (circulation) taxes have been based entirely on CO₂ since 2001, and have gradually shifted over time such that the tax on vehicles with lower CO₂ emissions has fallen and the tax on higher-CO₂ vehicles has increased.

Prior to 2002, the tax base for company cars was estimated using a fixed percent (35%) of the prices of the cars, but from 2002, this was made variable, depending on CO₂ (along with other changes on the treatment of business mileage). In the UK, company cars typically make up around half of new car sales (Walud, 2013).

In 2009-2010 there was a scrappage programme that offered a £2,000 subsidy toward buying new vehicles, but this was not linked to fuel economy (Walud, 2013).

Forthcoming changes for vehicles registered from 1st April 2017 are expected, with a flat £140 rate for all cars except those emitting 0 gCO₂/km for which the standard rate will be £0.

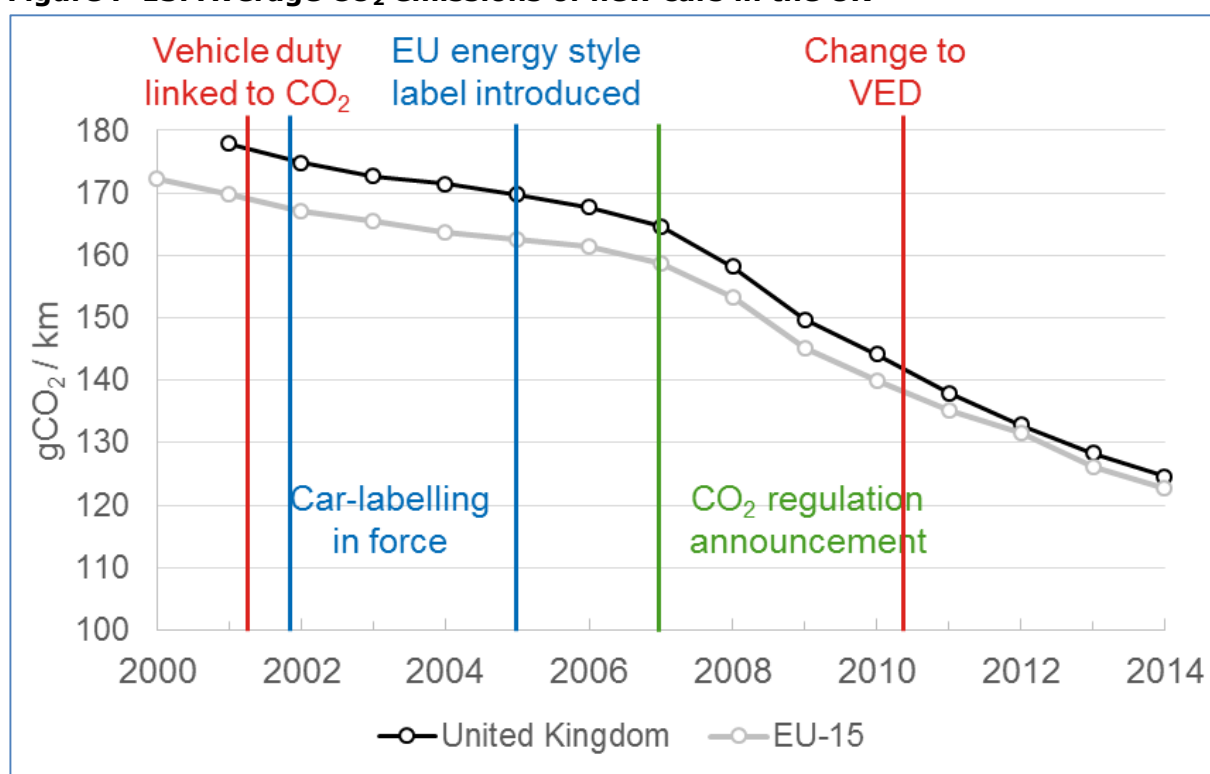
Company car taxation was reformed in April 2002 to an emissions-based system. The amount is linked to vehicle CO₂ emissions with the percentage "benefit in kind" calculation increasing from 15% to 37% with increasing CO₂. The rates are revised each year⁷¹.

F.3.3 Trends in new car registrations

F.3.3.1 Average CO₂ emissions of new cars

Since 2001, the average CO₂ emissions of new passenger cars has decreased from 177.9 gCO₂/km to 124.6 gCO₂/km in 2014. The trend in CO₂ reductions has generally followed the average for EU-15 countries, albeit at a marginally faster rate (Figure F-13), meaning that the UK has narrowed the gap between its average new car CO₂ emissions and the EU-15 average. By 2012, new car CO₂ emissions in the UK were roughly equal to the average figure for the EU-15.

⁷¹ Full details given at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/356654/TC2b.pdf

Figure F-13. Average CO₂ emissions of new cars in the UK

Source: (EEA, 2014)

Table F.3-2: United Kingdom - Year on year reduction in average new car CO₂ emissions (% change)

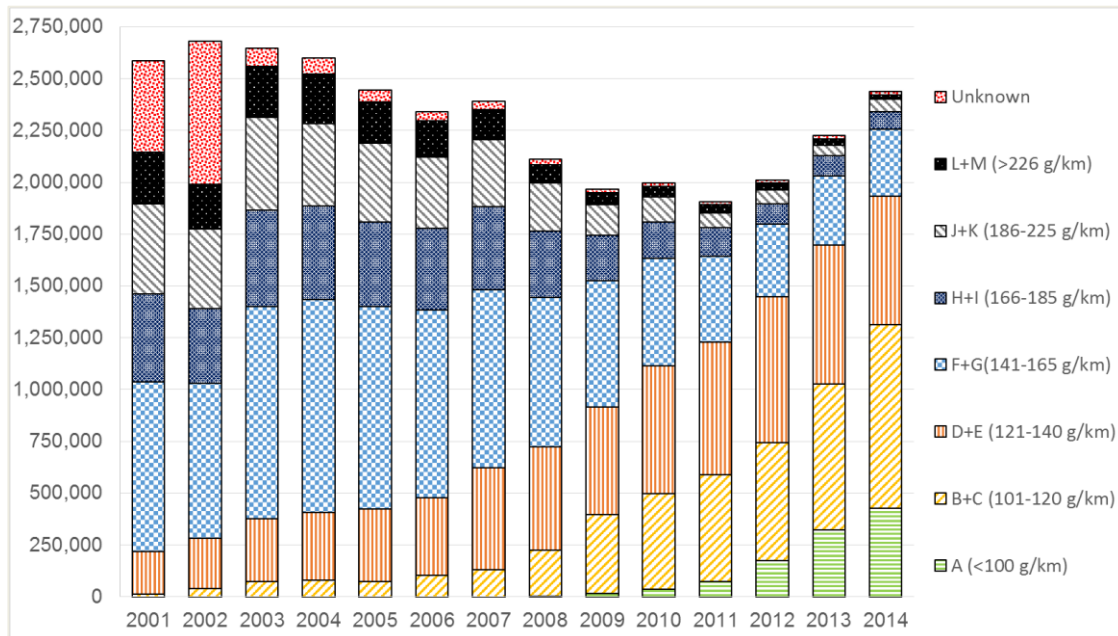
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EU-15	1.5 %	1.0 %	1.1 %	0.7 %	0.7 %	1.7 %	3.5 %	5.3 %	3.7 %	3.4 %	2.6 %	4.2 %	2.6 %
United Kingdom	1.7 %	1.2 %	0.8 %	1.0 %	1.2 %	1.8 %	3.9 %	5.4 %	3.7 %	4.3 %	3.7 %	3.5 %	2.9 %

Notes: Green text indicates a percentage change greater than 0.5% above the EU-15 average; red text indicates a percentage change greater than 0.5% below the EU-15 average. Source: (EEA, 2014)

F.3.3.2 New car registrations by label category

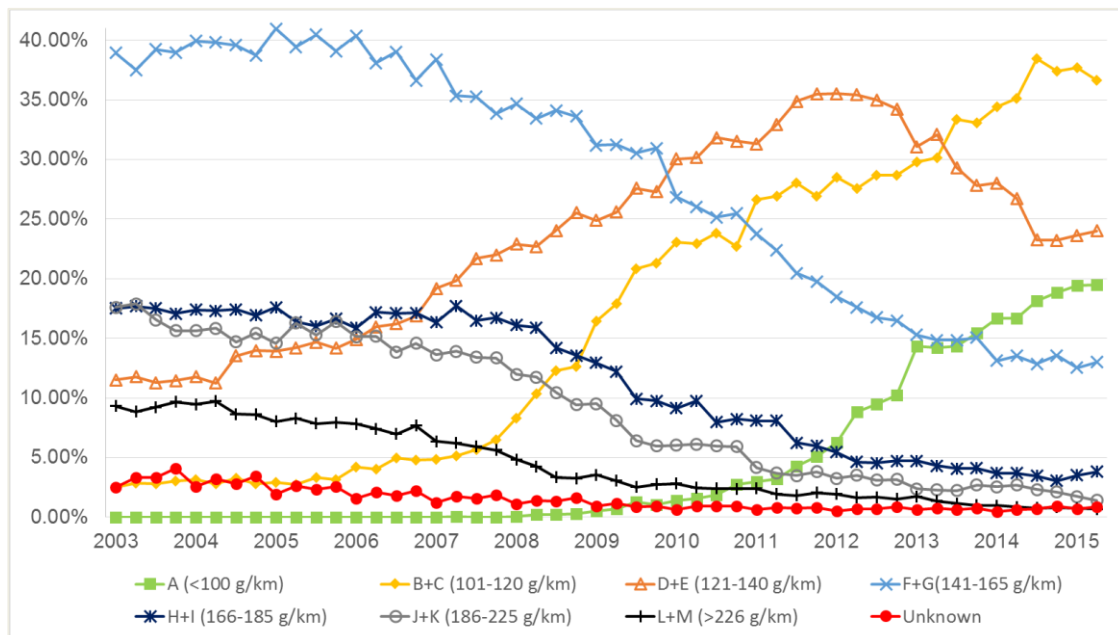
Data was also collected on **new car registrations by car CO₂ label**. This was complemented by research into fiscal measures, which are also likely to have had an impact on new car sales. In the UK, vehicle tax bands are grouped into seven categories when displayed on car CO₂ labels, as shown in Table F.3-1. In this section, data for car sales in each tax band has been collated into the seven categories shown on car CO₂ labels.

From 2001 – 2014, the number of newly registered cars within the A – E tax bands has risen, as shown by Figure F-14. New registrations of vehicles in the F-M tax bands have gradually decreased over the same period. This trend is more pronounced from 2008 onwards.

Figure F-14. Number of new car registrations in the UK by label category 2001 - 2014

Source: (UK DfT, 2015)

Analysis of the market share of different tax bands shows that the largest increase in new car registrations has been within the A, B and C tax bands. In 2001, A, B and C label categories accounted for less than 1% of new car registrations. By 2008, this figure had increased to 11%, while in 2014 A, B and C label categories represented 54% of the market.

Figure F-15. Percentage of new car registrations in the UK by label category Q1 2003 - Q2 2015

Source: (UK DfT, 2015)

F.3.4 Consumer response

F.3.4.1 Consumer recognition/awareness of the information

Label

A UK consumer group commented during an interview for this study that the label part of the Directive is likely the most effective.

Consumer surveys conducted by LowCVP between 2006-2009 have shown that awareness of the label has been increasing over time – of new car owners, 36% spontaneously recalled seeing the label in 2006, rising to 37% in 2007, 41% in 2008 and 49% in 2009 (Hill, 2009). Prompted awareness was higher in all years, rising from 42% among new car owners in 2006 to 59% in 2009.

More recent studies do not appear to have asked specifically about the level of recognition. Estimates obtained from UK stakeholders suggest that they believe the current level of recognition is relatively high, at 65% (according to the enforcers) up to 75-100% (according to the consumer association).

Poster

Concerning the poster, the UK consumer group believes that many consumers are not aware of it (in part because it is not necessarily well-displayed).

Guide

The UK authorities note that there are 3.5 million unique visits to the website tool (online version of the guide) every year and feel that it also has a significant role (along with the label) in driving consumer awareness. Results from a consumer survey also show a positive response to the use of websites – and welcomed the ability to compare information for a number of vehicles (LowCVP, 2010).

Conversely, the UK consumer group felt that the guide could in fact be counterproductive, since it is out-dated.

F.3.4.2 Interpretation/understanding of the information

Both the UK consumer association and the authorities believe that the label is a useful tool for informing consumers. In particular the colour coding and bars are thought to be effective – a view that is supported by the findings of consumer surveys where consumers responded positively to these aspects (LowCVP, 2010); (LowCVP, 2012).

The accuracy of interpretation of the label information suggests that a high proportion of consumers are able to correctly understand the information, with almost 90% able to report the correct CO₂ values of two models (LowCVP, 2010).

F.3.4.3 Utilisation of the information

The UK consumer association commented that the Directive has been effective in providing information to consumers, while noting at the same time that consumers tend to be more focussed on cost rather than CO₂.

This view is supported by consumer surveys carried out in the period from 2006-2010. These surveys show that the share of car buyers claiming to use the labels as a source of information has increased – less than 10% for 2006-2009, rising to around 25-35% of consumers in 2010 (Hill, 2009); (LowCVP, 2010). The proportion of buyers using the label increased to almost 40% amongst those identifying themselves as environmentally conscious in 2010, suggesting that the label is more informative for those concerned with environmental performance. Use of the guide has remained consistently low, with less than 5% of respondents reporting that they use it as a source of information in 2006-2010 (Hill, 2009); (LowCVP, 2010).

However, the LowCVP reported during an interview for this study that they believe the label at the point of sale has become less relevant today, considering how consumers research and make choices – and consequently more recent studies have not focussed on recognition and uptake of the label. This trend seems to be reflected in studies of consumer behaviour even back in 2010, where more than half of respondents in focus groups stated that they use the internet/websites as a source of information – a higher share than any other information source and well ahead of the reported shares for the elements of the

Various consumer surveys have confirmed that new car buyers in the UK report that that the fuel economy is one of the most important purchase factors (LowCVP, 2010); (LowCVP, 2012); (Hill, 2009), although the ranking of its importance seems to rise or decline with the level of fuel prices. Other environmental performance factors were not an important choice element. The attitudes of the consumers to environmental issues strongly influenced the rankings given – for those describing themselves as most concerned about environmental issues, fuel costs, emissions and tax bands moved up in importance (LowCVP, 2010).

Table F.3-3 **Error! Reference source not found.** below provides a summary of stakeholder estimates regarding the share of consumers in the UK that recognise, interpret/understand and use the information in the labels. This shows a broad perception that there is generally a high level of recognition and understanding among consumers, which is also supported by consumer studies conducted by LowCVP which found almost 90% of respondents were able to report the correct CO₂ values of two models (LowCVP, 2010). Conversely, the estimates of effectiveness drop considerably when it comes to whether consumers actually use the information in their purchase decisions – a fact that is also suggested by other sources, as discussed further below.

Table F.3-3: Overview of stakeholder estimates of functioning of causal chain

Stage	Respondent	
	Consumer association	UK authority
Recognition (% of consumers recognising the label)	75-100%	65%
Interpretation / understanding (% of consumers understanding the label)	50-75%	50-60%
Influence / utilisation (% of consumers using the label in purchase decisions)	<25%	45-50%

Source: Interviews conducted for this study

Finally, in relation to the used car label a survey of used car buyers conducted on behalf of the LowCVP in 2011 (LowCVP, 2011) found over half said their impression of the dealer had been enhanced by displaying the label. Two-thirds of used car buyers said that the information had influenced their purchase decision while 25% stated that they 'strongly influenced.' More recent surveys are not available. However, the LowCVP representative consider that used car label is still relevant and useful and pointed to the increase in the number of dealers that are involved in the scheme (close to 50% of the total used car dealers in the UK).

F.3.5 Manufacturer response

The study team are not aware of any literature or studies on manufacturer responses to the Directive in the UK in terms of shifts in the supply of vehicles. Qualitatively, during interviews conducted for this study both the UK consumer association and the national authorities suggested that the label may have stimulated competition between manufacturers to drive down CO₂ emissions. Evidence from two surveys of car advertising in 2007 and 2010 (cited in (Wallis, 2011)) showed that there was considerable growth in the proportion of advertising focusing on lower carbon, fuel efficient cars. This suggests that manufacturers may have attempted to differentiate on CO₂ performance, although it does not indicate whether supply of lower CO₂ emitting models increased nor whether these changes were linked explicitly to the Directive (for instance, the car CO₂ Regulations may have been important in this regard). Overall therefore, the evidence on manufacturer response in the UK is rather scarce.

F.3.6 Impacts of the Directive on CO₂ emissions

The UK is a rare example of a country that had requirements for information on fuel economy to be displayed on cars prior to the introduction of the Directive (since 1993). There were previously no requirements on format, and research suggests that this previous scheme was largely ineffective in reducing CO₂ emissions of new cars – average new car fuel consumption remained relatively stable between 1984 and 2000 (Boardman, et al., 2000) – during this period, the rates of tax were generally considered to be too low to significantly affect vehicle choice. Another assessment noted that the experience with the early labels was not promising, pointing out that the power rating of new cars in the UK increased faster than other Member States between the 1980s and 2000 (TRB, 2001). Other early research conducted in 2003 on the provision of information found most car buyers did not find this statutory, data-based information, useful (Wallis, 2011).

Since the introduction of the coloured bands on the label, subjective assessments of the effectiveness generally seem to have improved, highlighting the importance of visual aspects. For instance, the LowCVP's research shows that, around three-quarters of new car buyers say the label is useful in helping them to choose the make and model of their new car (Hill, 2009). More recently, it appears that buyers increasingly use the internet (referring to a wide range of third-party, media and official manufacturer websites for their information).

It is difficult to find concrete evidence that links higher consumer awareness of environmental/CO₂ aspects to a direct effect on purchase choices (Wallis, 2011) and, eventually, to the reduction of average CO₂ emissions. As noted above, surveys consistently report fuel economy as one of the most important purchase factors – according to consumer responses. At the same time, other research suggests that, while consumers state that fuel efficiency is an important buying criteria, there is little evidence that this leads to significant choice modifications – rather, most simply compare the new vehicle against their current model leading to incremental improvements in fuel efficiency (Anable et al, 2008). There is also evidence that consumers *perceive* that the more fuel efficient models tend to be more expensive – either because they are new technologies (such as petrol-hybrids), or because manufacturers artificially increase the prices of the most fuel-efficient conventional models (LowCVP, 2010); (LowCVP, 2012). This perceived trade-off may act as a barrier to changing purchase decisions in favour of more fuel efficient models.

The only direct assessment of the effectiveness of the Directive in the UK was based on a qualitative indication that it had made a “low” contribution to reductions in energy consumption of the car sector (i.e. <0.1% reduction) (ODYSSEE-MURE, 2014d).

More generally, unlike for other case studies (such as France), where fiscal measures in combination with the labels have had a significant impact on CO₂ emission reductions,

this does not appear to have been the case in the UK. The bands used in the label have been linked with the annual circulation tax (Vehicle Excise Duty - VED) since 2005, and VED costs are also displayed on the label. While we are not aware of any studies explicitly quantifying the impact of the label using econometric techniques, it is worth noting that analysis of the effectiveness of the VED tax (implicitly including any supporting role of the label) does not indicate particularly high reductions of CO₂. An econometric analysis of the effect of VED in the UK between 2005 and 2012 suggests that the CO₂-based taxation contributed only 3.6g/km to the total reduction of 32.5/km seen over that period (Cambridge Econometrics, 2013).

Nevertheless, both the UK authorities and the UK consumer association expressed positive views concerning the synergies between the VED and the Directive. In particular, consumer surveys suggest that when CO₂ emissions are considered by car buyers, they are most commonly done so in the context of the VED, because it is perceived as a cost issue (LowCVP, 2012), (Anable et al, 2008) – that is, the VED may be successful in increasing consumer awareness of CO₂ because it provides a mechanism by which CO₂ emissions can be interpreted as direct costs. Even so, there is some confusion among consumers participating in focus groups over what the bands mean. As such, it has been recommended that the UK fuel economy label should include a comparison of total first-year fuel and VED tax costs with all models in the same model range (LowCVP, 2012).

The UK authorities feel that the label also supports other fiscal measures, including company car taxes based on CO₂ and congestion charging based on emissions – although they were not able to comment on the extent of these effects due to difficulties in disaggregation. Conversely, the UK association felt that the transparency in company car taxes was successful but not necessarily due to the label.

F.3.7 Conclusions from the UK case study

The analysis of the information gathered for this case study points to the following main conclusions:

- The average CO₂ emissions of new cars in the UK have generally decreased in line with the EU-15 average. Over the period 2001-2014 average new car CO₂ emissions in the UK have decreased by 30%, compared to 28% for the EU-15. However, average emissions have remained above the EU-15 average, although the difference is reducing. In 2001, the average CO₂ emissions of new cars in the UK were 177.9 g/km, while in 2014 the average was 124.6 g/km. For the EU-15, the average was 169.7 g/km in 2001 and 122.8 g/km in 2014. Data for new car registrations by label category also shows that the share of category A, B and C cars is rising.
- Consumer surveys conducted in the UK between 2006 and 2009 have shown that awareness of the label has increased over time (from 36% in 2006 to 49% in 2009). Estimates obtained from stakeholders suggest that they believe consumer recognition has increased further (to 65% according to enforcers and >75% according to a consumer association). The label is thought to be the most effective element of the Directive, while evidence from UK authorities shows that 3.5 million unique visits are made to the online version of the guide per year. The poster is thought to be less effective – for example, the UK consumer group believes that people are not aware of the poster as it is not always well-displayed.
- Interpretation and utilisation of the information are also thought to be high in the UK. Numerous consumer surveys have shown that fuel economy is one of the most important criteria for purchase decisions, however, input from a consumer association suggests that consumers tend to be more focussed on cost, rather than CO₂ emissions.

- Since the introduction of coloured bands on the label in 2004, the effectiveness of the label seems to have improved, which highlights the importance of visual aspects on the label.
- Evidence of a specific manufacturer response in the UK is limited, however qualitative evidence collected during interviews suggested that the Directive has stimulated competition between manufacturers to drive down CO₂ emissions. Evidence has also shown that there has been growth in advertising fuel efficiency of new cars.
- In the UK, the label categories are linked to the annual circulation tax (Vehicle Excise Duty – VED). A recent econometric analysis suggested that the VED between 2005 and 2012 contributed only 3.6g/km to the total reduction of 32.5/km seen over that period. However, both the UK authorities and the UK consumer association interviewed for this study agreed that the synergies between these two measures are very positive overall.
- The adoption of the voluntary used car label with similar design and information provided to that for new cars appears to have been success in terms of uptake among used car dealers. The provision of information on fuel efficiency is considered by dealers as both relevant and useful for both the dealers and for consumers. In a 2011 survey over half of consumers considered this information useful in their purchase decision process.

F.4 - Denmark⁷²

F.4.1 Implementation of the Directive in Denmark

Directive 1999/94/EC was transposed into national legislation in Denmark under the Order on energy labelling etc. of new passenger cars no. 216 of 28.03.2000 ("Bekendtgørelse om energimærkning m.v. af nye personbiler, nr. 216 af 28.03.2000") and the order amending no. 121 of 27.02.2003 ("Bekendtgørelse om ændring, nr. 121 af 27.02.2003") (retsinformation.dk, 2000).

The legislation was amended in 2009 by BEK nr 1437 af 11.12.2009 (retsinformation.dk, 2009) and in 2012 by BEK nr. 655 af 20.06.2012 (retsinformation.dk, 2012). These amendments incorporated two key changes into the legislation: the requirement for energy labels to be displayed on light commercial vehicles (from 1st January 2010) and the incorporation of additional A+++, A++ and A+ label categories into the Danish system (from 1st August 2012). Implementation is the responsibility of Trafikstyrelsen (Danish Transport Authority).

F.4.1.1 Car label

An absolute labelling system is used to classify vehicles, based on the fuel efficiency of the vehicle in terms of kilometres travelled per litre of fuel (km/l). Classification is therefore different based on the fuel type of the vehicle, with different criteria for diesel and petrol cars (see Table F.4-1 - the equivalent CO₂ emissions are shown alongside the fuel consumption thresholds in this table for information).

Table F.4-1: Car label categories 2016 – Denmark

Label category	Diesel Fuel consumption (km/l)	Diesel CO ₂ emissions (g CO ₂ / km)	Petrol Fuel consumption (km/l)	Petrol CO ₂ emissions (g CO ₂ / km)
A+++	>38.6	<70	>34.3	<70
A++	28.1 – 38.5	70 – 96	25.2 – 34.2	70 – 95
A+	22.5 – 28.0	96 – 120	20.0 – 25.1	96 – 120
A	20.5 – 22.4	121 – 132	18.2 – 19.9	121 – 132
B	17.3 – 20.4	132 – 156	15.4 – 18.1	133 – 156
C	16.1 – 17.2	157 – 168	14.3 – 15.3	157 – 168
D	14.1 – 16.0	169 – 191	12.5 – 14.2	169 – 192
E	13.2 – 14.0	193 – 205	11.8 – 12.4	194 – 203
F	11.9 – 13.1	206 – 227	10.5 – 11.7	205 – 229
G	<11.9	>227	<10.5	>229

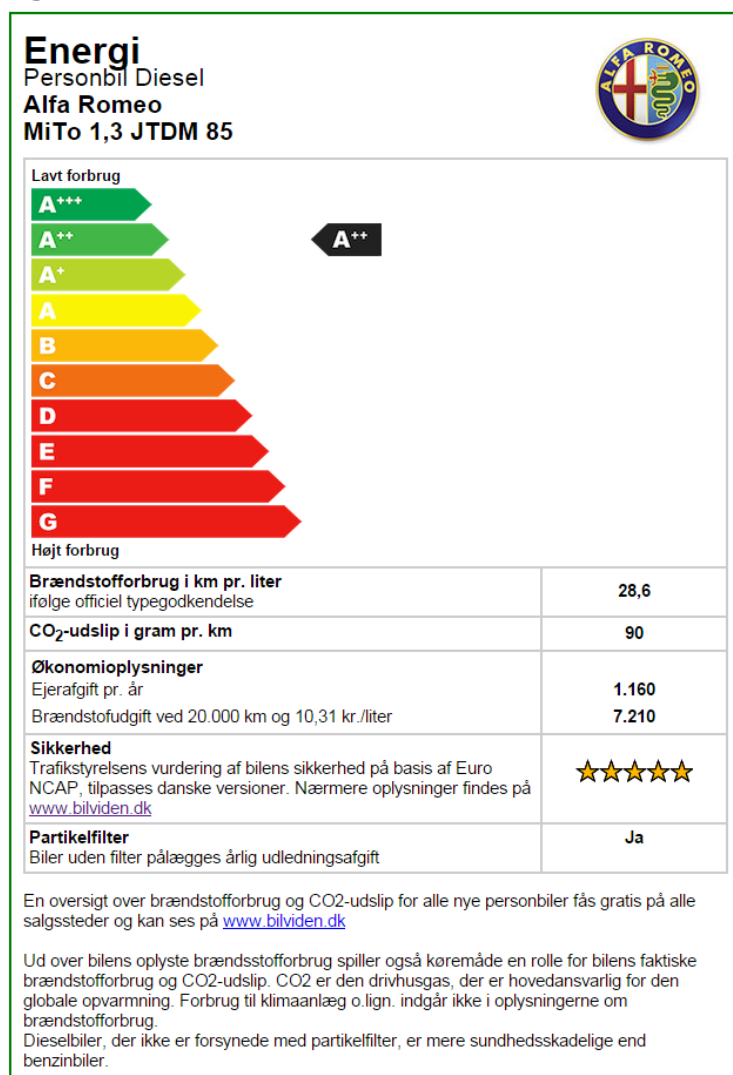
Notes: Prior to the introduction of the A+++, A++ and A+ label categories in 2012, the A label category was >20.5 km/l for diesel cars and >20.0 km/l for petrol cars. For approximation of equivalent CO₂ emissions, it was assumed that 1 litre of diesel emits 2.7 kg of CO₂ and 1 litre of petrol emits 2.4 kg of CO₂. Figures were calculated based on the fuel consumption figures shown in the Danish legislation and rounded to the nearest whole number. Sources: (retsinformation.dk, 2012; bilviden.dk, 2015).

⁷² To support this case study, interviews were carried out with a Danish car dealers' association and with the a Danish consumer association

The label design is similar to the EU Energy Label, with 10 colour coded categories (A+++ to G). An example label is shown in Figure F-16. The A+++, A++ and A+ are relatively new categories, which were introduced in August 2012 in response to the increasing fuel efficiency of cars available in Denmark (retsinformation.dk, 2012).

In addition to the information specified in the Directive, Danish car labels also include: typical running costs, tax information, safety information based on EuroNCAP ratings, and specify whether diesel vehicles are fitted with a particulate trap. There are no modifications to the label for electric vehicles or hybrids. Since 2010, light commercial vehicles (<3.5 tonnes) have also required a car label.

Figure F-16: Car label - Denmark



Source: (bilviden.dk, 2015)

It should be noted that, besides passenger cars, a mandatory car labelling requirement has also been adopted in the case of light commercial vehicles (vans). The requirements concerning the label design and the information provided are the same in the case of vans as in the case of passenger cars.

F.4.1.2 Guide

The guide on fuel economy is published annually by the Danish Transport Authority (Trafikstyrelsen). An online version of the guide is also made available⁷³. Printed copies are issued to car dealerships, vehicle inspection locations and libraries each year. In 2015, a government representative estimated that 60,000 copies were distributed. This is down from the 2011 estimate of between 80,000 and 160,000 copies stated in the 2011 monitoring report published by AEA (AEA and TEPR, 2011).

A number of national requirements in Denmark go beyond the Directive. For example, the guide provides 10 tips for energy efficient driving. A website (<http://bilviden.dk/>) has also been set up to provide consumers with additional information about vehicles. Consumers can search an extensive database of cars (both new and older models) for information about CO₂ emissions, fuel efficiency, running costs, taxes and safety. The website also contains a calculator which can be used to determine annual running costs (AEA and TEPR, 2011).

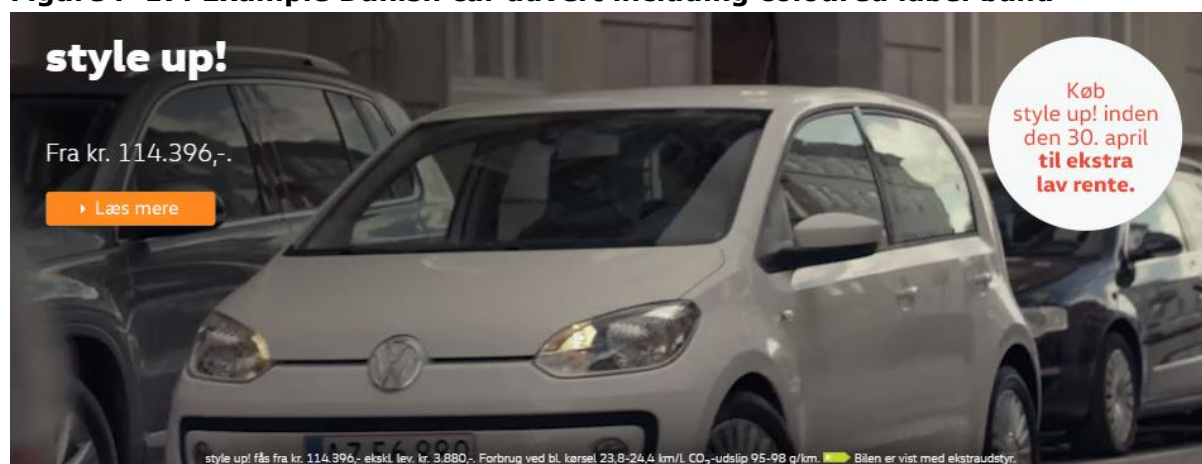
F.4.1.3 Poster

The poster in Denmark closely follows the requirements set out in the Directive, with no additional requirements beyond those stated in the Directive.

F.4.1.4 Promotional material

The national requirements for promotional material go beyond the Directive. In addition to the requirements set out in the Directive, advertisements in Denmark must display the coloured band or coloured arrow indicating the energy class for the model of car being advertised since 2011 (AEA and TEPR, 2011). Fuel consumption and CO₂ emissions information must be presented in addition to the coloured band/arrow. An example of a recent Danish car advert is shown in Figure F-17 – the coloured arrow with the A+ label is visible at the bottom of the advert, accompanying the fuel consumption and CO₂ emissions information.

Figure F-17: Example Danish car advert including coloured label band



Source: (Volkswagen, 2016)

⁷³ The Danish online guide for 2015 *Hvor langt på literen 2015* is available at: <http://www.trafikstyrelsen.dk/~media/Dokumenter/06%20Center%20for%20groen%20transport/Groen%20transport/Hvor%20langt%20paa%20literen/Hvor%20langt%20literen%20web.aspx>

F.4.1.5 Enforcement activities and compliance

Trafikstyrelsen is responsible for monitoring and enforcement of the Directive. Approximately 75 inspections are carried out at car dealerships per year, at an annual cost of over €10,000. Monitoring of compliance with the Directive is carried out in conjunction with other types of inspections at car dealers.

Compliance in Denmark is reported to be high (>75%), according to input provided by the Danish government for this study. A Danish automotive industry representative suggested that compliance among car dealers is high due to the high penalties for not having the label in place (approximately €350, or 2,500 Danish kroner).

225 inspections have been carried out at car dealerships in the last three years. Of these, only 3 dealerships have shown a complete absence of labels. 40% of car dealers inspected had minor violations, such as the car label being missing on one or more vehicles on display.

To date, there have been no cases related to non-compliance with the Directive.

Enforcement activities appear to have decreased in recent years, however compliance is still considered to be high. The 2011 monitoring report stated that 200 unannounced inspections were performed each year at car dealerships and that approximately 10% were not satisfactory in 2011 (AEA and TEPR, 2011).

F.4.2 Other relevant measures

A number of other measures have been introduced in Denmark which may have had an impact on car CO₂ emissions. Fiscal measures have long been linked to the fuel efficiency of vehicles in Denmark. Relevant fiscal measures introduced between 1997 and 2014 are listed below.

- 1997: Annual vehicle tax replaced by the 'green owner' tax, which is based on fuel consumption
- January 2000: Registration tax first linked to fuel consumption
- 2006: Registration tax calculations restructured
- 2007: Registration tax calculations restructured
- 2007: EU car CO₂ regulation announced
- April 2009: EU car CO₂ Regulation entered into force
- April 2010: Introduction of an additional 1,000 kroner annual road tax charge for diesel vehicles without a particulate filter
- 2011: Requirement for advertisements to include the coloured band or coloured arrow indicating the energy class of the vehicle being advertised
- 2012: Introduction of A+++, A++ and A+ label categories
- January 2016: Electric and hybrid vehicles are no longer exempt from annual road tax

Further details on these measures are discussed below.

Ownership tax

Ownership tax in Denmark is referred to as the 'green owner tax' (grøn ejerafgift) and was first linked to fuel efficiency in 1997 (OECD, 2008; SKAT.dk, 2016). Prior to this it was calculated based on vehicle weight. The annual tax is calculated based on fuel consumption and is different depending on the fuel type of the vehicle. For an understanding of the level of taxation, the higher and lower bands of the green owner tax are shown in Table F.4-2.

Table F.4-2: 2016 road tax charges in Denmark

Fuel consumption (km/l)	Green owner tax (kr. per year)
0 – 4.4	21,660
4.5 – 4.7	20,460
4.8 – 4.9	19,300
5 – 5.2	18,160
5.3 – 5.5	17,000
5.6 – 5.8	15,780
5.9 – 6.2	14,620
6.3 – 6.6	13,460
6.7 – 7	12,280
7.1 – 7.6	11,120
7.7 – 8.2	9,960
8.3 – 9	8,800
9.1 – 9.9	7,600
10 – 10.4	6,460
10.5 – 11	5,860
11.1 – 11.7	5,280
11.8 – 12.4	4,700
12.5 – 13.2	4,120
13.3 – 14.2	3,540
14.3 – 15.3	2,960
15.4 – 16.6	2,380
16.7 – 18.1	1,780
18.2 – 19.9	1,200
>20	620

Source: (SKAT.dk, 2016)

Two modifications to the road tax system have been made since 1997. The first was in 2010, when an additional 1,000 kroner fee was charged to owners of diesel cars not fitted with a particulate filter. This tax applies to all vehicles registered after the 16th of March 2009 (ACEA, 2014).

In January 2016, a further change was made, meaning that electric and hybrid vehicles are no longer exempt from the annual green owner tax. The tax will be calculated based on the car's electrical consumption (Wh) per km, which will be converted into an equivalent km per litre of petrol value. To convert from electricity consumption in Wh to an equivalent energy consumption in litres of petrol per km, a fixed factor of 91.25 Wh/litre is used. An example calculation is shown in Box 1.

Box 1: Example calculation of green owner tax for an electric vehicle in Denmark in 2016

Electricity consumption: 158 Wh/km

Conversion of electricity consumption to litres of petrol per 100 km: 158 Wh per km / 91.25 Wh per litre = 1.73 litres per 100 km

Conversion to km/l: 100 / 1.73 litres per 100 km = 57.8 km/l

Road tax to be paid: 620 kroner

Registration tax (Registreringsafgift):

The registration tax in Denmark is high compared to other Member States and is intended to reduce the number and size of cars (The Danish Ecological Council, 2015). It is primarily calculated based on the price of the vehicle, although reductions are applied for the following features: number of airbags (above 2), ABS brakes, ESP, in-vehicle radio, 5 star rating in the EuroNCAP safety system and seat belt alarms (ACEA, 2014).

Fuel consumption has been integrated into the calculation of registration tax in Denmark since January 2000 (ODYSSEE-MURE, 2014a). Since this time, there have been two changes in its calculation (in 2006 and 2007). The reductions applied for fuel efficiency prior to the 2007 changes are shown in Table F.4-3.

Table F.4-3: Summary of registration tax changes in Denmark prior to 2007

Fuel consumption (km/l)		Reduction in car registration tax 2000 – 2005	Reduction in car registration tax 2006
Petrol	Diesel		
25 – 28.6	28.1 – 32.1	1/6	0
28.6 – 33.3	32.1 – 37.5	1/3	1/5
33.3 – 40.0	37.5 – 45	1/2	2/5
>40	>45	2/3	3/5

Source: (OECD, 2008)

The most notable change occurred in 2007, when the system was revamped to allow for both reductions and increases to be applied, depending on the fuel efficiency of the car. Prior to 2007, only reductions were applied based on fuel efficiency.

Currently (2015), the tax rates based on vehicle price are shown below:

- For vehicles with a price less than 81,700 Danish Kroner (approximately €11,000), the registration tax is 105% of the value of the vehicle
- For vehicles with a price over 81,700 Danish Kroner, the registration tax is 180% of the value for vehicle. From 2016, this will change to 150%.

There are different limits for diesel and for petrol cars. Hybrid and electric vehicles weighing less than 2,000 kg were exempt from registration tax until the end of 2015. The 2015 thresholds are shown below (ACEA, 2014):

- Diesel:
 - 4,000 DKK reduction for each km/l more than 17.5 (within the B label category)
 - 1,000 DKK increase for each km/l less than 18 (within the B label category)
- Petrol:
 - 4,000 DKK reduction for each km/l more than 16 (within the B label category)
 - 1,000 DKK increase for each km/l less than 16 (within the B label category)

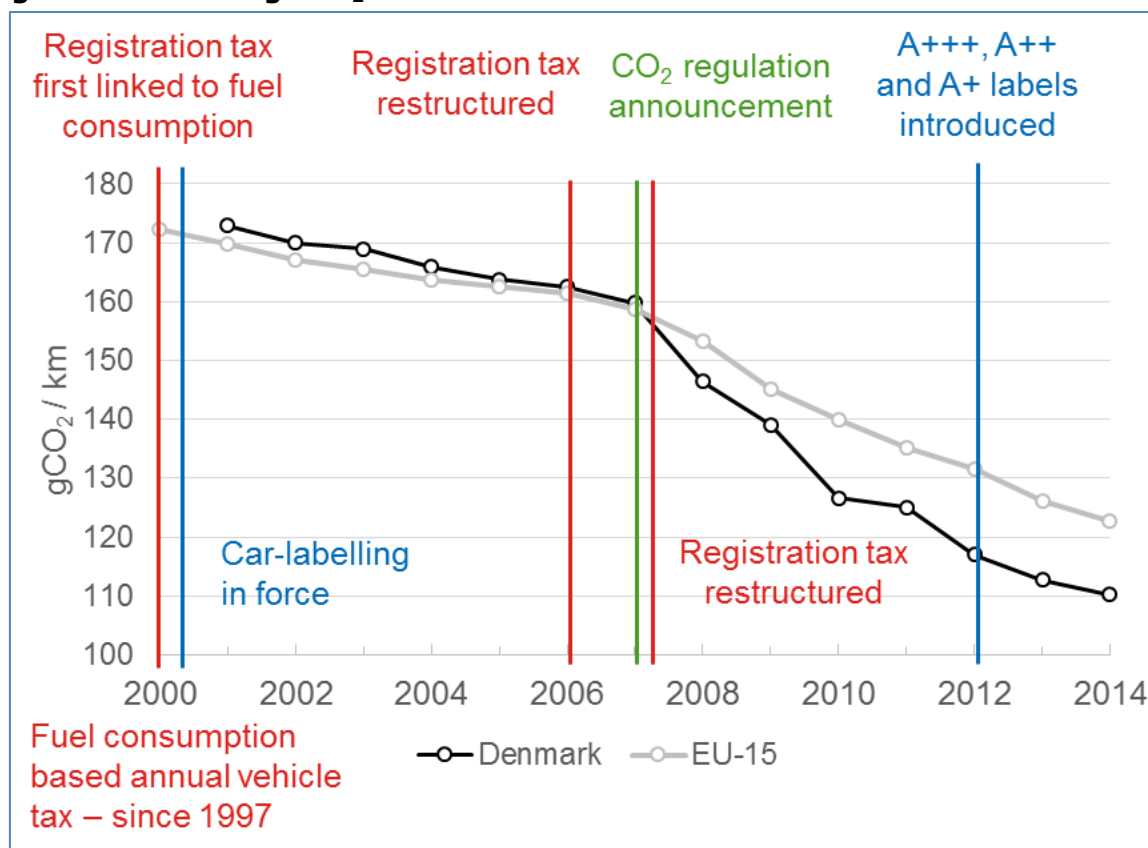
F.4.3 Trends in new car registrations

F.4.3.1 Average CO₂ emissions of new cars

Since 2001, the average CO₂ emissions of new passenger cars in Denmark has decreased from 172.9 gCO₂/km to 110.2 gCO₂/km in 2014. This is the second largest percentage change (35%) in this period out of all EU-15 countries. From 2001 – 2007

average new car CO₂ emissions closely tracked the EU-15 average (Figure F-18). From 2008 onwards, significant reductions were seen in Denmark, particularly in 2008 (8% reduction compared with previous year), 2010 (9%) and 2012 (6%). By 2014, average CO₂ emissions of new passenger cars were 10% lower than the EU-15 average.

Figure F-18: Average CO₂ emissions of new cars in Denmark



Source: (EEA, 2014)

Table F.4-4: Denmark - Year on year reduction in average new car CO₂ emissions

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EU-15	1.5 %	1.0 %	1.1 %	0.7 %	0.7 %	1.7 %	3.5 %	5.3 %	3.7 %	3.4 %	2.6 %	4.2 %	2.6 %
Denmark	1.7 %	0.6 %	1.8 %	1.3 %	0.7 %	1.7 %	8.4 %	5.0 %	9.0 %	1.3 %	6.4 %	3.7 %	2.2 %

Notes: Green text indicates a percentage change greater than 0.5% above the EU-15 average; red text indicates a percentage change greater than 0.5% below the EU-15 average.

Source: (EEA, 2014)

F.4.3.2 New car registrations by label category

Only data relating to the percentage of sales by label category from 2000 – 2014 could be identified for Denmark. Absolute numbers of registrations in each category were not available. Data is presented for diesel cars in Figure F-19 and for petrol cars in Figure F-20.

Diesel cars

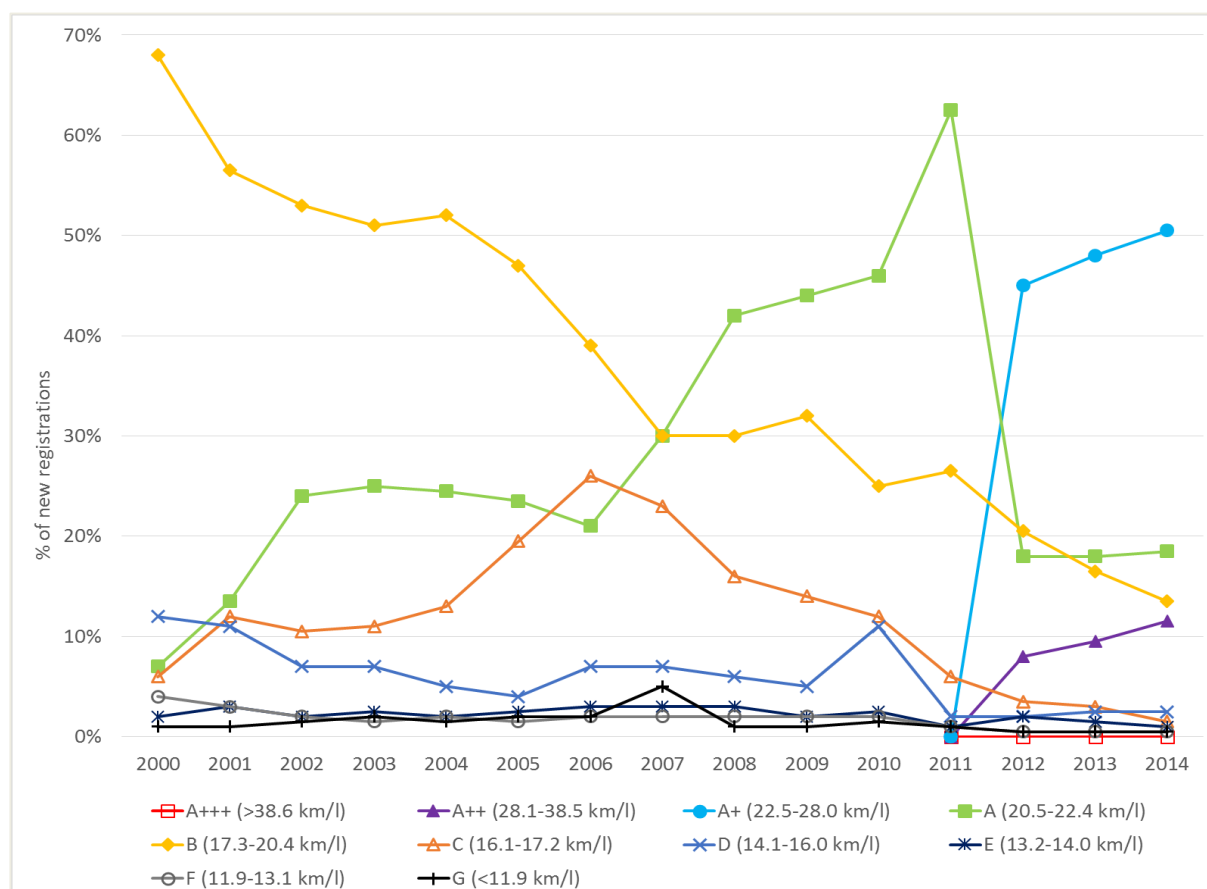
For diesel cars, significant changes in market share have been seen in a number of label categories. For example, new registrations of B labelled cars (17.3 – 20.4 km/l) have

steadily declined over time. In 2000, B label cars dominated the market, accounting for close to 70% of diesel cars in Denmark, while in 2014 this figure had fallen to less than 15%.

Over the period 2000-2011, almost the opposite trend was seen for A labelled cars (>20.5 km/l). In 2000, this category accounted for 7% of the market, while in 2011 this had risen to over 60%. In 2012, a sharp decrease (to less than 20%) in registrations of A label cars was observed, however this coincides with the introduction of the new A+++ (>38.6 km/l), A++ (28.1 – 38.5 km/l) and A+ (22.5 – 28.0 km/l) label categories and the creation of an upper limit for the A label category (now 20.5 – 22.4 km/l). Therefore, due to the new classifications, sales of a significant proportion of A label category cars (18% market share in 2012) appear to have been replaced by sales in the A+ (45%) and A++ (8%) label categories. The combined share of A++, A+ and A label categories in 2012 was over 70%, which shows an overall increase in the share of efficient vehicles compared to the previous year (compared to just over 60% for A label cars in 2011). From 2012 onwards sales in each of the, A+ and A++ category vehicles have risen and new registrations in the A label category have remained constant. Since its introduction, sales in the A+++ category have been minimal (<1%).

For new registrations of C label (16.1 – 17.2 km/l) cars a different trend was seen; the share of C label cars increased from 6% to 25% from 2000 – 2006, after which a steady annual reduction was seen until 2014 (1.5%).

The percentage share of E (fuel efficiency of 13.2 – 14 km/l), F (11.9 – 13.1 km/l) and G (<11.9 km/l) label categories remained relatively constant until 2010, after which a slight reduction has been observed. However, these categories account for a relatively small share of the market (combined share of 2% – 10%, depending on the year). By 2014, the combined share was 2%. Finally, although D label (14.1 – 16.0 km/l) cars account for a much smaller percentage of the market, the share has decreased substantially over this period, from 12% in 2000 to approximately 3% in 2014.

Figure F-19: Percentage of new diesel car registrations by car label category in Denmark 2000 – 2014

Source: (Danish Transport and Construction Agency, 2010; Danish Transport and Construction Agency, 2015)

Petrol cars

For petrol cars the share of new registrations is more evenly spread amongst the label categories than for diesel cars. Over the same time period quite different trends were observed, although as for diesel cars the most significant change was seen for A label (>18.2 km/l up to 2011) cars, which went from having the lowest market share in 2000, to accounting for the most registrations out of all label categories from 2008 onwards.

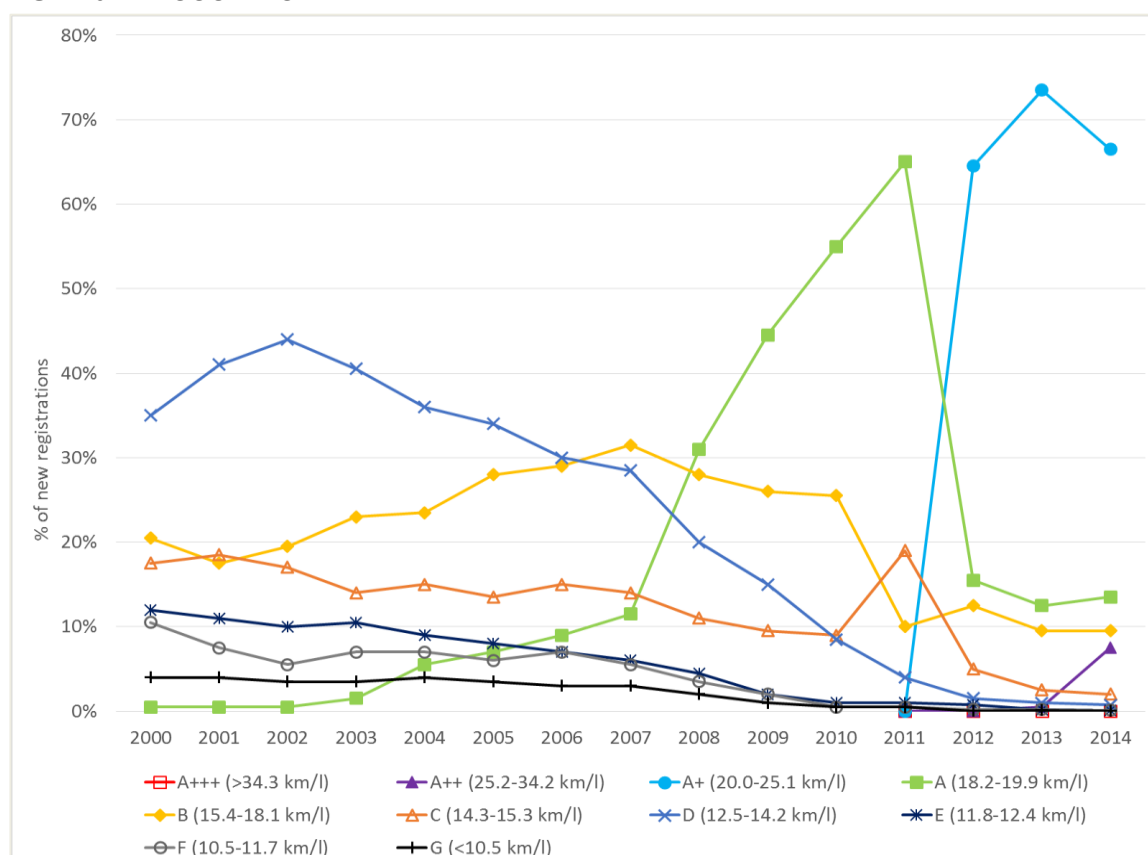
In 2000, A label cars accounted for less than 1% of the market, while by 2011 the market share had grown to approximately 65%. In particular, a very large change in new registrations of A label cars was seen from 2007 – 2011. Similarly to diesel cars, a reduction in sales of A label cars was observed in 2012, which coincides with the adjustment of the band to 18.2 – 19.9 km/l and the introduction of the new A+++ (>34.3 km/l), A++ (25.2 – 34.2 km/l) and A+ (20.0 – 25.1 km/l) label categories. In 2012, only a small number of vehicles were sold in the A++ and A+++ categories, while the A+ label category had a market share of approximately 65%. The combined share of A and A+ sales was approximately 80%, which shows a significant improvement in the sales of energy efficient cars compared to the previous year (A label cars accounted for 65% of the market in 2011). In 2013 and 2014 this trend continued, with sales also rising in the A++ label category.

In contrast to diesel cars, a slight increase in B label (15.4 – 18.1 km/l) cars was seen for petrol cars between 2000 and 2007. Sales in this category followed a similar trend to

C label category diesel cars (increasing market share until 2007, followed by a decrease from 2007 – 2014 as shown in Figure F-20 and Figure F-19).

For D label (12.5 – 14.2 km/l) category petrol cars an overall reduction was seen from 2000 – 2014 with a decrease in market share from 35% to less than 1%. Gradual reductions were also seen for E (11.8 – 12.4 km/l), F (10.5 – 11.7 km/l) and G (<10.5 km/l) label cars, which accounted for a combined market share of over 25% in 2000, compared to less than 1% in 2014.

Figure F-20: Percentage of new petrol car registrations by car label category in Denmark 2000 - 2014



Source: (Danish Transport and Construction Agency, 2010; Danish Transport and Construction Agency, 2015)

F.4.4 Consumer response

F.4.4.1 Consumer recognition/awareness of the information

Stakeholders interviewed for this study (a Danish consumer association and a Danish car dealers association) agreed that most consumers (>75%) recognise the car label.

Recognition of the label is helped due to the taxation, which is linked to fuel consumption, and also due to the similar EU energy efficiency labels for appliances. The car label is regularly presented on the windscreen/dashboard of cars in showrooms and the coloured band is shown in advertisements/ promotional material, which also aids consumer recognition. Overall, both the consumer association and the car dealers association view the label to be an effective way of presenting useful information to consumers.

Other environmental initiatives in Denmark may have also led to increased consumer awareness. For example, Trafikstyrelsen ran a greener driving campaign (Kørgrønt) between 2010 and 2012 in the area of energy efficient driving practices.

F.4.4.2 Interpretation and understanding of the information

In terms of the level of consumer understanding of the label, it seems to be very high according to the representatives of both Danish consumer association and the Danish car dealers association.

Consumers understand the label both in terms of the tax that they will have to pay and also in terms of fuel consumption. The Danish car dealers association revealed that consumers regularly ask salesmen about the label so they know how much tax they will have to pay. Consumers are therefore aware that in terms of taxation it will be more expensive to buy a new car with a less efficient label category (for example label category A, rather than A++) and that the fuel costs will also be higher. Interpretation of the label has been helped due to the similarity with the EU energy efficiency labels for appliances; consumers are therefore already familiar with information being conveyed in this way.

Concerning the new label categories (A+++, A++ and A+), the representative from the Danish consumer association considered that these can be slightly more difficult to understand but on the whole are well understood by consumers. Certain consumers (such as older people) may find these more difficult to understand but almost everyone is aware that A+ means that the car is more efficient than an A label vehicle. The understanding of the new label categories is again helped by the fact that appliances contain similar label categories.

Additional information such as EuroNCAP safety ratings and tax information is shown on car labels in Denmark. Both the consumer association and car dealers association believe that it is appropriate to show this information. Consumers understand the additional information presented, are not confused by the additional information and find this information helpful.

F.4.4.3 Utilisation of the information

According to representatives from a Danish consumer association, utilisation of the information displayed on **car labels** is very high. The car dealers association agreed that consumers' buying decisions will be influenced by the label, particularly at the lower and middle end of the market, where the cost of running the car is more important to consumers. However, those who have decided to buy the top of the range, more expensive cars are unlikely to be influenced.

While the majority of consumers are influenced by the label, it may not be the deciding factor in consumers' car purchasing decisions. Additional information displayed on car labels (such as safety information, or whether the car has a particulate filter) can help consumers to decide between two different cars, for example, one that has 2 airbags, compared to one that has 6 airbags. Overall, the main reason consumers are influenced by the label is because it gives an indication of the level of tax that they will have to pay.

The label category is also used in **advertising/promotional material**, however this can be problematic if different variants of the same model are classified under different label categories. In these cases, the range of label categories (for example, A – C) is shown on the advert, to show that the label category varies depending on the optional extras, or engine type selected. This is quite common in Denmark; the consumer association commented that although this is not ideal from the point of view of the consumer.

The information provided by the **guide** is not considered to be as effective as the label, because consumers can look at the information online. Overall, the **label has the strongest influence** as it is shown on the windscreen of the vehicle in the showroom. Consumers often visit the showroom to look at specific cars – the **poster** is on the wall so consumers may not look at this.

It is believed that utilisation of the label would improve if fuel consumption figures were more representative of real world driving, or if these were shown on the label alongside the official figures. Currently, consumers do not trust the official fuel consumption figures and many are aware that the official figures may deviate by up to 50% from those experienced during real world driving. This is not useful for consumers and presents difficulties when calculating the expected fuel costs. Furthermore, it means that comparing cars is more difficult.

F.4.5 Manufacturer response

Discussions during the interview with the Danish car dealers association suggested that manufacturers have changed their product ranges to offer more fuel efficient vehicles. This can be explained by a number of reasons, one of which is the car label, which manufacturers are aware need to be displayed on cars in showrooms. Another factor is that manufacturers view fuel efficiency to be a selling point; therefore, due to competition among manufacturers, more fuel efficient cars have been made available.

F.4.6 Impact of the Directive on CO₂ emissions

Since 2007, a high rate of reduction in the average CO₂ emissions of new vehicles have been observed in Denmark, especially when compared to the EU-15 average (see Table F.4-4 in Section F.4.3.1 above). For example, in 2008 average new car CO₂ emissions in Denmark were 8.4% lower than the previous year, whereas in the EU-15 the average reduction was 3.5%.

A key contributor to the rapid decrease (from 2007 onwards) is likely to be the restructuring of vehicle registration tax in 2007 to include tax increases or reductions for each km/l lower or higher than a certain threshold. Prior to 2007, reductions were only available for vehicles with a fuel efficiency better than 28.6 km/l for petrol cars or above 32.1 km/l for diesel vehicles (equivalent to CO₂ emissions of approximately 85 g/km or lower) and there were no registration tax increases based on fuel consumption.

This change is significant because before 2007, the fuel efficiency thresholds to be eligible for a reduction were set relatively high. At the time, it is likely that only a small percentage of available cars on the market would have satisfied this criteria. Furthermore, these cars are likely to have been hybrid vehicles, which being a relatively new technology may not have appealed to all consumers. The change in 2007 resulted in the fuel consumption criteria covering all cars bought in Denmark, which may have led to a greater impact on new car CO₂ emissions. The minimum fuel efficiencies required to be eligible for a reduction between 2000 and 2007 are shown in Table F.4-5.

Table F.4-5: Minimum fuel efficiencies to be eligible for a registration tax reduction in Denmark

	2000-2005	2000-2005	2006	2006	2007	2007
	Fuel efficiency	Tax reduction	Fuel efficiency	Tax reduction	Fuel efficiency	Tax reduction
Petrol cars	25.0 km/l	1/6	28.6 km/l	1/5	16 km/l	4,000 DKK for each km/l more than 16

	2000-2005	2000-2005	2006	2006	2007	2007
	Fuel efficiency	Tax reduction	Fuel efficiency	Tax reduction	Fuel efficiency	Tax reduction
						km/l
Diesel cars	28.1 km/l	1/6	32.1 km/l	1/5	17.5 km/l	4,000 DKK for each km/l more than 17.5 km/l

Notes: Registration tax in Denmark is primarily based on the purchase price. There are two rates, one for lower value cars (105% of the price of the vehicle) and one for higher value cars (180% of the price of the vehicle). The thresholds for each rate are revised every year. For example, in 2015, vehicles with a price lower than 81,700 Danish Kroner (approximately €11,000) paid the 105% rate and vehicles above this value were charged the 180% rate. Source: (OECD, 2008)

Discussions with stakeholders (Danish consumer association and Danish car dealers association) showed that consumer awareness, recognition and understanding of the information provided by car labels is very high (>75%). An important reason explaining why this is the case is because car taxation is strongly linked to fuel consumption in Denmark⁷⁴. As car labels provide fuel consumption information, consumers often use this information to calculate how much tax will need to be paid and then use this information when deciding which car to buy. Consumers may also save time finding fuel consumption information as the information is clearly presented on the labels and online.

The car dealers association also suggested that manufacturers have changed their product ranges to offer more efficient vehicles as a consequence of these measures. However, it was noted that many car dealers in Denmark displayed fuel efficiency information prior to the Directive, as it is viewed to be a good selling point. Nevertheless, the Directive is viewed very positively in Denmark as an informational tool to help consumers understand environmental performance, compare vehicles and to calculate vehicles taxes.

Overall, both of the stakeholders interviewed agreed that car labels and fiscal measures have worked together to increase consumer awareness of new car CO₂ emissions and have played a role in the reduction of new car CO₂ emissions in Denmark. Isolating the impact of the Directive is therefore difficult, however the Danish consumer association suggested that the label may be responsible for 5% of the decrease in emissions. This is because the fiscal measures and the amount of tax payable is the most important to consumers.

In relation to light commercial vehicles, there is no evidence to support any assessment. However, the input from the automotive association in Denmark – where the label has been extended to cover vans since 2009 – provides some positive indications. The industry representative considered the scheme successful and pointed to the important link between the information on fuel consumption that is provided by the label and the annual circulation tax, similar to the case for passenger cars.

⁷⁴ In addition to the car registration tax discussed above, ownership tax (the 'green owner tax' - grøn ejerafgift) is also linked to fuel efficiency, however there have been no major changes to this tax since the implementation of the Directive in Denmark.

F.4.7 Conclusions from the Danish case study

Analysis of the information gathered during this case study points to the following conclusions:

- In the period 2001-2014, Denmark has seen the second largest percentage reduction in new car CO₂ emissions (36%) out of all EU-15 countries, from 172.9 g/km in 2001, to 110.2 g/km in 2014. The EU-15 average reduction over this same period was 28%.
- Prior to the Directive, a voluntary label was in place (showing fuel consumption information) that was frequently used by car dealers. Therefore, it is likely that a labelling system would exist in Denmark regardless of whether the Directive had entered into force.
- The change to registration tax in 2007 is likely to have had a particularly significant impact on new car CO₂ emissions. Although vehicle taxes and car labels are not directly linked (registration tax and ownership taxes are based on a continuous scale so it is possible to have a different tax amount within the same label category) the combination of these measures are thought to have worked well together to help reduce new car CO₂ emissions.
- A further point to note is that Denmark differs from all other case study countries, in that the focus of environmental performance and taxation is primarily presented in terms of fuel consumption, rather than in terms of CO₂ emissions. It may be possible that consumers find this information easier to understand than the concept of CO₂ emissions, as fuel consumption is directly related to fuel costs. Based on the successful reduction of new car CO₂ emissions in Denmark, further exploration of this topic may be of importance in future analysis.
- Based on stakeholder feedback, consumer awareness about the environmental performance of new cars is thought to have increased as a result of the Directive. Consumer recognition, understanding and utilisation of the information are all thought to be high. The information provided may also help consumers to save time looking for fuel consumption information and ultimately save money in terms of taxation and fuel costs.
- Information on the absolute fuel consumption is considered to be the most important in Denmark. It is thought that an absolute system is the best as consumers can easily understand the absolute environmental impact and the fuel costs from this information.
- Although the current system with A+++, A++ and A+ label categories works well and are generally understood by consumers, stakeholders consider that in the future, label categories should be limited to A-G.
- While specific evidence is not available, the feedback provided is that the use of the car label in the vans has also been relatively successful, particularly together with the presence of relevant fiscal measures.
- In relation to the promotional material, the requirements set out in Danish national legislation go beyond the Directive. Since 2011 advertisements have been required to display the coloured band or coloured arrow indicating the energy class for the model of car being advertised. Denmark is the only EU country to include this requirement and ensures that consumers receive information ahead of the point of sale. This gives consumers the opportunity to consider environmental information at an earlier stage in the car buying process and may allow consumers to make more informed purchase decisions. Further research is required to establish the effectiveness of this requirement, however a Danish consumer group commented that requiring the coloured arrow can be problematic if different variants of the same model are classified under different label categories. In these cases, the range of label categories (for example, A –

C) is shown on the advert, to show that the label category varies depending on the optional extras, or engine type selected.

- Danish stakeholders were of the opinion that alternatively fuelled vehicles should also have a label to represent absolute energy consumption. It is understood that this would be difficult as the sustainability and emissions produced by electricity consumption would need to be incorporated for electric/hybrid vehicles. Stakeholders also commented on the importance of providing accurate information on car labels regarding the real-world fuel consumption as currently consumers do not trust the information provided by car labels. It is also difficult for consumers to calculate fuel costs based on this inaccurate information.

F.5 - Netherlands⁷⁵

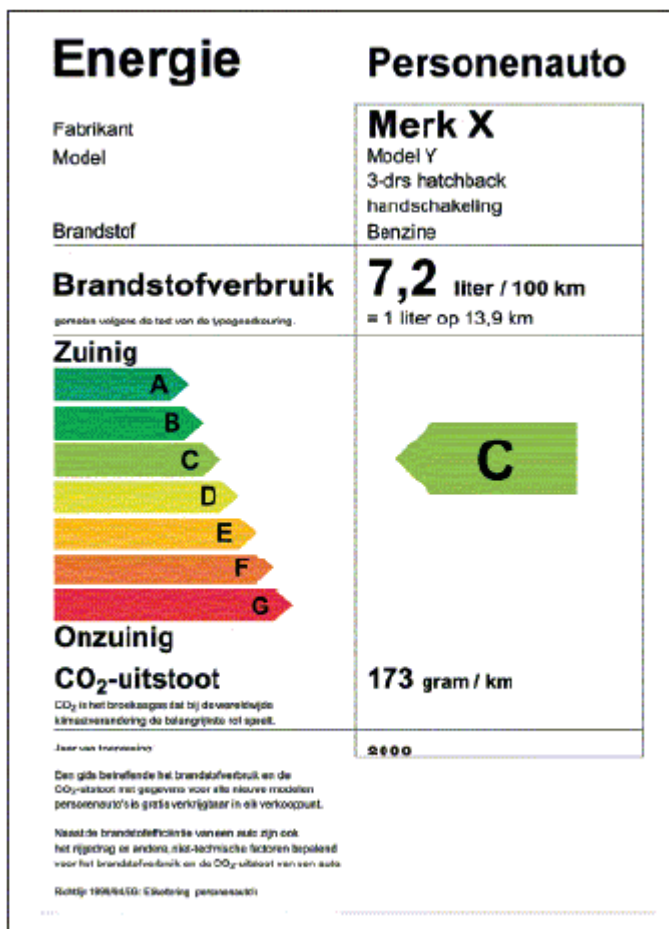
F.5.1 Implementation of the Directive in the Netherlands

Directive 1999/94/EC was implemented in the Netherlands by the Decree of 3rd November 2003 on the labelling of the energy use of passenger cars (Besluit etikettering energiegebruik personenauto's) (Overheid.nl, 2000). The Decree was later amended in 2009.

F.5.1.1 Car label

In the Netherlands a relative labelling system is used to classify vehicles, which shows whether a car is more economical than other cars of a similar size. The label design is similar to the EU Energy Label, with 7 colour coded categories (A to G), as shown in Figure F-21.

Figure F-21: Car label - Netherlands



Source: (Milieu Centraal, 2016)

Label categories are calculated based on deviation from a reference value for that size car (Table F.5-1). The reference value for each segment of vehicle is calculated as follows:

- Based on the fuel consumption of cars of the same size (75% weighting)

⁷⁵ To support this case study interviews were carried out with a Dutch manufacturers' association and a Dutch consumer association

- Based on the fuel consumption of all cars (25% weighting)

Consequently, it is more difficult to achieve the A category label for larger vehicles as they are likely to have a higher fuel consumption compared to smaller cars.

Table F.5-1: Car label categories - Netherlands (2015)

Label category	Relative scale. Efficiency (fuel consumption) compared to average
A	> 15% more efficient
B	5 – 15% more efficient
C	5% more efficient – 5% less efficient
D	5 – 15% less efficient
E	15 – 25% less efficient
F	25 – 35% less efficient
G	> 35% less efficient

Source: (RDW, 2014)

Until 2008 the reference values used for energy labels were reviewed annually, however since this time there have been a number of changes:

- From 2009 onwards label categories have been reviewed every two years, to allow car manufacturers time to adapt to CO₂ regulations.
- In 2012, the boundaries associated with different labels were reduced by 5 percent.
 - For example, to qualify for an A label cars now had to be 15% more efficient than the average car in that segment (rather than 20%), while for the G label category included cars more than 35% less efficient than average (rather than >30%).
- Secondly, starting in 2012, the average fuel consumption of the previous two years is taken into account, rather than just the previous year.
 - For example, the calculation rules for 2012 are set in 2011 and average fuel consumption is based on the sales of 2009 and 2010. Therefore an A category car sold in 2012 and 2013 is more than 15% more efficient than the average car in its segment sold in 2009 and 2010.
 - For 2014 and 2015, the average consumption is set in 2013 and is based on sales in 2011 and 2012.

F.5.1.2 Guide

The fuel economy guide in the Netherlands is updated twice per year by RDW, an implementing body under the Ministry of Infrastructure and the Environment. In addition to the online guide, websites in the Netherlands exist where car dealers can print labels for specific models on sale.

F.5.1.3 Poster

The poster in the Netherlands provides similar information to other Member States. As stated in the European Parliament report, relatively little information is available concerning implementation of the poster in the Netherlands (Ecologic et al., 2010). According to the monitoring report, there is no specified format for the poster (in contrast to the label) (AEA and TEPR, 2011).

F.5.1.4 Promotional material

The provision of fuel consumption and CO₂ emissions information on promotional material is covered by the 'Reclamecode' (Advertising Code) in the Netherlands. In addition to hardcopies of promotional material, the Reclamecode also applies to websites. Since October 2009, the Reclamecode has included:

- Specification of the requirements of Directive 1999/94/EC
- Specification of a minimum size and spacing of lettering to be used for fuel consumption and CO₂ emissions information on adverts

Guidance on application of the Reclamecode is provided by consumer and advertising agencies.

F.5.1.5 Enforcement activities and compliance

Monitoring of the Directive is the responsibility of RDW, an implementing body under the Ministry of Infrastructure and the Environment.

Early reports from investigations carried out in 2002 indicated very high compliance - 99% where advance was given and 90% where advance notice was not given (Ecologic et al., 2010). At the time, the Dutch Ministry quoted in (Ecologic et al., 2010) believed that compliance was good and there were no particular enforcement issues. In 2005, compliance was reported at close to 100% for the label and poster after the second inspection, whereas compliance with requirements related to promotional literature was considered "very good" (ADAC, 2005).

According to an interview with a representative from the Netherlands Environmental Assessment Agency (PBL), compliance is thought to have remained high (>95% according to the survey response from the national ministry). The maximum penalty for non-compliance is a six month sentence or a fine of €18,500.

F.5.2 Other relevant measures

Since the Directive was implemented in the Netherlands, a number of other measures have been introduced which may have had an impact on car CO₂ emissions. Relevant fiscal measures introduced or modified between 2001 and 2014 are listed below, along with details of the implementation of the car labelling Directive in the Netherlands. These are discussed in further detail in this section.

- During 2002 the system of labelling was combined with a rebate.
- In 2003 the rebate was abolished
- July 2006, a bonus-malus scheme was introduced for the calculation of bpm (a Dutch registration tax, discussed further below) based on car label category
- January 2007: EU car CO₂ Regulation announced
- In 2008, the bonus-malus amounts were increased, still based on car label category
- In 2008, 2009 and 2010 changes were made to the MRB (annual road tax) to take into consideration CO₂ emissions
- April 2009: EU car CO₂ Regulation entered into force
- In 2010, the bonus-malus system was abolished. Instead, bpm was determined based on a combination of the absolute CO₂ emissions (*not by car label category*, which is a relative system) and the list price of the vehicle (RAI Vereniging, 2013).
- In 2013, the calculation of bpm became completely dependent on the absolute CO₂ emissions of the vehicle. Exemptions were available for low CO₂ emitting vehicles.
- In 2015, exemptions to bpm became only available for electric vehicles (Netherlands Tax and Customs Administration, 2015a).

In conjunction with implementation of the car labelling Directive in the Netherlands, fiscal measures are likely to have influenced sales of cars during this period and increased the demand for fuel efficient cars.

Bonus-malus system and changes to the bpm

The most notable change is to the Bpm (Belasting van Personenauto's en Motorrijwielen), a one-off tax that must be paid when a vehicle is registered in the Netherlands for the first time. From 2006 -2013, significant changes have been made to the calculation of bpm, which can help to explain some of the trends discussed in Section F.5.3 (also see Figure F-24 and Figure F-25). Prior to 2006, bpm was calculated purely on the catalogue price of the car, however since 2006, its calculation has become increasingly dependent on CO₂ emissions. Specific changes to bpm are summarised below (Netherlands Tax and Customs Administration, 2015b):

- In July 2006, a bonus-malus scheme was introduced for calculation of the bpm, based on car label categories. As shown in Figure F-22 cars with an A or B label were eligible for a discount on the bpm, whereas D-G label categories incurred a surcharge. This resulted in bpm being calculated based on a combination of the list price of the vehicle and its CO₂ emissions relative to other vehicles in its class.
- In 2008, the bonus-malus amounts were increased, as show in Figure F-22. Supply of A and B category cars had also increased by this time, giving consumers more choice for new purchases.
- In 2010, the bonus-malus system was abolished. Instead, bpm was determined based on a combination of the absolute CO₂ emissions (not by car label category) and the list price of the vehicle (RAI Vereniging, 2013).
- In 2013, the calculation of bpm became completely dependent on the absolute CO₂ emissions of the vehicle. Exemptions were available for low CO₂ emitting vehicles.
- In 2015, exemptions to bpm became only available for electric vehicles (Netherlands Tax and Customs Administration, 2015a).

Referring back to Figure F-24 and Figure F-25 (in Section F.5.3) shows that changes to the calculation of the Dutch bpm generally match the trends in new vehicle registrations. From 2007, an increase in the market share of label A and B category vehicles is seen, which is when bpm first became dependent on fuel efficiency. Furthermore, significant increases in new registrations of category A and B vehicles are generally seen when changes to the bpm calculation occurred, particularly in 2008 (increase in bonus-malus rates) and 2013 (conversion to a bpm system purely dependent on CO₂ emissions).

Figure F-22: Details of the bonus-malus system in the Netherlands from 2006 – 2009 (karting = rebate, toeslag = fee)

Energie-label	A	B	C	D	E	F	G
Relatieve zuinigheid*	>15% zuiniger	5-15% zuiniger	<5% on-zuiniger	5-15% on-zuiniger	15-25% on-zuiniger	25-35% on-zuiniger	>35% on-zuiniger
1-7-2006 t/m 31-1-2008	€ 1000 korting	€ 500 korting	€ 0	€ 135 toeslag	€ 270 toeslag	€ 405 toeslag	€ 540 toeslag
1-2-2008 t/m 31-12-2009	€ 1400 korting	€ 700 korting	€ 0	€ 400 toeslag	€ 800 toeslag	€ 1200 toeslag	€ 1600 toeslag

Source: (CBS, PBL, Wageningen UR, 2014b)

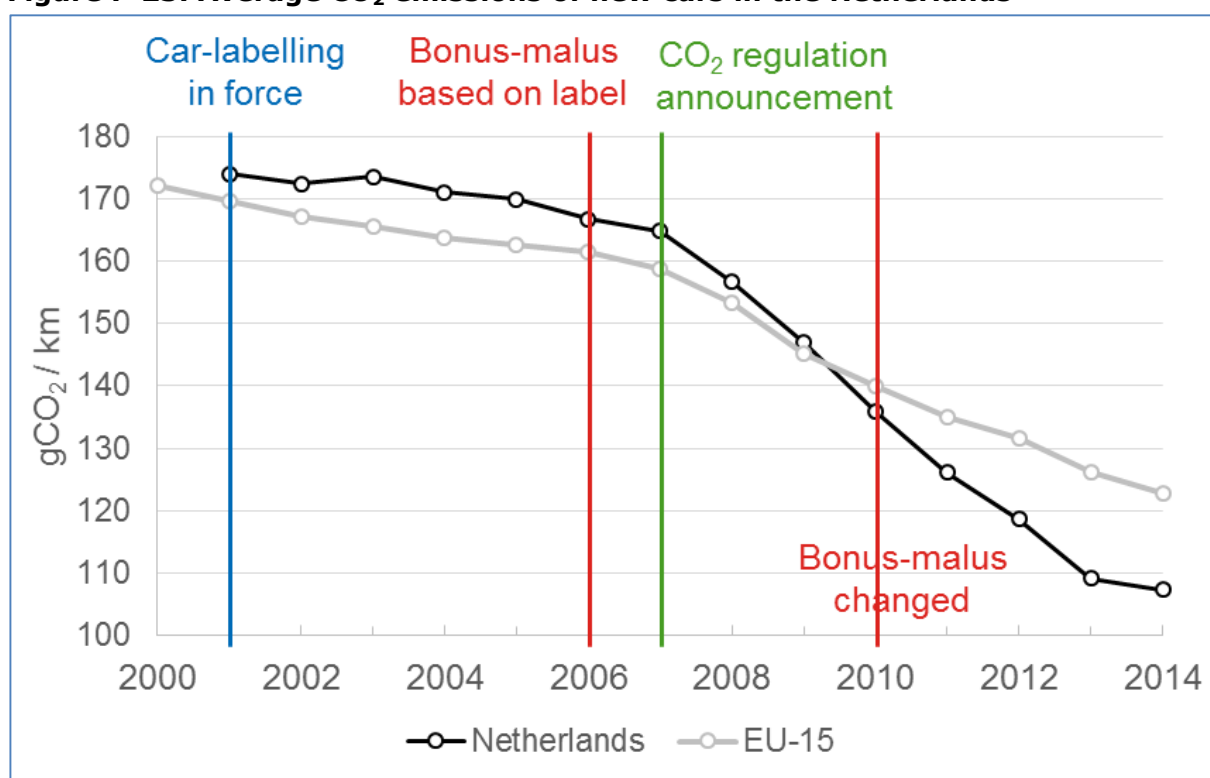
Annual motor vehicle tax (MRB)

Annual motor vehicle tax (MRB) annual tax has also changed since the Directive entered into force (ODYSSEE-MURE, 2014b). MRB is dependent on the weight of the car, however since February 1st 2008 owners of diesel cars with an expected average performance of less than 95 grams CO₂ per km pay half the amount of MRB. In April 1st 2009 this was reduced to a quarter and from 2010 onwards the amount has been €0. This reduction in MRB also applies to owners of non-diesel cars with an expected average performance of less than 110 grams CO₂ per km. The reduction of the MRB was in line with those for diesel, therefore from 2010 onwards this amount has been €0. The exemption from Motor Vehicle Tax for very efficient cars expired on 1 January 2014 for both new and existing passenger cars.

F.5.3 Trends in new car registrations

F.5.3.1 Average CO₂ emissions of new cars

Since the introduction of car CO₂ labels in the Netherlands, the average CO₂ emissions of new cars have decreased from 174.0 g/km in 2001 to 107.3 g/km in 2014 (39% reduction) (Figure F-23), giving the Netherlands the lowest average emissions in the EU (CBS, PBL, Wageningen UR, 2014a). In 2001, average CO₂ emissions from new cars were slightly above the EU-15 average; the trend in CO₂ reductions generally follows that seen at an EU-15 level until 2009, after which a significant acceleration in the reduction of CO₂ emissions from new cars is observed. From 2011 onwards, average CO₂ emissions from new cars in the Netherlands were lower than the EU average and have continued to decline at a much faster rate than the EU average. For example, from 2008 – 2013 year on year reductions in average new car CO₂ emissions in the Netherlands have consistently been between 5% and 8%, compared to between 3% and 5% for the EU-15.

Figure F-23. Average CO₂ emissions of new cars in the Netherlands

Source: (EEA, 2014)

Table F.5-2: Netherlands - Year on year reduction in average new car CO₂ emissions

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EU-15	1.5 %	1.0 %	1.1 %	0.7 %	0.7 %	1.7 %	3.5 %	5.3 %	3.7 %	3.4 %	2.6 %	4.2 %	2.6 %
Netherlands	0.9 %	-0.6 %	1.4 %	0.6 %	1.9 %	1.1 %	4.9 %	6.3 %	7.6 %	7.1 %	5.9 %	8.0 %	1.6 %

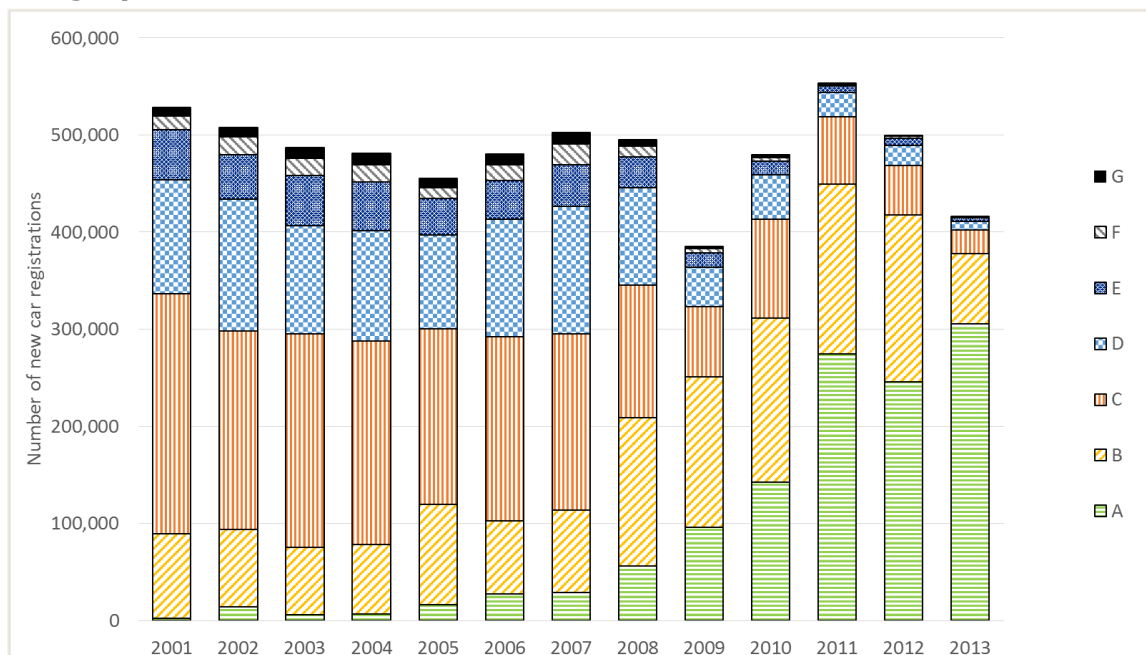
Notes: Green text indicates a percentage change greater than 0.5% above the EU-15 average; red text indicates a percentage change greater than 0.5% below the EU-15 average.

Source: (EEA, 2014)

F.5.3.2 New car registrations by label category

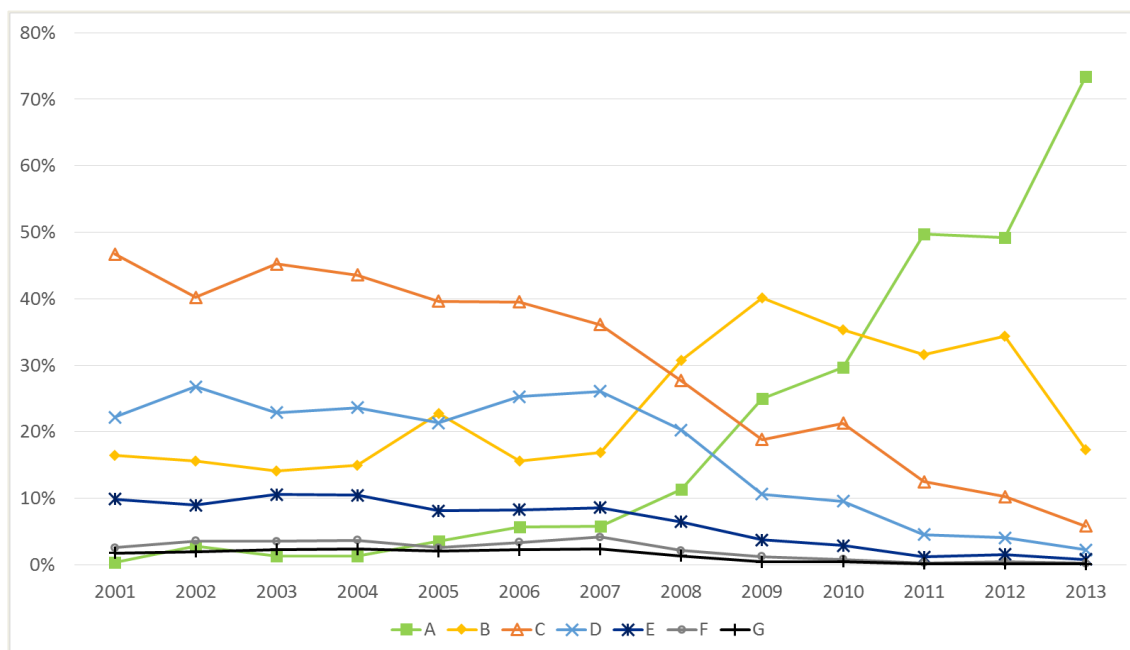
Netherlands has seen a significant improvement in the average CO₂ emissions of new cars since the adoption of the car labelling Directive. Data was collected on new car registrations by car CO₂ label to evaluate the possible impacts of the Directive on new car sales. This was complemented by research into fiscal measures, which are also likely to have had an impact on new car sales.

From 2001 – 2013, the number of newly registered low CO₂ emitting cars in the Netherlands has risen, as shown by the significant increase in the number of A and B label category cars sold (Figure F-24). In particular, the number of A category cars have increased considerably from 2007. Sales of B category cars also showed a large increase from 2007 – 2011, however in the following years sales have declined, being replaced by A category cars. Another notable observation is the large reduction in new car registrations in the C – G categories. In 2001, these accounted for almost 440,000 sales, while in 2013 only 38,000 new registrations were in these label categories.

Figure F-24: Number of new car registrations in the Netherlands by label category 2002 - 2014

Source: (CBS, PBL, Wageningen UR, 2014b)

In terms of market share, the combined share of A and B category cars has grown from 17% in 2001, to approximately 90% in 2013, with the majority of this increase occurring between 2007 and 2013. From 2011 - 2013, a decrease in the market share of B category vehicles has been observed (Figure F-25), from 32% to 17%. This is perhaps due to a shift in new registrations from category B to category A, which saw a large increase in market share during this time (from 50% - 73%). The share of new registrations in all other label categories has steadily decreased during 2001 - 2013.

Figure F-25: Percentage of new car registrations by car label category in the Netherlands 2002 - 2014

Source: (CBS, PBL, Wageningen UR, 2014b)

F.5.4 Consumer response

F.5.4.1 Consumer recognition/awareness of the information

A representative from the Netherlands Environmental Assessment Agency (PBL) interviewed as part of this study estimated that 80% of consumers recognise the label. Similarly, the national manufacturers association estimated that 75-100% of consumers recognised the label, in part due to its similarity with the energy label.

The effectiveness of the poster has not been studied; however it is not thought by either PBM or the national manufacturer association to be effective as consumers are not directed to the information when visiting car dealerships. In addition to this, consumers are not thought to pay attention to the information on the poster.

Consumers are thought to be aware of fuel efficiency information on promotional literature as it is linked to fiscal incentives, which have received extensive promotion. Fuel efficiency has become a major selling point in the Netherlands, although it is thought that this is not related to implementation of the Directive.

F.5.4.2 Interpretation and understanding of the information

The reason that the relative system was adopted (instead of one based on absolute CO₂ emissions) was because it was thought that car buyers go to the dealers with a well-defined wish list as to the car's main characteristics, and then compare the fuel efficiency of selected models with cars of similar characteristics (CE Delft, 2005). This design, which attempted to assist consumers by aligning with their purchasing process, does not appear to have been successful.

A representative from PBL interviewed as part of this study estimated that only 25 – 50% of consumers understand the label. The national manufacturers association estimated that less than 25% of consumers understood the label. Both organisations explained that this low level of understanding was because the relative efficiency label can be confusing – for instance, under this system large cars can have a green (A) label, while small cars can have an orange (E) label.

The view that the label is confusing to consumers is also supported by field research conducted with car salespeople in the Netherlands, who admitted that they avoided talking about the label with customers in the showroom since it sent out confusing messages and was “impossible to communicate” (Geerken & Borup, 2009). Although there was an initially positive reaction to the introduction of the labels, it eventually became apparent that consumers did not understand the energy classes within the label (Geerken & Borup, 2009).

F.5.4.3 Utilisation of the information

A 2009 study by PBL concluded that the car label was not very effective at directing consumers to fuel efficient cars. One reason for this is because the supply of A- and B-label cars was very low in 2009.

More recent data is not available but the PBL representative interviewed considered that the effectiveness of the label has remained low and estimated that less than 5% of consumers are influenced by car labels. The main reason proposed is that because consumers do not trust the official fuel consumption figures. The manufacturers association agreed that the impact of the label on private consumers was likely to be very low; however, they also pointed out that many companies have internal policies require vehicles to be A- B- or C-category (company cars make up approximately 30% of new car registrations).

The national consumer association interviewed for this study considered that the relevance of the label has decreased over time, since consumers use the internet to get information and make decisions before arriving in the showroom. According to the

interviewee, since the current label categories are not linked to the tax advantages, this limits their effectiveness.

Table F.5-3 summarises the estimates received from stakeholders regarding the share of consumers that recognise, understand and use the information.

Table F.5-3: Overview of stakeholder estimates of functioning of causal chain

Stage	Respondent	
	National authority	Manufacturers association
Recognition (% of consumers recognising the label)	80%	75-100%
Interpretation / understanding (% of consumers understanding the label)	25-50%	<25%
Influence / utilisation (% of consumers using the label in purchase decisions)	<5%	Unknown

Source: Interviews conducted for this study

F.5.5 Manufacturer response

The main evidence of manufacturer response in this section comes from a 2013 study, which examined the strategies of car manufacturers offering cars on the Dutch market (van der Vooren et al, 2013). The paper theorises that labels provide consumers with information that effectively forms a new product characteristic that they can take into account in purchase decisions. This provides a new source of consumer heterogeneity for firms that can be exploited through repositioning their product portfolio (i.e. providing lower CO₂ cars). The study focusses on the change in positioning of fossil-fuel cars in order to identify incremental changes in portfolio positioning, while the emergence of new technologies such as electric vehicles is not taken into account. It reviewed a database consisting of all 41,000 car models that were offered on the Dutch car market between 2001 and 2010 by the fifteen car manufacturers with the highest market shares (van der Vooren et al, 2013).

The results showed that since the introduction of the labels, each of the manufacturers reduced the CO₂ emissions of their portfolios – although the extent differed substantially from 3g/km (Renault) to 55g/km (Audi and Kia). Manufacturers typically achieved this reduction by adding cleaner vehicles to their ranges and discontinuing the most polluting versions. At the same time, changes in price were rather limited.

The conclusions of the study nominally link the provision of CO₂ information via the label to a strong reaction from manufacturers to offer more low CO₂ vehicles. However, the paper is silent on whether other factors could have contributed to the changes seen over the same time period could have been (i.e. car CO₂ Regulations, taxes etc.). Nevertheless, the time period chosen (2001-2010) was before any major tax changes that were deemed to have a substantial effect on market shares (although minor tax incentives were in place before 2009, these had limited effects – as discussed below). The omission of a discussion of the CO₂ Regulations seems to be a more important

limitation. Although the Regulations were only adopted in 2009, there is evidence of an “announcement effect” taking place from 2007 (Ricardo-AEA, 2015).

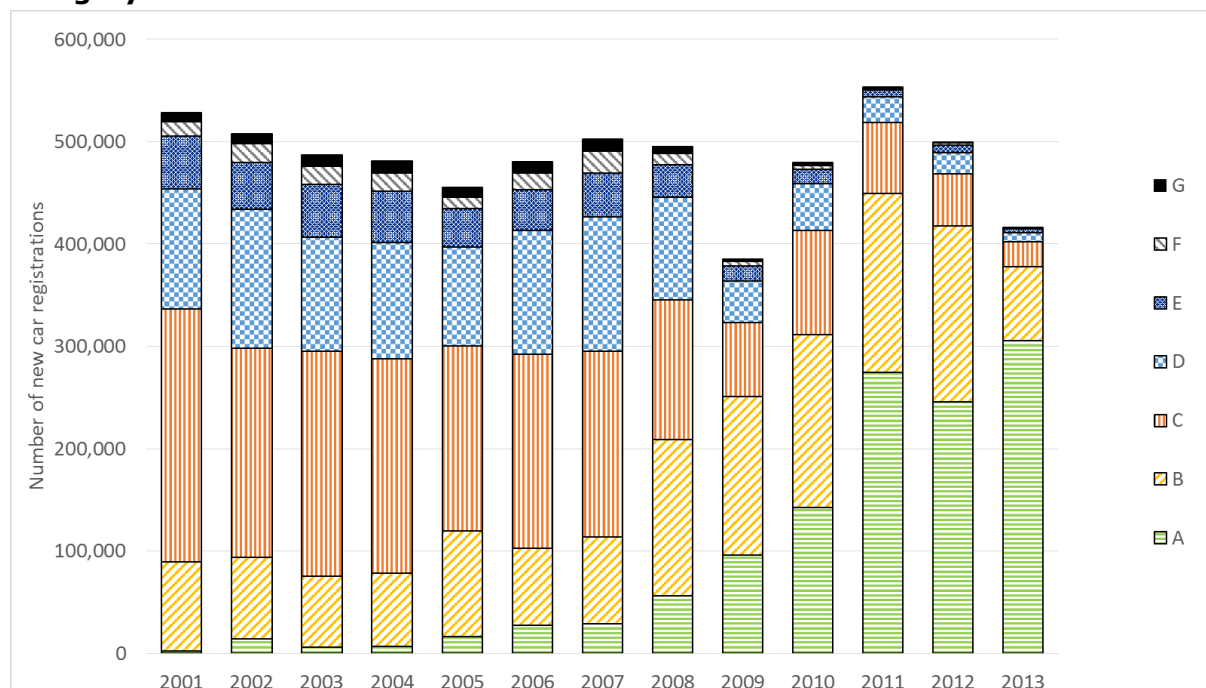
Overall therefore, the study provides evidence of a supply side effect, but it does not seem possible to attribute this to the labels (or to any other specific developments). Qualitatively, a national manufacturers association interviewed for this study felt that there could be some role of the label on supply side response - they noted that manufacturers want to have a “green” image and hence try to supply greener cars. In addition, importers try to convince manufacturers to produce greener versions. Overall however, the effect was considered to be minor in terms of influencing strategic decisions. Evidence from a review of advertising materials in the Netherlands showed that car companies became much more active in using the labels and financial incentives in their campaigns (Geerken & Borup, 2009), which seems to suggest there is some strategic role.

F.5.6 Impact of the Directive on CO₂ emissions

The impact of the labelling system is confirmed in the literature as being difficult to measure given that its introduction was combined with other policies and the fact that the label is dynamic (i.e. a car that is labelled “A” in one year may become “B” the next year). Nevertheless, in combination with these other measures, the labels are reported to have had a “substantial” impact (ODYSSEE-MURE, 2011b).

Looking at the development of sales of cars in each label category (Figure F-26) suggests that it took some time for market changes to happen. Initially, when the energy label was introduced in 2001, the market shares of A- and B-class vehicles did not substantially increase until after 2006. There is a small increase in sales of both A and B class in 2002 – this was due to a temporary BPM (vehicle acquisition tax) refund for environmentally-friendly cars (ADAC, 2005). A-class vehicles received a subsidy of €1,000, and subsequently their market share increased from 0.3% in 2001 to 3.2% in 2002. Similarly, B class vehicles, which received €500 subsidy, increased market share from 9.5% in 2001 to 16.1% in 2002. However, after abolishing the refunds in 2003, the percentage market shares of A and B class vehicles immediately decreased again (respectively to 0.9% and 11.5%) (ADAC, 2005). Although these market shares were higher than in 2001, this seems to suggest that the impact of the label on its own was rather marginal in terms of changing market shares.

Overall CO₂ emissions of new cars fell by less than 1% between 2002 and 2003, despite the rapid increases in sales of A- and B-labelled vehicles. This is because the impact on CO₂ is not correlated directly with the response to the feebate, due to the relative system of labelling - it may for example be the case that a small car incurs a penalty whereas a larger and less fuel efficient car (compared to the small car) received a rebate.

Figure F-26: Number of new car registrations in the Netherlands by label category 2002 - 2014

Source: (CBS, PBL, Wageningen UR, 2014b)

The label remained unsupported by fiscal measures until 2006, and as can be seen, the market share of A- and B-class vehicles remained rather stagnant – suggesting again, that the label on its own cannot drive significant market transformation.

The gradual increase in the share of A and B labelled cars from 2006-2008 is related to the introduction of the feebate in 2006, which was linked to the label categories. This was explicitly intended to “add momentum” to the car labels – however, it is reported to have only had a small effect for two reasons (CBS, PBL, Wageningen UR, 2014b; van der Vooren et al, 2013):

- At time, there was a low supply of A and B label cars, which limited the choices for consumers even if they would prefer a more fuel-efficient model;
- The value of the bonus-malus was low relative to the price of the car (particularly for larger cars).

Hence, even in combination with fiscal policies, the information provided in the label may not be effective in cases where there is insufficient supply and/or insufficient monetary incentive. The value of the bonus malus was small compared to the price of the car because it was based on the label (which is a relative scale). That is to say, the differentiation was largely dependent on the efficiency of the car *compared to cars of similar size*. This appears to have been a less effective means of differentiation compared to absolute differentiation, as described below. In 2009, the Netherlands Environmental Assessment Agency (PBL) conducted a stated preference study on the car labelling system for passenger cars, concluding that the effect of the labels was small (Kieboom & Geurs, 2009). However, the system was still considered a success due to the low cost of implementation.

From 2009, there is a much more rapid increase in the share of A- and B-labelled cars. This is due to a combination of revised tax policies and changes to the calculation methods. Regarding taxation, in 2008 the amount of bonus and penalty were increased. In 2010 the Dutch government completely replaced the feebate system and other private vehicle taxes with a tax based on the absolute CO₂ emissions of the car (van der

Vooren et al, 2013). At the same time there was an increasing supply of A- and B-category cars due to changes in the calculation rules, which made qualification for the A- and B- categories easier (van der Vooren et al, 2013)⁷⁶. For instance, the supply of cars with an A-label was only 1% of models in 2001, rising to 5% in 2009 and 21% in 2013 (CBS, PBL, Wageningen UR, 2014b).

Even though this increasing supply distorts the picture somewhat, the demand for these vehicles has also grown and the market shares of A- and B-labelled vehicles is higher than the proportion of these labels on offer. Still, it is difficult to link the increasing sales of A- and B-labelled vehicles to the fiscal incentives, since the label categories are based on relative emissions whereas the taxes are based on absolute emissions. Rather, it seems that the tax policies have been the main factor driving market changes, whereas the labels have a very minor (if any) effect. In particular, the rapid reduction of average CO₂ emissions of new cars seen in the Netherlands is largely due to the sale of PHEVs, which in turn is largely due to specific tax incentives (CBS, PBL, Wageningen UR, 2014a). For instance, the effective fiscal incentive in the Netherlands in 2013 was from €21,000 for private cars up to €38,000 for a PHEV (for company cars - about 75% of vehicle base price), which was associated with a 5% market share for PHEV in 2013 (the highest in the EU), and a 1,900% market share increase from 2012 to 2013 (ICCT, 2013).

F.5.7 Conclusions from the Dutch case study

The analysis of the implementation of the car labelling Directive in the Netherlands point to the following main conclusions:

- In the period 2001-2014, the Netherlands has seen the largest percentage reduction in new car CO₂ emissions (38%) out of all EU-15 countries and has the lowest average new car CO₂ emissions (107.3 gCO₂/km in 2014, compared to the EU-15 average of 122.8 gCO₂/km). The EU-15 average reduction over this same period was 28%.
- It is a general view that the label and promotional material are widely recognised by consumers (>75%) due to the similarity with the energy label and generally high compliance with the Directive. However, the poster and guides are thought to be largely irrelevant. Since the label categories in the Netherlands are calculated on a relative basis, this is thought to be confusing for consumers – consequently, it is thought that consumer understanding is rather low (<50%), and utilisation of the information even lower (<5%).
- The label on its own seems to have had little or no effect in the Dutch market, as evidenced by stagnant sales of A- and B-class vehicles until 2006 – even when paired with a bonus malus system. This is in part due to the relatively low supply of A- and B-labelled vehicles at the time, as well as the low level of fiscal incentives (due to the relative scale used in the label, the price differentiation was compared to cars of similar sizes when the incentives were based on the label). Nevertheless, due to the low cost of implementation, even the small effects achieved with the label were considered to be a success.
- The more recent and dramatic reductions in new car CO₂ emissions seen in the Netherlands do not appear to be linked to the label, but are rather spurred by generous tax incentives based on absolute CO₂ emissions (not relative CO₂ and hence

⁷⁶ These changes were a conscious choice made by the Government to increase the supply of A- and B-labelled cars, following the conclusions of the 2009 evaluation study (Kieboom & Geurs, 2009), which suggested there was insufficient supply of these vehicles.

not linked to the label). Furthermore, comments received during an interview with the national environment agency suggested that the relative label may be confusing for consumers, and additionally they may not trust the official fuel consumption figures. However, indirectly, the label may have played a positive role through its impact on company car purchases that represent around 30% of the total. Many companies require that any new purchased vehicles for the company fleet to be A,B- or C-category.

- On the supply side, there is evidence that manufacturers have adjusted their portfolios in the Netherlands to include more low-CO₂ cars, although it is impossible to determine what share of this behaviour can be attributed to the labels. Qualitatively, a national manufacturers association interviewed for this study felt that there could be some role of the label, especially considering manufacturers want to have a “green” image and importers also place pressure on manufacturers to produce greener versions. Overall however, the effect was considered to be minor in terms of influencing strategic decisions.

F.6 - Austria⁷⁷

F.6.1 Implementation of the Directive in Austria

Directive 1999/94/EC was implemented in Austria in March 2001 by the Federal Act on the availability of consumer information of the marketing of new passenger cars (Bundesgesetz über die Bereitstellung von Verbraucherinformationen beim Marketing für neue Personenkraftwagen) (RIS, 2001).

F.6.1.1 Car label

In Austria a continuous comparative label is used, which does not have defined emissions/efficiency categories (see Figure F-27). The label displays the absolute CO₂ emissions on a colour coded scale. The colour coding is a relative scale, which is determined by national fleet averages (in terms of CO₂ emissions). The label design is also the same for hybrids and EVs.

No revisions to the label have been identified by the desk research phase of this project.

In addition to the requirements set out in the Directive, the Austrian label can include additional useful information (zusätzliche nützliche Informationen) in the form of text at the bottom of the label. Additional information is voluntary and can include: power, length, width, weight, number of seats, operating noise, exhaust emissions class (EURO standard), whether diesel filters are included, NO_x value, biofuel suitability, and alternative fuel usability (such as CNG, ethanol, hybrid) (Ecologic et al., 2010).

⁷⁷ To support this case study interviews were carried out with an Austrian National Authority and a manufacturers' association

Figure F-27: Car label – Austria

BGBl. II - Ausgegeben am 11. Mai 2006 - Nr. 187 1 von 1

Umweltinformation
Nach Richtlinie 1999/94/EG idgF, BGBl. I Nr. 26/2001 idgF


Hersteller:

Modell:
Leistung, Antriebsart

Kraftstoff:

Offizieller Kraftstoffverbrauch: XX,X l/100 km
Gesamtverbrauch laut Typenschein

Dieser Kraftstoffverbrauch entspricht folgender
Kohlendioxid-Emission (CO₂): XXX g/km




60	80	100	120	140	160	180	200	220	240	260	280	300	darüber
----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	---------

geringer Beitrag zum Treibhauseffekt
hoher Beitrag zum Treibhauseffekt


Ein Leitfaden über den Kraftstoffverbrauch und die CO₂-Emissionen, der Daten für alle neuen Personenkraftwagenmodelle enthält, ist kostenlos an allen Verkaufsorten erhältlich.

Der Kraftstoffverbrauch und der CO₂-Ausstoß eines Fahrzeugs sind nicht nur von der effizienten Ausnutzung des Kraftstoffs durch das Fahrzeug, sondern auch vom Fahrstil und anderen nicht technischen Faktoren abhängig. CO₂ ist das für die Erderwärmung hauptsächlich verantwortliche Treibhausgas.


Zusätzliche nützliche Informationen:




Der Fahrzeughandel



ASSOCIATION OF IMPORTERS





lebensministerium.at

www.ris.bka.gv.at

Source: (RIS, 2015)

F.6.1.2 Guide on fuel economy

The fuel consumption guide is only published online in Austria, in the form of a fully searchable website/online database⁷⁸; paper copies are not printed or distributed (since 2003?), however there is a requirement for the guide to be printed at the request of interested customers. It must be updated at least once per year and provide official fuel economy and CO₂ emissions for every model.

The production of the online guide is a collaborative effort, produced with the assistance of the Austrian Association of Importers and Association of Car Dealers, whose members contribute information. The information provided by manufacturers in the online guidance far exceeds the requirements of the Directive and this is how most consumers choose to research and compare vehicles.

Compared to a printed guide, Austrian National Authorities reported that the development of an online guide/website has resulted in a more informative service for consumers than the printed guide. A number of advantages for both consumers and manufacturers are shown below.

⁷⁸ See www.autoverbrauch.at.

- Less costly and easier for manufacturers to update
- Can be updated more frequently
- Additional summaries, providing additional information for each vehicle can be provided
- Allows for easy and faster comparison between models

F.6.1.3 Poster

In the case of the poster, the requirements set at the national level are the same as those set out in the Directive (ODYSSEE-MURE, n.d.).

All stakeholders interviewed consider that the poster has very limited, if any effect.

This is because consumers in Austria use the online database to research and compare vehicles. By the time consumers visit car showrooms it is likely that they will have already selected a vehicle of interest and therefore they will pay little attention to the poster. Furthermore, the Austrian Federal Association of Motorvehicle Dealers argued that the poster is difficult for the dealerships to keep up to date and that this activity is wasteful as it is not interesting to customers.

F.6.1.4 Promotional material

Written advertisements for new cars must show fuel consumption and CO₂ emissions in a form which is as prominent as the main message (ODYSSEE-MURE, n.d.). The requirements set at the national level are the same as those set out in the Directive.

F.6.1.5 Enforcement activities and compliance

The enforcement of the Directive in Austria is the responsibility of the Austrian Energy Agency. Spot checks were carried out during the initial period after the adoption of the Directive. However, the review conducted in 2003 (two years after the Directive entered into force) to assess implementation of the Directive in Austria found that there was a very high levels of compliance (no specific number provided). On the basis of this and in order to reduce some of the compliance costs for industry it was decided to enter into a collaborative "spirit of the law" situation. The discussions led to a voluntary agreement where further checks for compliance would not take place on a regular basis but associations of importers and car dealerships would set up an online database mentioned in section F.6.1.2 and provide an update guide on the website and printed on demand any time for interested customers.

During our interviews with a representative from the Austrian government, it was suggested that this voluntary approach has led to high compliance levels (close to 100%). This was linked to the high level of use of the relevant database by consumers. Manufacturers/importers that do not provide the relevant data in the required format will not have the respective vehicle model included. This is seen as an important incentive for ensuring compliance.

Penalties for non-compliance, as provided in the national legislation, are very small but grow larger for repeated offences, up to a few thousand Euros. However, fines for non-compliance have rarely been imposed since.

F.6.2 Other relevant measures

Besides the Car labelling legislation requirements, additional relevant policy measures that play a role in consumers' choices and passenger cars fuel consumption include:

- January 2007: EU car CO₂ regulation announced
- July 2008: Incorporation of a bonus-malus system into the Austrian purchase tax (NoVA – Normverbrauchsabgabe)
- April 2009: EU car CO₂ Regulation entered into force

- Ownership tax based on engine power. This measure has been in force since 1993.

In terms of fiscal measures, in July 2008, the Austrian government incorporated a bonus-malus system into the Austrian fuel consumption/pollution based purchase tax (NoVA - Normverbrauchsabgabe) that has been in place since 1992. The objective was to promote the purchase of cars with low CO₂, NO_x, and particulate emissions (ACEA, 2014). The NoVA tax is levied on the registration of new vehicles and is calculated based on the fuel consumption and purchase price of the vehicle, with a maximum rate of 32% of the list price for passenger cars. The criteria used for the bonus-malus system is as follows:

- A deduction of up to €300 on the NoVA tax for cars with CO₂ emissions lower than 120 g/km. A higher bonus, of up to €500 is available for hybrid, E85, CNG, biogas, LPG and hydrogen fuelled vehicles.
- A malus of €25 per g/km for emissions exceeding 160 g/km, plus an additional €25 per g/km for emissions exceeding 180 g/km, plus an extra €25 g/km for emissions exceeding 220 g/km. In 2013, the malus limits were lowered to 150 g/km, 170 g/km and 210 g/km.

Furthermore, the ownership tax on motor vehicles may also influence consumer choices as it is based on engine power for passenger cars. It was introduced in 1993 and is calculated as shown below (ODYSSEE-MURE, 2014c). The monthly minimum is €6.20, while the maximum is €72. Electric vehicles are exempt from this tax.

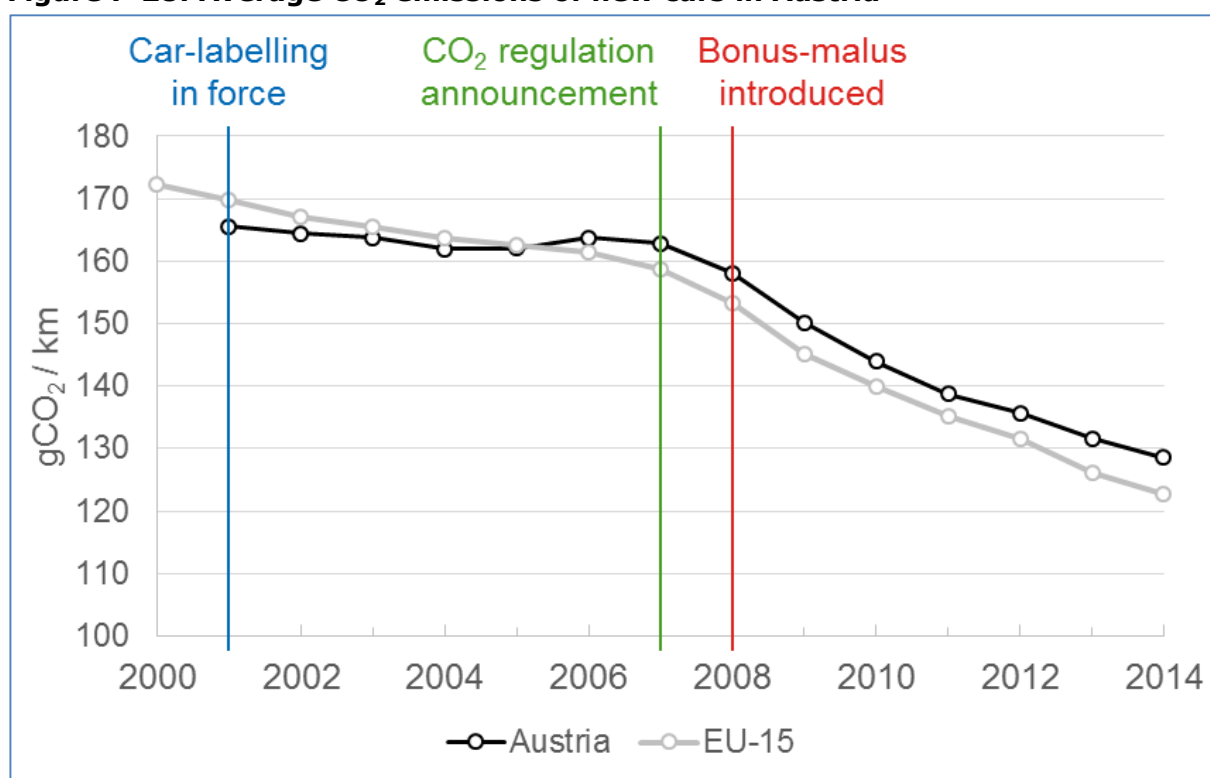
- For the first 24 kW of engine power: 0 EUR/month
- For the further 66 kW of engine power: 0,62 EUR/month
- For the further 20 kW of engine power: 0,66 EUR/month
- For every further kW of engine power: 0,75 EUR7month

F.6.3 Trends in new car registrations

In this section, we present available data on the average CO₂ emissions from new cars sold in Austria, as well as data on the sales of passenger cars by label category

F.6.3.1 Average CO₂ emissions of new cars

According to the available data from the European Environmental Agency (EEA, 2014), during the period from 2001 – 2014, average CO₂ emissions of new passenger cars in Austria decreased from 165.6 gCO₂/km in 2001 to 128.6 gCO₂/km in 2013. As shown in Figure F-28, average CO₂ emissions in Austria were marginally lower than the EU-15 average in 2001, however since 2006, average emissions have been greater than in the EU-15. This is because during 2001 – 2006, changes in average CO₂ emissions in Austria did not match the trend seen at EU-15 level; as shown by Figure F-28, average CO₂ emissions in Austria remained relatively constant in these years, compared to consistent annual reductions in the EU-15. From 2006 onwards, emissions reductions have closely followed the trend at EU-15 level.

Figure F-28: Average CO₂ emissions of new cars in Austria

Source: (EEA, 2014)

Table F.6-1: Austria - Year on year reduction in average new car CO₂ emissions

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EU-15	1.5 %	1.0 %	1.1 %	0.7 %	0.7 %	1.7 %	3.5 %	5.3 %	3.7 %	3.4 %	2.6 %	4.2 %	2.6 %
Austria	0.7 %	0.4 %	1.2 %	0.1 %	1.0 %	0.5 %	2.9 %	5.0 %	4.1 %	3.7 %	2.2 %	3.0 %	2.3 %

Notes: Green text indicates a percentage change greater than 0.5% above the EU-15 average; red text indicates a percentage change greater than 0.5% below the EU-15 average.

Source: (EEA, 2014)

F.6.3.2 New car registrations by label category

The Austrian label does not include efficiency categories, therefore data by label category is not available.

F.6.4 Consumer response

F.6.4.1 Consumer recognition/awareness of the information

While there are no detailed results from a consumer survey, the qualitative input collected as part of this study suggests that many Austrians expect to see labels on vehicles displayed in car showrooms. Both the national authorities and association of vehicle dealers interviewed for this study believe that over 75% of consumers recognise the **label**.

In contrast, both the National Authorities and the Austrian Federal Association of Motorvehicle Dealers believe that the **poster** is the least effective element of the

Directive. It is thought that consumers do not pay attention to the information displayed on the poster.

Website statistics for the **online guide** show that the information is used more frequently than the printed guide. Usage of the website has increased in recent years, which indicates that consumers are becoming increasingly aware of the information.

F.6.4.2 Interpretation and understanding of the information

The input from stakeholders (representing authorities and industry) also suggests a high level of understanding of the information included in the label. They estimate that 75-100% of consumers understand the label.

However, as is also pointed out by the national authorities, consumers are aware that official CO₂ values should be viewed only as indicative figures and are reported to have little confidence that official values are relevant for everyday driving situations (such as driving in congested areas). Further to this, consumers view car labels as another form of advertising, however the Directive has contributed towards raising consumer environmental awareness. Following recent news that emissions test results have been manipulated, consumer confidence has further eroded. Therefore stakeholders strongly believe that labels should indicate real world driving conditions to help rebuild consumer confidence.

F.6.4.3 Utilisation of the information

In terms of the actual utilisation of the information, the stakeholders interviewed agreed that the online guide is the most effective element. Website statistics from the online guide show that consumers typically check material online and download the guide after some time spent browsing. This indicates that consumers regularly use this tool to compare vehicles and help decide which car to buy.

In terms of the label, while stakeholders indicated that there is a high level of awareness, they consider that less than 25% of them are influenced by the Directive. This is explained by the fact that consumers do not make a decision on fuel consumption and emissions alone. For example, these factors are greater than the 5th consideration when purchasing cars in Austria. The representative of the Federal Association of Motorvehicle Dealers considered that, typically, on arrival at car showrooms consumers already have a good idea about the vehicles they are interested in buying on the basis of information available online, quite often relying on the online guide. As a result the information provided at the showroom – including the label and the poster – are thought to be less effective.

Finally, the poster is regarded to be ineffective, no longer relevant, not interesting to consumers and difficult for dealers to keep up to date.

F.6.5 Manufacturer response

At the time of the introduction of the car labelling legislation, there was a lot of resistance to the label from manufacturers. The key question was the nature and structure of label. As was argued by national authorities, car manufacturers wanted to minimise the effort required to comply with the Directive and to ensure that the system would be neutral, not biased to a particular party.

After much debating it was agreed that relative categories do not provide a reference point and so are less informative. Therefore, the continuous comparison format was agreed upon, which offers absolute values but with a relative colour coding determined by national fleet averages.

Compliance is now considered to be very high and manufacturers willingly contribute information to be published for the online guide, which is a key tool used by consumers

to compare vehicles during the car purchasing process. Manufacturers failing to supply information are excluded from the Austrian website, which places them at a disadvantage compared to their competitors.

According to the Federal Association of Motorvehicle Dealers, some manufacturers are now focussing on clean cars. Overall, manufacturers are adapting to evolving consumers' preferences for cleaner cars.

F.6.6 Impact of the Directive on CO₂ emissions

Since 2001, there has been an overall decrease in the CO₂ emissions of new passenger cars, however there is little evidence connecting this decrease to the implementation of the Directive in Austria.

The Directive came into force in 2001, yet between 2000 and 2007, there was little change in average CO₂ emissions of new passenger cars. Since 2007, average emissions have steadily decreased in line with the trend observed for EU-15 countries. Stakeholders interviewed for this case study suggested that this was due to a combination of European CO₂ regulations and targets, and fiscal measures implemented in Austria.

As indicated by input from stakeholders, it is difficult to disaggregate the effects of the Directive from fiscal measures. This is because these measures work together to form a consistent strategy on the CO₂ reduction of new passenger cars and aim to increase awareness and information provision in Austria. For example, the online guide to fuel economy is viewed as a key development in Austria and was used to provide information and to help transition to the new fuel consumption based purchase tax in 2008.

The combination of the Directive and the fiscal measures introduced in 2008 have led to a substantial decrease in average new car CO₂ emissions. In 2008, 8% of new passenger cars had emissions below 120 g/km, while in 2015 this figure was 47%. The market share of high emission vehicles has also declined; in 2008, 27% of vehicles had emissions above 160 g/km, whereas in 2015 only 17% had emissions above 150 g/km.

Overall, stakeholders suggested that the information displayed on car labels is still relevant for consumers, however it should be updated to give a better indication of real world driving conditions and be more relevant for alternative forms of media such as websites and social media. It was also suggested that the Directive is too prescriptive about the physical poster in car showrooms, which may not be relevant now that the internet is commonly used by consumers to research cars.

Austrian stakeholders also commented that because the Directive only requires the provision of information on CO₂ emissions (and not other pollutants), diesel vehicles appear to be cleaner than petrol vehicles. This information may be misleading for consumers and be contradict other guidance in Austria.

F.6.7 Conclusions from the Austrian case study

The evidence collected during this case study points to the following conclusions:

- In the first years after the Directive was implemented (2001-2007), there appears to have been little impact on new car CO₂ emissions. Since 2007, CO₂ emissions of new passenger cars have decreased at a similar rate to the EU-15. The analysis suggests that this is driven by a combination of measures, including the car labelling Directive, which have worked together to achieve emissions reductions.

- In particular, the Directive has aided the implementation of CO₂/fuel consumption related fiscal measures in Austria, which are considered to be very effective.
- It is difficult to disaggregate the effects of the Directive from other measures implemented in Austria.
- The most useful element of the Directive is considered to be the online guide, whereas the poster is not regarded to be very effective.
- A key feature of the implementation of the Directive in Austria is that a voluntary agreement was used to relax the monitoring and enforcement activities in exchange for the development by industry of information in an online form. The approach adopted appears to have helped in reducing costs for authorities and industry without, as suggested, having a negative impact on compliance.

F.7 - Czech Republic⁷⁹

F.7.1 Implementation of the Directive in the Czech Republic

The car labelling Directive was implemented by the following acts in the Czech Republic (Ecologic et al., 2010):

- Act no. 56/2001 Coll. on the conditions of road traffic (zákon č. 56/2001 Sb., o podmínkách provozu vozidel na pozemních komunikacích, vplatném znění) – Section 24
- Decree no. 245/2005 Coll. laying down details of labels and posters on fuel consumption and CO₂ emissions of new passenger cars (Vyhláška MD č.245/2005 Sb., o náležitostech informačních štítků a plakátů s údaji o spotřebě pohonných hmot a emisích CO₂ při prodeji nových osobních vozidel)
- Decree no. 341/2002 Coll. on the technical capacity and technical conditions of road vehicles, as amended (vyhláška MDS č. 341/2002 Sb., oschvalování technické způsobilosti a o technických podmínkách provozu vozidel na pozemních komunikacích)

F.7.1.1 Car label

The car label in the Czech Republic closely follows the requirements of the Directive. No additional information is required beyond that set out in the Directive. The design or format of the label is not mandated in the Czech Republic, therefore car dealers often use their own label format.

F.7.1.2 Guide

The guide on fuel economy is available as hardcopies and online in the Czech Republic. It is updated twice per year and is available on the website of the Ministry of Transport (Ecologic et al., 2010).

F.7.1.3 Poster

Requirements for the poster closely match those set out in the Directive. The size and content of the poster are stated in Decree no 245/2005 Coll (Ecologic et al., 2010).

F.7.1.4 Promotional material

The requirements of Czech national legislation are as stated by the Directive. As described in the 2010 report concerning the implementation of the Directive (Ecologic et al., 2010), there was a debate over whether the Czech Republic had correctly transposed the Directive with regards to the promotional material. The report states that a law association in the Czech Republic filed a complaint in June 2009 to the European Commission relating to the incorrect transposition of Annex IV of the Directive into Czech national law. This aspect relates to the requirement that information should be “easy to read and no less prominent than the main part of the information provided in the promotional literature”. This has subsequently been closed.

F.7.1.5 Enforcement activities

The Czech Trade Inspection Authority (Česká obchodní inspekce) is responsible for monitoring the display of the label at point of sale. Issues of non-compliance have been documented in the Czech Republic in relation to the label, poster and promotional material. It has been reported that in 2007, 138 checks were carried out, with financial penalties applied for non-compliance in 7 instances (Ecologic et al., 2010). The fines imposed totalled 63,000 CZK, equivalent to €2423 (Ecologic et al., 2010). Common

⁷⁹ This case study is based solely on desk research, as no Czech organisations were available for interview

issues included missing labels, or absence of specific obligatory text on labels, such as numerical CO₂ emissions and fuel consumption information.

F.7.2 Other relevant measures

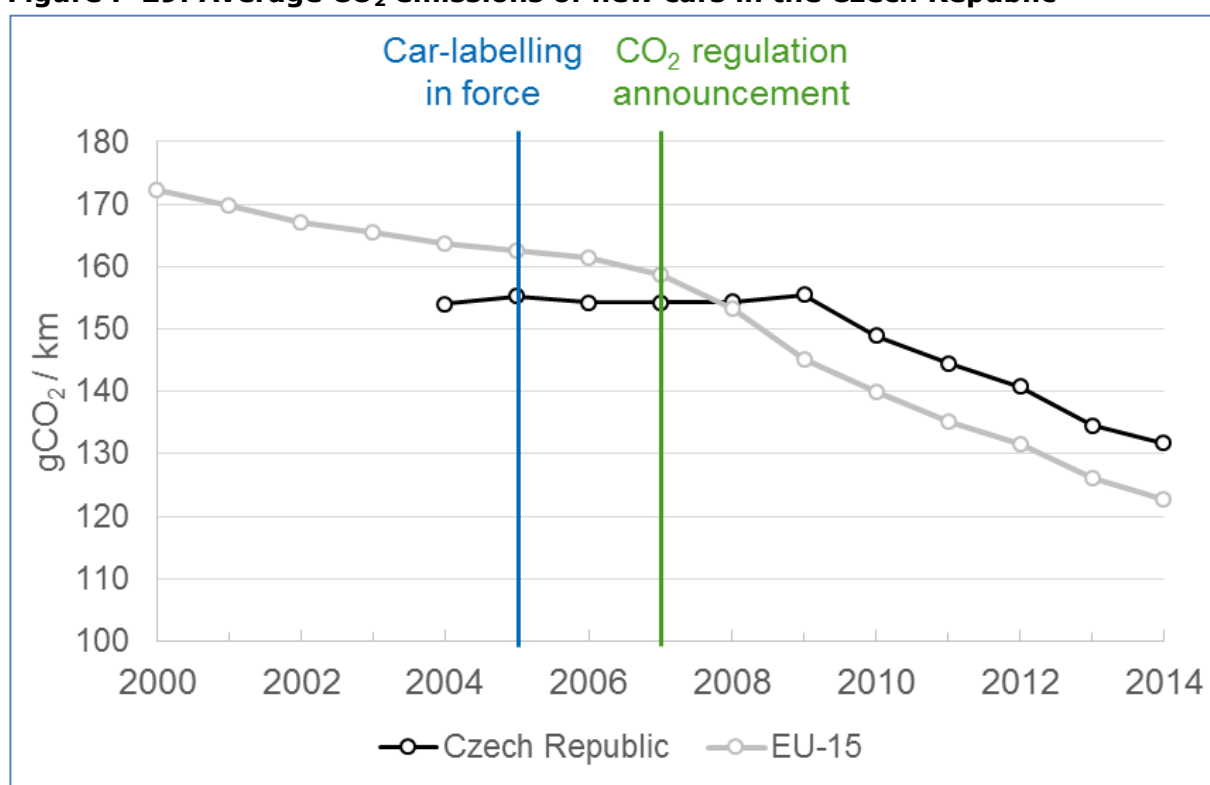
Besides the car labelling Directive and EU car CO₂ Regulation, a new registration surcharge was implemented in 2009 in the Czech Republic for vehicles not complying with EURO 3 emissions standards (ACEA, 2014). However, no fiscal measures related to the CO₂ emissions of new vehicles have been identified in the Czech Republic.

F.7.3 Trends in new car registrations

F.7.3.1 Average CO₂ emissions of new cars

Average CO₂ emissions of new passenger cars have reduced from 154.0 gCO₂/km in 2004 to 131.8 gCO₂/km in 2014. As shown by Figure F-29, CO₂ emissions in the Czech Republic were lower than the EU average in 2004, however as average emissions remained relatively constant in the Czech Republic from 2004 – 2009, average emissions have been above those seen at an EU level from 2008 onwards. Since 2009, reductions in emissions have generally followed the trend observed at EU level.

Figure F-29: Average CO₂ emissions of new cars in the Czech Republic



Source: (EEA, 2014)

Table F.7-1: Czech Republic - Year on year reduction in average new car CO₂ emissions

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EU-15	0.7%	0.7%	1.7%	3.5%	5.3%	3.7%	3.4%	2.6%	4.2%	2.6%
Czech Republic	-0.8%	0.7%	0.0%	-0.1%	-0.7%	4.2%	3.0%	2.6%	4.4%	2.1%

Notes: Green text indicates a percentage change greater than 0.5% above the EU-15 average; red text indicates a percentage change greater than 0.5% below the EU-15 average.

Source: (EEA, 2014)

F.7.3.2 New car registrations by label category

There are no data on car registrations by label category since the Czech label does not include categories.

F.7.4 Consumer response

The 2010 study (Ecologic et al., 2010) suggested that the information provided on Czech car labels is generally easy for consumers to understand. Unfortunately, no further information was identified concerning the consumer response to the Directive in the Czech Republic.

F.7.5 Manufacturer response

Unfortunately, no information was identified concerning the manufacturer response to the Directive in the Czech Republic.

F.7.6 Impact of the Directive on CO₂ emissions

The impact of the Directive on CO₂ emissions in the Czech Republic is difficult to determine due to the lack of available data. Between 2005 (when the car labelling Directive entered into force in the Czech Republic) and 2009, there was little change in average CO₂ emissions. Since 2009, emissions have decreased at a rate similar to the EU-15, however this is likely to be due to the European new car CO₂ Regulation.

F.7.7 Conclusions from the Czech case study

- Very limited information is available concerning the implementation and impacts of the Directive in the Czech Republic, therefore it is difficult to draw clear, evidence based conclusions.
- New car registration data shows that average CO₂ emissions have decreased at a rate similar to the EU-15 average since 2009, although emissions in the Czech Republic are above the EU-15 average. To determine whether the Directive has influenced this trend more detailed evidence is required than is currently available.

F.8 - Italy⁸⁰

F.8.1 Implementation of the Directive in Italy

Directive 1999/94/EC was implemented in Italy by the Presidential Decree of 17th February 2003, n.84, published in Gazzetta Ufficiale Serie Generale n.92 of the 19th April 2003: Decreto del Presidente della Repubblica 17 febbraio 2003, n. 84 - Regolamento di attuazione della direttiva 1999/94/CE concernente la disponibilit  di informazioni sul risparmio di carburante e sulle emissioni di CO₂ da fornire ai consumatori per quanto riguarda la commercializzazione di autovetture nuove (Regulation implementing Directive 1999/94/EC on the availability of information on fuel economy and CO₂ emissions with regard to the marketing of new passenger cars). The Decree entered into force on the 5th of April 2003 (Gazzetta Ufficiale, 2003).

F.8.1.1 Car label

Annex I of the Regulation shows that a simple list format label is required in Italy (shown in Figure F-30). The information displayed on the label meets the requirements of the Directive. No additional information is required, however the Italian legislation specifies that size 12, Times New Roman font must be used (Gazzetta Ufficiale, 2003).

The Italian Ministry of Economic Development informed us that although the label contains the official figures, there is low consumer confidence in the accuracy in real world driving conditions.

⁸⁰ To support this case study an interview was carried out with an Italian Ministry

Figure F-30: Label format suggested in Annex I of the Italian legislation.

INFORMAZIONI AMBIENTALI RELATIVE AL CONSUMO DI CARBURANTE E ALLE EMISSIONI DI CO₂ DELLE AUTOVETTURE							
MARCA/MODELLO.....				CILINDRATA.....			
(Carattere di stampa Times New Roman 12)							
TIPO DI CARBURANTE: <input type="checkbox"/> BENZINA <input type="checkbox"/> GASOLIO <input type="checkbox"/> GPL <input type="checkbox"/> METANO							

CONSUMO DI CARBURANTE								
CICLO DI GUIDA	LITRI / 100 Km				Km / LITRO			
	Benzina	Gasolio	GPL	Metano	Benzina	Gasolio	GPL	Metano
Urbano	□□.□	□□.□	□□.□	□□.□	□□.□	□□.□	□□.□	□□.□
Extra-Urbano	□□.□	□□.□	□□.□	□□.□	□□.□	□□.□	□□.□	□□.□
Misto	□□.□	□□.□	□□.□	□□.□	□□.□	□□.□	□□.□	□□.□

EMISSIONI DI BIOSSIDO DI CARBONIO (CO ₂) g / Km			
BENZINA	GASOLIO	GPL	METANO
□□□	□□□	□□□	□□□

- E' disponibile gratuitamente presso ogni punto vendita una guida relativa al risparmio di carburante e alle emissioni di CO₂ che riporta i dati inerenti a tutti i nuovi modelli di autovetture.
- Oltre al rendimento del motore, anche lo stile di guida ed altri fattori non tecnici contribuiscono a determinare il consumo di carburante e le emissioni di CO₂ di un'autovettura. Il biossido di carbonio è il gas ad effetto serra principalmente responsabile del riscaldamento terrestre.

Source: (**Gazzetta Ufficiale, 2003**)

F.8.1.2 Guide

The Italian legislation closely follows the requirements of the Directive, requiring the publication of the guide on an annual basis. Publication is the responsibility of the Ministry of Economic Development, although the Ministries for Environment and Transport also contribute to the development of the material. In addition to the requirements set out in the Directive, a guide to driving more efficiently (consisting of a set of 10 "eco-driving" rules) is included, which is aimed at reducing fuel consumption. The 10 most fuel efficient vehicles are also listed in the guide (Ecologic et al., 2010).

Since 2008, the guide has not been printed by the Italian Government and is only available online⁸¹. The printing costs are estimated to be over €60,000 per year.

F.8.1.3 Poster

In relation to the poster, the Italian legislation has adopted the requirements of the Directive without any additional requirements.

The view of the Italian competent authorities is that, while this medium could be useful, it is probably out of date in comparison with the online services available.

⁸¹ See http://www.mit.gov.it/mit/site.php?o=vc&lm=2&id_cat=225

F.8.1.4 Promotional material

The Italian legislation closely follows the requirements of the Directive with no additional requirements.

The Italian government considers that the provision of fuel consumption information in promotional material is useful but suggested that the requirements need to be updated to take into account the increasing use of internet by consumers. Furthermore they described some confusion regarding the requirements concerning the size of the characters used in the promotional material suggesting that this was unclear. A formal question has been raised with the Commission regarding this clarification requirement.

Feedback from the Ministry also suggested that the Directive is unclear about a number of elements including:

- Definitions (for example on groups of models, versions and types etc.). This makes the requirements too flexible, causes doubt for consumers and enterprises, and makes monitoring compliance more difficult.
- The dimensions of the text used in promotional literature leaves too much to interpretation. Feedback suggested that it would be useful to provide for a minimal dimension for fuel consumption/CO₂ emissions related text on promotional material, similar to information already provided for consumers on food and beverage (cfr. Regulation 1169/2011). The European Parliament report also suggested a similar measure (Ecologic et al., 2010).
- A specification for hybrid vehicles is also considered necessary. This is anticipated to be more relevant in the future as market share of alternatively fuelled vehicles rises.

F.8.1.5 Enforcement activities and compliance

The Ministry of Economic Development is responsible for implementation of the Directive, while the Chambers of Commerce are responsible for monitoring. The Ministry uses letters of instructions (circolare) to guide stakeholders and the Chambers of Commerce, competent bodies for market surveillance.

Penalties for non-compliance are in the range of €250 - €1000, however are usually fixed at €333.30.

Data relating to enforcement activities is not available for the whole period during which the Directive has been in force. However, according to the Ministry, a monitoring study conducted in 2011 showed that a total of 90 inspections were conducted in automobile concessionaries, with 17 cases of non-compliance (19%). Furthermore, from a total of 4,818 tests on advertisements in newspapers were carried out, 96 advertisements were deemed non-compliant (2%).

Another study examining the compliance of promotional material in Italy (Scopa, et al., 2016) examined a total of 902 car advertisements published in a popular monthly Italian car magazine during the period 2005-2009 and the second half of 2014. It found only partial compliance with the Directive requirements. More specifically, while inclusion of fuel consumption and CO₂ emissions information in adverts was very high (96.2% during the period 2005 - 2009 and 98% in 2014) the percentage of adverts explicitly reporting the model of the car to which the data referred was much lower. In the 2005 - 2009 period, on average, only 41.6% of advertisements correctly linked the specific model to CO₂ emissions and 41.5% correctly linked the specific model to fuel consumption. This was even less in 2014 (22% of adverts). There is also significant variation among different manufacturer groups (anonymised for privacy reasons), as can be seen in Figure F-31.

One explanation is that CO₂ emissions and fuel consumption are often expressed as ranges, rather than the exact values (Scopa, et al., 2016). However, publishing data in

this way makes it more difficult for consumers to quickly obtain the correct information and compare specific vehicles.

Figure F-31: Compliance of promotional material of different manufacturer groups with the Directive between 2005 and 2009.

Manufacturer group									
Type of information	1	2	3	4	5	6	7	8	9
CO ₂ emissions data included (%)	96.7	99.2	96.7	98.6	100	97.9	97.1	96.8	95.3
CO ₂ emissions correctly linked to model	38.3	99.2	93.4	6.9	16.7	2.1	30.4	0.0	34.3
Fuel consumption data included	94.5	99.2	96.7	98.6	100	100	95.6	98.4	95.3
Fuel consumption data correctly linked to model	37.8	99.2	93.4	6.9	16.7	2.1	29.4	0.0	34.3

Source: (Scopa, et al., 2016)

Concerning the readability of environmental information on promotional material was not, several observations were made (Scopa, et al., 2016):

- Fuel consumption and CO₂ emissions information were printed in a smaller typeface in almost all adverts.
- In over 50% of adverts the information was printed along the page margin or perpendicular to the main text.

The study concluded that data currently provided in adverts often presents incorrect or unclear information on environmental performance to potential car buyers.

F.8.2 Other relevant measures

Since the Directive was implemented in Italy, a number of other measures have been introduced which are expected to influence the passenger car CO₂ emissions and consumers' choices when it comes to buying passenger cars.

They include the 2009 CO₂ Regulation but also a range of fiscal measures introduced between 2001 and 2014:

- The annual ownership tax on vehicles is calculated based on EURO emissions standard, in addition to engine power
- Annual ownership tax exemptions for alternatively fuelled vehicles were also introduced
- An additional ownership tax for high powered vehicles was introduced in 2011

The annual ownership tax is imposed on all registered vehicles. The amount varies by region in which the car is registered and is based on a combination of:

- EURO emissions standard (EURO 5-6, EURO 4, EURO 3, EURO 2, EURO 1, EURO 0)
- Power of the engine (whether the power of the engine is less than 100 kW or greater than 100 kW)

There is however no linkage with the level of fuel consumption or the CO₂ emissions. Electric, LPG and CNG vehicles are also exempt from ownership tax for five years after

the date of first registration (ACEA, 2014). After 5 years, an exemption of 75% applies in many regions.

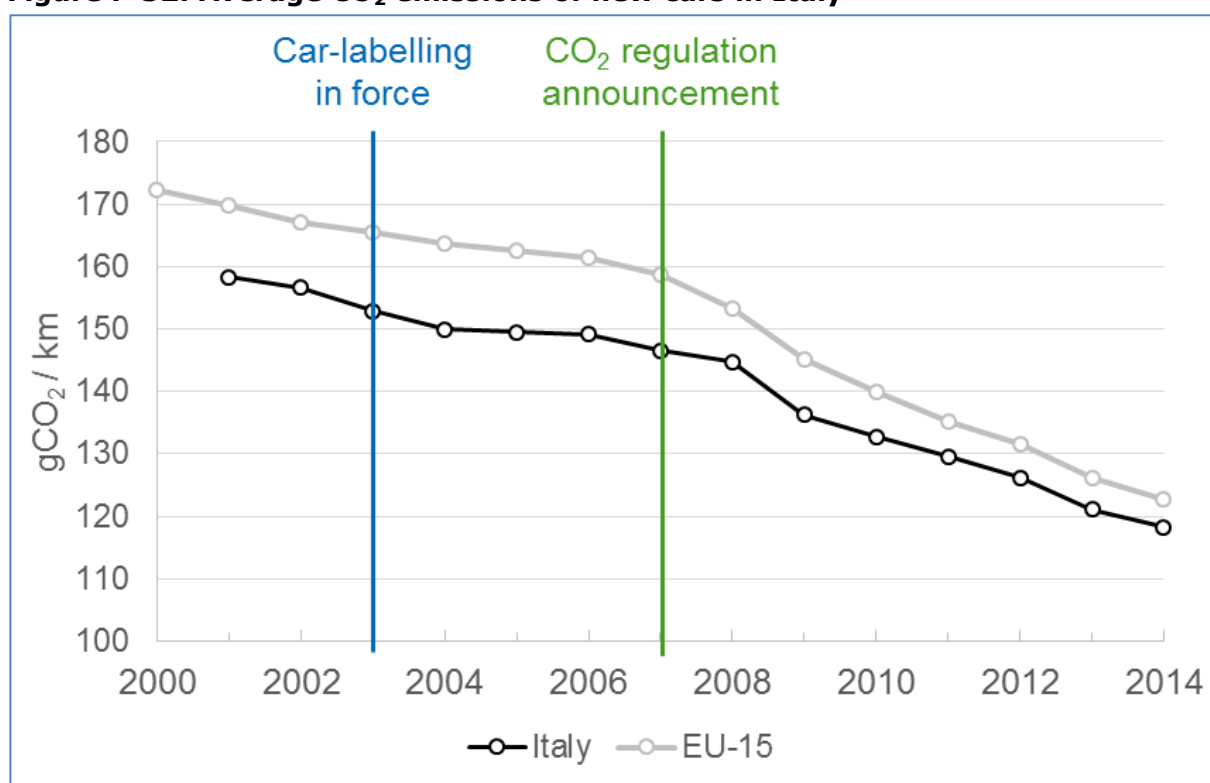
Furthermore, to incentivise the uptake of less polluting vehicles, an additional ownership tax ("superbollo") was introduced in 2011 targeting high powered vehicles, which resulted in a charge of €10 per kW for all vehicles above 225 kW. In 2012, the threshold was lowered to 185 kW and the charge was raised to €20 per kW over 185 kW. However, the charge is reduced after 5, 10, and 15 years after the vehicle was manufactured by 60%, 30% and 15% respectively (ACEA, 2014). 20 years after the date of manufacture the additional rate no longer applies.

F.8.3 Trends in new car registrations

F.8.3.1 Average CO₂ emissions of new cars

The analysis of the available data from the EEA shows that, since 2001, the average CO₂ emissions of new passenger cars have decreased from 158.3 gCO₂/km to 118.2 gCO₂/km in 2014. The trend in CO₂ reductions has generally followed the average for EU-15 countries but at a slightly slower rate (Figure F-32). This means that the difference in average CO₂ emissions between Italy and the EU-15 has gradually narrowed over time. In 2001, average CO₂ emissions of new passenger cars were 7% below the EU-15 average, whereas in 2014 this had reduced to 4% below the EU-15 average.

Figure F-32: Average CO₂ emissions of new cars in Italy



Source: (EEA, 2014)

Table F.8-1: Italy - Year on year reduction in average new car CO₂ emissions

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EU-15	1.5 %	1.0 %	1.1 %	0.7 %	0.7 %	1.7 %	3.5 %	5.3 %	3.7 %	3.4 %	2.6 %	4.2 %	2.6 %
Ital	1.1	2.4	1.9	0.3	0.2	1.8	1.2	5.8	2.6	2.3	2.6	4.0	2.4

y	%	%	%	%	%	%	%	%	%	%	%	%	%	%
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Notes: Green text indicates a percentage change greater than 0.5% above the EU-15 average; red text indicates a percentage change greater than 0.5% below the EU-15 average.

Source: (EEA, 2014)

F.8.3.2 New car registrations by label category

The Italian label does not include efficiency categories, therefore data by label category is not available.

F.8.4 Consumer response

F.8.4.1 Consumer recognition/awareness of the information

Unfortunately, information on the level of awareness and recognition of the car label among Italian consumers is not available and the stakeholders interviewed were not able to provide relevant estimates.

F.8.4.2 Interpretation and understanding of the information

Unfortunately, feedback on the interpretation by Italian consumers of the information provided is not available.

More generally, according to a government representative, consumers view official CO₂ emissions with scepticism due to the difference between official fuel consumption figures and those observed from their own driving experiences. This may be limiting the effectiveness of the Directive.

F.8.4.3 Utilisation of the information

Feedback from a government representative indicated that all elements of the Directive are useful for consumers, however they are out-of-date in comparison with information available online. Unfortunately, an estimate of the utilisation of information by Italian consumers is not available, however results from consumer preference surveys are included below as an indication of the importance of fuel consumption to Italian consumers.

Two consumer preference surveys carried out in Italy in 2008 show that 72% - 81% of Italian consumers considered fuel consumption to be an important characteristic required in a new vehicle. Specifically, 24% -34% consider it to be the main factor (AXA, IPSOS, 2009; UNRAE, Istituto Piepoli, Confcommercio, 2008).

Another survey, conducted out in 2009, aimed to measure the change in consumers' attitude in 2009, compared to in 2008, towards environment/pollution when deciding to buy a new vehicle. 49% of respondents answered that their opinion has changed a little, while 28% considered their opinion to have changed significantly. The main reasons were: because customers are afraid to exceed the limits for polluting emissions enforced by the municipalities (41%); because they want to save money on fuel consumption (25%); and because they know there are incentives (23%) (InterAutoNews, 2009).

F.8.5 Manufacturer response

A recent study analysing compliance with the Directive in Italy suggested that one of the most likely reasons average new car CO₂ emissions decreased between 2005 and 2009 is due to the introduction of the EURO 5 emissions standard in 2008 (Scopa, et al., 2016). Manufacturers are likely to have adapted their product range to comply with new emissions standards for toxic emissions and as a consequence may have also explored CO₂ emission reductions.

Unfortunately, no further information was identified relating to a manufacturer response in Italy.

F.8.6 Impact of the Directive on CO₂ emissions

Overall, while there has been a decrease in the average CO₂ emissions, there is limited evidence connecting this trend with the implementation of the Directive. While the government considers the provision of information on fuel consumption as relevant, it also considers that other forms of media need to be covered (internet and television) in order for the provision of information to have an effect.

It is also argued that the difference between official fuel consumption and CO₂ figures and those reported for real world driving conditions has caused distrust among consumers. This is another limiting factor of the effectiveness of the Directive.

Furthermore, there is no possible indirect impact through the use of fiscal measures – which focus on high powered vehicles – since there is no connection between the label and the tax incentives adopted.

F.8.7 Conclusions from the Italian case study

Analysis of the data collected during the Italian case study points to the following conclusions:

- Between 2001 and 2014, the average CO₂ emissions of new passenger cars in Italy have remained below the average for EU-15 countries, however in recent years the difference has been closing.
- Only a simple list format label (which does not include categories, or colour coding) is required in Italy. Unfortunately, the Ministry interviewed for this case study was not able to provide data on consumer recognition of the label, understanding of the information, or the level of utilisation of the information provided by the Directive.
- While consumer surveys show that Italian consumers value information on fuel efficiency and take this into consideration during their car buying decisions, stakeholder input indicated that consumers currently do not trust the fuel consumption and CO₂ emissions information that is provided. This is due to the difference between official CO₂ emissions figures and those observed for real-world driving conditions.
- In contrast to many other case study countries, there are no complementary fiscal measures working alongside the Directive in Italy. Vehicle taxes in Italy focus on engine power, rather than fuel efficiency or CO₂ emissions. This may be limiting the effectiveness of the Directive.

F.9 - Poland⁸²

F.9.1 Implementation of the Directive in Poland

The Directive has been fully implemented through articles 80a, 80b and 167 of the Environmental Protection Act (Dz.U. 2001 Nr 62 poz. 627 z późn. zm.) and subsequent regulations (Ecologic et al., 2010)

- Regulation of the Ministry of Economy and Labour of the 28th December 2004 on the products covered by the duty to provide information relevant from the point of view of environmental protection (Rozporządzenie Ministra Gospodarki i Pracy w sprawie produktów objętych obowiązkiem zaopatrzenia w informacje istotne z punktu widzenia ochrony środowiska z dnia 28 grudnia 2004 roku (Dz. U. 2005, nr 6, poz. 40))
- Ordinance of the Prime Minister of 29 April 2004 on the statements relevant to environmental information about products (Rozporządzenie Rady Ministrów w sprawie w sprawie zestawień istotnych z punktu widzenia ochrony środowiska informacji o produktach z dnia 29 kwietnia 2004 roku (Dz. U. 2004, nr 98, poz. 999))

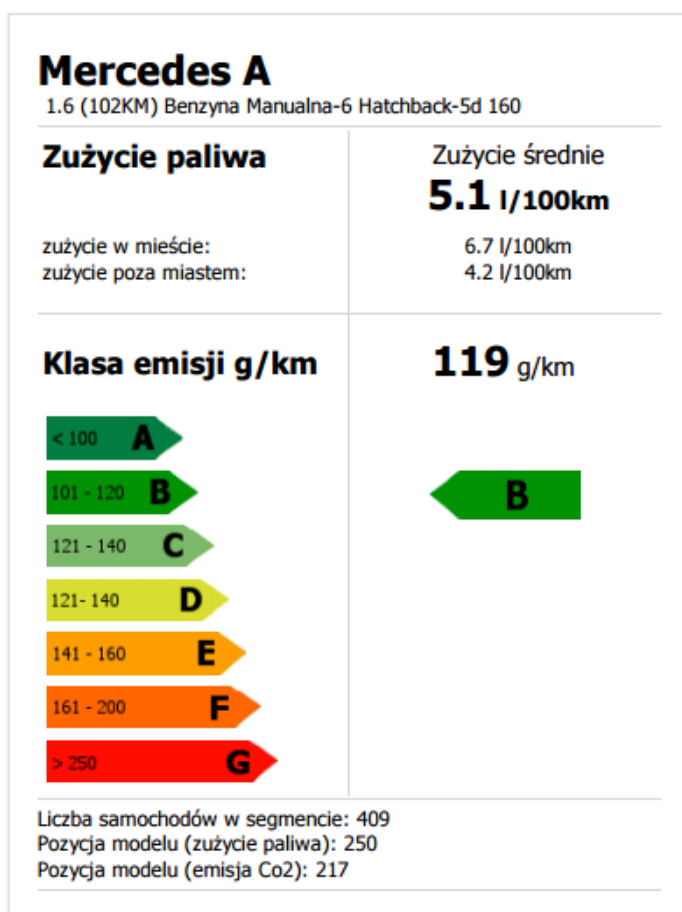
F.9.1.1 Car label

National legislation in Poland closely matches the requirements set out in the Directive. Polish national law permits additional information to be displayed on the car label – as a consequence, detailed technical information is often presented (Ecologic et al., 2010). The design or format of the label is not mandated in Poland.

Instead, it is the responsibility of car manufacturers or dealerships to devise their own labels, provided that the information required by the Directive is shown. Within this context, Samar (the Polish Car Market Institute) has voluntarily developed a feature on their website for car dealers to print labels for all vehicle models and variants currently offered for sale. The label has the same format as the EU energy label and classifies vehicles via an absolute system, based on the CO₂ emissions. An example label is shown in Figure F-33.

Information displayed on car labels is sourced from the Polish Liaison of Car Manufacturers (imported cars) or the Institute for Car Transport (Centre for Car Certification).

⁸² To support this case study an interview was carried out with a Polish automotive industry association

Figure F-33: Sample car label – Poland.

Source: (Samar, 2016)

F.9.1.2 Guide

In Poland the guide on fuel economy is updated once per year by the Polish Ministry of Transport. The information for the guide is provided by the Polish Liaison of Car Manufacturers and the Institute for Car Transport. Polish national legislation does not include an obligation to distribute printed copies of the guide; instead, it is published online⁸³. An online database allowing comparison of fuel economy information has also been developed by Samar, the Car Market Institute (AEA and TEPR, 2011; Ecologic et al., 2010; Samar, 2016).

F.9.1.3 Poster

The poster in Poland closely matches the requirements set out in the Directive. There are no additional requirements in the national legislation. The poster can be presented electronically at the point of sale (Ecologic et al., 2010).

⁸³ See the following link for the online version of the 2015 guide. The online version of the guide consists of a list of vehicles and their CO₂ emissions, fuel economy, engine capacity and engine power. No additional guidance is provided (for example, a reference to the Community's target for the average emissions of CO₂ from new passenger cars and the date of which the target should be achieved, as stated in Annex II of the Directive). https://www.mr.gov.pl/media/4236/informacja_o_zuzyciu_paliwa_i_emisji_CO2_w_samochodach_osobowych_31_03_15.pdf

F.9.1.4 Promotional material

Polish national legislation follows the Directive. There are no additional requirements beyond those set out by the Directive. No additional guidance material is published to support manufacturers with this aspect of the Directive (Ecologic et al., 2010). Promotional material does not include non-printed material in Poland.

F.9.1.5 Enforcement activities and compliance

Market inspectors check whether information on labels corresponds to the model of car. According to the European Parliament report, no violations have officially been recorded (Ecologic et al., 2010). A field study carried out in Poland found that compliance was generally high, however in some cases labels were not presented on the vehicle but in separate folders containing information related to the vehicle. No additional information about compliance with the Directive has been identified.

F.9.2 Other relevant measures

In addition to the car labelling Directive and EU car CO₂ Regulation, evaluation of relevant fiscal measures, or changes implemented during the same time period may help to explain the shift to lower CO₂ cars. Only one relevant change to passenger car taxation has been identified in Poland: an updated excise tax that entered into force in March 2009, based on the engine capacity (ACEA, 2014). No further fiscal measures related to the CO₂ emissions of new vehicles have been identified.

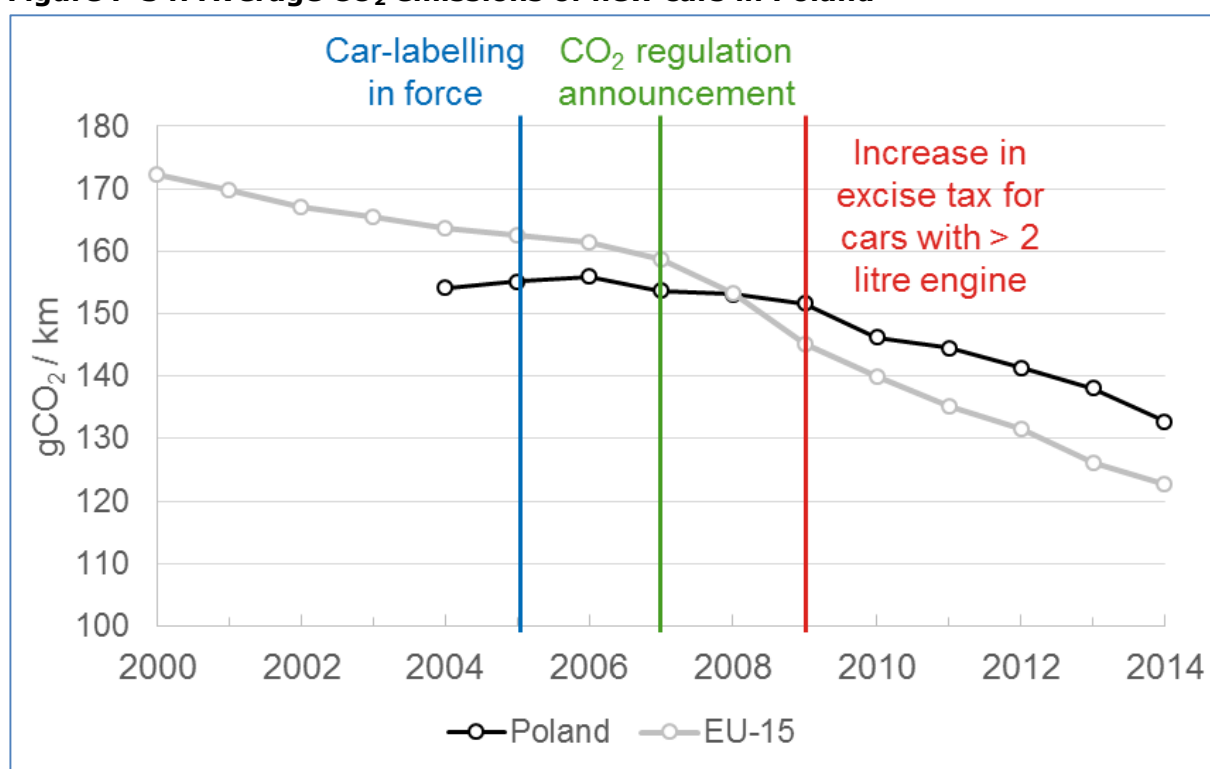
The new thresholds for the excise tax implemented in 2009 are as follows:

- Purchase of a new vehicle with up to 2 litres engine capacity = 3.1% tax (remained unchanged in 2008)
- Purchase of a new vehicle with greater than 2 litre engine capacity = 18.6% tax (prior to 2008 the tax was 13.6%).

F.9.3 Trends in new car registrations

F.9.3.1 Average CO₂ emissions of new cars

Data from the EEA (EEA, 2014) shows that average CO₂ emissions of new passenger cars have reduced from 154.1 gCO₂/km in 2004 to 132.7 gCO₂/km in 2014. As shown by Figure F-34, CO₂ emissions in Poland were lower than the EU average in 2004. However, average emissions remained relatively constant between 2004 and 2009 in Poland, meaning that since 2008, average emissions have been above the EU average. Since 2009, average new car emissions in Poland have started to decline, albeit not as rapidly as the trend seen at an EU level. In 2014, average new car CO₂ emissions in Poland were approximately 8% higher than the EU-27 average.

Figure F-34: Average CO₂ emissions of new cars in Poland

Source: (EEA, 2014)

Table F.9-1: Poland - Year on year reduction in average new car CO₂ emissions

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EU-15	0.7%	0.7%	1.7%	3.5%	5.3%	3.7%	3.4%	2.6%	4.2%	2.6%
Poland	-0.7%	-0.5%	1.4%	0.4%	1.0%	3.6%	1.2%	2.2%	2.3%	3.9%

Notes: Green text indicates a percentage change greater than 0.5% above the EU-15 average; red text indicates a percentage change greater than 0.5% below the EU-15 average.

Source: (EEA, 2014)

F.9.3.2 New car registrations by label category

The Polish label does not include efficiency categories, therefore it is not possible to collect data by label category.

F.9.4 Consumer response

F.9.4.1 Consumer recognition/awareness of the information

Feedback from the Polish automotive industry association interviewed as part of this project suggests that less than 25% of consumers recognise the label. There are no tools or programmes to promote the label or awareness about CO₂ emissions in Poland, which may have contributed to poor recognition. The low level of awareness about energy labels may also be because fiscal measures are not linked to CO₂ emissions.

Furthermore, a large percentage of car sales in Poland are used cars (there are an estimated 2-3 times as many used car sales than new car sales), where labels do not have to be displayed (Polish Automotive Industry Association (PZPM), 2016; 2015). Consequently, there is no guarantee that consumers are aware of the CO₂ emissions for a significant proportion of vehicles that are purchased. According to a representative from a Polish automotive industry association, CO₂ emissions are one of the least important factors considered when deciding which used car to buy.

No consumer studies have been carried out in Poland to assess the influence of car labels, perhaps due to the low level of interest and very low number of people aware of the issue.

F.9.4.2 Interpretation and understanding of the information

A representative from a Polish automotive industry association interviewed for this study estimated that less than 25% of consumers in Poland understand the label. A possible reason for this is because the presentation of information on the Polish label is not as easy to understand compared with the label for white goods and tyres. The labels often contain detailed technical information about the vehicle which are time consuming to read and may overload a typical consumer with information.

As part of the European Parliament study (Ecologic et al., 2010) representatives from the Ministry of Infrastructure and Samar commented that consumers are expected to understand the label without any additional information. However, the interviewees suggested that consumers usually do not understand, or do not read the information concerning CO₂ emissions.

The representative from the Polish automotive industry association suggested that the information provided by the guide to fuel economy is also difficult for consumers to understand. It is likely that only vehicle enthusiasts will spend time researching emissions levels of cars in the guide.

F.9.4.3 Utilisation of the information

Poor awareness of information provided by car labels and difficulties understanding this information are likely to lead to a low impact on buying decisions. This was confirmed by a representative from a Polish automotive industry association, who estimated that less than 25% of consumers will be influenced by the label.

The guide to fuel economy is rarely used in Poland, therefore this is unlikely to have an impact on consumer behaviour.

F.9.5 Manufacturer response

Unfortunately, no relevant information was identified regarding the manufacturer response to the Directive in Poland. However, new cars represent a much smaller share of the market in Poland, compared to sales of used cars, therefore the importance of the manufacturer response may be less significant compared to other countries.

While the manufacturer response remains important, it is also useful to understand the automotive market in Poland. A significant percentage of cars sales in Poland are for used cars. There are an estimated 2-3 times as many used car sales in the country; data from 2014 shows that there were 305,000 registrations of new passenger cars, while 740,000 used cars were imported (Polish Automotive Industry Association (PZPM), 2016; Polish Automotive Industry Association, 2015). Of these used cars, 50% were over 10 years old. These cars generally have higher CO₂ emissions than new cars. Furthermore, the display of car labels is not mandatory for used cars and CO₂ emissions are not recorded on registration documents in Poland.

Considering the above, it could therefore be argued that greater focus on providing information concerning the environmental performance of used cars would be relevant and useful for consumers in Poland.

F.9.6 Impact of the Directive on CO₂ emissions

The Directive appears to have had little impact in Poland in terms of average CO₂ emissions of new passenger cars due to a number of reasons:

- The low level of awareness and understanding of the label and the information provided
- There are no supporting fiscal measures linked to cleaner vehicles

First of all, the evidence collected shows a low consumer awareness, understanding and utilisation of the label. The automotive industry representative suggested that a label design similar to the EU energy efficiency label would improve ease of understanding. Addition of cost information to allow consumers to better understand the total cost of ownership was also expected to stimulate a consumer response. The guide is thought to be a good idea, however not in its current format (see Section F.9.4.2) as the information presented is too technical for typical consumers to understand. The poster is not thought to be relevant in Poland.

Secondly, the lack of any fiscal measures directly linked to CO₂ emissions means that there are no clear incentives to owning cleaner vehicles. Although the purchase tax for new vehicles is connected to vehicle engine capacity, this is not sufficient to impact the vehicle fleet as new car sales only account for a small proportion of overall sales. Since 2008 (when the tax for the purchase of new vehicles changed) there has been a decrease in average new car CO₂ emissions, however stakeholders attributed this to technological advances. One of the only incentives for owning a low CO₂ car in Poland is 'feeling green'. This is often not enough incentive to effect a change in consumer behaviour.

Besides the limited role of the label in new car sales, a key issue is the limited relevance of the label for car sales as a whole in Poland. This is because the label does not cover used vehicles, which represent over 65% of vehicles sales in Poland. These cars tend to be older (over 10 years) and have higher CO₂ emissions than new cars. Consequently, consumers are not aware of the CO₂ emissions of the vehicles being purchased since labels are not mandatory for used cars and CO₂ emissions are not recorded on registration documents. Stakeholders interviewed for this study therefore questioned the relevance of the Directive in its current form for countries with a high percentage of used car sales, such as Poland.

An automotive industry representative also expressed a concern that the exclusion of used vehicles from the Directive raises the cost of buying new versus used vehicles in Poland. The incentives in place in other EU countries to buy cleaner vehicles (and also penalties for owning vehicles with higher emissions) result in a higher number of older vehicles being exported to countries where there are no fiscal measures to limit ownership of vehicles with high CO₂ emissions. This means that more used vehicles will be bought in Poland and the problem of higher CO₂ emissions is shifted to countries where there are no benefits of owning low emission vehicles. For example, in Poland, used vehicles are often imported from countries with stricter CO₂ linked fiscal measures such as Germany.

F.9.7 Conclusions from the Polish case study

Analysis of the evidence collected for the Polish case study indicates the following conclusions:

- Although average new car CO₂ emissions have been decreasing since 2009, the Directive has had limited impact in Poland. Currently, new car CO₂ emissions are decreasing at a rate lower than the EU-15 average.
- The input from the Polish automotive industry association carried out for this case study suggests that the overall awareness about information related to fuel

consumption and CO₂ emissions is low and that the current label design is difficult for consumers to understand.

- The Directive in its current form has less relevance for Poland compared to other EU countries, due to the high proportion of used car sales. The provision of fuel consumption and CO₂ emissions information is not mandatory for used cars, therefore consumers may not be aware of the environmental performance for a significant percentage of car purchases in Poland.

F.10 - Spain⁸⁴

F.10.1 Implementation of the Directive in Spain

Directive 1999/94/EC was transposed into the Spanish legislation in August 2002 under the "Real Decreto 837/2002, de 2 de Agosto, por el que se regula la información relativa al consumo de combustible y a las emisiones de CO₂ de los turismos nuevos que se pongan a la venta o se ofrezcan en arrendamiento financiero en territorio español" (Royal Decree 837/2002, of 2 August, by which information on fuel consumption and CO₂ emissions of new passenger cars offered for sale or offered for lease in Spanish territory is regulated). This was subsequently amended by Government Decision no. 343 of 18th March 2004.

F.10.1.1 Car label

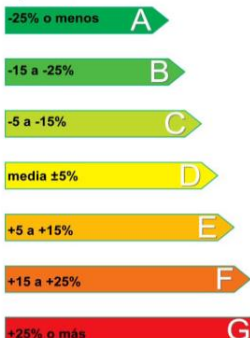

A relative labelling system is used in Spain to classify vehicles, which shows how CO₂ emissions compare to an average car of the same segment. It uses the vehicle footprint/area to determine the relative performance (AEA and TEPR, 2011). The label design is similar to the EU Energy Label, with seven colour coded categories (A to G), as shown in

⁸⁴ To support this case study an interview was carried out with a Spanish competent authority

Figure **F-35**.

Figure F-35: Car label - Spain

Eficiencia Energética

Marca	XXXXXXXXXX
Modelo	XXXXXXXXXX
Tipo de Carburante	Gasolina
Transmisión	Manual
Consumo de Carburante (litros por cada 100 kilómetros)	X litros/100km
Equivalencia (kilómetros por litro)	XX,XX km/litro
Emisión de CO ₂ (gramos por kilómetro)	XXX g/km
Bajo Consumo  Alto Consumo	

* En todos los puntos de venta puede obtenerse gratuitamente una guía sobre el consumo de combustibles y emisiones de CO₂ en la que figuran los datos de todos los modelos de automóviles de turismo nuevos.

* El consumo de combustible y las emisiones de CO₂, no sólo dependen del rendimiento del vehículo; también influyen el comportamiento al volante y otros factores no técnicos. El CO₂ es el principal gas de efecto invernadero responsable del calentamiento del planeta.

Source: (IDAE, n.d.)

The thresholds for each label category are shown in Table F.10-1.

Table F.10-1: Car label categories - Spain

Label category	Relative scale
A	- 25% or less
B	-15% to -25%
C	-5% to -15%
D	+/- 5%
E	+5% to +15%
F	+15% to +25%
G	+25% or more

Source: (IDAE, n.d.)

F.10.1.2 Guide

The Institute for Energy Diversification and Saving of Energy, IDAE (Instituto para la diversificación y ahorro de la energía), is responsible for the production of the guide on fuel economy in Spain. The guide to fuel economy is updated very often (once per month) by vehicle manufacturers and can be downloaded online.

IDAE has also established an online database⁸⁵, which contains information about all new cars offered for sale in Spain. The database is continuously updated by car manufacturers as new vehicles become available and is fully searchable so that consumers can use it to compare vehicles before making purchasing decisions.

Activities related to the guide go beyond the requirements set out in the Directive, with the following additional information included (AEA and TEPR, 2011):

- Provision of information on alternative clean technology vehicles and fuel, including hybrids, fuel cell and electric cars; and natural gas, LPG and bioethanol.
- Database of detailed information and comparative information on fuel consumption and characteristics of new cars offered for sale in Spain.

F.10.1.3 Poster

The national legislation in Spain closely follows the requirements set out in the Directive without any additional requirements.

F.10.1.4 Promotional material

Similarly, the national legislation in Spain closely follows the requirements set out in the Directive without any additional requirements.

F.10.1.5 Enforcement activities and compliance

Regional authorities are responsible for monitoring the Directive in Spain, however no statistics on the level of compliance have been collected in recent years. Furthermore, according to IDAE, there have not been an annual inspection programme for a number of years. It is estimated that enforcement of the Directive costs around €40,000 per year, mainly related to the management of the database of vehicles maintained by IDAE.

IDAE estimated that compliance in car showrooms is low, although the organisation is not aware of any penalties for non-compliance. The last known compliance report was published in 2010 by the National Consumer Institute (Instituto Nacional del Consumo)⁸⁶ and reported a 10% non-compliance (AEA and TEPR, 2011).

F.10.2 Other relevant measures

The evaluation of fiscal, or other relevant measures implemented since the car labelling Directive has come into force may help to explain changes in the CO₂ emissions of new passenger cars in Spain.

Besides the EU CO₂ Regulation, only one relevant change to passenger car taxation has been identified in Spain: a reform of the vehicle registration tax (Impuesto Especial sobre Determinados Medios de Transporte - IEDMT) in January 2008 to become linked to CO₂ emissions (Freire-González & Puig-Ventosa, 2013).

Prior to 2008, IEDMT was calculated based on a combination of the market value of the car, engine size and fuel type. For petrol vehicles with an engine size lower than 1,600 cm³ and diesel vehicles with an engine displacement lower than 2,000 cm³ the rate was 7%, while a rate of 12% was levied on all other vehicles.

The tax was reformed in 2008 to encourage the uptake of low emission vehicles and is now based on the CO₂ emissions (ACEA, 2014). The rates in mainland Spain are calculated in relation to the market value of the vehicle and are as follows:

⁸⁵ Available at <http://coches.idae.es/>

⁸⁶ Currently operating as part of the Agency for Consumer Affairs, Food safety and Consumption (AECOSAN)

- $<120 \text{ g/km} = 0\%$
- $120 - 160 \text{ g/km} = 4.75\%$
- $160 - 200 \text{ g/km} = 9.75\%$
- $>200 \text{ g/km} = 14.75\%$

The registration tax is the responsibility of Regional Governments (Comunidades Autónomas). The Regional Governments can apply to increase the tax rates by up to 15%, or include deductions or exemptions (ACEA, 2014) if deemed necessary. An econometric analysis recently conducted indicated that the tax reform had a positive effect on the reduction of CO₂ emissions of new passenger cars (Freire-González & Puig-Ventosa, 2013), however further data is required to further quantify the effect.

The only other tax on passenger cars in Spain is the annual road tax (impuesto sobre vehículos de tracción mecánica – IVTM), which is calculated based on engine power (Freire-González & Puig-Ventosa, 2013). However there have been no significant modifications to this tax since the implementation of the Directive.

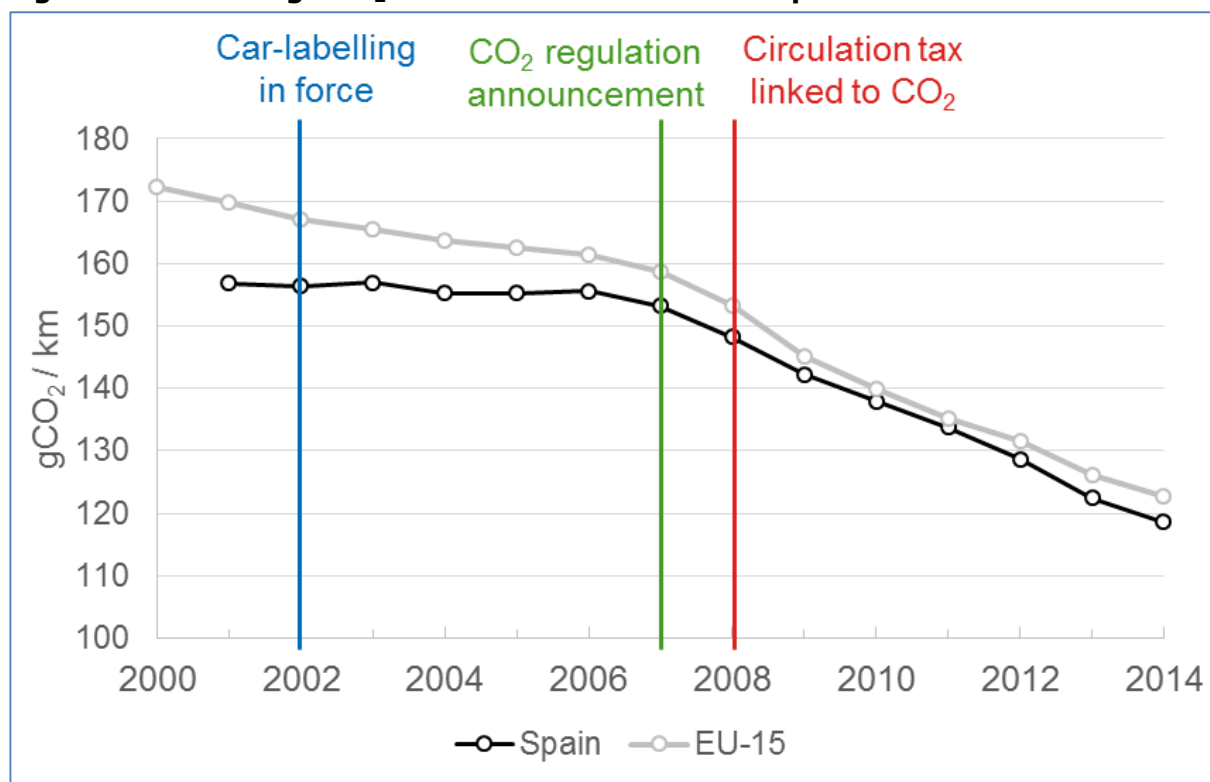
Besides fiscal measures, several initiatives have also been established in Spain to support the purchase of energy label 'A' vehicles. For example, inputs from IDAE indicated that 20% of State purchased vehicles must be Class A.

F.10.3 Trends in new car registrations

F.10.3.1 Average CO₂ emissions of new cars

Data from the EEA shows that since 2001, the average CO₂ emissions of new passenger cars has decreased from 156.8 gCO₂/km to 118.6 gCO₂/km in 2014 (EEA, 2014). The trend in CO₂ reductions has generally followed the average for EU-15 countries but at a slower rate (Figure F-36), particularly from 2001 – 2006. This means that the difference in average CO₂ emissions between Spain and the EU-15 has gradually narrowed over time. In 2001, average CO₂ emissions of new passenger cars were 8% below the EU-15 average, whereas in 2014 this had reduced to 3% below the EU-15 average.

Figure F-36: Average CO₂ emissions of new cars in Spain



Source: (EEA, 2014)

Table F.10-2: Spain - Year on year reduction in average new car CO₂ emissions

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EU-15	1.5 %	1.0 %	1.1 %	0.7 %	0.7 %	1.7 %	3.5 %	5.3 %	3.7 %	3.4 %	2.6 %	4.2 %	2.6 %
Spain	0.3 %	-0.4 %	1.1 %	0.0 %	-0.2 %	1.5 %	3.3 %	4.0 %	3.0 %	3.0 %	3.8 %	4.9 %	3.1 %

Notes: Green text indicates a percentage change greater than 0.5% above the EU-15 average; red text indicates a percentage change greater than 0.5% below the EU-15 average.

Source: (EEA, 2014)

F.10.3.2 New car registrations by label category

Unfortunately, data on the number of car registrations by label category in Spain are not available.

F.10.4 Consumer response

F.10.4.1 Consumer recognition/awareness of the information

In terms of consumer recognition and awareness of the car labelling information tools, there are no relevant studies or other data available. However, the representative from IDAE considered that implementation of the Directive has had benefits in terms of increasing public awareness about the energy efficiency of cars.

Several initiatives have also been established in Spain to support the purchase of energy label 'A' vehicles. For example, inputs from IDAE indicated that 20% of State purchased vehicles must be Class A.

F.10.4.2 Interpretation and understanding of the information

A representative from IDAE interviewed as part of this study rated the effectiveness of each element of the Directive in terms of informing consumers of the CO₂ performance/fuel consumption of new cars. All elements were ranked on a scale of 1 (least effective) – 5 (most effective). The results indicated that the label and the guide are the most effective elements in Spain (both were given a ranking of 3). The poster and the promotional material are thought to be less effective and were both given a ranking of 2.

F.10.4.3 Utilisation of the information

No studies investigating consumer utilisation of the information provided by the car label have been identified for Spain. However, IDAE suggested that the poster and promotional material are the least effective elements of the Directive.

F.10.5 Manufacturer response

A 2012 survey of the Spanish car market revealed that over 60% of cars are labelled with an A, B, or C category label (Galarraga, Ramos, Lucas, & Labandeira, 2014). There is no indication about how this has changed over time. Unfortunately no further information regarding the manufacturer response has been identified for Spain.

F.10.6 Impact of the Directive on CO₂ emissions

There is rather limited evidence of the role and effectiveness of the car labelling Directive in Spain, however the evidence collected suggests that the Directive has contributed towards increased awareness.

This is supported by a representative from IDAE, who informed us that car labels have led to increased environmental awareness among Spanish consumers, however further benefits could not be assessed. Energy labels have also become a useful tool during the

allocation/tendering process for the purchase of energy efficient state vehicles, with a certain percentage of vehicles expected to be 'A' category.

The willingness to pay for energy efficiency can also be used as an indication of the impact of the Directive on consumers. A study published in 2014 estimated the willingness to pay for energy efficient vehicles in Spain using a hedonic pricing model (Galarraga, Ramos, Lucas, & Labandeira, 2014). It demonstrated that vehicles with A or B category labels are sold for prices 3.0 – 5.9% higher than similar vehicles in less efficient label categories.

Finally, it is thought that the label would be more effective if it supported environmental policies at a local level. To achieve this, the representative from IDAE reiterated that the label should contain additional information about other pollutants that may be causing local air quality problems, such as NO_x and particulate matter. Linking these factors with the label and appropriate incentives could encourage greater uptake of clean vehicles.

F.10.7 Conclusions from the Spanish case study

Analysis of the information gathered during the Spanish case study indicates the following conclusions:

- The label has played a role in raising consumer awareness about the environmental performance of new vehicles.
- Econometric studies have shown an increased willingness to pay for energy efficient vehicles in Spain. These have been linked to the presence of the label and the registration tax reform in 2008.
- Evidence for additional impacts is not available.
- Fiscal measures such as the change to vehicle registration tax in 2008 have also played a key role in the decreasing emissions of new passenger cars in Spain. However, the role of the label in supporting the change to vehicle registration tax is not clear based on the data available.

F.11 - Summary of average new car CO₂ emissions data for case study countries

Table F.11-1: Average new car CO₂ emissions and percentage reductions between 2001-2013 and 2004-2013

	Average new car CO ₂ emissions			% reduction in average new car CO ₂ emissions	
	2001	2004	2014	2001-2014	2004-2014
EU-15	169.7	162.6	122.8	27.6%	24.5%
France	159.8	152.3	114.2	28.5%	25.0%
Germany	179.5	173.4	132.5	26.2%	23.6%
United Kingdom	177.9	169.7	124.6	30.0%	26.6%
Denmark	172.9	163.7	110.2	36.2%	32.7%
Netherlands	174.0	169.9	107.3	38.3%	36.8%
Austria	165.6	162.1	128.6	22.4%	20.7%
Czech Republic	Data not available	155.3	131.8	N/A	15.2%
Italy	158.3	149.5	118.2	25.3%	20.9%
Poland	Data not available	155.2	132.7	N/A	14.5%
Spain	156.8	155.3	118.6	24.4%	23.6%

Notes: The first year for which data was available for Poland and the Czech Republic is 2004. Source: (EEA, 2014)

Table F.11-2: Year on year reduction in average new car CO₂ emissions 2001-2013

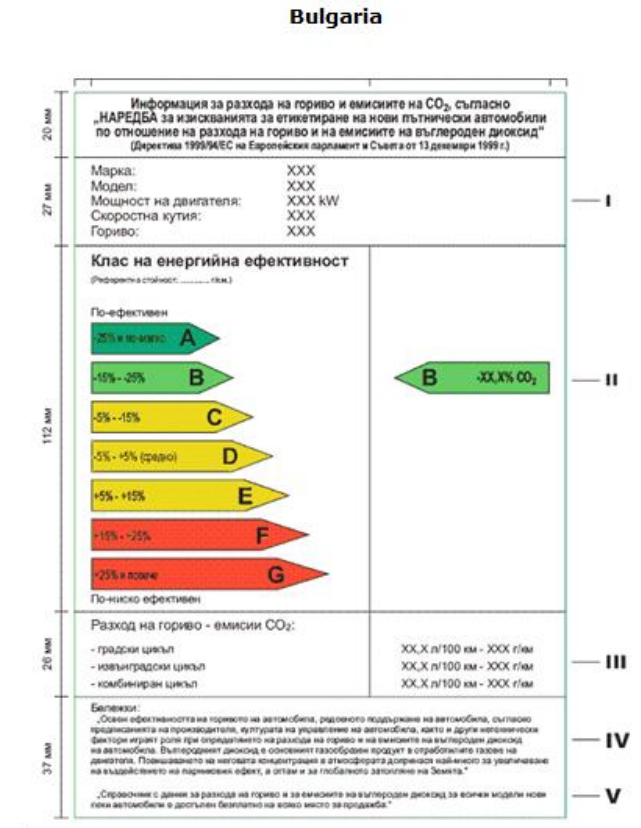
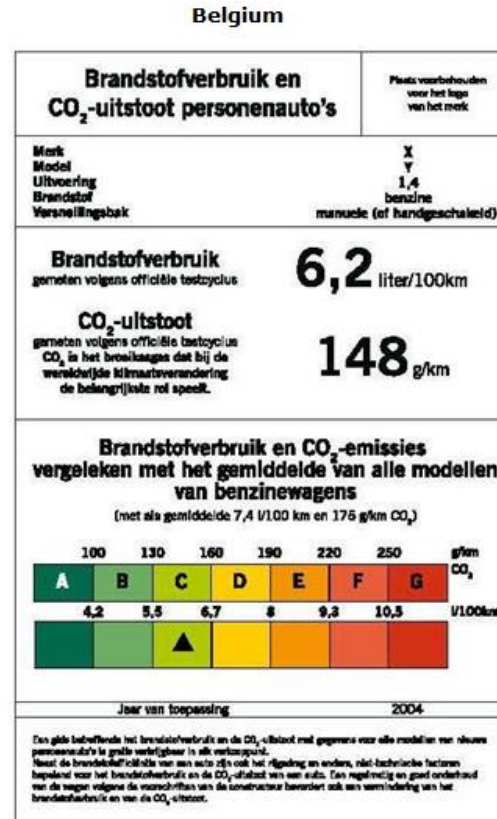
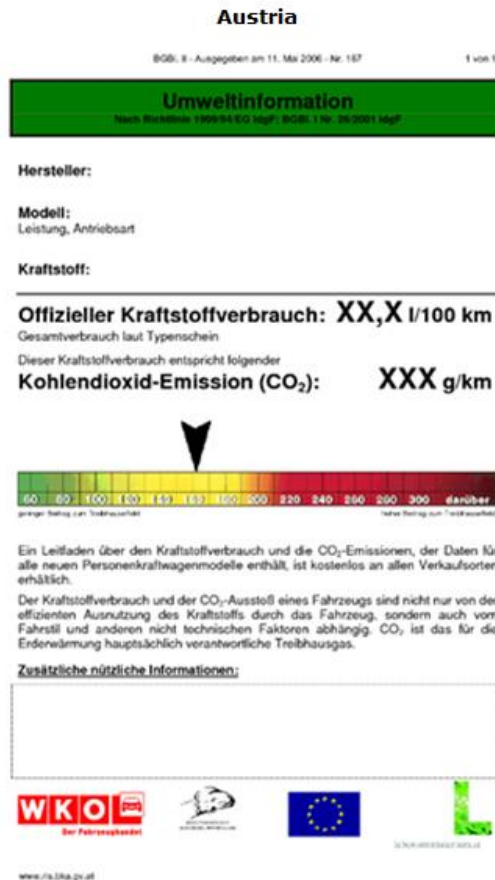
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EU-15	1.5%	1.0%	1.1%	0.7%	0.7%	1.7%	3.5%	5.3%	3.7%	3.4%	2.6%	4.2%	2.6%
France	1.9%	1.1%	1.2%	0.5%	1.6%	0.3%	6.2%	4.7%	2.2%	2.1%	2.6%	5.6%	2.7%
Germany	1.2%	0.8%	0.6%	0.9%	0.5%	1.7%	2.8%	6.6%	1.9%	3.6%	2.7%	3.9%	2.7%
United Kingdom	1.7%	1.2%	0.8%	1.0%	1.2%	1.8%	3.9%	5.4%	3.7%	4.3%	3.7%	3.5%	2.9%
Denmark	1.7%	0.6%	1.8%	1.3%	0.7%	1.7%	8.4%	5.0%	9.0%	1.3%	6.4%	3.7%	2.2%
Netherlands	0.9%	-0.6%	1.4%	0.6%	1.9%	1.1%	4.9%	6.3%	7.6%	7.1%	5.9%	8.0%	1.6%
Austria	0.7%	0.4%	1.2%	-0.1%	-1.0%	0.5%	2.9%	5.0%	4.1%	3.7%	2.2%	3.0%	2.3%
Czech Republic				-0.8%	0.7%	0.0%	-0.1%	-0.7%	4.2%	3.0%	2.6%	4.4%	2.1%
Italy	1.1%	2.4%	1.9%	0.3%	0.2%	1.8%	1.2%	5.8%	2.6%	2.3%	2.6%	4.0%	2.4%

Ex-post evaluation of Directive 1999/94/EC

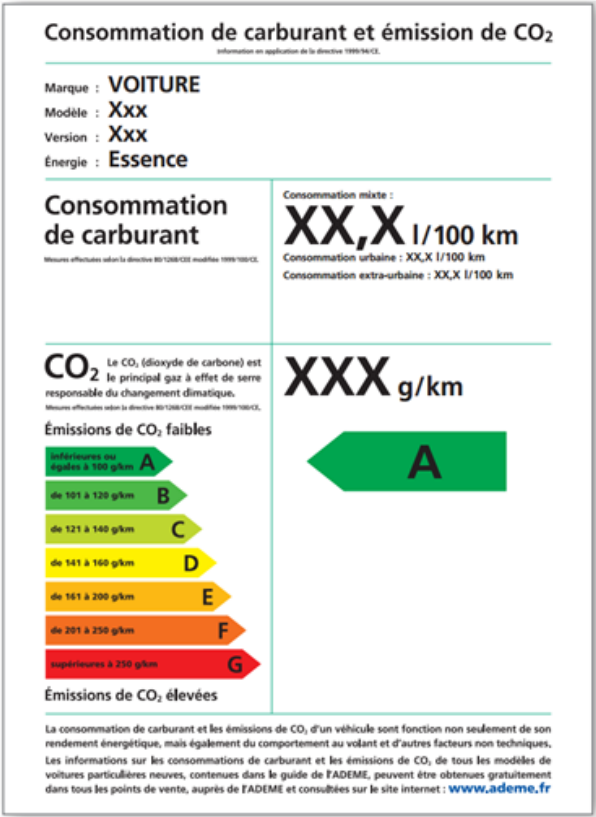
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Poland				-0.7%	-0.5%	1.4%	0.4%	1.0%	3.6%	1.2%	2.2%	2.3%	3.9%
Spain	0.3%	-0.4%	1.1%	0.0%	-0.2%	1.5%	3.3%	4.0%	3.0%	3.0%	3.8%	4.9%	3.1%

Notes: Green text indicates a percentage change greater than 0.5% above the EU-15 average; red text indicates a percentage change greater than 0.5% below the EU-15 average. Source: (EEA, 2014)

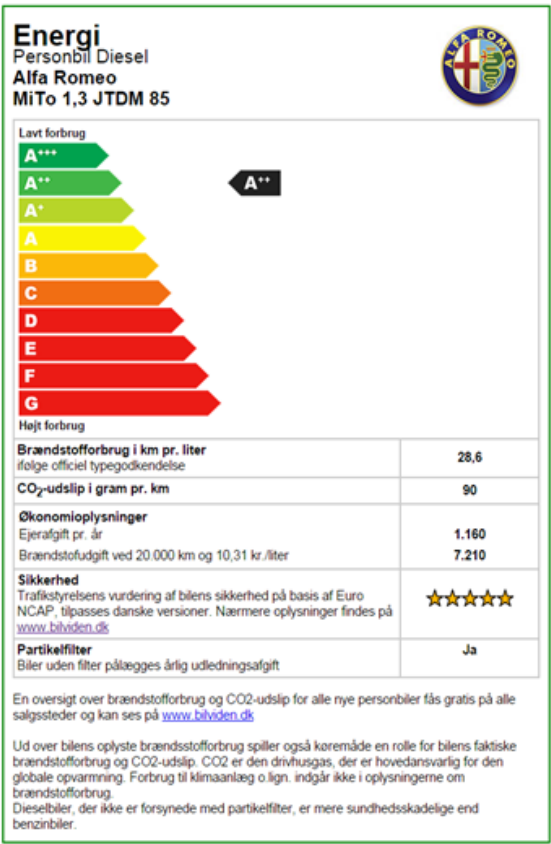
Annex G : EU CAR LABELS



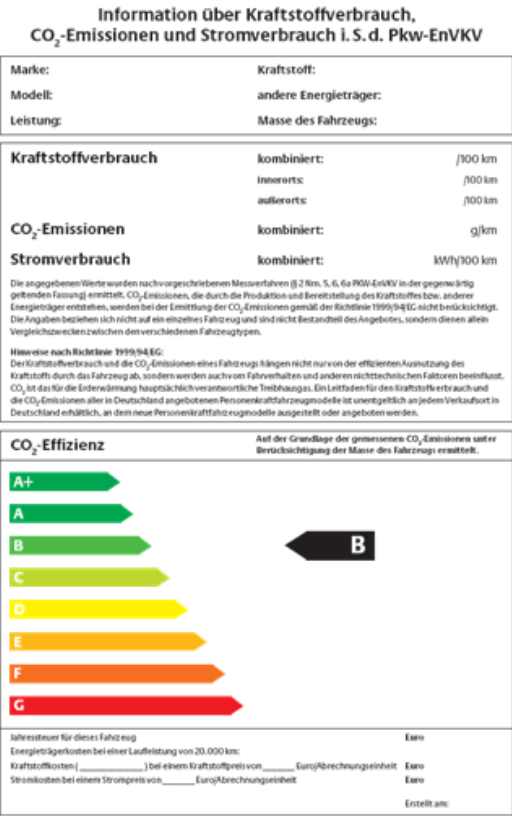
France




Denmark



Germany



Estonia



Maanteeamet

Energiateave ja CO₂ heitkoguse informatsioon
Märksa trükkid 11.11.2015

Audi A4, bensiin

02.01.2014

B
CO₂ heitkogus:
102 g/km

Keskmine kütusekulu:
6,75 l/100 km

Energia klass ja CO₂ heitkogus

Klass	CO ₂ heitkogus (g/km)
A	< 90
B	90 - 120
C	121 - 150
D	151 - 180
E	181 - 200
F	201 - 250
G	> 250

Kütusekulu 100 km kohta

Keskmine: **6,75 l**
Linnas: **8 l**
Maanteed: **5,5 l**

Keskmine kütuse maksumus

Aastas: **7819 €**

* Hinnang põhineb keskmisel kütusekulul 10 000 km kohta.

Kütuse hind on määratud eelmise kalendriaasta hinnangulise keskmise bensiini 1,240 €/l.

Keskkonnaalane teave

Kütusekulu ja süsinikdioksiidi heitkoguse teatmik, mis sisaldab andmeid kõigi uute sõidautomodelite kohta, on tasuta saadaval kõigis uute sõidautode müügikohtades ja elektrooniliselt nähtav Maanteeameti veebilehel.

Sõiduauto kütusekulu ja süsinikdioksiidi heitkoguse hulka mõjutavad ka sõidustil ning muud tegurid, mis ei ole tehnilist laadi. Süsinikdioksiid on põhiline kliima globaalset soojenemist põhjustav kasvuhoonegaas.

Antud mudeli teistsuguste konfiguratsioonide puhul võib CO₂ heitkogus erineda. Lisainfo saamiseks palume pöörduda teenindaja poole.


Spain

Eficiencia Energética	
Marca	XXXXXXXXXX
Modelo	XXXXXXXXXX
Tipo de Combustible	Gasolina
Transmisión	Manual
Consumo de Combustible (litros por cada 100 kilómetros)	X litros/100km
Equivalencia (kilómetros por litro)	XX.XXkm/litro
Emisión de CO ₂ (gramos por kilómetro)	XXX g/km
<p>Bajo Consumo</p> <p>23% o menos A</p> <p>15 a 23% B</p> <p>5 a 15% C</p> <p>media 15% D</p> <p>5 a 15% E</p> <p>15 a 25% F</p> <p>25% o más G</p> <p>Alto Consumo</p>	


* En todos los puntos de venta puede obtenerse gratuitamente una guía sobre el consumo de combustibles y emisiones de CO₂ en la que figuran los datos de todos los modelos de automóviles de turismo nuevos.

* El consumo de combustible y las emisiones de CO₂, no sólo dependen del rendimiento del vehículo; también influyen el comportamiento al volante y otros factores no técnicos. El CO₂ es el principal gas de efecto invernadero responsable del calentamiento del planeta.

Finland



Trafi
LIIKENTEEN TURVALLISUUSKESKUS



Lisenssi- ja rekisterivirasto
Liikenne- ja viestikansio

Merkki ja malli
Dacia Sandero 1,2 16V 75
Tiedot tulostettu 20.6.2016 14:12:04

Auton päästöluokka ja polttoainetaloudellisuus

CO₂ -päästöraajat (g/km)

101	A
101-120	B
121-130	C
131-150	D
151-175	E
176-200	F
> 200	G

CO₂ -päästö ja päästöluokka

Tavoite EU:ssa myytävän saman painoisen auton CO₂-päästöle

Polttoainekustannukset (18000km)
1 420 EUR/vuosi

Esitetty kustannus perustuu keskilukulutukseen ja arvioon polttoaineen keskihinnasta kuluvalle vuodelle. Keskihinnat ovat 1,36 €/l bensiinille, 1,26 €/l dieselöljylle ja 1,41 €/kg maakaasulle.

Vuotuinen ajoneuvovero
160,67 EUR/vuosi

Vuotuinen perusvero ja käyttövoimaverot perustuvat auton käyttöönottopäivän, kokonaismassan ja käyttövoimaan.

Käyttövoima
Bensiini

Melu (db)
 Melu paikallaan (db) 79
 Ohiajamelu (db) 72

Polttoaineenkulutus (l/100 km)
 Yhdistetty 5,8
 Maantie 4,9
 Kaupunki 7,4

Mallisarjan CO₂-päästöt (g/km)
 Sandero 98 - 130


Muut päästöt (g/km)
Päästöluokka Euro 6

5,8	Typenoksidit (NOx)		max 0,06
4,9	Hiilivedyt (HC)	0,01	
7,4	Hiilimonoksidi (CO)	0,04	max 0,10
		0,35	max 1,00

Kunkin päästön suuruus on suhteutettu Euro 6-normin raja-arvoihin.

Auton polttoainekustannusten laskelman pohjana oleva kulutusluku ja hiilidioksidipäästöarvo perustuvat auton EU-tyyppilyäkityksen edellyttämien testien, ajoneuvon polttoainekulutuksen ja siten myös hiilidioksidipäästöihin vaikuttavat merkittävästi myös mm. ajotapa, auton kuormitus, autoon asennettujen renkaiden ominaisuudet ja ajon aikainen säätö. Autoiluun liittyviä valinnoilla voit vähentää merkittävästi ilmastoon lämpenemistä aiheuttavia hiilidioksidipäästöjä.

Ireland

Vehicle Information		
CO ₂ emission figure (g/km)		
		
		A 104 g/km
Fuel Use (estimated) for 15,000 kilometres A fuel use figure is indicated to the consumer as a guide for comparison purposes. This figure is calculated by using the combined drive cycle (urban and extra urban fuel consumption cycles).		
		774 litres
Motor Tax for 12 months Motor Tax varies according to the CO ₂ emissions of the vehicle.		
		€104
Vehicle Registration Tax (VRT) Rate Percentage rate of VRT payable of the value of the vehicle is dependent on the CO ₂ emissions.		
		14%
Environmental Information A guide on fuel economy and CO ₂ emissions which contains data for all new passenger car models is available at any point of sale free of charge or directly from the Society of the Irish Motor Industry, 5 Upper Perinckoe Street, Dublin 2, Tel: 01-4781690, web address: www.simi.ie. In addition to the fuel efficiency of a car, driving behaviour as well as other non-technical factors play a role in determining a car's fuel consumption and CO ₂ emissions. CO ₂ is the main greenhouse gas responsible for global warming.		
Make:		
Model/Version:		
Carbon dioxide emissions (g/km): 104 g/km This figure may be obtained from the vehicle's Certificate of Conformity. Important note: Some specifications of this make/model may have lower CO ₂ emissions than this. Check with your dealer.		
Fuel Consumption:	Litres/100km	Fuel Type: Petrol Engine Capacity (cc): 1887 Transmission: Automatic
Drive cycle		
Urban	3.0	
Extra-urban	4.2	
Combined	4.3	

Portugal

INFORMAÇÃO SOBRE ECONOMIA DE COMBUSTÍVEL E EMISSÕES DE CO₂

FORD

Marca / Modelo / Versão	FORD S-MAX 2.2TDCi 200CV - 5 portas
Cilindrada / Transmissão	2179 cc / Manual
Combustível	Gasóleo
Consumo de combustível *	6.6 litros / 100 km
Emissão CO ₂ *	174 g / km

* Conforme a Diretiva 1999/94/CE


Consumo de Combustível



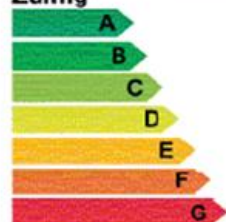

Está disponível gratuitamente em todos os pontos de venda, um guia sobre a economia de combustível e as emissões de CO₂ contendo os dados relativos ao consumo de combustível de todos os modelos de automóveis novos de passageiros.

Para obter os dados em termos de consumo de um automóvel, o tipo de condução, bem como outros fatores, não técnicos, influenciam a determinação do consumo de combustível e das emissões de CO₂.

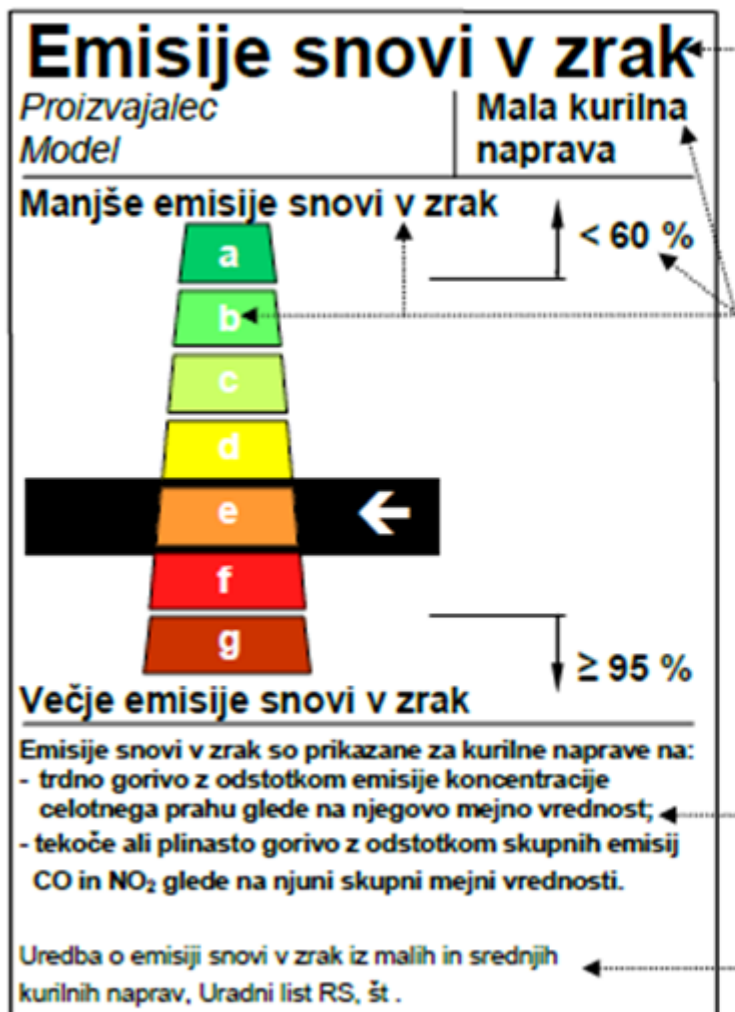
O CO₂ é o principal gás com efeito de estufa responsável pelo aquecimento do planeta.

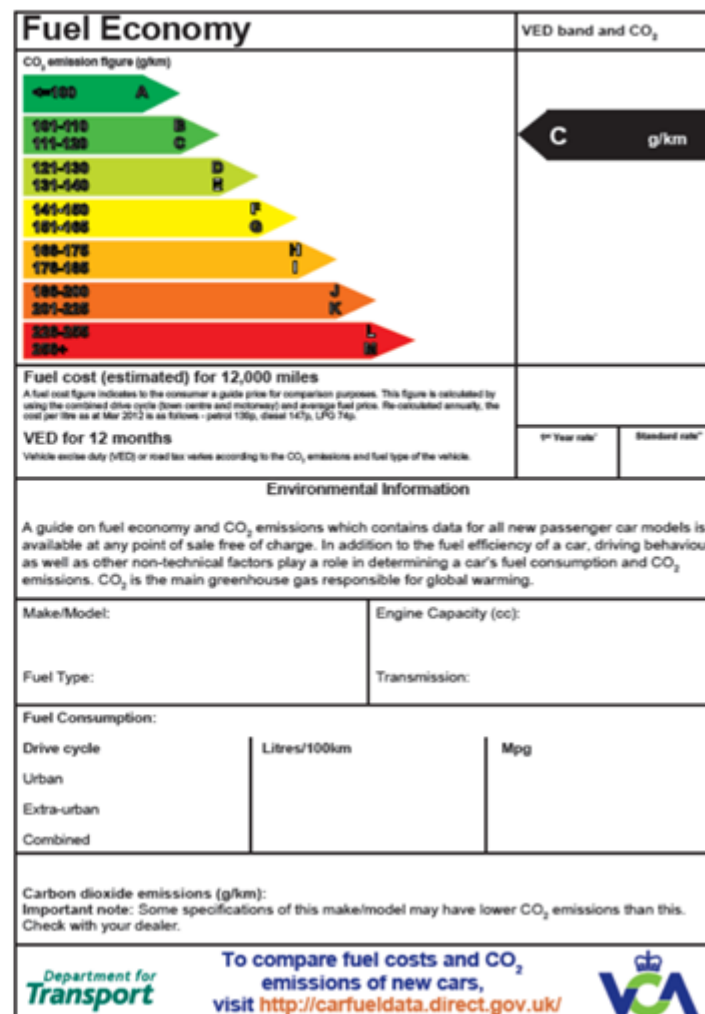
Netherlands

Energie	Personenauto
Fabrikant Model	Merk X Model Y 3-drs hatchback handschakeling Benzine
Brandstof	
Brandstofverbruik <small>gegevens volgens de test van de typegoedkeuring</small>	7,2 liter / 100 km = 1 liter op 13,9 km
Zuinig 	
Onzuinig CO₂-uitstoot <small>CO₂ is het broeikasgas dat bij de verbranding van fossiele brandstoffen de belangrijkste bijdrage aan de opwarming van de aarde doet.</small>	173 gram / km
<small>Zeer veel informatie</small>	2000
<small>Deze gegevens betreffen het brandstofverbruik en de CO₂-uitstoot van personenauto's die op de markt zijn gebracht vóór 1 januari 2001. Na die datum zijn deze gegevens niet meer van toepassing op personenauto's die op de markt zijn gebracht na 1 januari 2001.</small>	
<small>Naast de brandstofefficiëntie van een auto zijn ook het rijgedrag en andere, niet-technische factoren bepalend voor het brandstofverbruik en de CO₂-uitstoot van een auto.</small>	
<small>Buurtje 1000/1000: 1000/1000</small>	

Slovenia

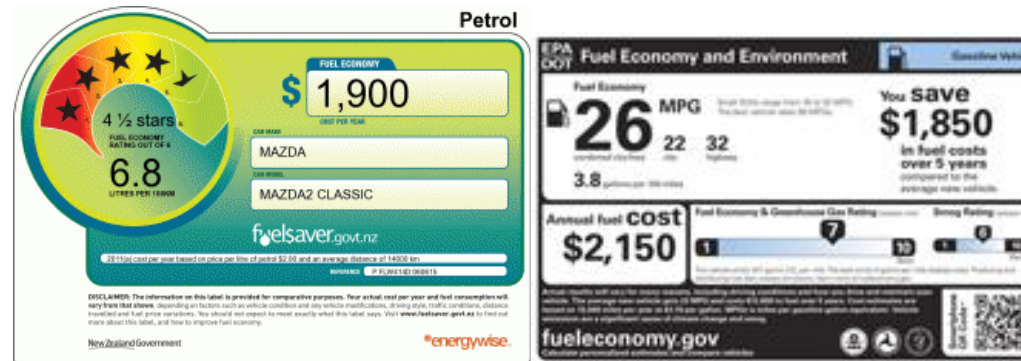


United Kingdom

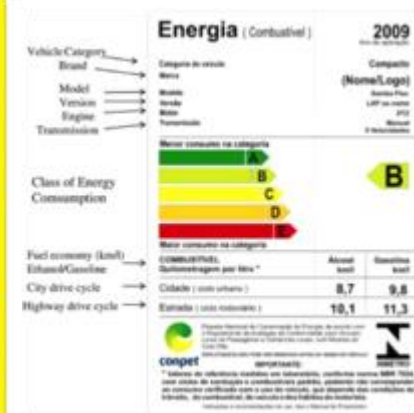


Annex H - EXAMPLES OF CAR LABELS USED OUTSIDE THE EU

Figure H--H-1: Examples of car fuel economy labels from New Zealand, USA, South Korea, China, Brazil, Switzerland and Australia



GRADE	1	2	3	4	5
~2011 (FTP-75)	≥ 15	14.9~12.8	12.7~10.6	10.5~8.4	≤ 8.3
2012~ (US Combined Mode adjusted)	≥ 16	15.9~13.8	13.7~11.6	11.5~9.4	≤ 9.3
Label					



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doi:10.2834/541874