EUROPEAN
COMMISSION

Brussels, 17.5.2018
SWD(2018) 189 final

PART 3/3

COMMISSION STAFF WORKING DOCUMENT

IMPACT ASSESSMENT

Accompanying the document

Proposal for a Regulation of the European Parliament and of the Council

on the labelling of tyres with respect to fuel efficiency and other essential parameters, and repealing Regulation (EC) No 1222/2009

{COM(2018) 296 final} - {SEC(2018) 234 final} - {SWD(2018) 188 final}

Annex 5: Evaluation

Table of Contents

Glossary for the evaluation report

Term or acronym	*Meaning or definition*
RRC	Rolling Resistance Coefficient
WG	Wet Grip
BAU	Business as Usual – no label (Before regulation)
OPC	Open Public Consultation
SRTT	Standard Reference Test Tyre
MSA	Market Surveillance Authority
C1 Tyres	Passenger car tyres
C2 Tyres	Light commercial vehicle tyres
C3 Tyres	Medium and Heavy commercial vehicle tyres
LCV	Light Commercial Vehicle
HCV	Heavy Commercial Vehicle
TCO	Total Cost of Ownership
LCC	Life Cycle Cost
GHG emissions	Greenhouse Gas emissions
OEM tyres	Original Manufacturer Equipment tyres, sold with new vehicles

1. Introduction - Purpose and scope of the evaluation

The Tyre Labelling Regulation 1222/2009[1] (hereafter called '**TLR**') was one of the initiatives set out in the Commission Communication of 8 July 2008 entitled Greening Transport[2] that aimed at increasing the sustainability of the transport sector and contributing to achieve the EU 2020 Strategy on climate change and energy targets[3].

Car tyres were identified as an important factor that impacts the fuel consumption and pollution from road traffic, as 5% to 10% of fuel consumption is caused by the tyre rolling resistance[4]. Furthermore, the grip of the tyres on wet road and the external rolling noise are important parameters for increasing road safety and decreasing noise pollution from road traffic, respectively.

The TLR was implemented to improve the performance of tyres sold in the EU with respect to the fuel efficiency, wet grip and external rolling noise.

Pursuant to article 14[5] of the TLR, it should be reviewed by March 2016, in regard of which a review study was carried out[6]. Based on the results from this 2016 Review Study, the Commission decided to carry out an evaluation.

The purpose of the evaluation is to **quantify the effect of introducing the TLR** separately from the effect of the GSR. The intention is to determine the effect the label has had on the tyre market, after five years of application of the tyre labelling scheme in the European Union, in terms of increased performance in fuel efficiency, safety and environmental noise by assessing the three performance parameters of the label; rolling resistance, wet grip and external rolling noise.

Furthermore, the purpose of the evaluation is to **determine whether the TLR has been effective and efficient in achieving its objectives**, **whether it is still relevant**, and **whether it is coherent with other EU regulations** and **brings added value to the EU tyre market**. By answering these questions, the evaluation helps ultimately to **identify the potential for improving the regulation** to better achieve its objectives, thus supporting the Impact Assessment's policy options.

The evaluation looks at the development of tyre performance in all EU Member States from 2005 to 2017, thus including the progress that took place in the years before the Regulation started to apply in November 2012.

---

1 Regulation (EC) No 1222/2009 of the European Parliament and of the Council of 25 November 2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters, OJ L 342 of 22.12.2009, p.46

2 https://ec.europa.eu/transport/themes/strategies/2008_greening_transport_en

3 https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester/framework/europe-2020-strategy_en

4 http://www.npc.org/reports/FTF-report-080112/Chapter_10-HD_Engines-Vehicles.pdf and https://www.fueleconomy.gov/feg/atv.shtml

5 The Commission shall assess the need to review this Regulation, presenting the result of this assessmentto the European Parliament and the Council no later than 1 March2016, and, if appropriate, submit proposals to the European Parliament and to the Council

6 https://ec.europa.eu/energy/sites/ener/files/documents/Study%20in%20support%20of%20the%20Review%20of%20the%20Tyre%20Labelling%20Regulation_final.pdf

2. Background to the intervention

2.1. DESCRIPTION OF THE INTERVENTION AND ITS OBJECTIVES

The TLR was designed to promote sustainable mobility in the light of the climate change challenges and the need to support European competitiveness.

The TLR was introduced simultaneously with the Regulation on type approval of "general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefore"[7] (hereafter the "**General Safety Regulation**" or "**GSR**"). The GSR sets minimum requirements for tyre performance in terms of rolling resistance and external rolling noise as well as wet grip for certain tyre types.

The two Regulations are intended to work in synergy; the GSR pushing the tyre market towards higher performance by removing the lowest performing tyres from the Union market, and the label introduced by the TLR pulling the market towards even higher performance by providing end-users with the necessary information to identify and purchase the best performing tyres on the market.

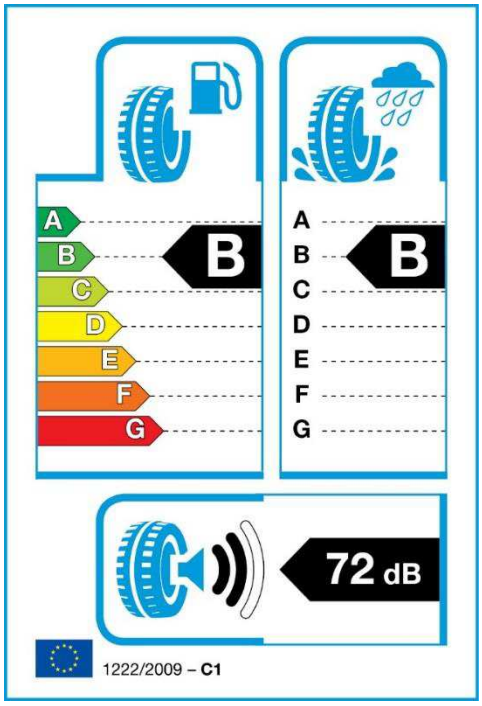
Before the implementation of the TLR, end-users did not have access to any harmonized and reliable information about the fuel efficiency of tyres. Therefore, they were not able to incorporate the possible fuel savings in their purchase decision.

The TLR was set up to encourage:

- tyre manufacturers to optimise all three interrelated label parameters (rolling resistance, external rolling noise and wet grip for certain tyre types) beyond the minimum requirements in the GSR.
- end-users to purchase more fuel-efficient tyres to reduce the environmental impact of road transport.
- end-users to purchase tyres with low external rolling noise to reduce traffic noise.
- end-users to purchase tyres with high wet grip performance to improve road safety.

The TLR sets out harmonised requirements on tyre parameter information to be provided to end-users allow them to make informed purchasing choices. Three tyre performance parameters are included: fuel efficiency, wet grip, and external rolling noise class and measured value (in dB). An element of complexity is that improving one parameter such as rolling resistance may have an adverse impact on other parameters such as wet grip, while improving wet grip may have an adverse impact on external rolling noise.

Figure 12: Example of the tyre label



a. Scope of the intervention

The TLR applies to C1, C2 and C3 tyres, as defined in article 8 of the GSR (C1 tyres can generally be said to be tyres for passenger cars, C2 tyres for light commercial vehicles (LCVs) and C3 tyres for heavy commercial vehicles (HCV's). The definition of the tyre types is based on the vehicles they are primarily designed for, including the weight and passenger capacity, and on the tyre load and speed indexes of the tyres, as seen in Table 1. In general, C1 tyres can be said to be tyres for passenger cars, C2 tyres for light commercial vehicles (LCVs) and C3 tyres for heavy commercial vehicles (HCV's)[8].

Table 59: Definition of tyre types included in the TLR, based on Regulation (EC) 661/2009

Tyre type	Designed primarily for vehicle categories	Seats in addition to driver's seat (based on vehicle category)	Vehicle weight (based on vehicle category)	Load capacity index	Speed category symbol
C1 tyres	M_1, N_1, O_1 and O_2	≤8	≤3.5 t	Not applicable	Not applicable
C2 tyres	M_2, M_3, N, O_3 and O_4	≥8	≥3.5 t	≤121	≥N
C3 tyres	M_2, M_3, N, O_3 and O_4	≥8	≥3.5 t	≤121	≤M
				≥122	none

The TLR does not apply to the following tyre types:

- re-treaded tyres;

8 European Commission (2014), "Frequently Asked Questions (Version 25/11/2014) for Regulation (EC) No 1222/2009 of the European Parliament and of the Council. Link: http://ec.europa.eu/energy/sites/ener/files/documents/faq_-_tyre_labelling.pdf

- off-road professional tyres;
- tyres designed to be fitted only to vehicles registered for the first time before 1 October 1990;
- T-type temporary-use spare tyres;
- tyres whose speed rating is less than 80 km/h;
- tyres whose nominal rim diameter does not exceed 254 mm or is 635 mm or more;
- tyres designed only to be fitted on vehicles intended exclusively for racing.
- tyres fitted with additional devices to improve traction properties, such as studded tyres.

The TRL requires C1 and C2 tyres to bear the label. For C3 tyres the label is not required but the information on rolling resistance, wet grip and rolling noise needs to be included in the promotional documentation.

b. The intervention logic

Objectives of the TLR. The tyre label was introduced to provide end-users with information on tyre parameters so that they can make an informed choice, and to influence their purchase decisions in favour of more fuel efficient, safer, and quieter tyres. Furthermore, it incentivises manufacturers to optimise those tyre parameters, paving the way for more sustainable consumption and production.

Problems the TLR aimed to solve. The tyre label was designed based on the experience from the effect of the EU energy labelling scheme for household appliances (under Directive 1992/75/EC), which had shown that energy labelling can have a significant influence on consumer choice and market transformation towards more energy-efficient products.

Before introducing the TLR, the absence of information gave rise to a market failure preventing tyre end-users to consider fuel efficiency and related impacts in their purchasing decisions. More concretely, the market failure identified by the Commission's impact assessment[9] prior to proposing Regulation (EC) No 1222/2009 consisted of:

- *lack of information on the rolling resistance of tyres* – the criteria for buying tyres was influenced by price, size, appearance, alignment, etc. End-users had no information on tyre rolling resistance;
- *lack of information on the relative energy efficiency of tyres* – no tangible or transparent way for an end-user to understand a tyre's capability to increase a vehicle's fuel economy and to secure fuel cost savings;
- *lack of information on the range of tyre attributes* – end-users need to understand better the interplay between the different tyre attributes (fuel efficiency, tyre

9 Impact Assessment COM(2008)779, SEC(2008)2861,
Link: http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1458040597506&uri=CELEX:52008SC2860
Study EPEC 2008; "Impact Assessment Study on Possible Energy Labelling of Tyres".
Link: https://circabc.europa.eu/sd/a/99ffc67c-4422-4a38-9995-e41e3a40c333/Technical%20Study%20on%20Possible%20Energy%20Labelling%20of%20Tyres.pdf

safety and noise) to make rational choices between tyres with different properties depending on end-user preferences.

The consequence of the market failure was an unexploited potential for lowering the rolling resistance and rolling noise while increasing the wet grip performance.

The mechanisms set in place by the TLR. The tyre labelling Regulation introduced a label for tyres as seen above that includes three interrelated performance parameters:

- **Fuel efficiency**: The fuel efficiency of tyres is defined in terms of the *Rolling Resistance Coefficient* (**RRC**), given as kg resistance per ton of vehicle (kg/t). The lower the value for RRC, the better the fuel efficiency of the tyre.
- **Wet grip**: Wet grip refers to the safety performance of tyres, i.e. it reflects the capacity of a tyre to brake on a wet road. Wet grip is determined based on the wet grip index (G), calculated based on either the average deceleration in m/s^2 or the peak brake force coefficient, which is unit-less, and compared to a Standard Reference Test Tyre (**SRTT**). The better the wet grip, the safer the tyre.
- **External rolling noise**: The external rolling noise refers to the noise of the tyres experienced outside the car (i.e. not by the driver or passengers). The external rolling noise (N) is measured in decibel (dB).

The interrelation of the three parameters means that improving one may have an adverse effect on another, due to the physical and chemical characteristics of the tyres. While the best performing tyres, especially those with high performance in all parameters, generally have a higher purchase price, the total cost of ownership (**TCO**), also called life cycle cost (**LCC**) for the consumer is often lower for tyres with low rolling resistance due to the increased fuel efficiency and the accompanying fuel cost savings over the whole life of the tyre. To help end-users make an informed decision the label therefore shows the rolling resistance converted to an A-G fuel efficiency scale. To avoid trade-offs in safety and noise pollution while improving the rolling resistance, the wet grip scale is shown next to the fuel efficiency scale on the label and the external rolling noise is added as a three-step scale (1 to 3 “sound waves”) below. This is intended to increase the demand for tyres that have high performance in all three parameters in spite of the additional purchase cost, which in turn is intended to encourage manufacturers to increase innovation rate and optimise all three label parameters beyond the standard performance. The synergy between the three parameters is therefore important, and end-users need information on all three to make an informed purchasing decision.

2.2. BASELINE AND POINTS OF COMPARISON (BAU)

The base line of this evaluation will be the market without the implementation of the TLR but including the effect of the type-approval process of the GSR. This baseline is also referred to as Business as Usual (**BAU**).

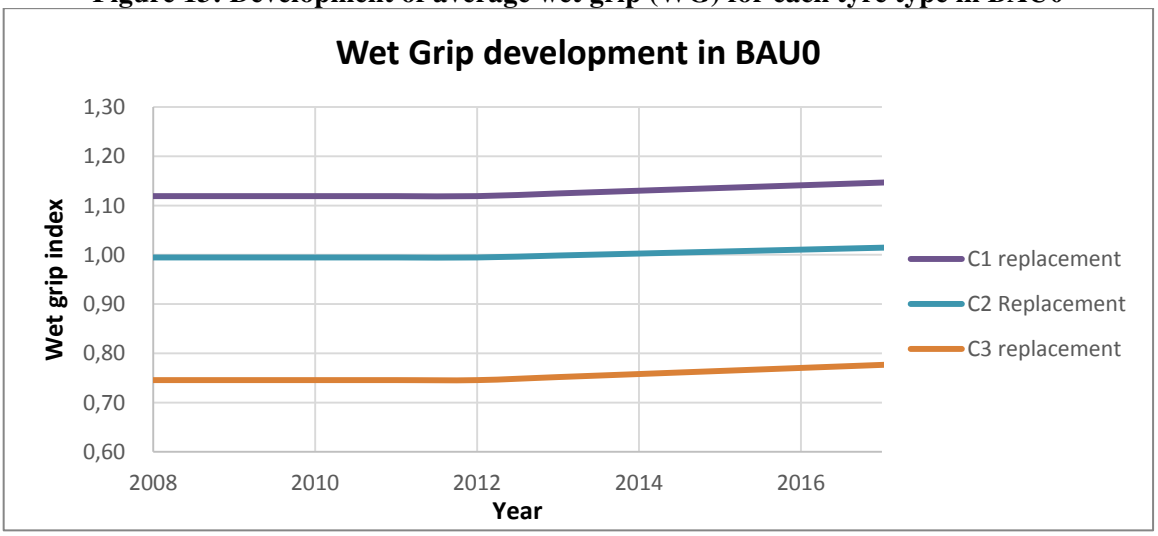
The development in the BAU scenario is based on the future market estimates made in the 2008 Impact Assessment under the no-label scenario for the years 2004-2017 for C1 and C2 tyres. However, for C3 tyres the future market estimates for the no-label scenario

resulted in better tyre performance than can be observed from real-life data in the market *with* the label. The C3 BAU scenario was therefore adjusted to a more realistic level, taking into consideration the available market data from a German tyre model database[10]. The assumed distribution can be seen in Appendix 2.

In the 2008 Impact Assessment only the rolling resistance was included as a performance parameter in the scenarios, while noise was not included at all and the wet grip was only mentioned superficially and only for C1. The wet grip and noise market levels therefore had to be estimated in the development of another Business as Usual scenario BAU0 using market data from 2008 until 2017. The data and estimates are shown in Appendix 2. .

The figures and table below show the BAU development for each label parameter (rolling resistance, wet grip and noise) for C1, C2 and C3 tyres. The change occurring around 2012 is induced by the GSR that sets minimum requirements for rolling resistance and noise for all three tyres types (C1, C2, C3) as well as for wet grip on C1 tyres. Further limitations on maximum rolling resistance were introduced from 2014 for C1 and C2 tyres and from 2016 for C3 tyres.

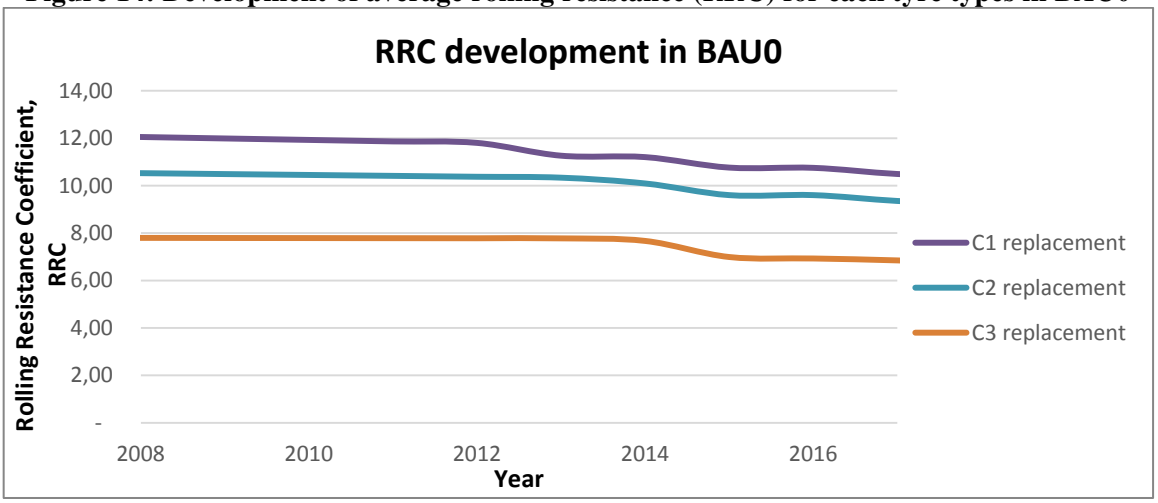
Figure 13: Development of average wet grip (WG) for each tyre type in BAU0



Source: Based on market distribution of WG adopted form the IA 2008 (Appendix 2)

10 http://www.tol-energy.de/ . The TOL database provides the most comprehensive and representative data on tyres sold in the EU, as many importers and manufacturers transport their tyres through Germany, which are then registered in this database. The data therefore provides an indication of the general European tyre market.

Figure 14: Development of average rolling resistance (RRC) for each tyre types in BAU0



Source: Based on market distribution of RRC adopted form the IA 2008 (Appendix 2)

Table 60: External rolling noise levels for all tyre types in BAU0

Tyre type	External rolling noise, dB, 2008	External rolling noise, dB, 2017
C1	71.20	71.05
C2	72.51	72.35
C3	72.00	71.85

Based on the very low rate of development for external rolling noise seen from actual data (i.e. the "Current label scenario" as described in chapter 3) from 2012 to 2017, it is assumed that almost no development would have occurred without the TLR, as the average levels were already below the noise limit values in the GSR. The average external rolling noise levels in the BAU scenario are therefore assumed to change only very little from 2008 to 2017 as seen in Table 60.

3. Implementation / state of Play

The TLR was adopted by the Council and the European Parliament in November 2009 and entered into force on 1 November 2012. Member States had thus three years to implement the necessary market surveillance and enforcement processes.

The TLR provides a framework for the provision of harmonised information on tyre performance and is directly applicable in all Member States. Enforcement is carried out by national market surveillance authorities (**MSAs**) appointed in each Member State in accordance with Regulation (EC) No 765/2008[11]. Interviews conducted with MSAs in various Member States[12] in 2015 showed that the market surveillance effort varies greatly throughout the EU, and in general, the only widespread activity is shop inspections. Technical documentation is rarely requested for market surveillance

11 Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93, OJ L 218, 13.8.2008, p. 30.

12 Belgium, Finland, Germany (3 Länder), Estonia, Malta, Netherlands, Sweden, United Kingdom, Hungary, Poland and Slovakia

purposes and there is a severe lack of market surveillance testing due to a lack of resources and limited number of testing facilities. Furthermore, the few Member States which have conducted tests found that the repeatability and reproducibility of the test results was very low.

The low market surveillance activity decreases end-user confidence in the tyre label. Similarly, tyre dealers reported that due to lack of market surveillance inspections, they decreased their efforts to train their employees in informing end-users of the labelling scheme.

In response to the acknowledged lack of market surveillance and enforcement, the Horizon 2020 funded the MSTyr15 project[13] was launched in April 2016 for a two-year duration. Based on coordinated market surveillance actions by 15 countries[14], the project aims to perform 15,000 tyre inspections (shop inspections), 1,500 document inspections and 150 tyre tests of rolling resistance and wet grip for C1 tyres by May 2018. The results of the efforts are still to be published.

Aside from the enforcement issues, a general low awareness among C1 users was identified in the 2016 consumer survey performed in the context of the 2016 Review Study[15]. Only 41% of the respondents were aware of the tyre label before they responded to the survey, and while more than 70% found the information on fuel efficiency and wet grip easy to understand, less than 60% found the noise information easy to understand. This indicates that for the full potential of the label to be realised both the general awareness of the label's existence and the specific knowledge of the label content would need to be improved.

Despite the issues related to enforcement and awareness of the label, the rolling resistance and wet grip have both improved since the label was first implemented, while the pattern is less consistent for the external rolling noise parameter. The evolution of the three label parameters can be seen in **Figure 16** to **Figure 18** in chapter 5.

4. Method

4.1. SHORT DESCRIPTION OF METHODOLOGY

This evaluation is partially based on the findings from the Review Study carried out in 2016[16] and the subsequent Open Public Consultation (**OPC**)[17], but with market data updated to 2017.

The evaluation calculations are based on a stock model, determining the number of tyres of each type (C1, C2, C3) in the EU, which is shown in the table below. The stock model is built on annual sales provided by the European Tyre and Rubber Manufacturers

13 http://www.mstyr15.eu/index.php/en/

14 Belgium, Bulgaria, Croatia, Estonia, Finland, Germany, Ireland, Latvia, Lithuania, Luxembourg, Poland, Romania, Spain, Sweden and Turkey

15 https://ec.europa.eu/energy/sites/ener/files/documents/Study%20in%20support%20of%20the%20Review%20of%20the%20Tyre%20Labelling%20Regulation_final.pdf

16 http://www.labellingtyres.eu/

17 See Annex 2 of the 2018 Impact Assessment for the results and answers of the Open Public Consultation

Association (**ETRMA**), combined with European Automobile Manufacturers Association (**ACEA**) annual numbers on vehicles in use in EU[18]. The specific data and assumptions are shown in Appendix 2

Table 61: Derived tyre stock in EU-28, from 2008 to 2017

Stock in millions	2008	2010	2012	2014	2016	2017
C1	1 351	1 415	1 398	1 406	1 461	1 499
C2	121	122	123	122	126	130
C3	65	59	57	56	62	67
Total	**1 537**	**1 596**	**1 578**	**1 584**	**1 650**	**1 696**

Source: Stock model, Viegand Maagøe 2018.

The calculated tyre stock gives an average of 5.5 tyres/C1vehicle, 4.1 tyres/C2 vehicle and 12.2 tyres/C3 vehicle. The higher average number of tyres per vehicle for C1 than C2 is assumed to be due to the larger number of users having two sets of tyres for their car (e.g. winter tyres in addition to summer tyres).

The development in rolling resistance, wet grip and external rolling noise with and without the label regulation (i.e. the BAU and the current label scenarios) is used to calculate the effect on fuel efficiency, safety and environmental noise. The specific calculation methods are detailed in Appendix 2.

The fuel efficiency is correlated with the tyre rolling resistance based on the following equation, derived by IDIADA[19] and used in the official "Fuel savings calculator" on the Commission website on tyres[20] (K is a correlation factor determined by testing of tyres):

$$Fuel\ consumption\ change\ (\%) = K * \frac{RRC_{BAU} - RRC_{Label}}{RRC_{BAU}} * 100\%$$

The correlation between wet grip and safety in terms of severity of accidents is much more complex than that of rolling resistance and fuel efficiency. The wet grip is directly correlated to the braking length, which is in turn related to the impact speed in accidents. The correlation is based on data form a study undertaken by TNO in 2014[21] on the potential benefits of Triple-A tyres in the EU. The probability distribution of fatality, severe injury and minor injury varies with impact speed. Hence, a change in wet grip will cause a change in accident severity or even in some avoided accidents. The methodology and underlying calculations are explained in more detail in Appendix 2.

The external rolling noise is important for the environmental noise pollution from road traffic, and the health effects experienced by those exposed to it. The exact correlation between tyre noise and the health effects of environmental noise has not been thoroughly identified. The World Health Organisation (**WHO**) is developing environmental noise

18 http://www.acea.be/statistics/article/Report-Vehicles-in-Use
19 http://www.applusidiada.com/en/
20 https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficient-products/tyres
21 TNO, Memorandum to Ministry of Infrastructure and Environment, "Potential benefits of Triple-A tyres in the EU", link:http://www.unece.org/fileadmin/DAM/trans/doc/2014/wp29grb/GRB-60-13e.pdf

guidelines for the EU[22] and reports regarding the noise effects. Studies are ongoing (to be finalised in 2018) and it is possible that a calculation model for quantitatively correlating traffic noise with its health effects will also be developed. At the moment, only a preliminary model is available, which has been used for estimating the health effects.

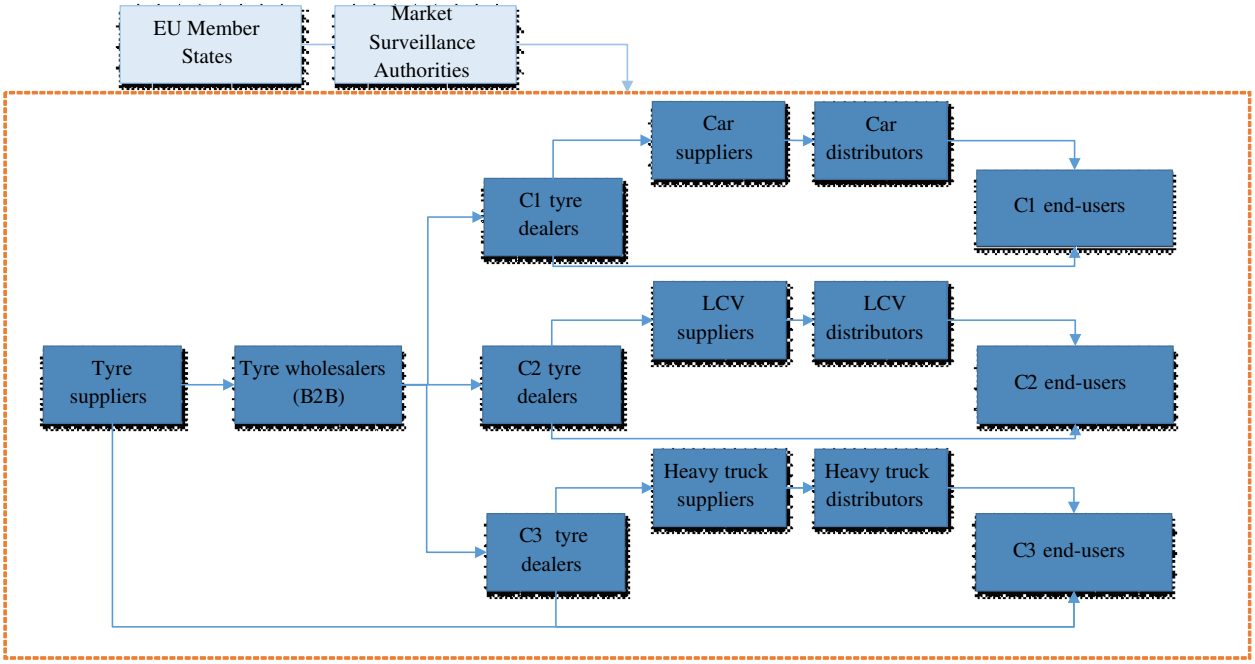
4.2. INTERVIEWS AND END-USER SURVEY

As part of the 2016 Review Study[23], an extensive stakeholder consultation was performed, to assess the efficiency and effectiveness of the label scheme. Stakeholders from across the supply chain (see Figure 15), were approached to assess their role and whether the TLR was serving its intended purpose.

The stakeholder consultation thus included:

- Tyre suppliers;
- Tyre distributors;
- Vehicle suppliers and distributors;
- End-users in each tyre segment: C1, C2 and C3.

Figure 15: Overview of the stakeholder groups directly and indirectly involved in the tyre supply chain of both OEM (Original Equipment Market) and replacement tyre market



Interviews and questionnaires were conducted with organisations in each segment, and a more thorough consumer survey was carried out in the largest end-user segment: private car owners of C1 vehicles. The C1 consumer survey included 6,000 respondents, a thousand from each of the following six Member States:

- Germany (~42 million cars)

22 http://www.euro.who.int/en/health-topics/environment-and-health/noise/activities/development-of-who-environmental-noise-guidelines-for-the-european-region

23 https://ec.europa.eu/energy/sites/ener/files/documents/Study%20in%20support%20of%20the%20Review%20of%20the%20Tyre%20Labelling%20Regulation_final.pdf

- England (~29 million cars)
- France (~32 million cars)
- Italy (~37 million cars)
- Sweden (~4.5 million cars)
- Finland (~3 million cars)

The consumer survey was supplemented with answers from the OPC. More details about the stakeholder consultation are presented in Appendix 1.

4.3. LIMITATIONS AND ROBUSTNESS OF FINDINGS

The major limitation of the findings is the **inability to directly correlate the external rolling noise reported on the label to societal consequences in terms of human health**. It is reasonable to expect that decreasing tyre rolling noise will result in a decreasing number of people exposed to excessive traffic noise. However, the effect in terms of hospitalisations and fatalities cannot be quantified.

Also, the correlation between wet grip and safety (in terms of number of accidents, fatalities and injured in the traffic) relies on several crucial assumptions, such as the likelihood of sustaining various degrees of injury in a traffic accident based on the impact speed (as explained in Appendix 2).

Another important limitation is the lack of available data on non-compliance with the label values; i.e. the number of tyres that do not live up to the declared label values, and how much the actual performance varies from the reported performance for these products. This might result in a larger estimated saving than actually achieved, because the modelling is based on reported label values.

5. Analysis and answers to the evaluation questions

5.1. EFFECTIVENESS

a. Evaluation question 1: what have been the effects of the intervention?

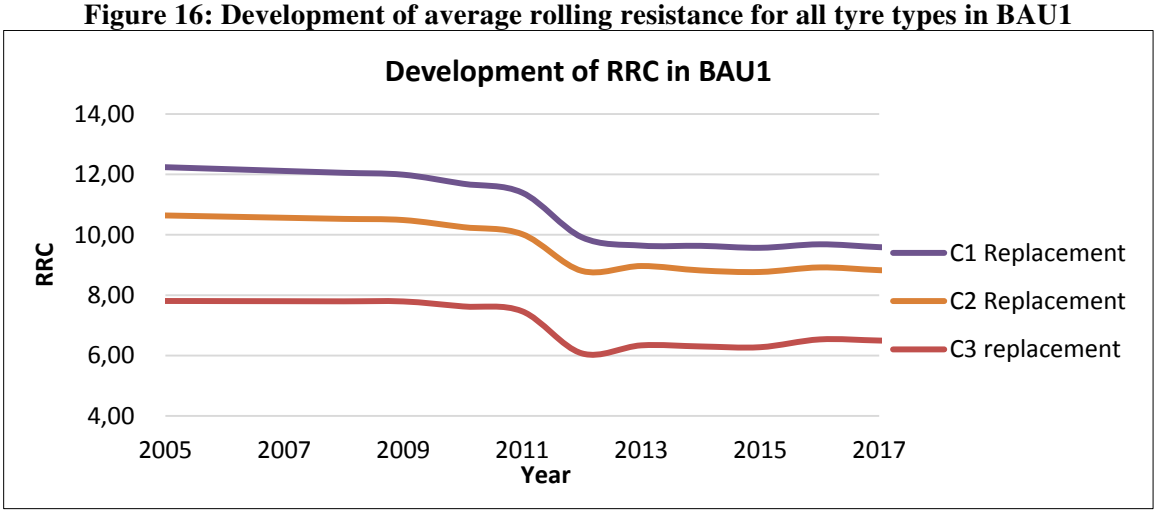
The Review study from 2016 and the results from the OPC show that the objectives of the TLR have been achieved to some extent, but that the effect is reduced due to relatively low consumer awareness, lack of visibility of the label in the purchase situation and weak enforcement resulting in low confidence in the label.

The consumer awareness affects effectiveness of the TLR because it is reliant on affecting consumers' choice when purchasing tyres and with low awareness and confidence, users will be less likely to take the label into account in a purchase situation. The lack of visibility of the label before a purchase decision is taken, is contributing to the low awareness and thus decrease the overall effectiveness of the TLR.

The rolling resistance and wet grip performance of tyres have improved since implementation of the TLR in 2009, as seen from the data in **Figure 16** and **Figure 17**, whereas the effectiveness on noise is questionable (**Figure 18**). As seen in the graphs

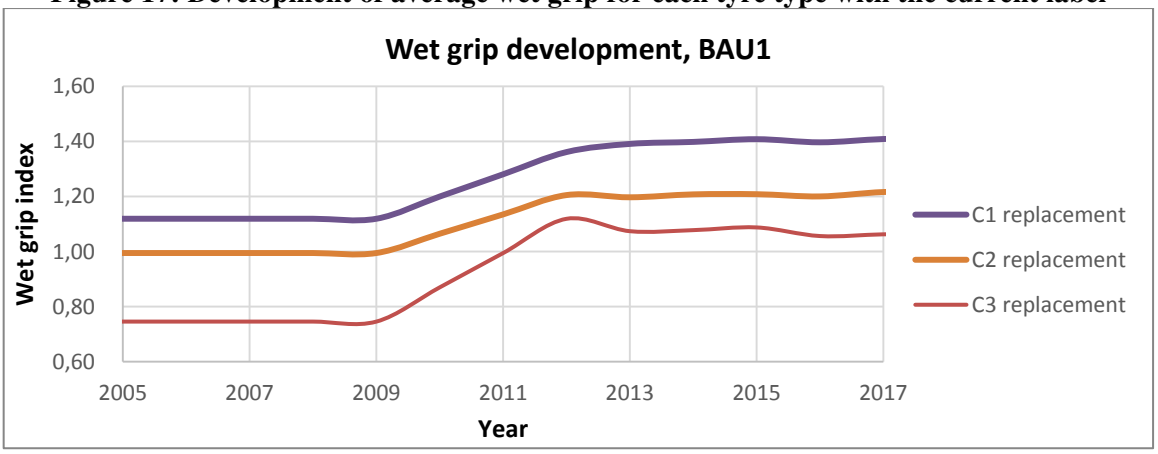
below, the rolling resistance and wet grip improvements of all three tyre types (C1, C2, C3) subside after 2013. For C3 tyres (trucks and busses) there is even an increase in average rolling resistance from 2015 to 2017 and a simultaneous decrease in wet grip.

Figure 16: Development of average rolling resistance for all tyre types in BAU1



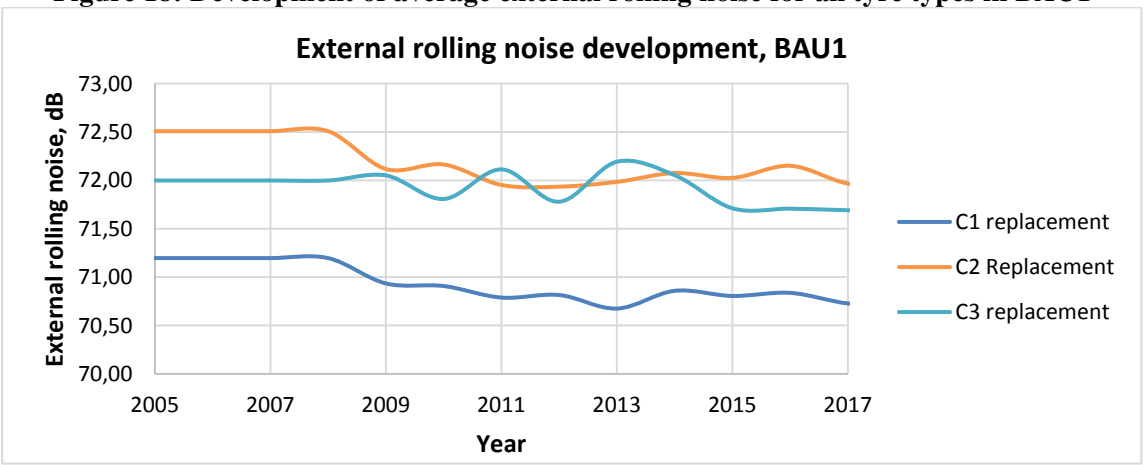
Source: Based on data on market distribution from TOL/GfK (Appendix 2)

Figure 17: Development of average wet grip for each tyre type with the current label



Source: Based on data on market distribution from TOL/GfK (Appendix 2)

Figure 18: Development of average external rolling noise for all tyre types in BAU1



Source: Based on data on market distribution from TOL/GfK

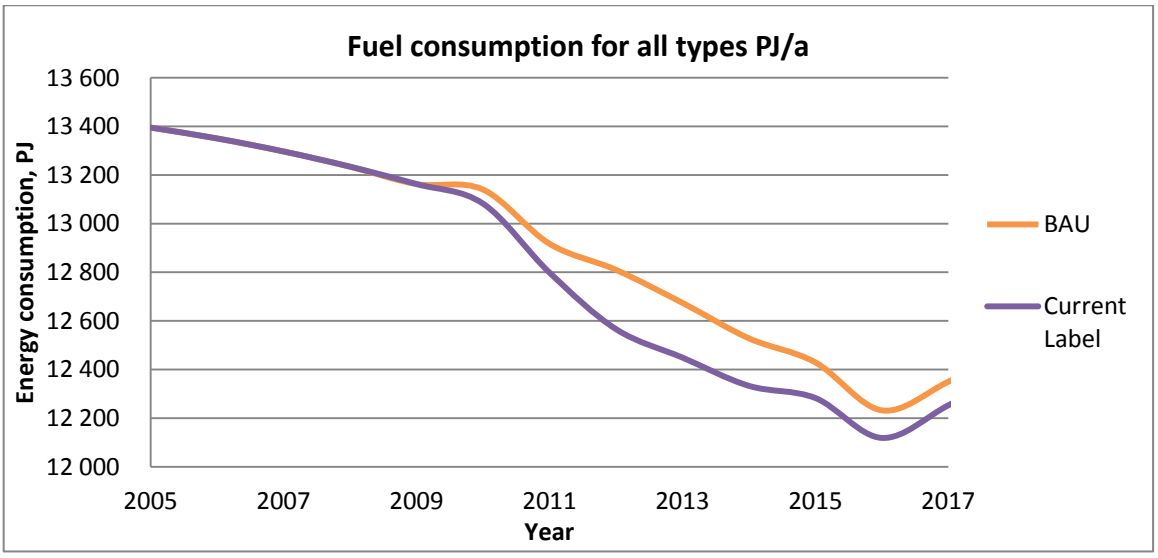
The reverse development for C3 tyres could be due to a variety of reasons, but one is that C3 tyres are often purchased by procurement departments in professional fleets, and that the focus is on purchase price rather than total cost of ownership. Also, the label is not shown for C3 tyres, but only the values are given in the technical promotional material, which could result in lower awareness of the label criteria and their significance. Furthermore, other parameters such as mileage might play a bigger role for C3 fleet operators than for private consumers and C2 users, since the yearly distances driven with C3 vehicles are often much higher.

In general, the C3 tyre market fluctuates more for all three label parameters than the C1 and C2 markets. This variation is most pronounced for the external rolling noise parameter, which does not show the same smooth development as the rolling resistance and the wet grip, but overall still shows a declining tendency for all tyre types.

The decrease in rolling resistance has resulted in cumulative fuel savings of approximately 1200 PJ from 2010 to 2017, corresponding to 170 PJ per year in saved fuel consumption[24]. According to official EU statistics the energy consumption of the road transport sector was around 12,300 PJ in 2015[25]. The annual savings are thus around 1% of road transport fuel consumption.

The difference in total fuel consumption of all vehicle types (C1, C2, C3) in the EU-28 in the BAU and the Current Label Scenario is shown in Figure 19. The saved fuel consumption is directly linked to corresponding avoided greenhouse gas (GHG) emissions of around 88 MT CO_2-eq[26] as well as other pollutant emissions related to road transport.

Figure 19: Development of fuel consumption for all tyre types (C1, C2, C3) in EU-28 from 2005 to 2017 for the BAU and Current Label Scenario



Source: Calculation by external consultants Viegand Maagøe

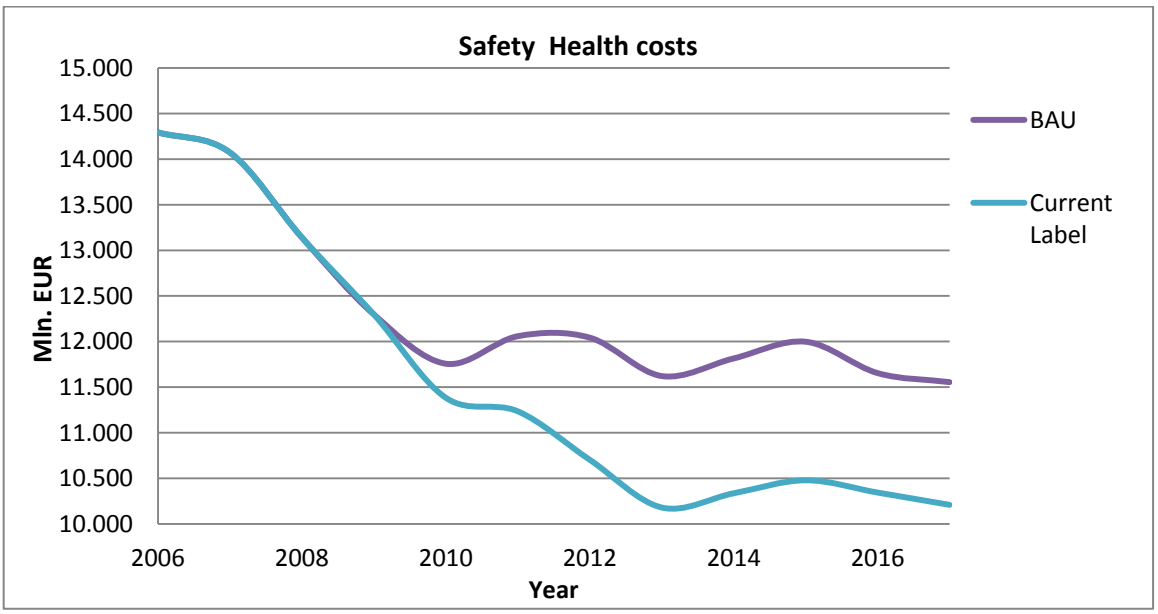
[24] Based on calculations models developed by consultants from Viegand Maagoe

25 EU statistical pocketbook, European Commission, 2017
https://ec.europa.eu/transport/sites/transport/files/pocketbook2017.pdf

[26] Based on calculations models developed by consultants from Viegand Maagoe

Regarding safety, the observed improvement in wet grip performance is estimated to have led to 1,825 avoided fatalities in traffic accidents and 29,640 less people severely injured from 2010 to 2017[27]. At the same time, however, an additional 43,122 people suffered minor injuries because the accidents became less severe (i.e. the accidents with avoided severe injuries instead resulted in minor injuries)[28]. The total societal costs savings of the avoided fatalities and accidents amount to approximately EUR 9,600 million in the entire period the Regulation has been in place, or EUR 1,200 million per year. The development of safety health costs for the BAU and the Current Label Scenario is shown in Figure 20 for the years 2006 to 2017.

Figure 20: Development of safety health costs for all tyre types



Source: Calculation by external consultants Viegand Maagøe

The external rolling noise of tyres is the parameter for which the TLR has been least effective in changing the market. Even though noise levels have decreased slightly for all three tyre types, the decrease is rather tenuous with fluctuating noise levels from year to year, and overall less than 0.5 dB decrease is observed from 2005 to 2017 (See Figure 18). The small effect on external rolling noise compared to the other label parameters, is thought to be because both industry and end-users give noise a lower importance than other parameters[29]. Furthermore, the rolling noise pictogram is the label parameter that end-users find most difficult to understand according to both the consumer survey from the 2016 Review Study and the OPC responses.

Nevertheless, overall external rolling noise has decreased slightly, which might have led to an unquantifiable number of people experiencing less severe noise nuisance from road traffic. Road and traffic noise is causing health effects such as sleep deprivation,

27 Based on calculations models developed by consultants from Viegand Maagoe
28 Based on calculations models developed by consultants from Viegand Maagoe
29 According to the consumer survey made in relation to the 2016 review study, 34% found fuel efficiency very important, 62% found wet grip very important and only 21% found external rolling noise very important. Industry declared during the review study that the focus was first on developing tyres with good wet grip and rolling resistance, and noise had lower priority.

increased stress and ultimately hospitalisation or death due to coronary heart disease and cerebrovascular disease. A report from 2014[30] estimated that traffic noise above 55 dB caused around 8,900 deaths and 38,150 hospitalisations per year.

Since the external rolling noise remains above 70 dB on average, and the actual noise nuisance experienced depends on several factors not affected by the tyre itself (e.g. distance to the road, noise barriers, pavement type and speed limits), it is not possible to quantify the actual change in number of people affected by road noise due to the TLR.

Even though the TLR has resulted in savings of about 1% annual fuel consumption, more than 90% of tyres sold are still in fuel efficiency class C to F, and only 6-8% are in class A or B. A potential thus exists for further energy savings, which can be obtained without compromising road safety (wet grip), since tyres with fuel efficiency and wet grip performance class combinations "AA" or "AB/BA" are already on the market. However, the energy savings obtained through the labelling scheme is being somewhat counteracted by a trend towards larger tyres (due to deliberate consumer choice), which tends to increase absolute fuel consumption, even though these tyres are more fuel efficient than earlier models of that size[31].

The effectiveness of the scheme is reduced by the low degree of enforcement and market surveillance, which prevents the full savings potential to be realised. This has been assumed to cause relatively high non-compliance rates[32] of the recorded label values for tyres sold in the EU. One of the barriers for market surveillance reported by some MSAs[33] and by the PROSAFE MSTyr15 project is the problems experienced when trying to obtain technical documentation. According to these sources it is sometimes difficult and time consuming to identify the party responsible for providing the information, and then to receive the complete information. Furthermore, the uncertainty of the test methods leads to low reproducibility of test results, making it difficult for MSAs to prove non-compliance in the cases when they find it by testing. An MSA interviewed for the 2016 Review Study stated that the same tyre tested on two different tracks could vary up to 3 label classes on the wet grip scale in some cases.

b. Evaluation question 2: To what extent do the observed effects link to the intervention?

The observed market change in especially RRC and WG is likely to be largely linked to the TLR. It is possible that the effects are in part due to other factors such as general innovation and market trends towards more fuel efficient tyres, independent of the TLR. However, as seen from the graphs (Figures 5 to 8), there was only very minor development in the label parameters before the regulation was adopted in 2009.

[30] http://www.rivm.nl/en/Documents_and_publications/Scientific/Reports/2014/december/Health_implication_of_road_railway_and_aircraft_noise_in_the_European_Union_Provisional_results_based_on_the_2nd_round_of_noise_mapping

[31] According to industry members consulted during the Review Study, 2016

[32] In the Current Label value, a 15% non-compliance rate is assumed with the average non-compliance magnitude of 2 classes lower than recorded on the label, based on preliminary results from the PROSAFE MSTyr15 project..

[33] In interviews conducted in relation to the 2016 Review Study

A report in the TLR's impact on innovation from 2014[34] found that the label had a positive impact on the innovation activities in the tyre supply chain. Not only tyre manufacturers, but also rubber and plant manufacturers were affected positively, since the improvement of the label parameters are heavily reliant on rubber compounds and new compounds require the development and adaption of machinery. According to the innovation study, manufacturers stated that innovation activities started around four years before the legislation came into place, which is also seen by the development in the label parameters (Figure 16 to Figure 18).

According to the innovation study, the work towards more efficient tyres was initiated before the TLR was implemented, but the label provided a "strong additional impulse" in innovation[35]. Furthermore, the "background" improvement is also included in the BAU scenario of this evaluation, thus taking into account the expected performance development without any intervention. The first tyre with class A for rolling resistance and for wet grip (so-called AA tyre) was presented in the spring 2012, but due to changes in production lines, it was not marketed before January 2015, which was the first year AA tyres became available on the market[36].

Another intervention influencing the tyre performance parameters on the label is the GSR, setting minimum efficiency requirements for the performance parameters on the label. However, the effect of the GSR is taken into account in the BAU scenario and therefore the difference between the BAU and the current label scenario can be assumed to be very closely linked to the TLR. Furthermore, the GSR does not set minimum requirements on wet grip for C2 and C3 tyres, and the development of WG for these tyre types can therefore not be linked to the GSR.

c. Evaluation question 3: To what extent can these changes/effects be credited to the intervention?

Some of the observed effects already took place in the years before the regulation was adopted. However, the observed effect (difference between BAU and Current Label Scenario) is still linked to the TLR because the manufacturers adapted to the foreseen Regulation (from 2009) even before it entered into force (in 2012), as mentioned earlier.

It should be noted that the average label values before 2012 are not based on actual data, but on estimates from the 2008 Impact Assessment (which were based on expert statements)[37]. The development before 2012 is thus more uncertain than the effect seen after 2012. However, it is expected that most of these changes were a response to the

[34] Ecofys, Impact of Ecodesign and Energy/Tyre Labelling on R&D and technological innovation, https://www.ecofys.com/files/files/fraunhofer-ecofys-2014-impact-of-ecodesign-energy-labelling-on-innovation.pdf

[35] Ecofys, Impact of Ecodesign and Energy/Tyre Labelling on R&D and technological innovation, https://www.ecofys.com/files/files/fraunhofer-ecofys-2014-impact-of-ecodesign-energy-labelling-on-innovation.pdf Page 25

[36] http://news.cision.com/goodyear-dunlop-uk-newsroom/r/goodyear-achieves-top-ratings-in-tyre-labelling-with-introduction-of-eight-aa-tyre-sizes,c9716749

[37] https://circabc.europa.eu/sd/a/99ffc67c-4422-4a38-9995-e41e3a40c333/Technical%20Study%20on%20Possible%20Energy%20Labelling%20of%20Tyres.pdf

GSR, whereas the effects of the TLR are more pronounced after 2012, when consumers were first presented with the label in purchase situations.

d. Evaluation question 4: To what extent can factors influencing the observed achievements be linked to the EU intervention?

Even though the TLR as a whole has been effective in increasing fuel efficiency level, it has been less effective for C3 tyres than for C1 and C2 tyres, primarily due to the way C3 are purchased compared to C1 and C2 tyres. This is not related to the intervention itself but rather to the market structure of the C3 market.

For larger fleets, procurement departments are often responsible for the purchases, and they are typically less focused on fuel efficiency than on purchase price and mileage (which influences the frequency with which new tyres have to be purchased). Furthermore, some C3 tyres are sold through service schemes, which resemble a leasing solution, where the tyre supplier does not bear the fuel costs and therefore does not attach a high importance to fuel efficiency. Combined with purchase cost focused procurement departments, the label information might thus receive little attention in purchase decisions.

Several other factors have reduced the achievements of the TLR, including low consumer awareness, lack of visibility of the label in purchase situations, weak enforcement and inaccurate test procedures.

Some of these factors are linked to the intervention itself while other factors are linked to the national implementation or non-compliance of market actors.

Factors linked to the TLR itself include the lack of a requirement to show the label when tyres are offered for sale on the internet and that labelling is not always required for OEM tyres, which influences the visibility of the label and thus consumer awareness. Furthermore, the TLR itself affects the enforcement based on the facts that:

- the label values are based on self-declaration by the manufactures;
- the defined calculation methods for establishment of the wet grip performance cause uncertainties;
- no detailed explanation of the content of technical documentation is required.

These factors are all linked to the TLR itself and can thus be improved by changing the regulation. Regarding visibility of the label during internet sales, 12% of C1 end-users purchased their last set of tyres online, with 56% planning to buy tyres on the internet in the future[38]. According to input to the OPC from Deutsche Umwelthilfe e.V. it is important that consumers who buy tyres from on-line shops are provided with complete information and that this requires in particular an image of the label, which due to its recognition value, enables comparisons.

38 Review study on the Regulation (EC) No 1222/2009 on the labelling of tyres. March 2016. Consumer survey among 6000 car owners in Germany, England, France, Italy, Sweden and Finland (1000 per country)

In the OPC nearly 60% of the 70 respondents answered that they would be more confident in the label's information if third party verification were mandatory and nearly the same percentage is of the opinion that third party verification should be a requirement[39].

In addition, several stakeholders mentioned independent testing as a means to guarantee the credibility of the label (FOEN[40]) and to make a positive contribution to the confidence in the label (Verband der TÜV e.v.). However, industry (ETRMA and Goodyear) does not support the introduction of third party testing because they see no benefits compared to improving market surveillance efforts and that it might be disproportionate to the available infrastructure of testing institutes/type approval authorities' laboratories.

e. Conclusion on effectiveness of the TLR

So far, the tyre labelling scheme has shown its effectiveness by being able to **transform the market in a positive direction from 2012 to 2017 for the rolling resistance and wet grip** parameters. **For external rolling noise the label cannot be said to have been effective** as it is not possible to unambiguously relate the effect solely to the TLR.

Since only one other intervention (the GSR) affects the tyre performance parameters included in the label, and the effect of this intervention is taken into account in the BAU scenario, **the effects on rolling resistance and wet grip can be attributed directly to the TLR**. However, due to the low label awareness among consumers, the effect is not as great as it would have been with higher awareness. In the consumer survey from the 2016 Review Study, 90% of respondents found the label information "useful" or "very useful", but only 41% stated that they knew the label before the questionnaire. This indicates that the label would be more effective if the awareness was higher.

The effectiveness of the scheme is reduced due to relatively low consumer awareness, consumer preferences, weak enforcement and inaccurate test procedures, especially for the wet grip tests which can give 3-4 classes of difference when tested at different tracks. This was highlighted by MSAs interviewed for the 2016 Review Study[41] as a problem for enforcement and a potential for improvement.

Consumer awareness and confidence in the label is particularly important since the TLR does not require manufacturers to produce tyres with higher performance, but this is rather a result of increased end-user demand for such tyres. Hence, if user **awareness or confidence in the label is low, tyres with high performance according to the label parameters will not have a market advantage**, but rather the opposite since they are often sold at higher prices. Visibility of the label is therefore important especially in the case of tyres sold online and for OEM tyres.

---

39 36% support third-party verification for every tyre model, 22% for representative sample of tyres
40 Federal Office for the Environment, https://www.bafu.admin.ch/bafu/en/home.html
41https://ec.europa.eu/energy/sites/ener/files/documents/Study%20in%20support%20of%20the%20Review%20of%20the%20Tyre%20Labelling%20Regulation_final.pdf

5.2. EFFICIENCY

a. Evaluation question 1: To what extent has the intervention been cost-effective?

While the costs of labelling will fall on manufacturers in the first place, they will pass on any extra costs to end-users who will benefit from cost savings linked to the performance of the products that outweigh the upfront costs[42].

Increased tyre performance has resulted in increased purchase prices for end-users, but this is offset by lower fuel consumption, which results in greater cost savings over the tyre lifetime. The total costs of ownership (TCO)[43] over the life time of tyres are lower with the implementation of the label than without, for both C1/C2 and C3 tyres. On average, tyre labelling is estimated to have saved C1 end-users an average of 60 Euro/year, C2 end-users an average of 118 Euro/year and C3 end-users an average of 673 Euro/year[44] from 2010 to 2017.

However, for C3 tyres the TOC improvements seen in the Current Label Scenario went down in 2016 and 2017, as seen in **Figure 21** below. The reduction in benefits occurs because of the second stage of rolling resistance requirements in the GSR, which causes the rolling resistance levels to decrease in the BAU scenario, which thus "catches up" with the development otherwise experienced in the current label scenario. This indicates that even though the TLR was cost efficient for end-users in the years 2010-2015, it gives no further savings in 2016 and 2017, when the market is pushed by the GSR towards higher fuel efficiency.

The reasons why the TLR is less efficient for C3 tyres than C1 and C2 tyres are linked to the way C3 tyres are purchased as explained in section 5.1.4. As a result, for C3 tyres the TLR does not achieve better rolling resistance levels than the BAU scenario (after the second stage of the GSR), and thus it is not more cost efficient.

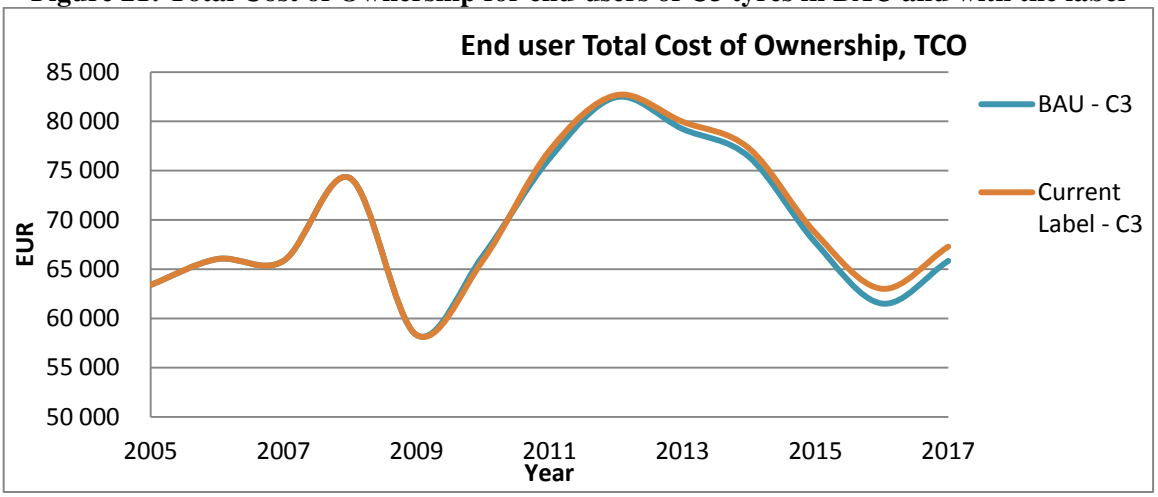
It is however important to note that even though the TOC for C3 end-users does not improve compared to the BAU scenario in the years 2016 and 2017, improvement *was* seen in the years 2010 to 2015. Furthermore, although the effect of the improved wet grip performance for C3 tyres is not included in the TOC calculation (as there isn't a directly derived cost effect), end-users still benefit in terms of less severe and fewer accidents.

42 Evaluation of the Energy Labelling and Ecodesign Directives SWD(2015) 143 final

43 The total costs of ownership include the purchase price of the tyre and the costs for fuel in the life time of the tyre.

44 Based on calculation models developed by consultants at Viegand Maagøe. The figures are in total direct savings (fuel savings minus purchase price), in TCO (Total Cost of Ownership) of a full set of tyres (4 for C1 and C2, 10 for C3).

Figure 21: Total Cost of Ownership for end-users of C3 tyres in BAU and with the label

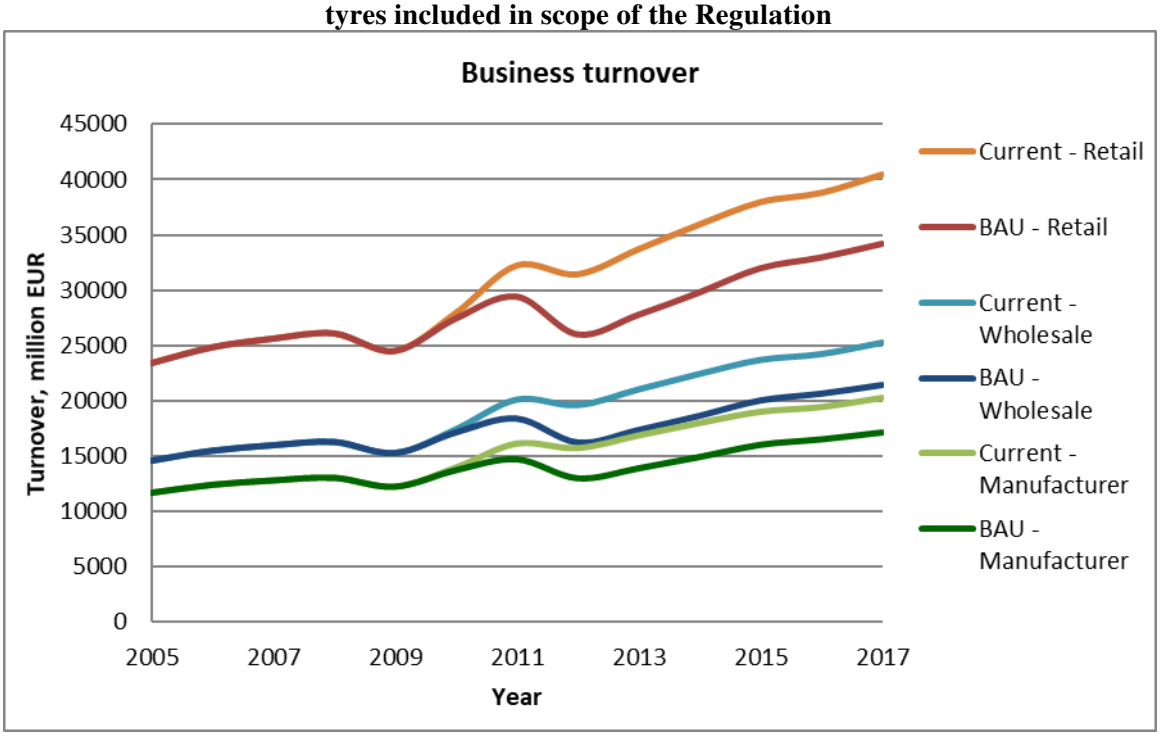


Source: based on unit prices from GfK and sales for ETRMA

Since the introduction of the TLR both tyre performance and purchase prices of tyres have increased. According to ETRMA[45] the TLR has encouraged manufactures to upgrade their products in the context of increased competition on the European market. However, no data is available to make a conclusive connection between increased sale prices and increased costs for development and production of improved tyres.

Based on product prices from GfK the annual retailer turnover has been calculated and mark-up factors have been used to estimate the corresponding turnover for wholesalers and manufacturers (see Appendix 2), which is seen in **Figure 22**below.

Figure 22: Turnover for tyre manufacturers, wholesalers and retailers in EU-28 for the tyres included in scope of the Regulation



Source: unit sales prices from GfK combined with sales data

45 ETRMA input to Inception Impact Assessment

It is important to bear in mind that although the label is mandatory there is no obligation for manufacturers to improve the performance of the product. Experiences from the EU energy labelling of energy-related products show strong evidence that manufacturers have reacted positively to the EU energy labelling scheme and consider the label as an important instrument to differentiate their products. This also suggests that the extra investments needed to achieve higher efficiency levels have generally been outweighed by the benefits[46].

As the labelling is based on self-declaration, no excessive testing costs are put on the manufacturers. The current test costs depend on the tyre type, but can be estimated for all three label parameters[47]:

- 3,500-4,000 Euro for C1 tyres
- 4,000-4,500 Euro for C2 tyres
- 5,000-6,000 Euro for C3 tyres

For each model family with up to 10 different tyre sizes, at least one test needs to be performed. It is not possible to estimate the total testing costs for manufacturers because no data of the actual number of tyres sold of each model are available. However, as mentioned above manufacturers have so far been able to pass most of the additional costs for testing in relation to the tyre labelling on to end-users. According to a 2014 study[48] manufacturers stated that the TLR provided a tool for differentiating their products, making it easier to achieve a return on investment in innovation, because it provided information on an otherwise low-interest product.

In the 2008 Impact Assessment[49], test costs of around 2,300 Euro were estimated for wet grip grading alone, with a need for 1,100 tests per year. No data estimates were given for the other label parameters. Since the TLR includes not only wet grip, but also rolling resistance and external rolling noise, the actual test costs mentioned above are higher than estimated in 2008. The number of tests depends on the number of different tyre models placed on the market each year, and with around 4,000 new models per year[50] around 1,000 individual tests seems reasonable. It can therefore be assumed that the wet grip testing costs estimated in the 2008 Impact Assessment have been materialised, with the addition of the cost for rolling resistance and external rolling noise.

Distributors and dealers must ensure that C1 and C2 tyres bear the label at the point of sale and they will have to cover the administrative costs for this activity. Although no quantitative data is available, costs for dealers to show the label on displayed products is widely accepted within the framework of the EU energy labelling scheme for energy-related products. In addition, the dealers will benefit from higher turnover due to

46 Ecofys, Evaluation of the Energy Labelling Directive and specific aspects of the Ecodesign Directive, June 2014.
47 Source: Information from ETRMA
48 https://www.ecofys.com/files/files/fraunhofer-ecofys-2014-impact-of-ecodesign-energy-labelling-on-innovation.pdf page 25
49 http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52008SC2860&from=EN –table 16 on page 51.
50 Based on estimates from data purchased from TOL https://www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=257341008

increased sales of better performing and more expensive tyres[51]. In the 2008 Impact Assessment[52] it was estimated that it would cost 0.04 Euro/tyre to print and add a label as a sticker on the tyre tread, amounting to around 10 million Euro per year in total (for C1 and C2 tyres). In more recent studies, e.g. the Impact Assessment on Energy Label Framework Regulation[53], a price 0.3 Euro/sticker was estimated.

Member States need to bear the costs for market surveillance, but they will also benefit from the reduction of accidents and health problems resulting from tyre labelling. In addition, EU wide legislation will be more cost effective from a Member State perspective compared to national legislation, because the costs of developing the regulation, test methods and conducting pre-regulatory studies are shared instead of conducted for each country separately.

The costs for market surveillance vary between Member States. Some carrying out almost no activities while others undertake both shop inspections and testing. No data regarding Member States costs for market surveillance is available.

Via the MSTyr15[54] project, the Commission supportscoordination and improvement of tyre market surveillance on the European market. The overall objective of the project is to help deliver the intended economic and environment benefits of the labelling of class C1 (passenger car) tyres. This will be achieved by improving the effectiveness of the MSAs through training and the adoption of good practice guidelines. The budget for the project is EUR 1.85 million [55].

b. Evaluation question 2: To what extent are the costs of the intervention justified, given the changes/effects it has achieved?

The TLR has resulted in substantial savings for end-users and society, without excessive costs for manufacturers, other market actors or Member States. In total 1,200 PJ, corresponding to 88 MT CO_2 emissions, have been avoided from 2010 to 2017, benefiting the society as a whole. Furthermore, in the same period an estimated 1,825 fatalities and 29,640 severe injuries were avoided in traffic due to higher performing tyres.

Manufacturers have been able to pass on the extra cost for development of better performing tyres to end-uses, and distributors and dealers benefitted from increased turnover.

Member States need to bear costs for market surveillance, but they will also benefit from the reduction of accidents and health problems achieved due to the tyre labelling. In addition, an EU wide legislation will be more cost effective from a Member State perspective compared to national legislation.

[51] Stoock model numbers presented in Appendix 3 indicate a continuous increase in overall sales
[52] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52008SC2860&from=EN – Table 17 on page 52
[53] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015SC0139&from=EN - Annex 9, page 114
54 http://www.prosafe.org/horizon-2020-projects/mstyr15/72-joint-actions/mstyr15
55 https://cordis.europa.eu/project/rcn/200156_en.html

Therefore, the intervention costs seem justified given the improved performance of tyres and the associated benefits.

c. Evaluation question 3: To what extent are the costs associated with the intervention proportionate to the benefits it has generated? What factors are influencing any particular discrepancies? How do these factors link to the intervention?

Due to the benefits illustrated above and the low costs for implementation of labelling compared to other actions, the intervention is considered proportionate. The fact that the same tests can be used to prove compliance with the GSR to document the label values makes both regulations more cost efficient for manufacturers.
One important factor influencing the discrepancy observed for C3 tyres is their purchase pattern, which often involves procurement departments primarily focused on purchase costs or leasing solutions in which different actors carry the burden for the purchase cost (the tyre supplier) and the fuel cost (the end-user). This is a market factor (i.e. a split incentive) that cannot be linked to the intervention itself but to the supply chain.

d. Evaluation question 4: To what extent do the factors linked to the intervention influence the efficiency with which the observed achievements were attained? what other factors influence the costs and benefits?

Since the efficiency to some extent depends on the effectiveness of the scheme, some of the same factors influence the efficiency. This is especially true for consumer awareness, since the label does not require manufacturers to produce tyres with higher performance, but this is rather a result of end-user demand for such tyres. Hence, if end-user awareness or confidence in the label is low, tyres with high performance according to the label parameters will not have a market advantage, but rather the opposite since they are often also sold at higher prices.

Consumer awareness and label confidence are in turn linked to the enforcement and market surveillance actions of the Member States, and to improve awareness and confidence, market surveillance activities should also be strengthened.

Other factors affecting the costs and benefits of the Tyre Label Scheme is the general tendency towards more fuel-efficient cars. Since the tyre rolling resistance accounts for a certain percentage of the car fuel consumption, cars with higher fuel efficiency subsequently also give the end-user lower absolute savings from the tyres. This should however not be seen as a negative effect, since the reduced fuel consumption of the car itself is a means to the same end of mitigating GHG emissions.

e. Evaluation Question 5: How proportionate were the costs of the intervention borne by different stakeholder groups taking into account the distribution of the associated costs?

Tyre manufacturers bear the largest share of the costs, but they have so far been able to pass the extra costs on to the end-users, without increasing the total costs for end-users over the life time of the tyres.

The end-users bear the costs for more expensive tyres, but they will be compensated by saved fuels costs over the lifetime of the tyres.

Member States bear the costs for market surveillance in general and tyres only form one small part of that. Moreover, the Commission has supported market surveillance through the MSTyr15 project.

For this intervention it is important to bear in mind that it is voluntary for manufacturers to improve the performance of tyres and for the end-users to buy better performing tyres. The mandatory part for the manufacturer is the provision of the label information and the label itself (for C1 and C2 tyres).

f. Evaluation question 6: Are there opportunities to simplify the legislation or reduce unnecessary regulatory costs without undermining the intended objectives of the intervention?

The one opportunity for simplification and reduction of regulatory costs that has been identified is the establishment of a product registration database in line with database introduced in the energy labelling framework regulation (EU) 2017/1369. According to MSAs interviewed in correlation with the 2016 Review Study and the PROSAFE MSTyr15 project, obtaining technical documentation is difficult and a database would help them in their work, making market surveillance easier.

The idea is that the tyre supplier will be obliged to register all new models and enter pre-defined information in the database before placing the tyre on the market. The information will include details about the supplier and the product, for instance suppliers name and trademark, model identifier, performance classes and other parameters on the label, the label in electronic format and the technical documentation.

As tyre suppliers are already obliged to assemble all the required documents and information (including providing the label) and make the information available to authorities on request, the additional costs for uploading the documentation in a database is limited. The additional costs could be compensated by the fact that manufacturers do not need to handle requests from authorities because these already have easy access to the information in the database.

The burden for Member States' MSAs to obtain the documentation is significantly reduced. Also, the burden for suppliers and dealers will be reduced because they have easier access to the label and the label information.

As the Commission is already obliged to set up the database for energy-related products, the extra costs for inclusion of tyres will be marginal. Establishment of a product registration database is supported by end-users, manufacturers and Member States.

g. Evaluation question 7: if there are significant differences in costs (or benefits) between Member States, what is causing them? How do these differences link to the intervention?

Member State costs associated with the tyre labelling Regulation are primarily related to market surveillance.

Even though all Member States have the same the obligation to perform market surveillance according to the Regulation, the actual level of market surveillance varies greatly between Member States - from zero to several hundred shop inspections per year. The prevailing type of market surveillance is 'point of sales' inspections. Some authorities performed inspections of technical documentation, but only very few performed laboratory tests to verify the label values. According to MSAs, high cost and too few accredited test facilities are the greatest barriers for laboratory testing of tyres.[56]

The relatively low level of market surveillance affects consumer confidence negatively, and many stakeholders[57] state in both the Review Study and the OPC that to increase confidence more market surveillance (including testing) and sanctioning of non-compliance is needed. Furthermore, retailers claim in the Review Study and the OPC that they 'not often' or 'never' experience that their shops are inspected, which has given them the impression that tyre labelling is of low priority for the authorities.

Based on this, some tyre dealer organisations have decreased their effort to educate their employees in advising consumers about the label parameters. The involvement of dealers is considered of great importance for consumer awareness and the actual use of the label.

h. Evaluation question 8: How timely and efficient is the intervention's process for reporting and monitoring?

Pursuant to the TLR, the Commission must assess the need to review the Regulation and present the result of this assessment to the European Parliament and the Council no later than 1 March 2016.

The TLR was adopted in November 2009 and entered into force in November 2012.

Pursuant to Article 14 of the TLR, the assessment should consider, *inter alia*:

> (a) the effectiveness of the label in terms of end-user awareness, in particular whether the provisions of Article 4(1)(b) are as effective as those of Article 4(1)(a) in contributing to the objectives of this Regulation;
>
> (b) whether the labelling scheme should be extended to include retreaded tyres;
>
> (c) whether new tyre parameters, such as mileage, should be introduced;

56 Review study on the Regulation (EC) No 1222/2009 on the labelling of tyres. March 2016
57 Both the industry and end users have expressed the need for more market surveillance in the context of the 2016 Review Study and in the OPC.

(d) the information on tyre parameters provided by vehicle suppliers and distributors to end-users.

Monitoring the effect of the regulation 6 years after its adoption and around 3 years after it entered into force seems to be appropriate. The Regulation needs to have been in place for some time before it is possible to evaluate its functioning and effectiveness. The list of issues that should be considered has been expanded to include also essential aspects regarding cost effectiveness and the possibility of the label to be able to pull the tyre market towards better performing tyres.

There is no collective data collection or monitoring procedure to evaluate the level of compliance and enforcement/market surveillance activities. This means that progress in the market can only be estimated by purchasing data from market research companies or the like, and not through data collected directly form Members States or suppliers.

i. Conclusions on efficiency of the TLR

The evaluation assessment has shown that **the benefits from the TLR seem to outweigh its costs, both for business and for society as a whole**. This is true both for manufacturers' costs for testing and for end-users. The fact that manufacturers have worked to improve their products shows that the TLR has been used as a product-differentiating factor, which suggests that the extra investment needed to achieve higher efficiency levels has generally been outweighed by the benefits[58].

The increased performance has resulted in increased purchase prices for end-users, but this is offset by the fuel savings, which results in larger savings over the tyre lifetime. All in all, **the total cost of ownership for end-users is lower with implementation of the TLR than without** for C1, C2 and C3 tyres. However, for C3 tyres the TOC improvements seen in the Current Label Scenario subsided in 2016 and 2017.

Member State costs associated with the TLR are primarily related to market surveillance. These costs should be reduced, to incentivise market surveillance in all Member States at a sufficient level. The cost could be reduced by establishing a product registration database in line with the database introduced in the energy labelling framework regulation (EU) 2017/1369 and by specifying better the content of the technical documentation.

5.3. RELEVANCE

a. Evaluation question 1: To what extent is the intervention still relevant?

The objective of the TLR is to provide end-users with information on tyre performance parameters thereby allowing them to make an informed choice, and to influence their purchase decisions in favour of more fuel efficient, safer, and quieter tyres. Furthermore, it incentivises manufacturers to optimise those tyre parameters, paving the way for more sustainable consumption and production.

58 Ecofys, Evaluation of the Energy Labelling Directive and specific aspects of the Ecodesign Directive, June 2014.

These objectives are still relevant since increasing fuel efficiency continues to be important with the EU facing a dependence on energy imports and with the need to limit climate change. Decarbonising the transport sector is a major challenge and it is the only large EU sector where emissions today are above their 1990 levels. Tyres account for 5-10% of vehicle fuel consumption due to their rolling resistance[59]. Decreasing rolling resistance of tyres is therefore important to increase fuel efficiency and cut greenhouse gas emissions.

Ensuring that consumers are informed about the rolling resistance (and thus the impact on fuel consumption) of different types of tyres is a crucial element in driving changes in behaviour and moving the market towards greater fuel efficiency. At the same time, the label helps end-users choose safer tyres through the wet grip performance indicator and quieter tyres through the external rolling noise indicator. The more effective the label, the greater the contribution to achieving clean, safe and quiet vehicles.

Increasing road safety is highly relevant with approximately 24,500 road accident fatalities in the EU in 2017[60]. The Commission has adopted a road safety programme[61] to decrease road deaths between 2011 and 2020. Tyres are an important part of road safety as they are the only contact between the vehicle and the road. Providing end-users with information on tyre safety parameters is highly relevant as well, with the tyre safety parameter wet grip being a top-level concern for end-users along with price when purchasing tyres. furthermore the 2016 Review Study indicated that considering including additional safety performance parameters such as tyre grip on snow and ice in addition to the wet grip parameter may contribute to increasing relevance. Snow and ice performance were also rated as relevant by end-users in the consumer survey conducted in relation to the 2016 Review Study.

Regulating external rolling noise levels also continues to be highly relevant. The Environmental Noise Directive (END) 2002/49/EC entered into force in 2002 and obliges Member States to report noise levels. The data collected shows that in 2013 70 million people in Europe suffered from unacceptable noise levels in so-called Black Areas, exceeding 65 dB noise levels, and even more in Grey Areas with noise levels between 55 and 65 dB. The WHO recommends night noise levels below 40 dB to protect public health. Regulating external rolling noise of tyres thus remains important to mitigate this problem.

According to the results of the OPC, a clear majority of the respondents (nearly 80%) find the tyre label helpful when deciding which tyres to buy. The respondents that find the label useful include manufacturers (ETRMA), national authorities and NGOs. In the consumer survey carried out as part of the 2016 Review Study, 90% of the interviewed car owners (cars with C1 tyres) rated the label as useful (including 38% as very useful).

[59] Numbers are for highway driving, https://www.fueleconomy.gov/feg/atv.shtml. City driving results in 3-5% rolling resistance loss.
[60] https://ec.europa.eu/transport/road_safety/specialist/statistics_en#
[61] http://europa.eu/rapid/press-release_MEMO-10-343_en.htm

b. Evaluation question 2: To what extent have the (original) objectives proven to have been appropriate for the intervention in question?

The original objectives of decreasing fuel consumption and increasing safety have been appropriate and as a result better performing tyres have been placed on the market. However, the original 2008 Impact Assessment did not include considerations on wet grip (safety) for C2 and C3 tyres or on external rolling noise for any of the tyre types. These factors, however, continue to be relevant for the TLR, and manufacturers consider that information about the interaction of all three parameters is crucial for end-users to make an informed choice[62].

c. Evaluation question 3: How well do the (original) objectives of the intervention (still) correspond to the needs within the EU?

There is still a need in the EU to promote cleaner, safer and quieter vehicles. In this context tyre labelling is still very relevant. However, some additional needs have appeared within the EU since the adoption of the current tyre labelling scheme.

The current tyre labelling scheme does not cover re-treaded tyres or studded tyres. In addition, there is no information on the performance of tyres in snow and ice conditions.

Tyre re-treading is a process used to extend the life of used tyres, in particular for C3 tyres. The market share of re-treaded C3 tyres is around 30% in Europe, which corresponds to around 4.3 million tyres[63].

Studded tyres[64] are primarily used in Finland, Sweden and Norway, where the market share is 25% on average of the C1 tyre market. More than 50% of car owners in Sweden and Finland have studded tyres for their cars[65]. In the rest of the EU, the market share can be estimated at around 0.50% of the annual sales according to the 2016 Review Study[66].

Wet grip is generally perceived as a safety rating of the tyre, but this is only true for wet conditions, not for the snow and ice conditions seen in the Nordic countries or in mountainous areas. Tyres with very good level of performance under ice conditions tend to have in general low wet grip rates. The market share of these tyres at EU level is around 30% of the annual C1 tyres sales for snow tyres and around 1% for ice tyres according to the 2016 Review Study.

The fact that these types of tyres are not in the scope of the current TLR means that there is no EU system of information to end-users about such tyres, and they could therefore be misled regarding the safety information because of confusion between the wet grip parameter and performance on snow/ice.

---

62 According to ETRMA answers to the OPC

63 http://www.etrma.org/uploads/20170912%20-%20Statistics%20booklet%202017%20-%20alternative%20rubber%20section%20FINAL%20web1.pdf

64 Tyres with a number of small metal studs embedded in the tyre tread to improve traction on snowy or icy roads

65 According to C1 end users participating in the consumer survey perfoirmed in relation to the 2016 Review Study

66 For the overall EU, the market share of the studded tyres is around 2%

In general, stakeholders are in favour of including information regarding snow and ice performances on the label (70% according to the OPC). This is also supported by industry (ETRMA).

Respondents to the OPC are also in favour of extension of the scope of the tyre labelling regulation to include retreated tyres (about 65% answer yes). However, only 22% are supporting inclusion of studded tyres. The majority of the respondents' answered "don't know" or "no" to that question.

Some stakeholders, in particular BIPAVER[67] in cooperation with ETRMA[68] and ETRTO[69], are working proactively to find an adequate system for the integration of retreated tyres in the tyre labelling scheme. However, ETRMA also stress that before inclusion of retreated tyres in the tyre labelling scheme it is essential to identify a technically and economically feasible tool or system for establishing the label performance parameters. This is particularly important because of the high number of SME tyre retreaders who will be impacted if retreated tyres are included in the scope.

d. Evaluation question 4: How well adapted is the intervention to subsequent technological or scientific advances?

Since the adoption of the TLR manufacturers have placed better performing tyres on the market especially regarding wet grip. Nevertheless, very few tyres are able to have at the same a high performance (i.e. corresponding to class A) with respect to both fuel efficiency and wet grip.

As more products are now in the highest performing classes of the label (especially with regard to wet grip and noise) re-adjustment of the label classes could be a solution ensuring that the label also in the future will able to pull the market for all the included performance parameters. Also the removal of the bottom classes (through the GSR), means that several of the label classes are no longer utilised, and a re-adjustment of the classes could possibly make it more relevant for future technology.

According to ETRMA, the tyre industry has taken a proactive approach in reducing CO_2 emissions through advanced technology while promoting road safety and other key performance parameters at the same time. In addition, ETRMA argues that because tyres are technologically complex products, tyre development faces a multiple set of customer-oriented performance requirements which often conflict with each other. Therefore, the performances rated on the tyre label are the results of complex engineering development. Against this background, ETRMA finds that the current scaling system of the three performance parameters on the label is already challenging and will remain so in the foreseeable future[70].

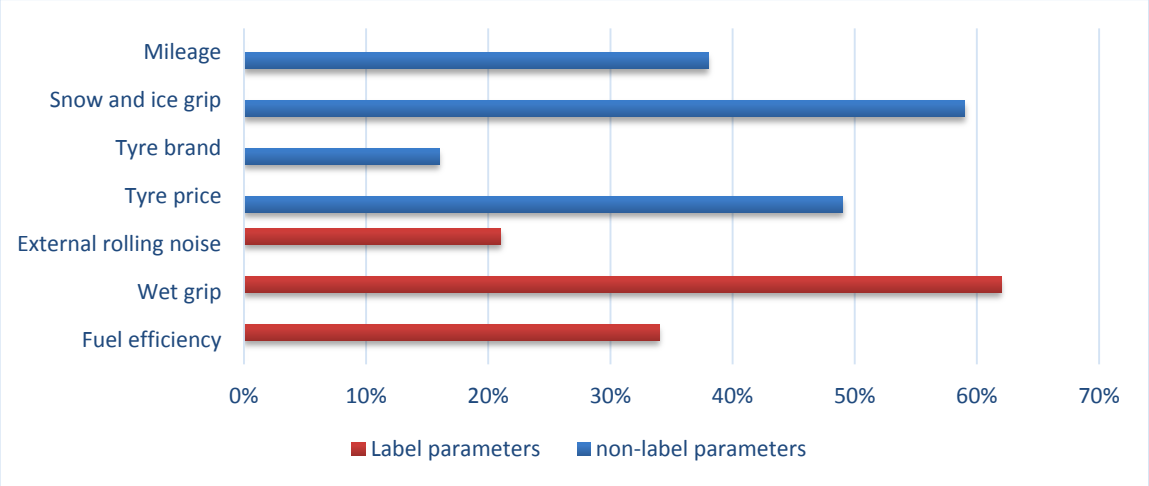
67 European retread industry trade association, representing National retreading associations and suppliers to the retreading industry from 11 Member States https://bipaver.org/
68 European Tyre & Rubber Manufacturer Association, http://www.etrma.org/
69 European Tyre and Rim Technical Organisation, https://www.etrto.org/Home
70 ETRMA contribution to Evaluation Roadmap/Inception Impact assessment. EU tyre labelling scheme – 1222/2009/EC. July 20, 2017.

e. Evaluation question 5: How relevant is the EU intervention to EU citizens?

As the TLR is an intervention that is specifically targeting end-users of tyres, and there are more than 250 million C1 vehicles plus C2 (30 million) and C3 (6 million) vehicles, it is by nature very relevant for EU citizens.

According to respondents to both the OPC and the consumer survey made in relation to the 2016 Review Study, the TLR is indeed relevant; 82% of respondents in the OPC found an EU label on tyres helpful when making a purchasing decision. In both the OPC and the consumer survey, fuel efficiency and wet grip were rated as important parameters, even when comparing to non-label parameters as seen in the figure below.

Figure 23: Percentage of C1 end-users rating different tyre parameters "very important"



Source: consumer survey made in relation to the 2016 Review Study

The external rolling noise, on the other hand, is rated as "very important" by only 21% of end-users (see figure above) and according to ANEC/BEUC[71] "external rolling noise performance does not deliver useful consumer information"[72].

One reason for the low relevance rating of external rolling noise is that it is not the noise experienced by the driver that is measured, but the noise experienced by a bystander when the vehicle drives past. This is important because of environmental noise effects, but users purchasing a new tyre typically find parameters that affect them directly more relevant (e.g. the wet grip and the fuel efficiency).

Another reason might be the lower understanding of the noise pictogram on the label, which according to both the consumer survey and the OPC is the label parameter users find most difficult to understand. Swiss FOEN[73] suggested in the OPC to reconsider the noise pictogram and exchange it with for example a "smiley" scale[74].

71 http://www.beuc.eu/about-beuc/who-we-are
72 Comment from the OPC answer
73 https://www.bafu.admin.ch/bafu/en/home.html
74 *"Reconsider noise pictogram (smileys? :-) / :-I / :-(, add color?)"* **[FOEN]**

Even though the external rolling noise might not be important for the end-user in a purchase situation[75], some still use it in their decision making, and it is still relevant for the EU citizens who are affected by traffic noise.

f. Conclusions on relevance of the TLR

The TLR continues to be highly relevant for promoting fuel efficient and safe tyres with low external rolling noise[76]. The end-users that participated in the survey found the label information relevant when purchasing tyres.

Increasing the fuel efficiency continues to be highly relevant with the EU facing a dependence on energy imports and with the need to limit climate change. With the transport sector constituting one third[77] of European energy consumption, increasing fuel efficiency of road transport plays an important role in addressing these challenges.

Increasing road safety is highly relevant with approximately 24,500 road accident fatalities in the EU in 2017[78]. The Commission has adopted a road safety programme[79] to decrease road deaths between 2011 and 2020[80]. Tyres are an important part of road safety, as they are the only contact between the vehicle and the road. Providing consumers with information on tyre safety parameters is highly relevant as well, with the tyre safety parameter wet grip being a top-level concern for consumers along with price when purchasing tyres[81].

Regulating external rolling noise levels also continues to be highly relevant. The Environmental Noise Directive (END) 2002/49/EC[82] entered into force in 2002 and obliges Member States to report noise levels. The data collected shows that in 2013 70 million people in Europe suffered from unacceptable noise levels in so-called Black Areas, exceeding 65 dB noise levels, and even more in Grey Areas with noise levels between 55 and 65 dB[83]. The WHO recommends night noise levels not higher than 40 dB to protect public health. Regulating external rolling noise thus remains important to mitigate this problem.

5.4. COHERENCE

a. Evaluation question 1: To what extent is this intervention coherent with other interventions which have similar objectives?

[75] Based on C1 consumer survey made in correlation to the 2016 Review Study.
76 Regulation 1222/2009 of the European Parliament and of the Council
77 European Commission (2014), "EU Energy in Figures statistical pocketbook 2014", European Union, 2014. ISBN 978-92-79-29317-7. Link: http://ec.europa.eu/energy/sites/ener/files/documents/2014_pocketbook.pdf
[78] https://ec.europa.eu/transport/road_safety/specialist/statistics_en#
79 European Commission (2010), "Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Towards a European road safety area: policy orientations on road safety 2011-2020". Brussels, July 2010. COM (2010) 389 final. Link: http://ec.europa.eu/transport/road_safety/pdf/com_20072010_en.pdf
80 European Commission (2016), "Mobility and Transport Road Safety; Statistics – accidents data". Website last updated 04.03.2016. Link: http://ec.europa.eu/transport/road_safety/specialist/statistics/index_en.htm
81 Consumer survey with C1 end-users in selected European Countries, Viegand Maagøe, fall 2015. See Appendix 2.
82 Directive 2002/49/EC of the European Parliament and of the Council
83 European Environment Agency (2014), "Exposure to and annoyance by traffic noise", December 2014, Link: http://www.eea.europa.eu/data-and-maps/indicators/exposure-to-and-annoyance-by-1/assessment

Description of the GSR

The TLR was adopted at the same time as the GSR that puts in place harmonised technical requirements that tyres must satisfy to be placed on the EU market.

The GSR removes the worst performing tyres from the market by putting in place minimum requirements for (i) the rolling resistance, (ii) external rolling noise and (iii) wet grip performance of tyres. All three minimum requirements applied from 1 November 2012 for new models of tyres, with a second more stringent set of requirements applied for the rolling resistance of new models of tyres from 1 November 2016.

Effects of the interaction of both Regulations

As a result of the current minimum requirements of the GSR, classes set up by the TLR are outdated: classes G and F (and E for C3 tyres) for rolling resistance, class F for wet grip and the three soundwaves class for noise are now empty. By contrast, the top classes are increasingly populated, in particular for wet grip[84].

The elimination of the bottom classes through the type approval legislation and the migration towards top classes due to technological progress makes a re adjustment of the the label necessary in order to maintain the incentive effect of the labelling scheme.

The TLR is coherent with the GSR. The same measuring methods and performance parameters are applied in both Regulations, and often industry uses the results from the type approval tests to establish the labelling values. The two Regulations are closely related and complement each other. While the GSR sets minimum efficiency requirements to remove the worst performing tyres from the market, the tyre labelling regulation inform end-users of the tyre performance so that they can make informed purchasing decisions (so call combined "push" and "pull" effect).

The TLR and the GSR should be seen as a "parallel" to the EU's Energy Labelling and Ecodesign framework for energy-related products (which is not applicable to means of transport). Similar to the GSR, ecodesign regulations set minimum energy efficiency requirements that products must satisfy before they can be placed on the Union market, while energy labelling regulations (similar to the TLR) provide information to consumer so that they can make better informed choices when purchasing.

This same "push and pull" effect can be seen in the EU mobility framework, where the car labelling Directive helps consumers buy or lease cars which use less fuel and thereby emit less CO_2 and encourages manufacturers to reduce the fuel consumption of new cars, while the Regulation on emission performance standards and reducing CO_2 emissions for new passenger cars sets the minimum requirements for the Union market.

84 2016 Review study on the Tyre Labelling Regulation, https://ec.europa.eu/energy/sites/ener/files/documents/Study%20in%20support%20of%20the%20Review%20of%20the%20Tyre%20Labelling%20Regulation_final.pdf

The TLR is coherent with the framework Energy Labelling Regulation[85] and the implementing measures (Commission Delegated Regulations) adopted under that framework. The design of the label itself as well as the structure of the implementing measures are very similar, although further alignment would be possible.

The efforts by the European Commission to decrease the fuel consumption of passenger cars, LCVs (HCVs interrelate with the TLR on achieving the same goal: higher overall energy savings and emission reductions from road transport within the EU. However, since the tyre rolling resistance causes a certain share of the vehicle fuel consumption, the general decrease in fuel consumption of vehicles, also decreases the absolute value of the saving potential of improving the tyres.

Tyres sold on the OEM (i.e. with a new vehicle) constitute around 25% of the tyre sales in Europe[86]. Even though it is smaller than the replacement market it is still considered important in terms of which tyres are used on European roads. According to the TLR, OEM tyres should only bear the label when end-users are offered a choice between different tyres when they buy a new car (which in most cases they are not[87]). Passenger cars are covered by European fuel efficiency labelling88 with the aim to help consumers buy or lease cars which use less fuel and thereby emit less CO_2. However, the fuel efficiency label for cars does not take the fuel efficiency of tyres into account because cars are tested with standard tyres when establishing the efficiency rating for the fuel label.

b. Evaluation question 2: To what extent is the intervention coherent internally?

Tyres are characterised by several interrelated parameters, and improving one parameter, such as rolling resistance, can have an adverse impact on other parameters, such as wet grip, thereby decreasing road safety. Furthermore, the improvement of wet grip might have an adverse impact on external rolling noise, increasing noise pollution.

It is important for the internal coherence that all three interrelated performance parameters are included in the label. If the wet grip was not included in the label the fuel efficiency could be improved at the expense of the wet grip, which could result in less safe tyres and more accidents.

The implementation of the TLR has especially resulted in improvement of the wet grip performance, while less progress has been achieved for fuel efficiency and only very minor improvements for external rolling noise. This corresponds to the fact that most

[85] Regulation (EU) 2017/1369 of the European Parliament and of the Council setting a framework for energy labelling and repealing Directive 2010/30/EU

[86] Based on statement from ETRMA and calculation methods used in the 2016 Ecodesign Impact Accounting https://ec.europa.eu/energy/sites/ener/files/documents/Ecodesign%20Impacts%20Accounting%20%20-%20status%20January%202016%20-%20Final-20160607%20-%20N....pdf

[87] According to answers in the consumer survey made in relation to the 2016 Review Study

[88] DIRECTIVE 1999/94/EC of the European Parliament and of the Council relating to the availability of consumer information on fuel economy and CO_2 emissions in respect of the marketing of new passenger cars

end-users find the wet grip performance the most important parameter on the label[89]. This is also confirmed by the results of the OPC.

c. Evaluation question 3: To what extent is the intervention coherent with wider EU policy?

The intervention is coherent with wider EU policies for increasing energy efficiency and reducing CO_2 emissions and the TLR contributes positively to achieving the objectives of these policies.

Lowering the demand for energy and 'putting energy efficiency first' is one of the five main objectives of the Energy Union strategy. In 2015, Member States confirmed the imperative need to reach the 20% energy efficiency target for 2020. In November 2016, the Commission proposed to further strengthen this beyond 2020 with a 30% EU energy efficiency target for 2030. That target is currently under examination in the ordinary legislative procedure: there is no sign that final agreement will be on a level of ambition lower than that proposed by the Commission.

The proposed 2030 EU Climate and Energy policy framework sets out binding targets for the non-Emissions Trading System (ETS) sectors (primarily agriculture and transportation) to cut emissions by 30% by 2030 compared to 2005. Legislation is in place to reduce emissions from new cars by 40% in 2021 compared to 2005 and by 19% for new vans in 2020 compared to 2012.

With the transport sector accounting for one third of European energy consumption, increasing the fuel efficiency of vehicles is a key element in decreasing transport emissions and also contributes to reducing the EU's dependence on energy imports.

Therefore, there are major efforts at EU level to reduce CO_2 emissions and air pollution caused by transport. For instance, in its Communication "A European Strategy for Low-Emission Mobility" the Commission announced that by 2050 greenhouse gas emissions from transport need to be 60% lower than in 1990. Similarly, the "Third Mobility Package" will include initiatives to reduce emissions by cars and lorries, to increase safety of road transport and to reduce pollution. The Commission's Communication "A European Strategy for Plastics in a Circular Economy" specifically mentions the need to study how to reduce unintentional release of microplastics from tyres, possibly through tyre design, minimum requirements for abrasion and information requirements.

d. Evaluation question 4: To what extent is the intervention coherent with international obligations?

International UNECE[90] test methods form the basis of the tests in both the tyre energy labelling Regulation and the GSR. The use of globally recognised measurement standards ensures coherence with international approaches and avoids that industry has to test according to different testing methodologies.

89 Review study on the Regulation (EC) No 1222/2009 on the labelling of tyres. March 2016.
90 United Nations Economic Commission for Europe (UNECE), https://www.unece.org/mission.html

No international obligations have been identified for tyres specifically, but in a wider perspective, the TLR is coherent with any obligations related to mitigating climate change.

e. Conclusions to coherence of the TLR

The TLR is coherent with the GSR. The same measuring methods and performance parameters are applied in both Regulations and the two Regulations are closely related and complement each other by acting as push and pull factors on the market, respectively.

The inclusion of all three interrelated performance parameters (wet grip, noise and fuel efficiency) in the label ensured internal coherence.

The intervention is coherent with wider EU policies in place to increase energy efficiency and reduce the CO_2 emissions and the tyre labelling regulation contributes positively to achieve the objectives of these policies. This includes for example the energy efficiency targets in the Energy Union Strategy for 2020 and 2030 and the European Strategy for Low-Emission Mobility (Commission Communication).

With the transport sector accounting for one third of European energy consumption, increasing the fuel efficiency of vehicles is a key element in decreasing transport emissions and contributes to reducing the EU's dependence on energy imports.

Finally, international UNECE test methods form the basis of the tests in both Regulations. The use of globally recognized measurement standards also ensures coherence with international approaches and saves the industry the effort to test according to different testing schemes.

5.5. EU ADDED VALUE

a. Evaluation question 1: What is the additional value resulting from the EU intervention compared to what could reasonable have been expected from Member States acting at national and/or regional levels?

The general stakeholder view as expressed in the OPC and consumer survey related to the 2016 Review study is that an EU-wide label covering all EU countries is preferable over national or regional regulation. 83% of the respondents (including industry respondents) to the OPC found an EU-wide label the best solution. During the OPC and the 2016 Review Study no stakeholder expressed opposition against having the tyre label at EU level.

Furthermore, several stakeholders indirectly support the EU-wide action by expressing in the OPC that they want to expand the reach of the label in terms of for example consolidated market surveillance actions and an EU tyre registration database.

An EU harmonised regulatory framework rather than having rules at Member State level brings down costs for manufacturers and ensures promotion of high-performing tyres. Moreover, given that the TLR is closely linked to the GSR, which operates at EU level, having both regulations operate at different levels would lower their added value.

If instead of the TLR, national or regional regulations would be in place, there would be considerable regulatory barriers to trading tyres because of different rules and requirements. This would make it difficult for businesses to enter the EU market as each Member State would have to be treated as a separate market, imposing considerable regulatory compliance costs.

For tyres the EU legislation preceded any national legislation that could have led to market fragmentation and created obstacles to the free movement of products and to higher costs for both producers and member states.

Furthermore, a Regulation at EU level provides end-users with the same, harmonised information, no matter which Member State they choose to purchase their tyres in, which is increasingly relevant as the online trade increases. With the tyre labelling scheme at EU level, energy efficient and safe tyres reducing noise pollution, are promoted in all Member States, creating a larger market for such tyres and hence larger incentives for the tyre industry to develop them. All Member States will also benefit from the optimised performance of the tyres in terms of lower fuel/energy consumption, lower CO_2 emissions, fewer accidents and fewer people exposed to increased noise levels.

The added value of having an EU-wide regulation compared to what could reasonably be expected from Member States acting at national and/or regional levels is the consistent labelling requirements for all manufacturers throughout the EU, the **reduced cost of market entry** and operation for businesses and the **availability of high performing tyres for all EU citizens** at reasonable costs due to the increased competition on the internal market.

b. Evaluation question 2: What would be the most likely consequences of stopping or withdrawing the existing EU intervention?

Since tyres are a relatively complicated product to test compared to other energy labelled products and no Member States or regions had any performance regulations in place before the EU TLR, it is unlikely that national or regional legislation would be adopted in case the EU label is withdrawn.

If no national regulations were in place, end-users would not be able to find harmonised information on tyre performance regarding fuel efficiency, wet grip or external rolling noise.

If Member States were to adopt national legislation, the most likely effect would be:

- Fewer models on the smaller national markets in particular (low purchasing power or low number of end-users) caused by the increased regulatory and monetary burden of introducing new tyres on the market
- More expensive tyres (to pay for the increased market entry costs faced by producers)
- Less competition and more fragmentation of the market

Without the TLR CO_2 emissions, the number of road accidents and road noise would likely be higher, resulting in increased societal costs from both the effect of climate change, road accidents and noise nuisance.

Most likely, if the EU TLR was withdrawn, **no national or regional legislation would be put in its place**. This would mean that the market would over time approach the performance seen in the BAU (no-label) scenario with **higher rolling resistance, lower wet grip and higher noise levels**.

c. Conclusions to EU added value of the TLR

A harmonised regulatory framework at EU level provides added value to the EU compared to having regulations at Member State level, because it enables businesses to enter a larger market for their products while ensuring high levels of environmental protection.

This strengthens competitiveness EU-wide and facilitates easier inter-European trade of tyres, which also benefits consumers in terms of lower prices and wider range of products.

The objective of reducing the negative environmental impacts of tyres cannot be sufficiently achieved only by the Member States, because this would lead to divergent national provisions and procedures that would result in undue costs for industry (and eventually consumers) and constitute obstacles to the free movement of goods within the EU internal market. Only through harmonised EU rules on tyre labelling, and underlying measurements and testing, can it be ensured that the same model of a tyre has the same published energy class throughout the EU. This is the only way to ensure end-users can compare tyres across the EU.

6. Conclusions

6.1. WHAT IS/IS NOT WORKING AND WHY?

The TLR is working only partly as intended towards the objective of providing end-users with information allowing them to choose more fuel efficient, safer and quieter tyres, since only around half of end-users know of the label. The label parameters continue to be relevant both from an end-user and societal perspective.

The overall fuel consumption for all vehicle types (C1, C2 and C3) has decreased compared to the No-label scenario through decreasing rolling resistance. However, the effect of the TLR on rolling resistance of C3 tyres is reducing after the latest minimum requirements of the GSR were introduced. This limited effect is most likely due to the differing supply chain for C3 tyres and not directly linked to the TLR itself.

The severity of accidents has been brought down through improving the tyre wet grip, which is the parameter rated as most important by both end-users and industry, and therefore also the parameter which has improved the most. However, the relevance of the label could be improved regarding safety, by implementing label parameters for tyre grip on snow and ice.

The external rolling noise is the parameter that has been affected the least by the TLR, and also the parameter rated as least important by end-users. The label is thus not effective in reducing the external rolling noise due to the lower focus on this parameter by end-users and possibly the difficulty to understand the label "scale" for noise.

The end-user awareness and confidence in the label are low according to the consumer survey conducted in correlation with the 2016 Review Study, presumably due to many end-users not seeing the label before purchase, which is partly a consequence of low market surveillance activity and inadequate enforcement in Member States. The awareness and market surveillance efforts can and should be improved by amending the Regulation.

6.2. THE LESSONS LEARNT

The effect of the TLR is strongly correlated with end-user preferences[91], which is for example shown by the achieved market change for rolling resistance and wet grip. The wet grip, which is most important to end-users, has improved the most, followed by rolling resistance (fuel efficiency). External rolling noise has hardly improved at all and is seen by most end-users as least important.

The end-user awareness of the label and knowledge of the parameters and their implications on fuel efficiency, safety and noise pollution is therefore crucial for the continued effectiveness of the label, which is in any case diminishing in comparison to the BAU scenario due to the new limit values implemented through the GSR in 2016.

Market surveillance actions are generally limited and coordination between Member Sate MSAs is necessary to achieve more efficient enforcement. The test costs are considered high, and MSAs experience problems when trying to obtain technical documentation.

6.3. ACTUAL PERFORMANCE COMPARED TO EXPECTATIONS

The original 2008 Impact Assessment for tyre labelling did not consider the label in the form that was eventually decided upon. For C1 tyres only wet grip and rolling resistance was assessed, and for C2 and C3 tyres only fuel efficiency labelling was assessed. Noise

[91] According to consumer survey performed in connection to the 2016Review study

was not considered in any of the options. It is therefore not possible to compare directly the expected savings from the 2008 Impact Assessment and the actual observed savings. However, in terms total cumulated fuel savings from 2012 to 2020, the 2008 Impact Assessment expected 879 PJ cumulated savings for all tyre types (C1, C2, C3), whereas the actual data from 2012 to 2017 shows fuel savings of 1200 PJ.

6.4. ACTIONS TO BE TAKEN

The objectives of the TLR were (i) to provide end-users with information on tyre parameters so that they can make an informed choice, (ii) to influence end-users purchase decisions in favour of more fuel efficient, safer, and quieter tyres, and (iii) to incentivise manufacturers to optimise those tyre parameters, paving the way for more sustainable consumption and production.

The present evaluation shows that effectiveness and efficiency of the TLR can be further improved notably by (i) increasing consumer awareness and confidence in the label (which will make them more likely to use the label information when purchasing tyres), and (ii) improving market surveillance to ultimately fully reach the three objectives of the TLR.

Appendix 1: Stakeholder consultation

Involvement of stakeholders has happened across the 2016 Review Study and the Evaluation / Impact Assessment studies and the same sources have been used in all of them.

I. STAKEHOLDER MEETING

One stakeholder meeting was held in November 2015 connection to the 2016 Review Study, where 37 stakeholders participated form various industry organisations, manufacturers and NGOs. The participants are shown in the table below.

Family Name	***First Name***	***Organisation***
Ahlen	Nils	Swedish Energy Agency
Anadón	Ricard	IDIADA
Bardini	Perla	Pirelli
Bottesini Campos	Alessandro	Vipal Europe SL
Brahy	Olivier	Ministry of Environment
Brito	Henrique	VIPAL RUBBER
Burfien	Joerg	Continental Reifen Deutschland GmbH
Cinaralp	Fazilet	ETRMA
Collins	Desmond	Continental
De Mahieu	Nicolas	ETRTO
Eaton	Adrian	UK Department for Transport
Falcioni	Simone	ETRTO
Gallegos	David	IDIADA
Gaube	Marie	SOLVAY
Goyeneche	Fabienne	Michelin
Guven Sumer	Ayse	ANEC
Gydesen	Annette	Viegand Maagøe
Hansen	Arne	Tyre Business Denmark
Herges	Benedikt	LANXESS
Kemna	Rene	VHK
Lim	Ho Taek	HANKOOK Tire Europe GmbH
López Benítez	Casto	EC - DG MOVE
Loponen	Mika	Finnish Transport Safety Agency
Maya-Drysdale	Larisa	Viegand Maagøe
Moreno Acedo	Juan	EC - DG ENER
Netsch	Lars	TUEV SUED Product Service GmbH
Noirhomme	Jean-Claude	ETRTO
O'Connell	Richard	Bandvulc Tyres Ltd
Ott	Guy	MICHELIN
Perrot	Jean-Dominique	Michelin
Poliscanova	Julia	Transport & Environment
Rames	Mette	Viegand Maagøe

Rieken	Robert	ITMA Europe
Scorianz	Marc-Antoine	UTAC
Shchuryk	Martina	Goodyear
Spuybroek	Ruud	BIPAVER
Sunnari	Jarmo	Nokian Tyres Plc
Taylor	Peter	ITMA Europe
Tosatti	Gianluca	Bridgestone Europe
van der Rijken	Tim	VACO
van Gelderen	Alex	NVR

- **TYRE SUPPLIERS (MANUFACTURERS AND IMPORTERS)**

On the manufacturer side, the European Tyre and Rubber Manufacturers' Association (ETRMA) was identified as the key representative accounting for 76% of the European C1 and C2 tyre markets and 83% of the C3 tyre market[92]. ETRMA has 12 corporate members consisting of large tyre manufacturers, who were reached though online surveys. ETRMA provided sales numbers and inputs throughout the process of both the 2016 Review Study and the evaluation/Impact Assessment study.

On the importer side, the International Tyre Manufacturers' Association (ITMA) was identified as the key representative for non-ETRMA tyre manufactures importing tyres to Europe[93]. By targeting ETRMA and ITMA, 90% of the European tyre market is represented. Interviews were conducted with contacts from key tyre importers provided by ITMA.

- **TYRE DEALERS**

A large number of tyre dealers exist in the European market and in order to get as large a representation of the market as possible they were reached through tyre dealer organisations listed in Table 4. Dealers are in this study defined as those having direct contact with end- users with exception of the 'fleet solution services' used primarily for C3 tyres, where tyre suppliers manage contracts directly with fleet operators [94].

Table 62: European tyre dealer organisations interviewed

NTDA	National Tyre Dealers Association (UK)	200 member companies representing over 2000 retailers
VACO	Industry association for the tire and wheel industry (NL)	350 member companies representing over 730 retailers
FEDERTYRE	Association of tyre specialists of Belgium (BE)	representing companies buying, selling and servicing tyres, rims & wheels
BRV	Federal Association of tyre trade and vulcanisation craft (DE)	800 member companies representing over 3,400 retailers
DRF	Trade organisation for Swedish tyre, rim and service (SE)	860 member companies

92 European Tyre and Rubber Manufacturers' Association, ETRMA (2016), "European Tyre & Rubber Industry; Statistics Edition 2015". Link: http://www.etrma.org/uploads/documents/Statistics%20booklet%20-%20edition%202015.pdf

93 International Tyre Manufacturers' Association (2014), "Europe's Importers show the way", November 18th 2014. Link: http://www.itma-europe.com/2014/11/europes-importers-show-the-way/

94 Information provided by ETRMA. 'Solution services' are services provided by the tyre suppliers where tyres are leased directly to fleet owners/operators charging a price per km driven.

- **VEHICLE SUPPLIERS AND DISTRIBUTORS**

Tyres sold on the OEM constitute approximately 25% of the tyre production in Europe[95]. This part of the tyre market is small compared to the replacement market, but still considered important in terms of which tyres are used on European roads. Interviews were therefore conducted with key representatives of the vehicle suppliers and distributors, which were identified as the European Automobile Manufacturers Association (ACEA) and the European Council for Motor Trades and Repairs (CECRA). ACEA represents the 15 Europe-based car, van, truck and bus makers and has close relations with the 29 national automobile manufacturers' associations in Europe[96]. CECRA brings together 24 national professional associations representing the interests of motor trade and repair business, and 12 European Dealer Councils representing vehicle dealers[97].

Tyres bought on the OEM are not the key product that is purchased, but only a minor part of the vehicle, which is the main product. However, the vehicle distributors are still in direct contact with the end-users, and therefore important for the general label awareness and understanding.

- **C1 END-USERS**

The C1 tyre market is by far the largest in terms of tyre sales, constituting 77% of the tyre sales in 2013[98]. C1 end-users include consumers defined as private persons buying tyres for their own private cars, as well as leasing companies buying tyres for their lease cars.

The main difference between the two segments is that private consumers hold all costs for both tyre purchase and tyre usage, and hence are affected by both the purchase price and the fuel efficiency. The leasing companies on the other hand, hold only the purchase costs, whereas the lessee holds all costs for fuel.

- **CONSUMER SURVEY**

The C1 consumer survey was carried out as an online questionnaire with user-panels of 1000 respondents in six European countries. All respondents were owners of passenger cars who were responsible for the purchase of tyres. The six countries were selected based on the number of registered cars[99], the access to user panels, and the presence of large tyre suppliers in the country. Furthermore, it was based on the geographical coverage, to have answers from both southern and central Europe and from Nordic countries, where the use of snow tyres is more predominant than in the rest of Europe[100]. Based on these considerations, the following countries were chosen:

- Germany (~42 million cars)
- England (~29 million cars)
- France (~32 million cars)
- Italy (~37 million cars)

95 Braungardt et al. (2014), "Impact of Ecodesign and Energy/Tyre Labelling on R&D and Technology Innovation", Link: http://www.ecofys.com/files/files/fraunhofer-ecofys-2014-impact-of-ecodesign-energy-labelling-on-innovation.pdf

96 ACEA, European Automobile Manufacturers Association, (2016), "Who we are" general website. Link: http://www.acea.be/about-acea/who-we-are

97 CECRA, The European Council for Motor Trades and Repairs (2016), "About CECRA", General website. Link: http://www.cecra.eu/page/about

98 Van Holsteijn en Kemna B.V. - VHK (2014), "Ecodesign impact accounting – Part 1, Status Nov. 2013", Link: https://ec.europa.eu/energy/sites/ener/files/documents/2014_06_ecodesign_impact_accounting_part1.pdf.

99 Odyssee-Mure Project (2012), "Energy Efficiency Trends in Transport in the EU" , Link: http://www.odyssee-mure.eu/publications/efficiency-by-sector/transport/)

100 Lennart Lomaeus, chairman of DFTF Sweden (Swedish Tyre, Rim & Accessories Suppliers Association) (2015), Presentation: "Winter tyre Market's segments evolution in the Nordic countries".

- Sweden (~4,5 million cars)
- Finland (~3 million cars)

The results of the C1 end-user survey are shown in the end of this annex.

- **LEASING COMPANIES**

According to Lease Europe[101], the leasing companies represent around 25% (2010[102]) of the European carpark. Ten companies were identified as key players in the European car leasing market, and an attempt to establish contact for potential interviews was done. Most of the companies did not show any interest in answering questions about the EU-tyre labelling scheme. Therefore, interviews have only been made with a few leasing companies in Denmark.

The main purpose of interviewing leasing companies was to identify any significant differences in tyre purchasing behaviour and use of the tyre label compared to private consumers.

- **C2 END-USERS**

C2 end-users are the purchasers and users of C2 tyres, used for light duty vehicles (LDV's). The C2 end-users can be individuals or companies who own or rent LDV's. The main difference is that LDV owners are affected by both the tyre purchase cost and the tyre fuel efficiency (in terms of fuel cost), whilst lessees of LDV's holds only the costs for fuel.

- **C3 END-USERS**

The C3 end-users are primarily truck fleet owners and operators. Existing truck fleet surveys were used in this study to reach a larger amount of truck fleet operators than would otherwise have been possible. The two main studies applied were performed by M2 Conceal (on behalf of Goodyear)[103] and by Commercial Motors Trucking Britain[104]. Since it was not possible within the frame of this study to make an equally thorough survey with fleet owners, results from these two surveys were used for information on C3 end-users.

- **MEMBER STATE AUTHORITIES (MSAS)**

As part of the 2016 Review Study, MSAs from Belgium, Finland, Germany (3 Regions), Estonia, Malta, Netherlands (mail), Sweden, United Kingdom, Hungary (mail), Poland and Slovakia were interviewed. This provides insight in the types of activities carried out and the differences in how market surveillance is approached in the Member States.

An overview of the market surveillance activities in the Member States is shown in the table below. The information is both form the interviews and from ADCO minutes. The inspections are counted as either number of shops or number of tyres or tyres sets inspected and the units are therefore not aligned.

The prevailing type of Market Surveillance in all Member States is the point of sales inspections. Some Member States inspected only physical shops, while many also inspected internet shops. In

101 Lease Europe represents about 92% of the entire European leasing market; Link: http://www.leaseurope.org/uploads/documents/ranking/Leaseurope%20Ranking%20Survey%202013_public.pdf

102 Lease Europe (2011), "The European Leasing & Automotive Rental Markets – State of Play" Link: http://www.leaseurope.org/uploads/documents/events/seminar_for_lessors/2011/Jurgita%20Bucyte_WEB.pdf

103 MV2 Conseil on behalf of Goodyear (2013), Truck fleet survey, Link: http://www.fleetfirst.eu/ff_home_en/news/goodyear-fleet-survey-reveals-growing-influence.jsp

104 Commercial Motor (2013), "The Ronseat approach", Ocotber 10th 2013 pp 32-35. Link: http://archive.commercialmotor.com/article/10th-october-2013/32/the-ronseat-approach

all Member States, the main task was to inspect the presence of the label, and that it was positioned correctly.

In general, the MSAs found high level of compliance regarding position of the label and information on bills and invoices. However, the actual level seemed to vary greatly, from 0% non-compliance to 25%, which seems to be due to differences in inspection procedures. The non-compliance occurred in various ways with the most widespread being the label entirely missing or positioned wrong.

Document control was only carried out by four of the interviewed Member State. Both the Swedish MSA and the MSAs of the individual federal states of Germany reported difficulties in requiring the documentation due to lacking jurisdiction when suppliers/supplier representatives are located in other countries/Member States. The MSAs are appointed and empowered by national law in a specific Member State, and hence suppliers located in other Member States can claim they have no obligation toward the MSAs.

In most Member States, it was not attempted to require the technical documentation, since they were either aware of the problem of lacking jurisdiction, or because without laboratory testing, there were no frame of reference to verify the information in the technical documentation.

Only two of the interviewed MSAs, Germany and Belgium, performed laboratory tests to verify the label values. All Member States mentioned the high costs and too few accredited test facilities to be the greatest barriers for laboratory testing.

Member State	Surveillance activities	Number of inspections	Non- compliance
Sweden	Shop inspections including internet shops	>30 shops since 2012	No non-compliance
	Document control	10 that failed (no documents received)	
Estonia	Tyre documents and questionnaire regarding supplier responsibility	Around 100 tyre sets per year	
	Shop inspections (physical shops)	Around 5-10 tyre sets per year	Low non-compliance
Netherlands	Shop inspections	760 shops since 2012	<10% non-compliance
	Information campaign by the ministry not the MSA itself	Targeting mainly end-users	
Poland	Inspections at suppliers, importers, retailers	135 entities since 2013, 640 tyre models	No or low non-compliance
	Technical documentation inspection	No specific number, but reports that it is many	No problems of receiving documentation
Germany – Hesse	Shop inspections including internet shops	172 shops in 2014	19 shops with no labelling
	Technical documentation	Requested 5 documents	All received
	Laboratory testing	Send to Rhineland-Palatinate	
Germany – Rhineland-Palatinate	Shop inspections	362 inspections in 2014 674 inspections in 2015	119 of the 362 inspections in 2014
	Technical documentation inspection	For the tyres they test in laboratory	
	Laboratory tests	4 models in 2014 8 models in 2015	Problem with varying test results
Germany – Baden Wüerttemberg	Shop inspections	174 models/41 shops in 2014 316 models/31 shops in 2015	No non-compliance (2015 final numbers to be registered)
	Technical promotional material	30 inspections	
Germany – Bavarian	Shop inspections	50 shops, 64 tyre models	12 non-compliance

			cases from missing or faulty label
	Technical documentation inspection	8 tyre models (same models that were tested)	
	Laboratory tests	8 tyre models	1 not compliant, 1 pending
Finland	Shop inspections (physical shops)	150 shops since 2013	Low non-compliance
United Kingdom	Awareness campaigns; tyre dealers, importers, car dealers	More than 500 visits in total since 2013	Website monitoring, 2013: 62 tyre brands – 10 had not label, 18 had incomplete information
	Shop inspections		
	Website monitoring		
	Technical documentation control	Requested for 10 models	Received for 8 models
Malta	Information campaigns; end-users, tyre dealers	Merged with energy labelling campaign	
	Shop inspections, including internet	15 shops 1 internet store (87 tyre models)	Two tyre models not compliant
Belgium	Shop inspections	76 shops since 2013 (only C1) 36 in 2013 and 40 in 2015	In 2015: all showed the label*
	Technical documentation control	Requested for 10 C1 models	Only received some of them. Request again.
	Lab test	2 C1 models currently tested	Test ongoing
Portugal	Have not yet implemented the national legislation to appoint a MSA		
Italy	Reported that no inspection or other market surveillance activities were conducted		
Slovakia	Shop inspections including internet shops	70 dealers inspected in 2014 (solely based on complaints)	4 were non-compliant

- **RESULTS OF THE CONSUMER SURVEY WITH C1 END-USERS**

userneeds
Online fieldwork

Viegand & Maagøe – EU tyre study

Project specifications

Target group: The survey is conducted among 18-70 year old car owners in:
- Sweden
- Finland
- United Kingdom
- Germany
- France
- Italy

Method: Online survey, the survey is conducted in Userneeds' panels in Sweden and Finland and Userneeds' partner panels in United Kingdom, Germany, France and Italy.

Number of interviews: In total 6051 interviews have been completed.
- 1011 in Sweden
- 1015 in Finland
- 1002 in United Kingdom
- 1007 in Germany
- 1008 in France
- 1008 in Italy

Average interview time: 7,5 minutes

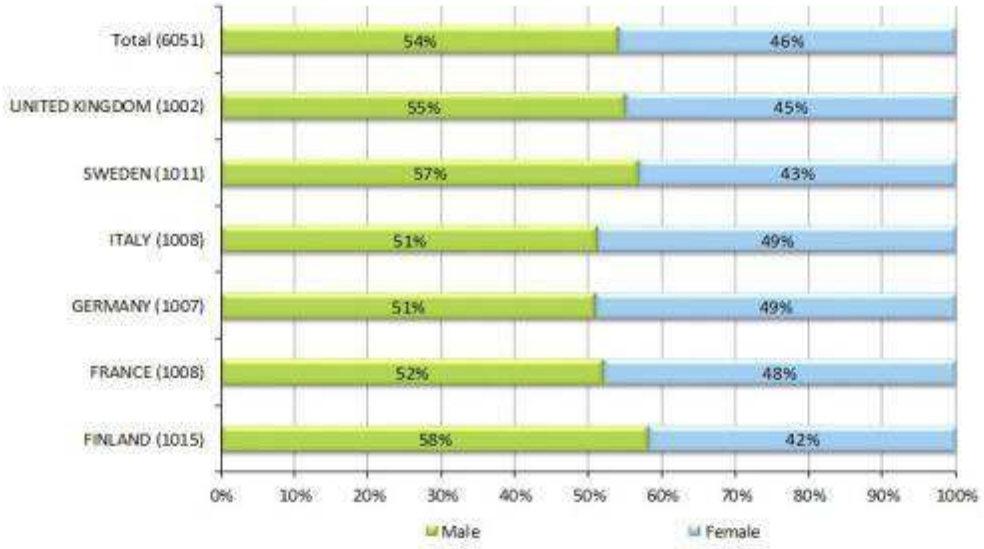
Period of data collection: 2nd of October 2015 to 19th of October 2015

Agenda

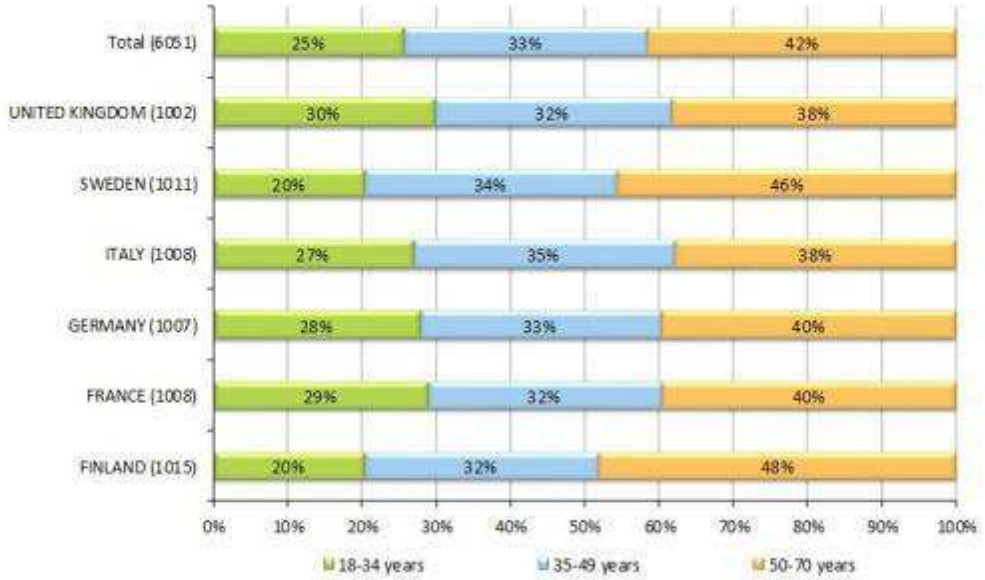
Background

- All car owners
- Buyers of new tyres for passenger car 2013-2015
- Buyers of new (not used) passenger car 2013-2015

What is your gender?



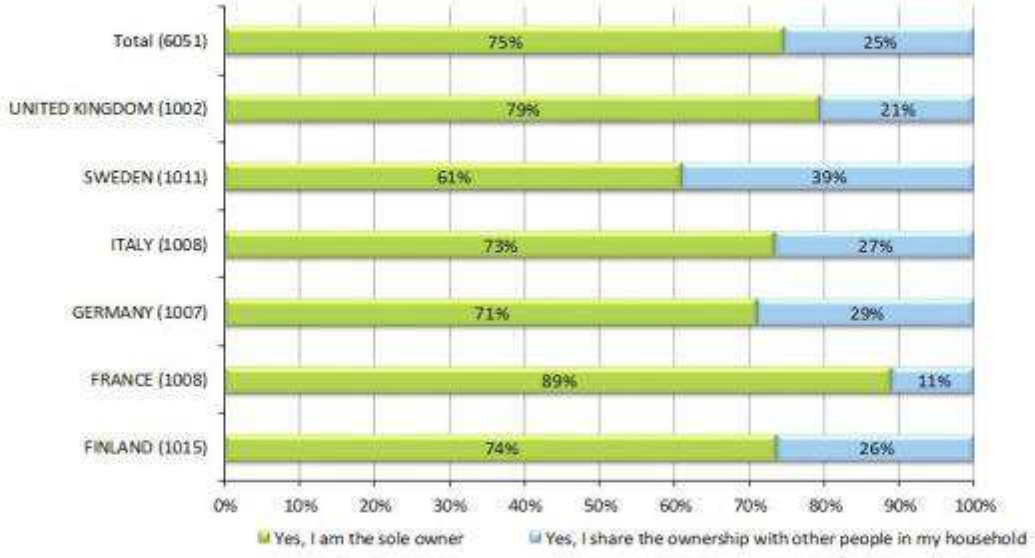
How old are you?



userneeds

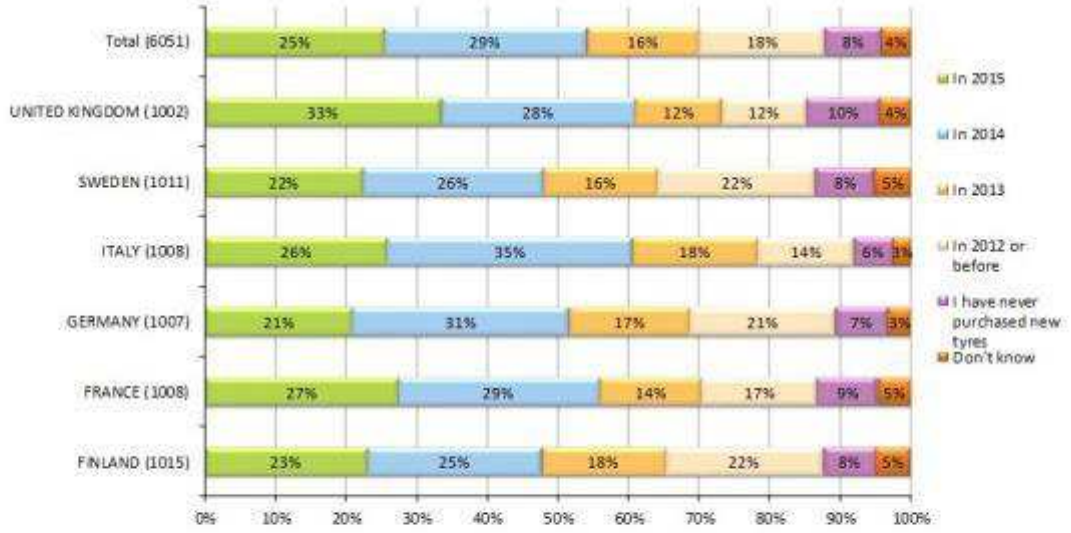
Do you own a passenger car?

(Leased car, carpool and suchlike are NOT included)

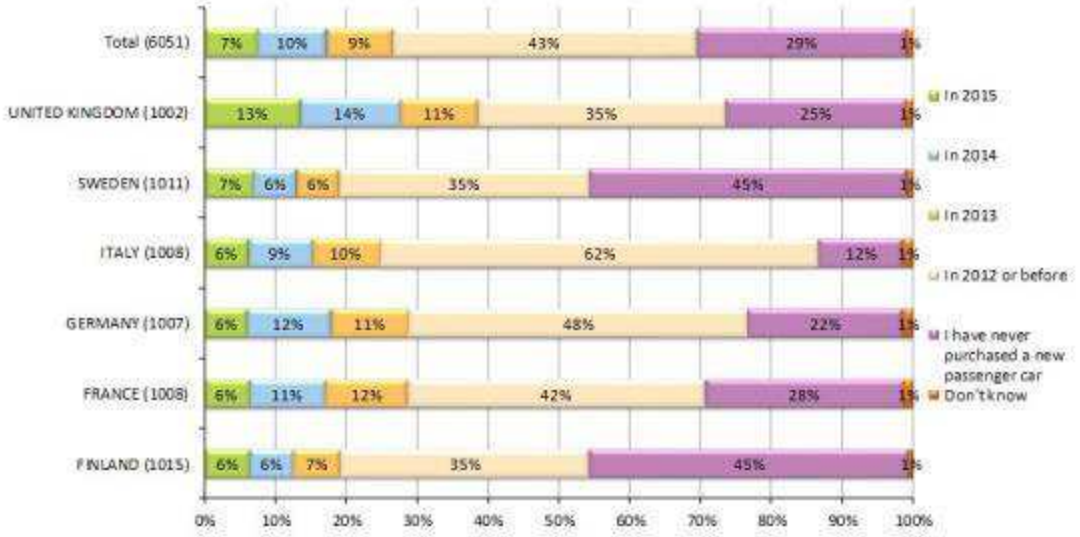


userneeds

When was the last time you purchased new (not used) tyres for a passenger car (without purchasing a car at the same time)?



When was the last time you purchased a new (not used) passenger car?



Agenda

- Background

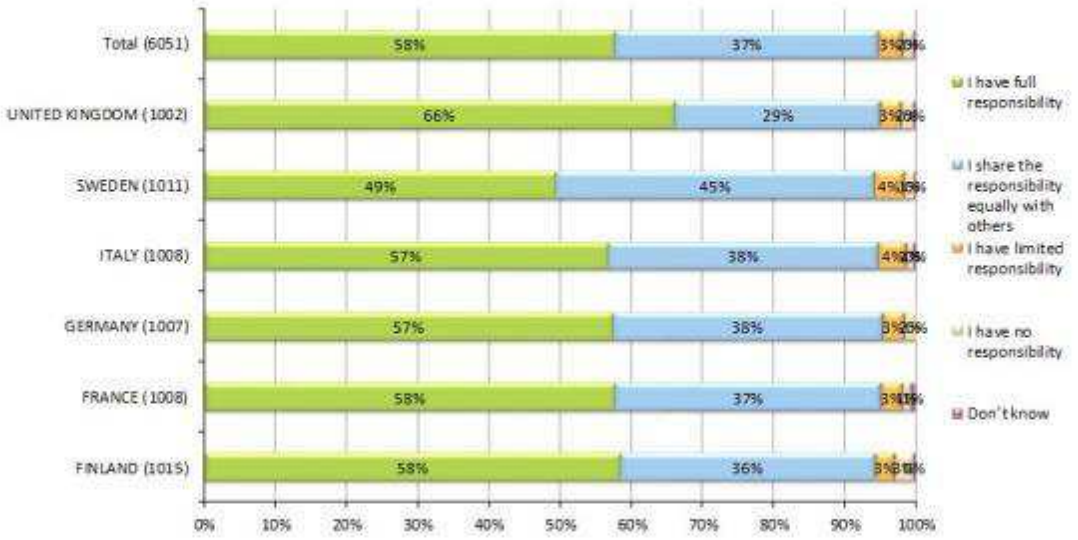
All car owners

- Buyers of new tyres for passenger car 2013-2015
- Buyers of new (not used) passenger car 2013-2015

userneeds

What is your level of responsibility regarding the activities listed below?

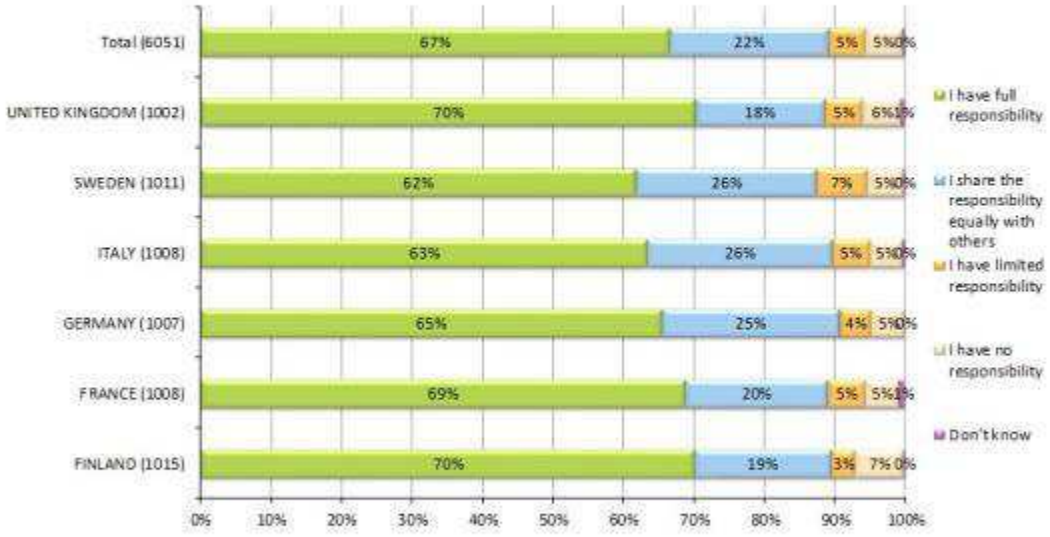
Purchase of car



userneeds

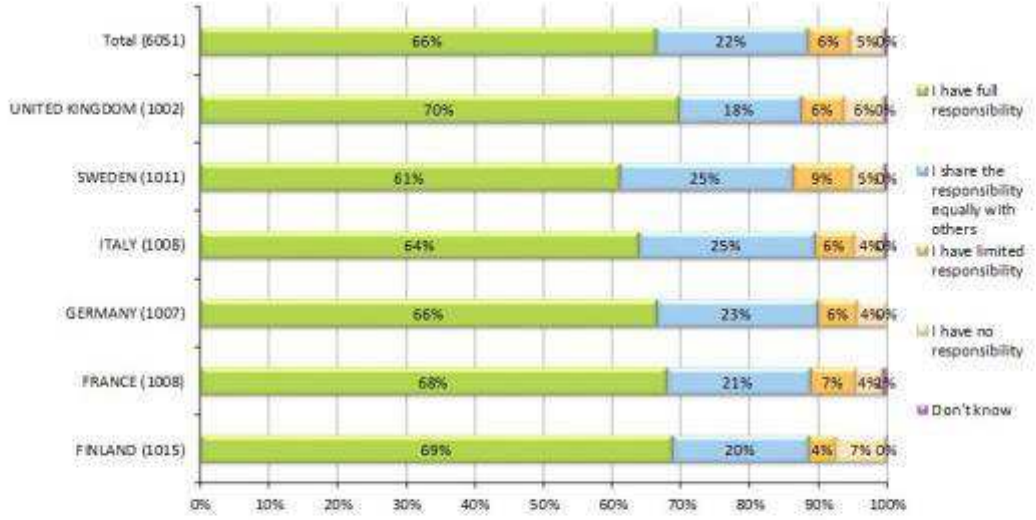
What is your level of responsibility regarding the activities listed below?

Purchase of tyres



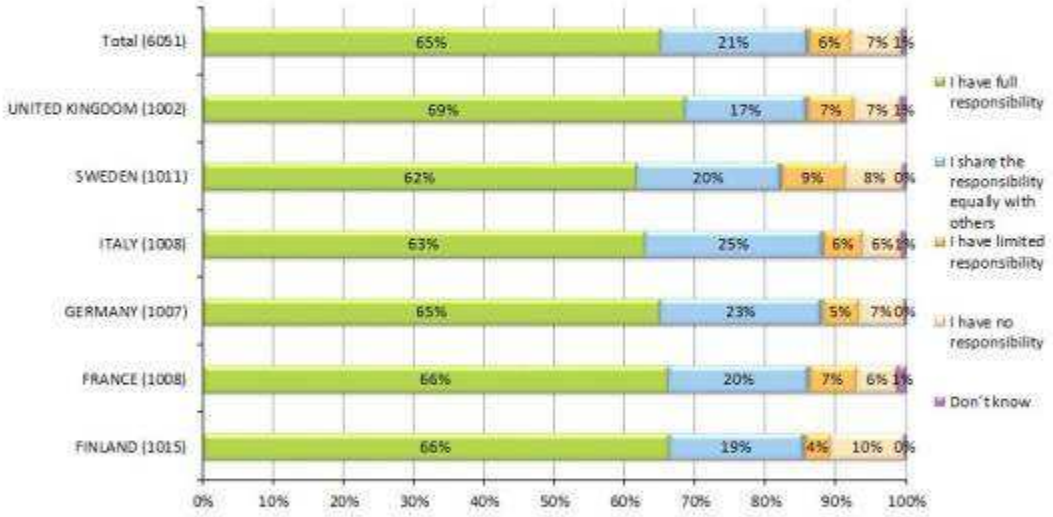
What is your level of responsibility regarding the activities listed below?

General maintenance of car



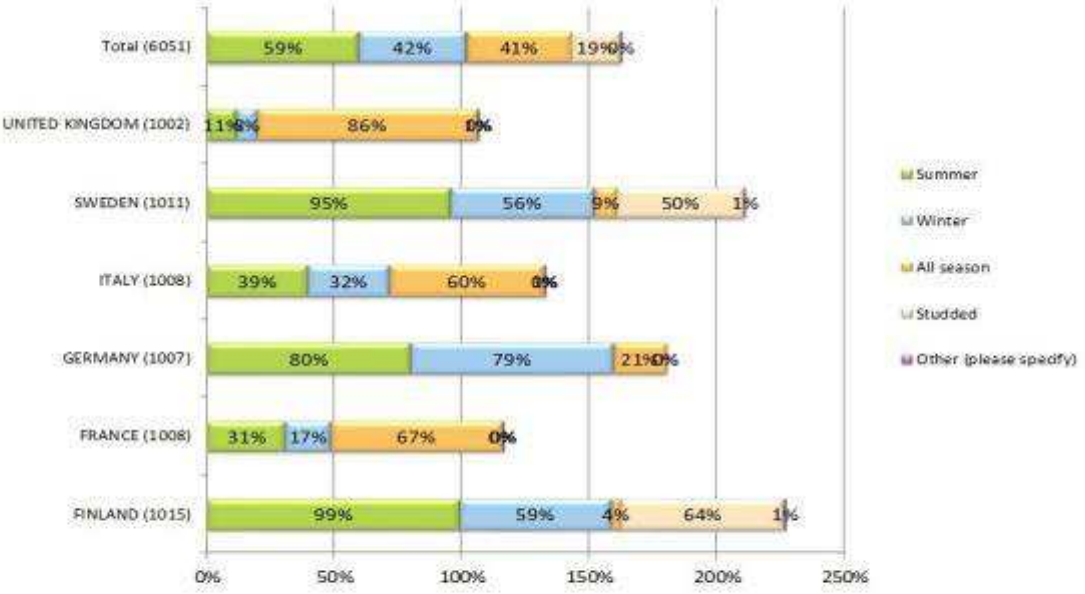
What is your level of responsibility regarding the activities listed below?

General maintenance of tyres (for instance changing from summer to winter tyres and checking tyre pressure)

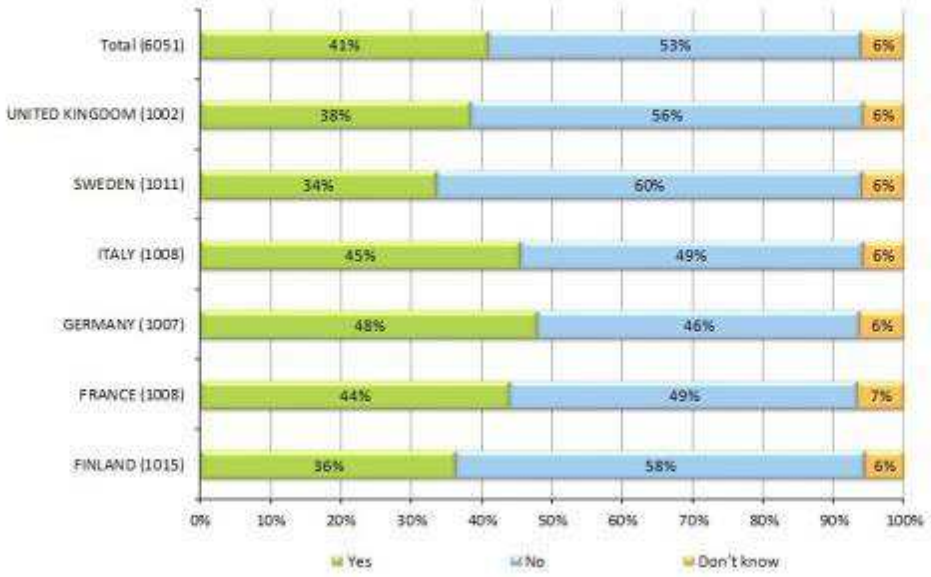


Please specify all types of tyres you have for your car.

Please indicate all those that apply

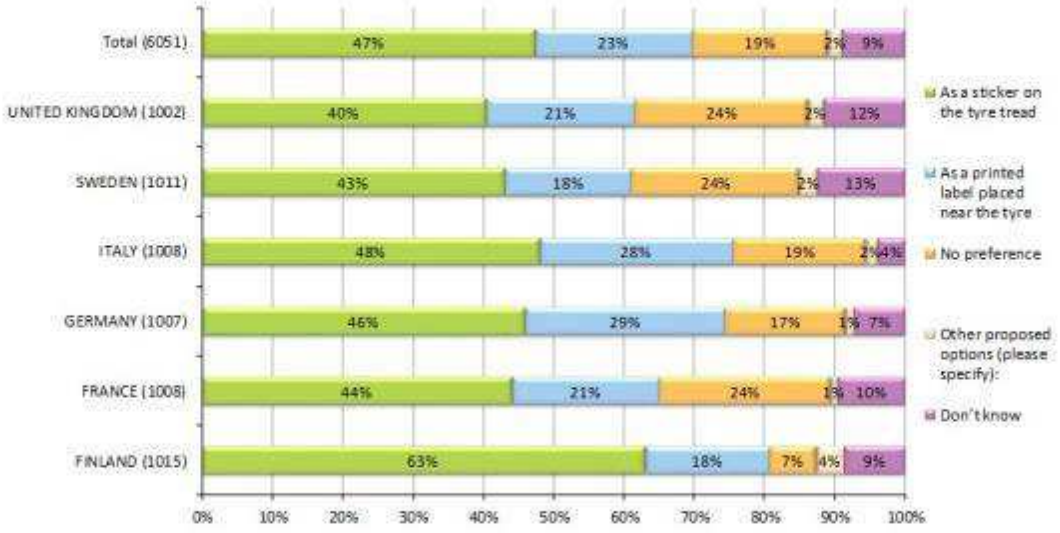


Were you aware of the tyre label below before you began this questionnaire?



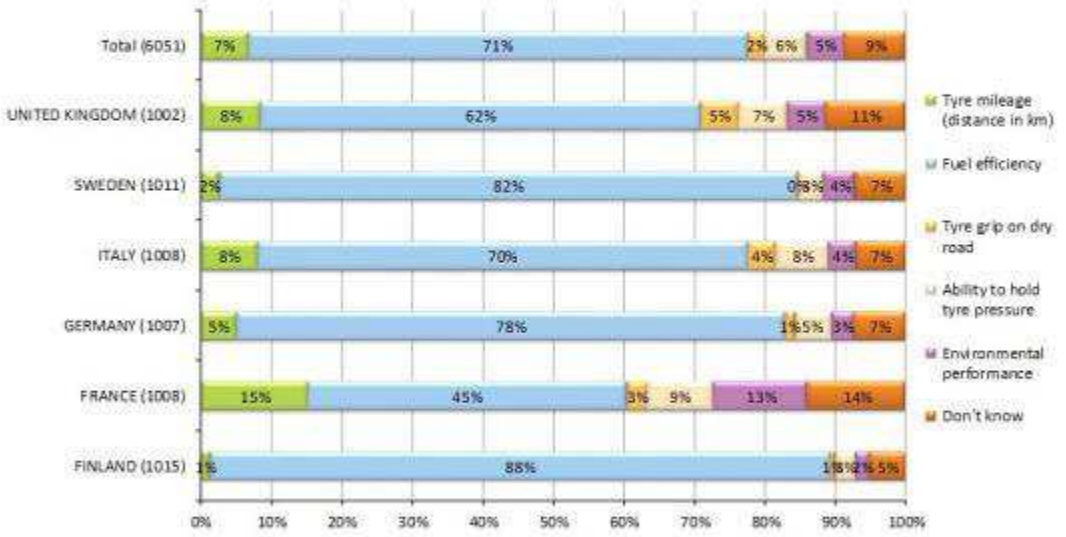
userneeds

According to the rules, the label should be displayed in the shop as a sticker on the tyre tread or as a printed label placed near the tyres. Which way do you think the tyre label is most visible?

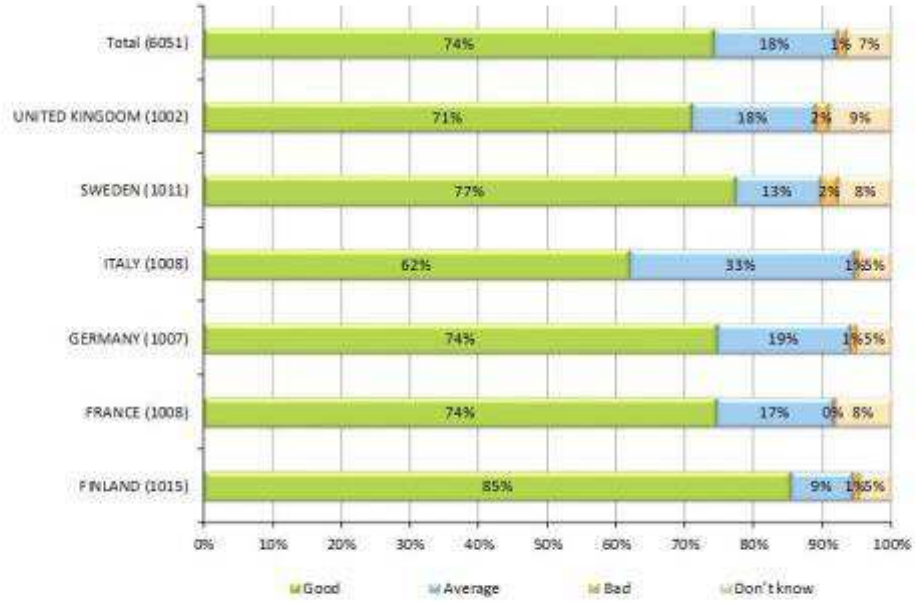


userneeds

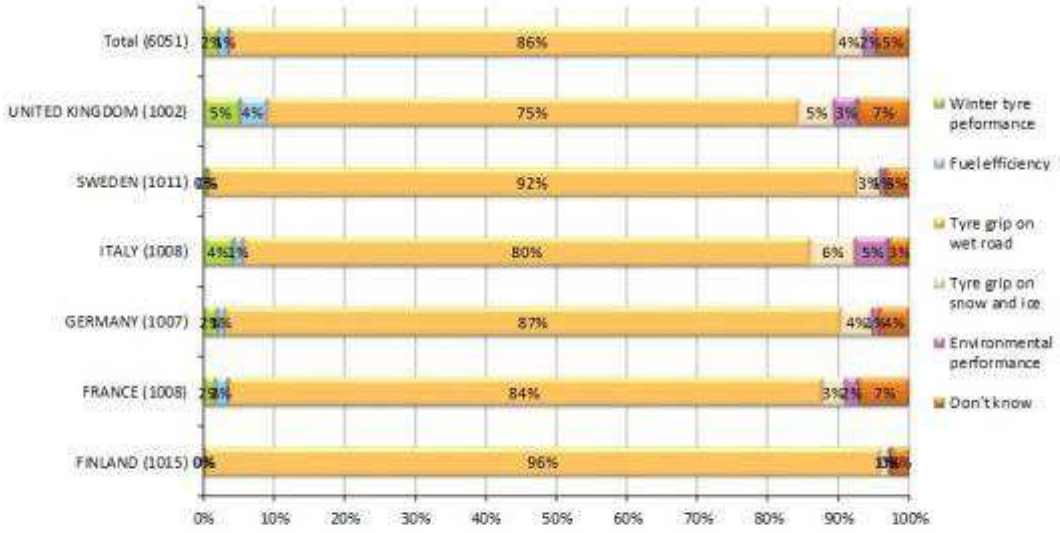
The label includes information about three basic tyre performance areas. Each of the performance areas are illustrated by a blue icon on the label.
Please indicate what you think is meant by the blue icon in the picture below (Q3a).



How well the tyre is performing with respect to the relevant performance area is indicated on a scale from A-G or by waves.
Please indicate how well you think the tyre is performing with regard to the performance area in question (Q3aa).

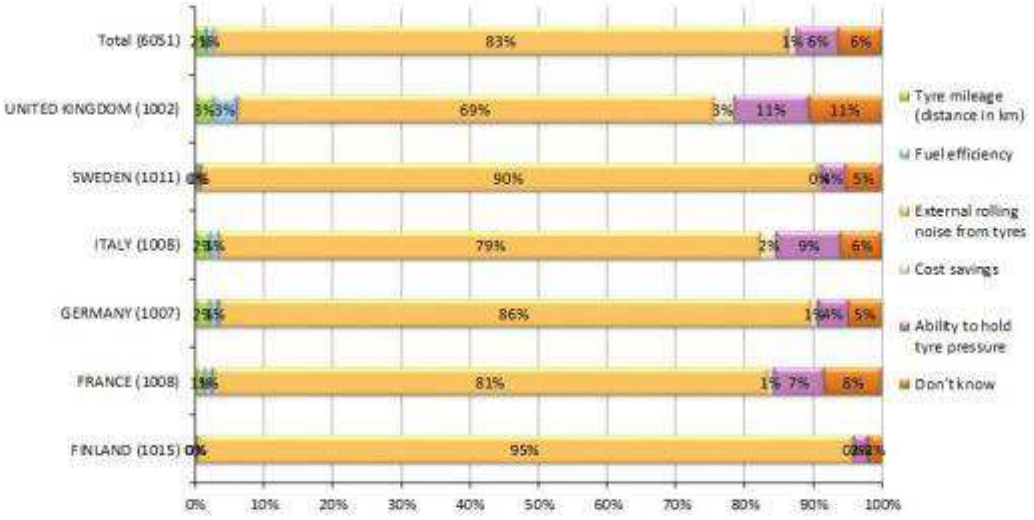


The label includes information about three basic tyre performance areas. Each of the performance areas are illustrated by a blue icon on the label.
Please indicate what you think is meant by the blue icon in the picture below (Q3b).



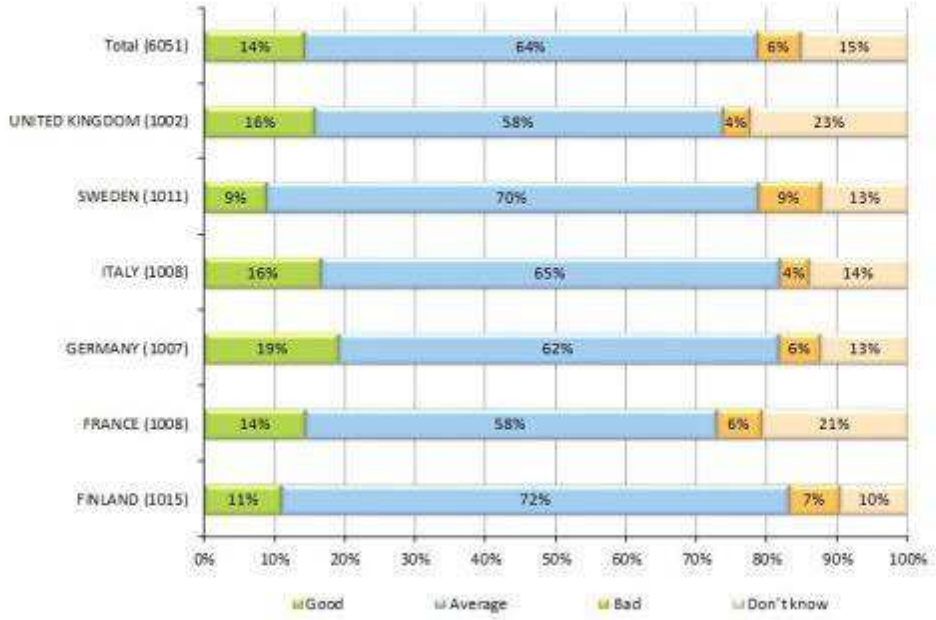
usemeeds

The label includes information about three basic tyre performance areas.
Each of the performance areas are illustrated by a blue icon on the label.
Please indicate what you think is meant by the blue icon in the picture below (Q3c).



usemeeds

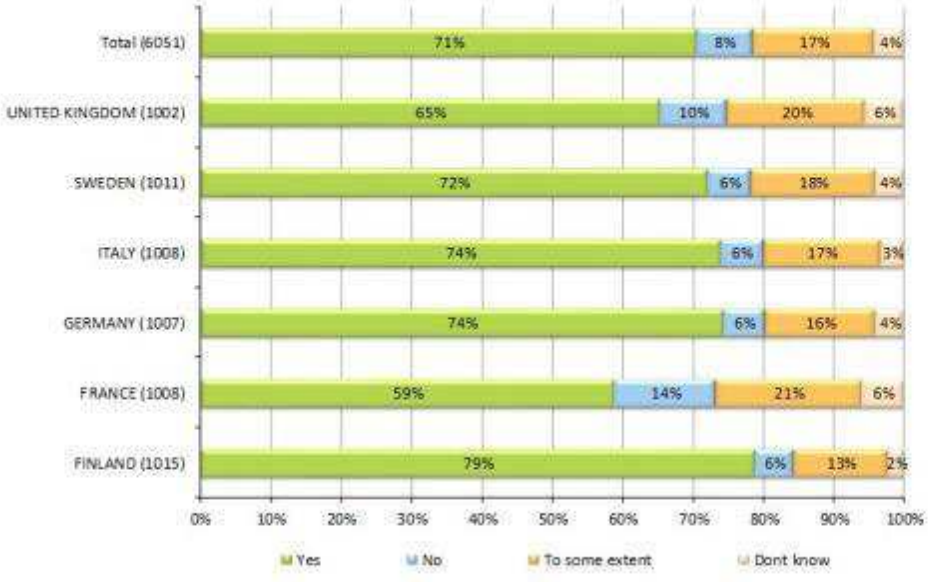
How well the tyre is performing with respect to the relevant performance area is indicated on a scale from A-G or by waves.
Please indicate how well you think the tyre is performing with regard to the performance area in question (Q3cc).



userneeds

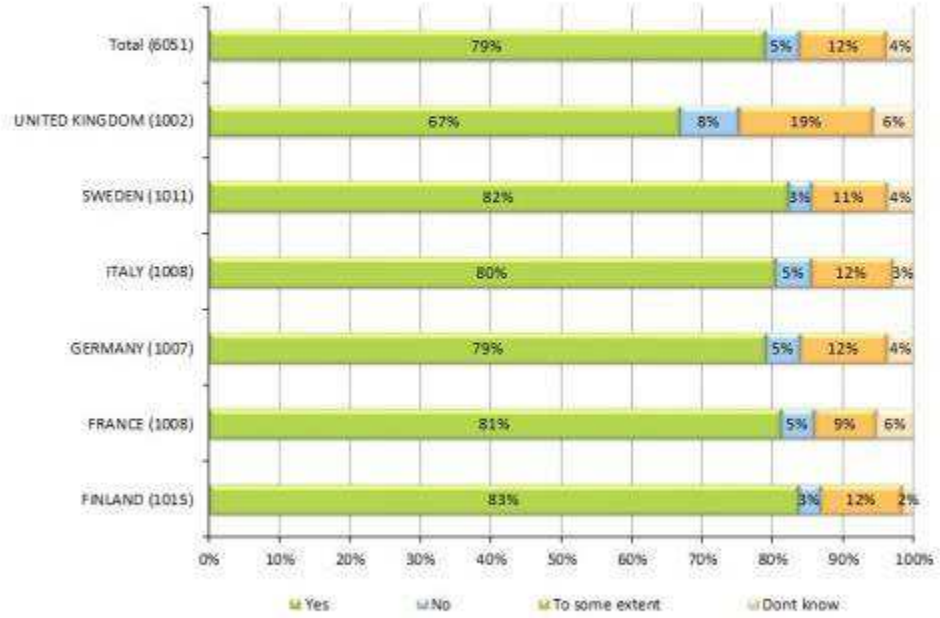
The icons refer respectively to fuel efficiency, tyre grip on wet road and external rolling noise. Do you find the icons and the information on the label easy to understand?

I find the information about fuel efficiency easy to understand



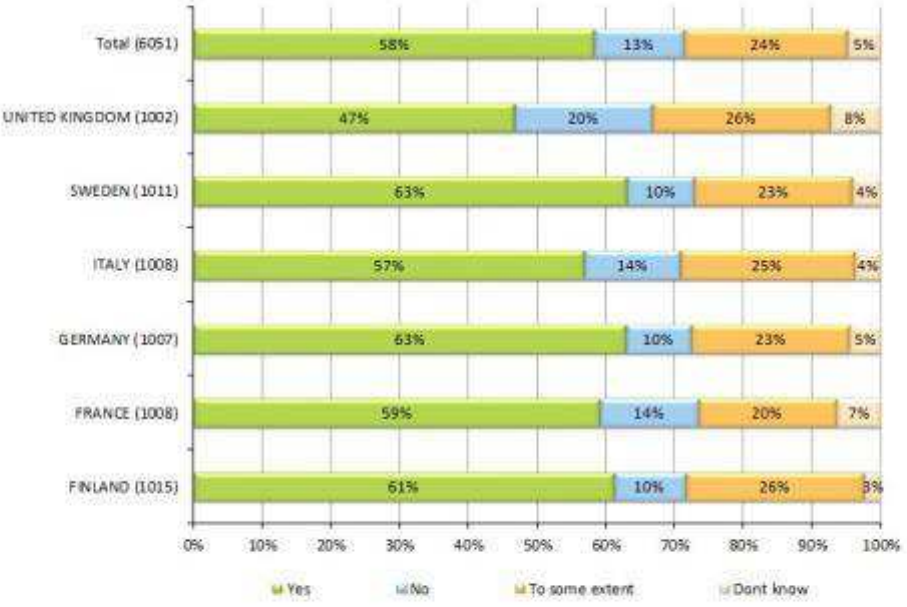
userneeds

The icons refer respectively to fuel efficiency, tyre grip on wet road (wet grip) and external rolling noise. Do you find the icons and the information on the label easy to understand?
I find the information about wet grip easy to understand



usermeeds

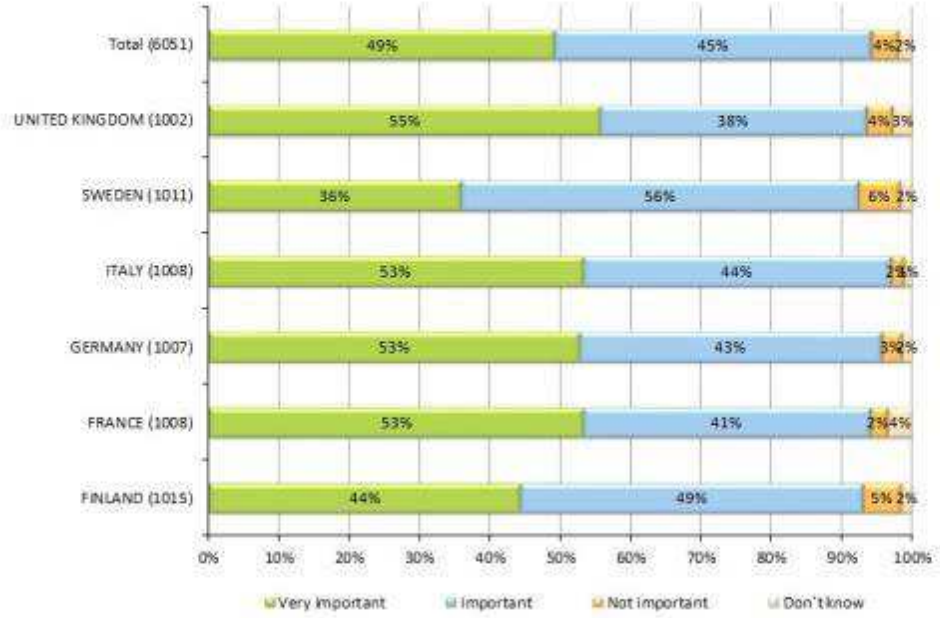
The icons refer respectively to fuel efficiency, tyre grip on wet road and external rolling noise. Do you find the icons and the information on the label easy to understand?
I find the information about external rolling noise easy to understand



usermeeds

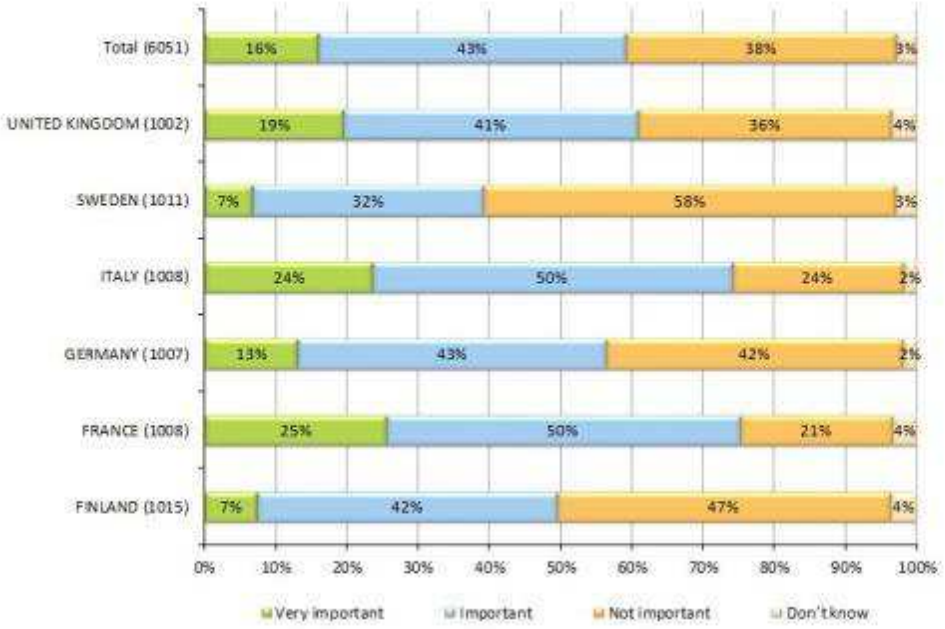
How important would the following tyre performance areas be to you, if you were to buy new tyres?

Tyre price



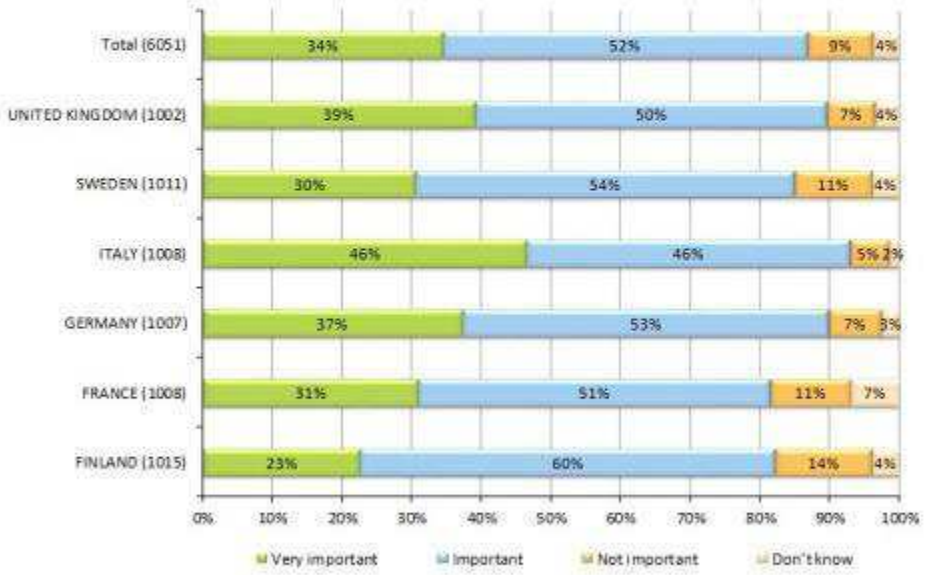
How important would the following tyre performance areas be to you, if you were to buy new tyres?

Tyre brand



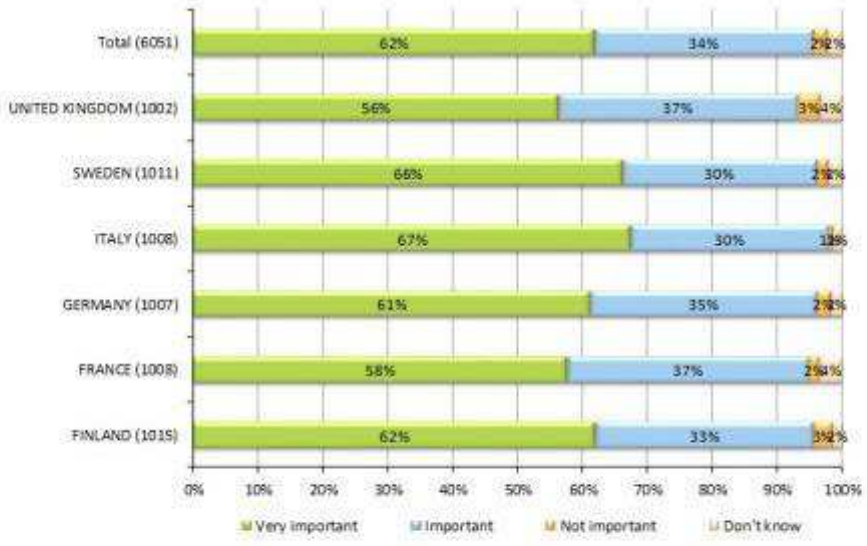
How important would the following tyre performance areas be to you, if you were to buy new tyres?

Fuel efficiency



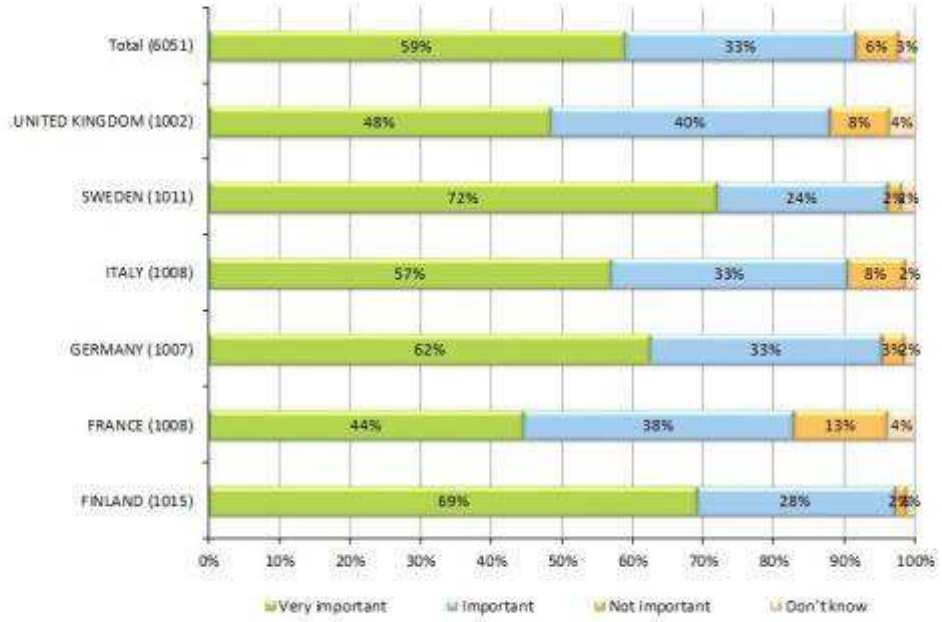
How important would the following tyre performance areas be to you, if you were to buy new tyres?

Tyre grip on wet road



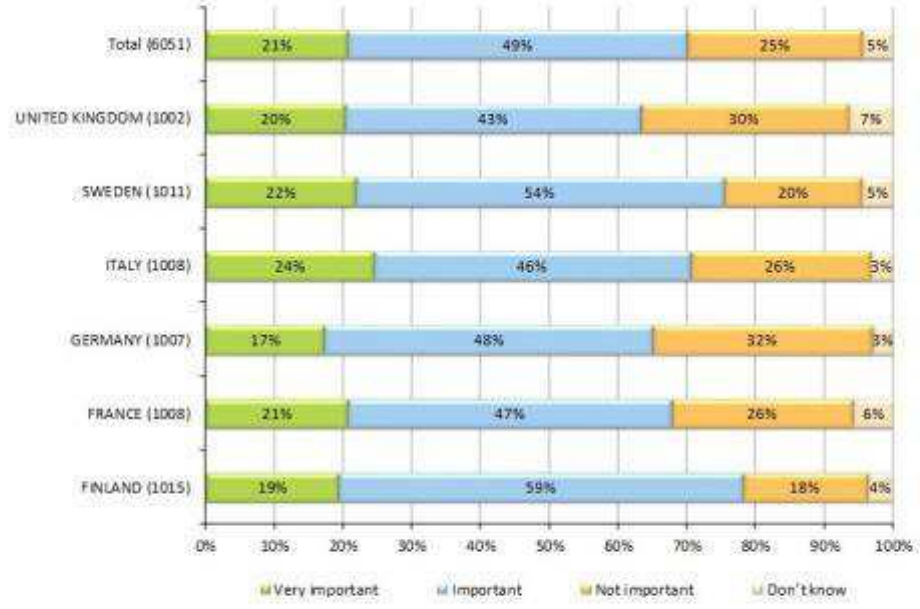
How important would the following tyre performance areas be to you, if you were to buy new tyres?

Tyre grip on snow and ice



How important would the following tyre performance areas be to you, if you were to buy new tyres?

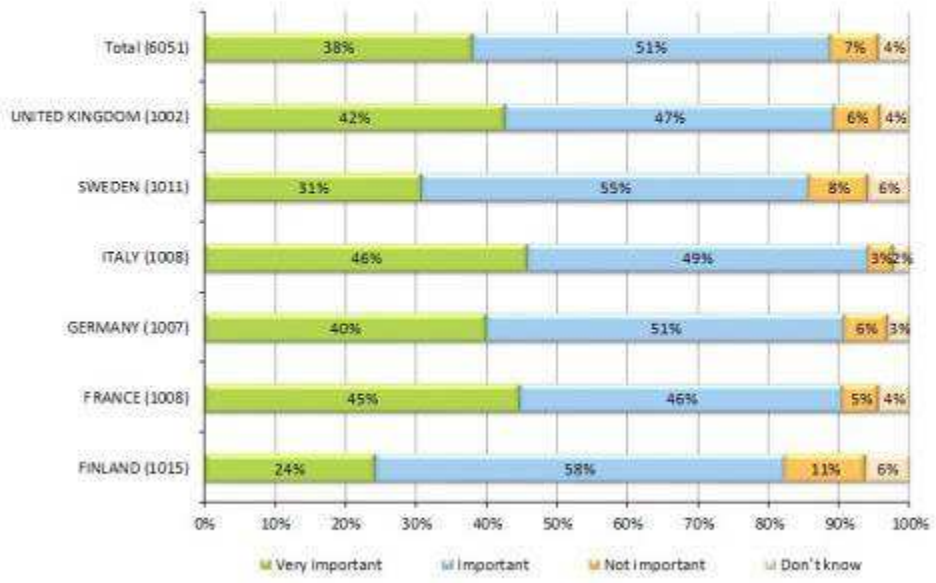
External rolling noise



usemeeds

How important would the following tyre performance areas be to you, if you were to buy new tyres?

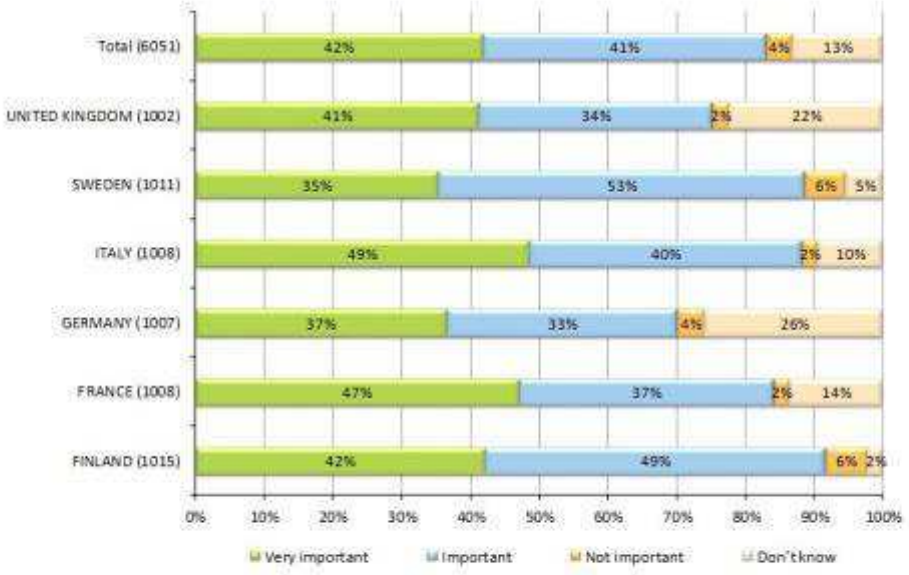
Tyre mileage (distance in km)



usemeeds

How important would the following performance areas be to you, if you were to buy studded tyres:

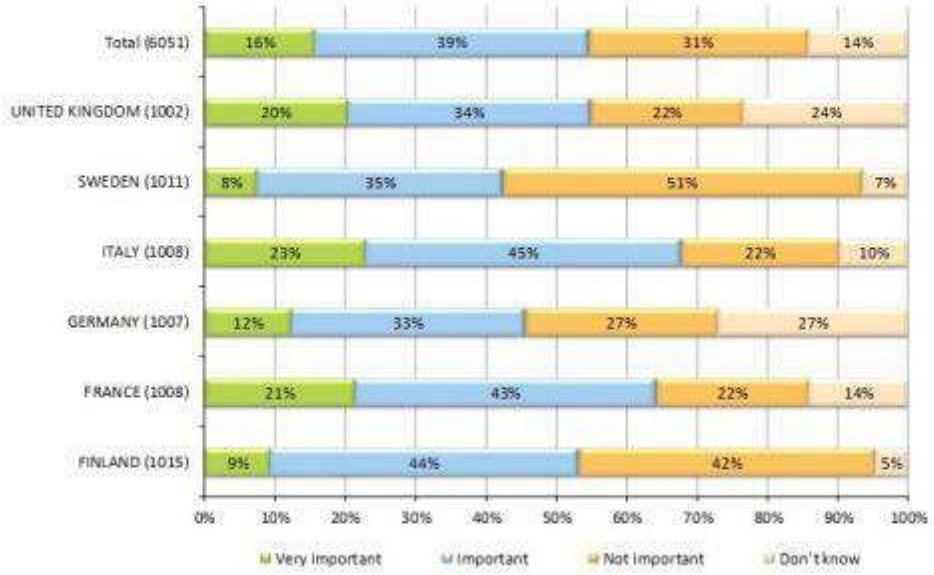
Tyre price



usemeeds

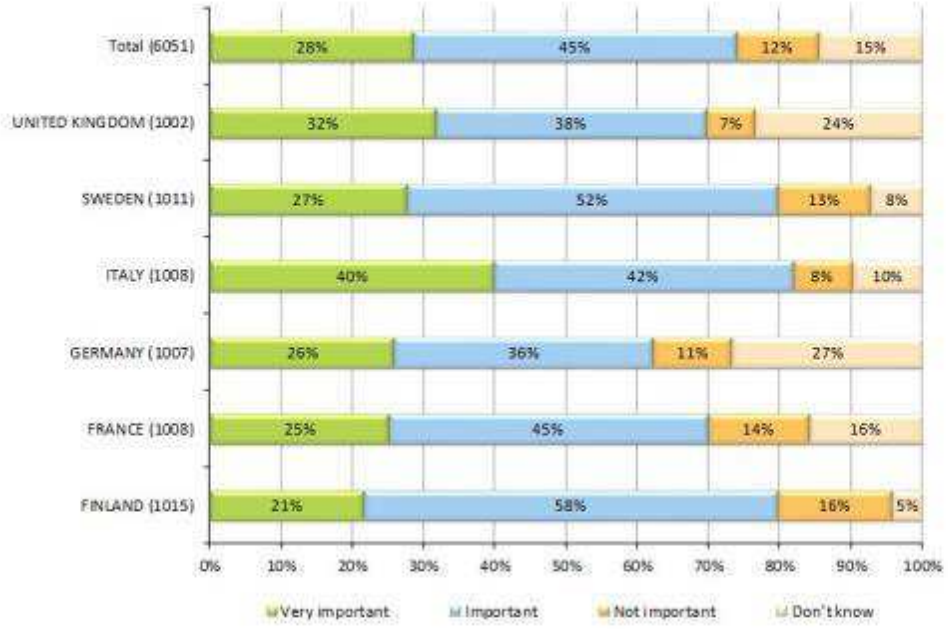
How important would the following performance areas be to you, if you were to buy studded tyres:

Tyre brand



How important would the following performance areas be to you, if you were to buy studded tyres:

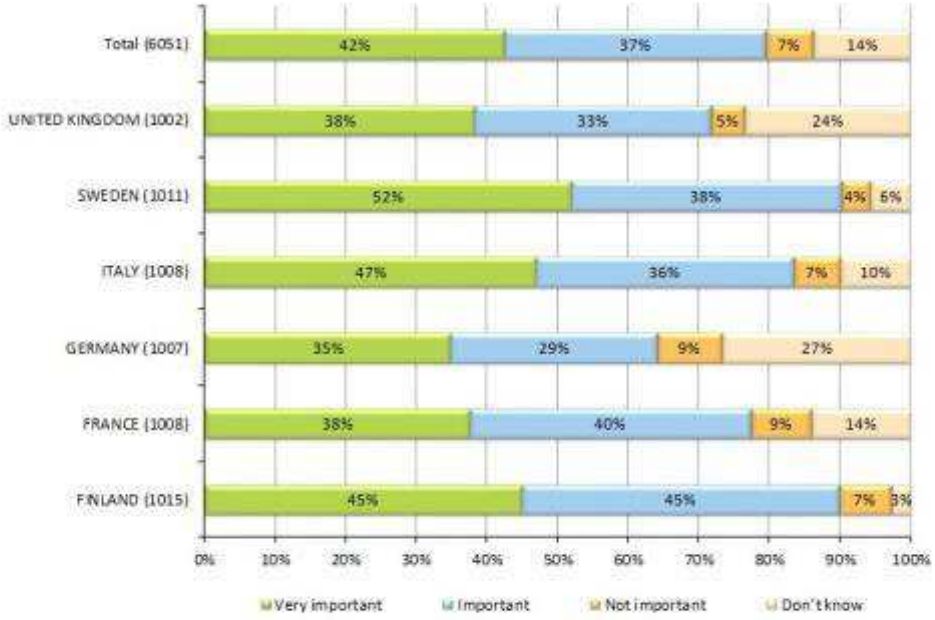
Fuel efficiency



userneeds

How important would the following performance areas be to you, if you were to buy studded tyres:

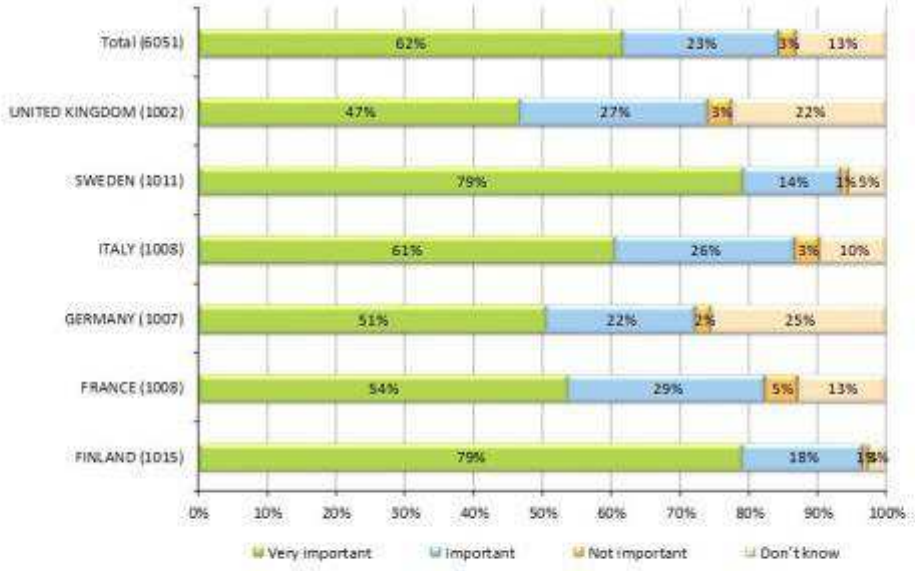
Tyre grip on wet road



usemeeds

How important would the following performance areas be to you, if you were to buy studded tyres:

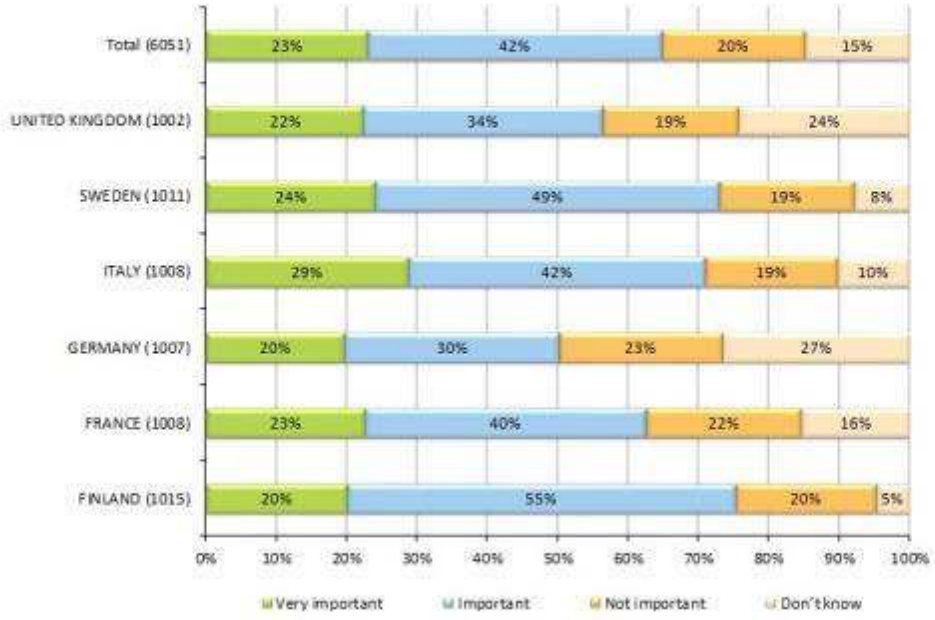
Tyre grip on snow and ice



usemeeds

How important would the following performance areas be to you, if you were to buy studded tyres:

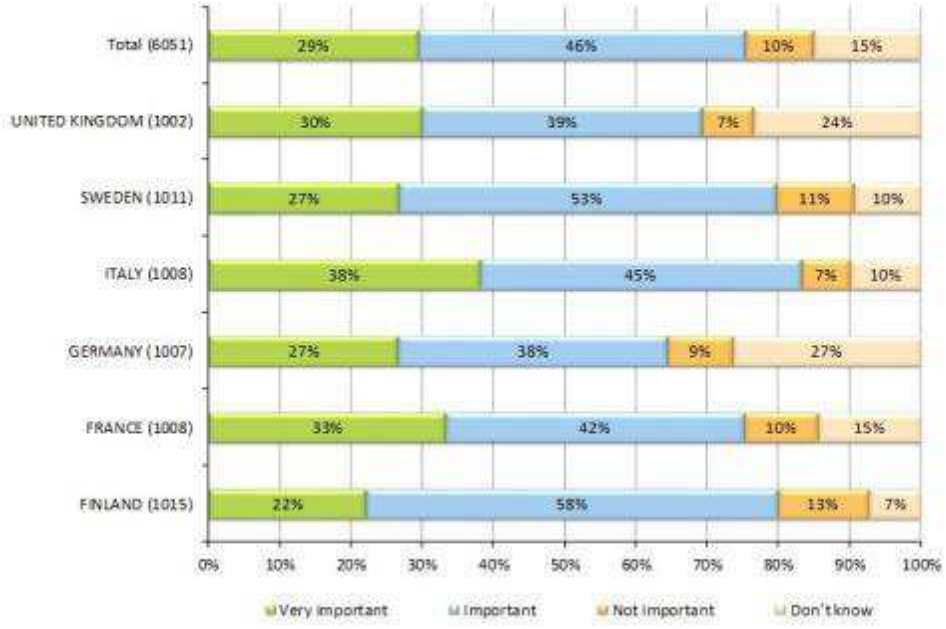
External rolling noise



userneeds

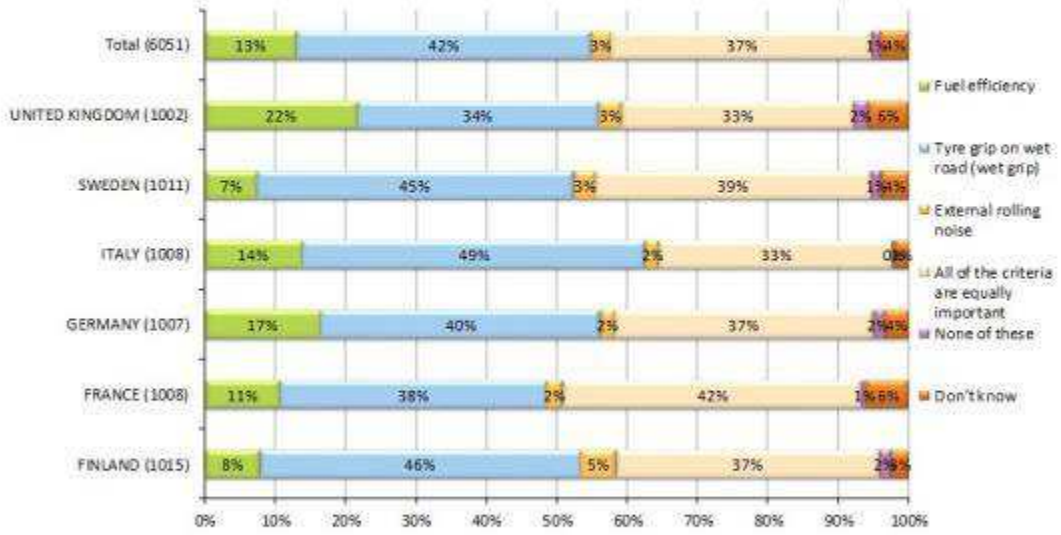
How important would the following performance areas be to you, if you were to buy studded tyres:

Tyre mileage (distance in km)

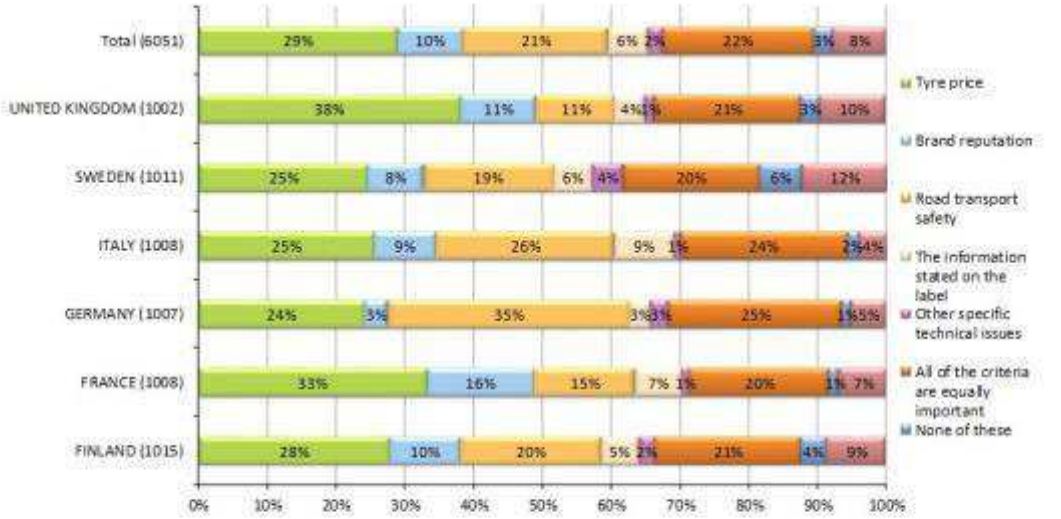


userneeds

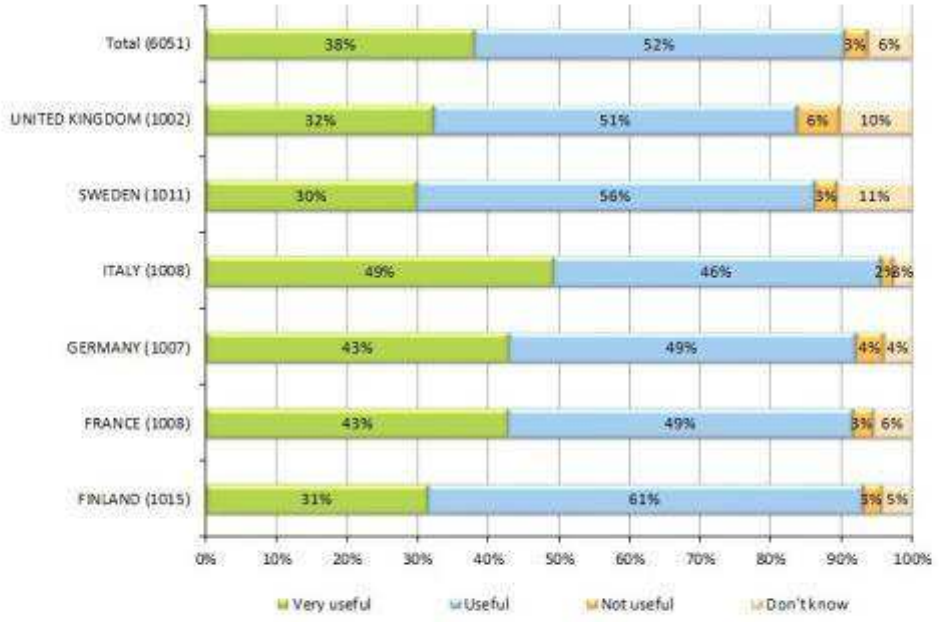
Which of the tyre performance areas on the label is the most important for you?



At your last tyre purchase, what was the most important factor in your choice of purchase?

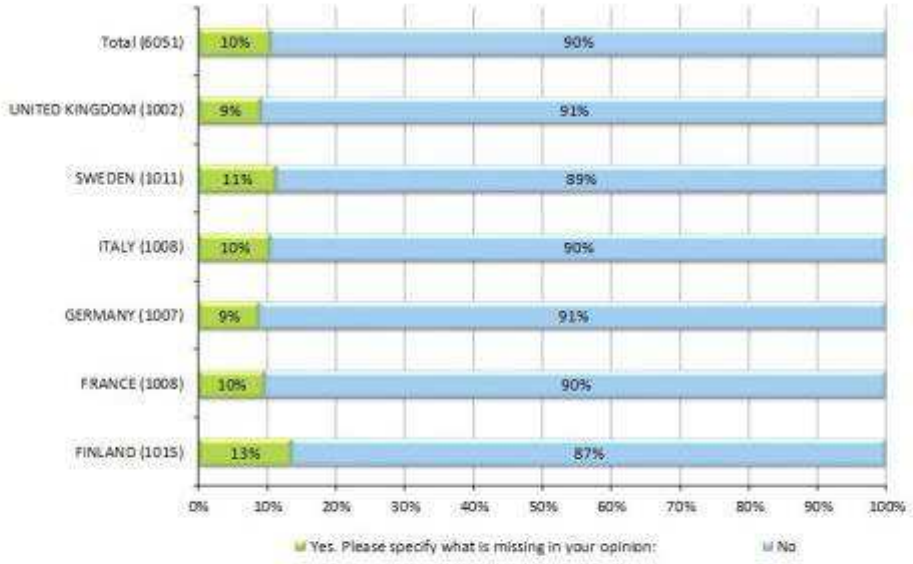


How useful do you find the information on the tyre label?



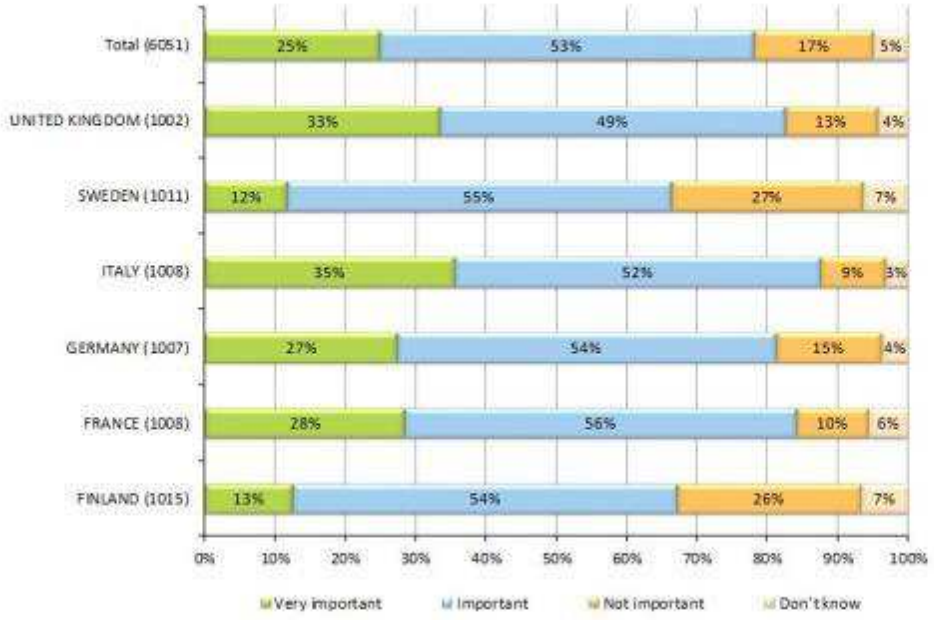
usermeeds

Is there any information or are there any performance areas missing in the current labelling scheme in your opinion?

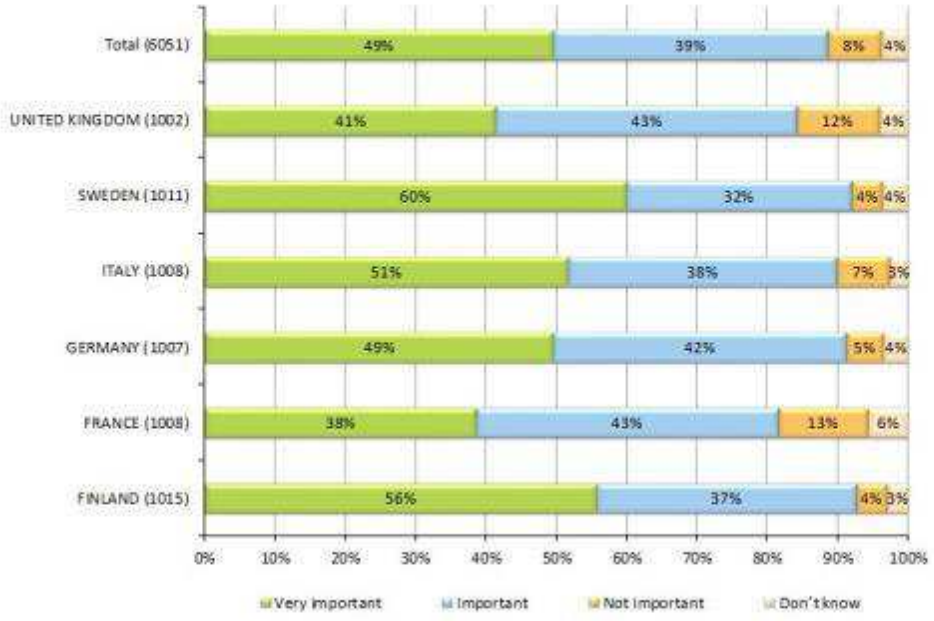


usermeeds

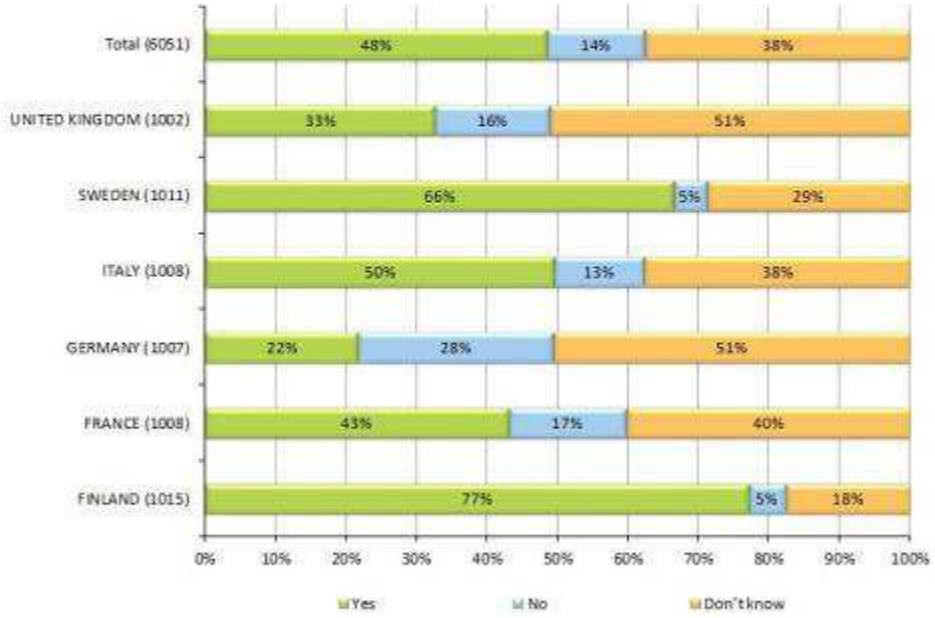
Today information about mileage (distance in km) and tyre grip on snow and ice is not currently shown on the label. How important is it for you to have this information on the label?
Information about mileage



Today information about mileage (distance in km) and tyre grip on snow and ice is not currently shown on the label. How important is it for you to have this information on the label?
Information about grip in snowy or icy conditions

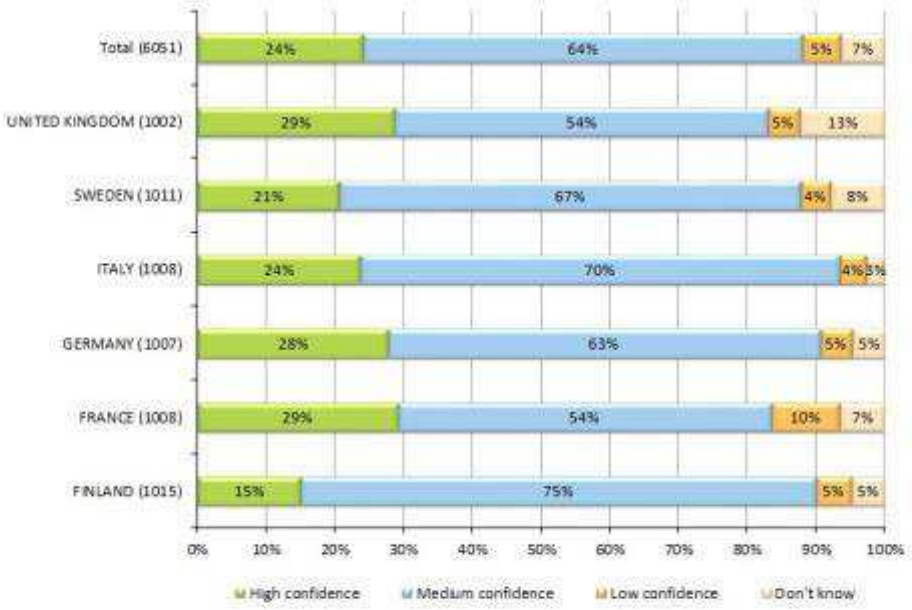


Currently studded tyres are not covered by the labelling scheme (they are not sold with the label). Would you like to have studded tyres included in the scheme?



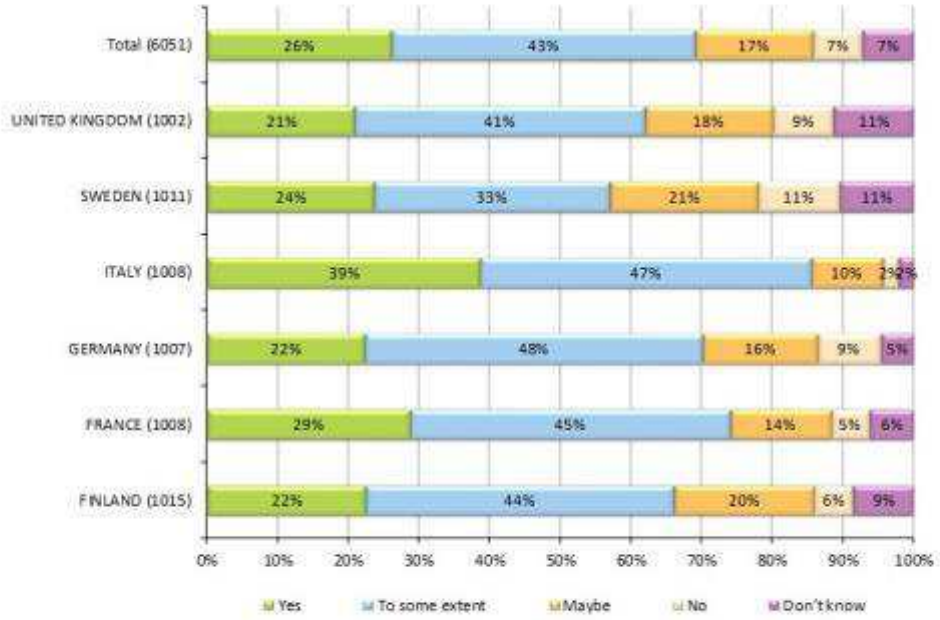
usermeeds

To what extent do you have confidence in the information provided by the tyre label?



usermeeds

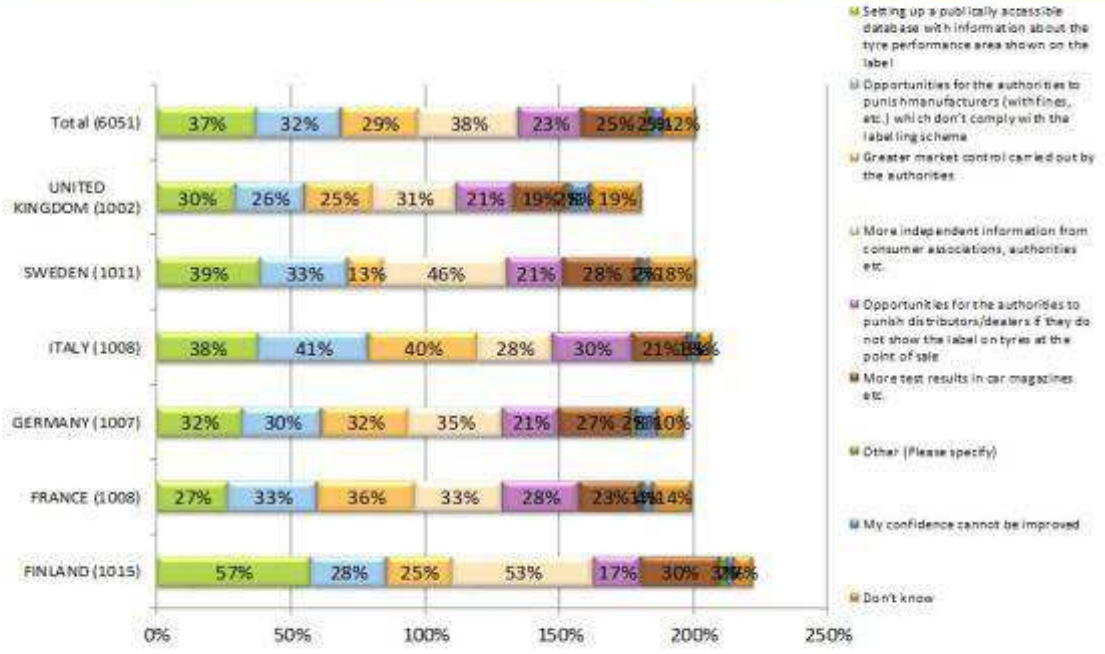
If your confidence in the label were higher, would the label have more influence on your purchase decision?



usemeeds

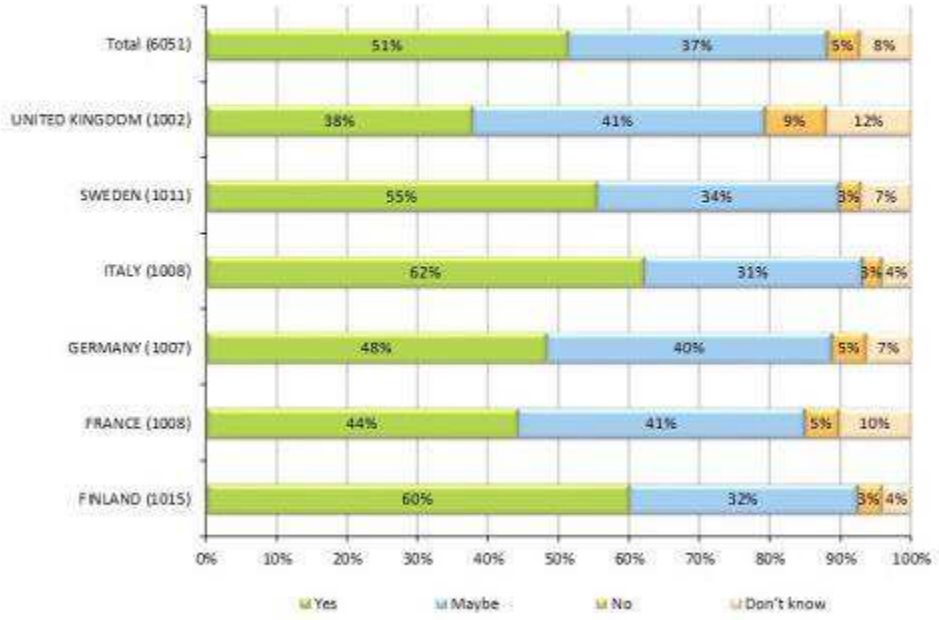
How could your confidence in the labelling scheme be improved?

Please select all those that apply.



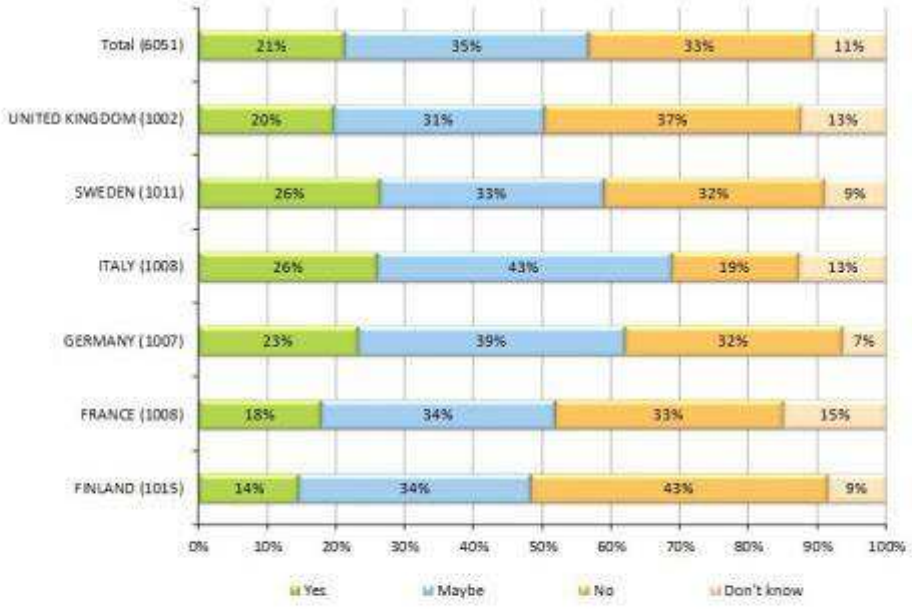
usemeeds

If a public database were to be established with information on tyre performance areas shown on the label, would you use the database to search for information when purchasing new tyres in the future?



usemeeds

Do you expect to buy tyres on the internet in the future?



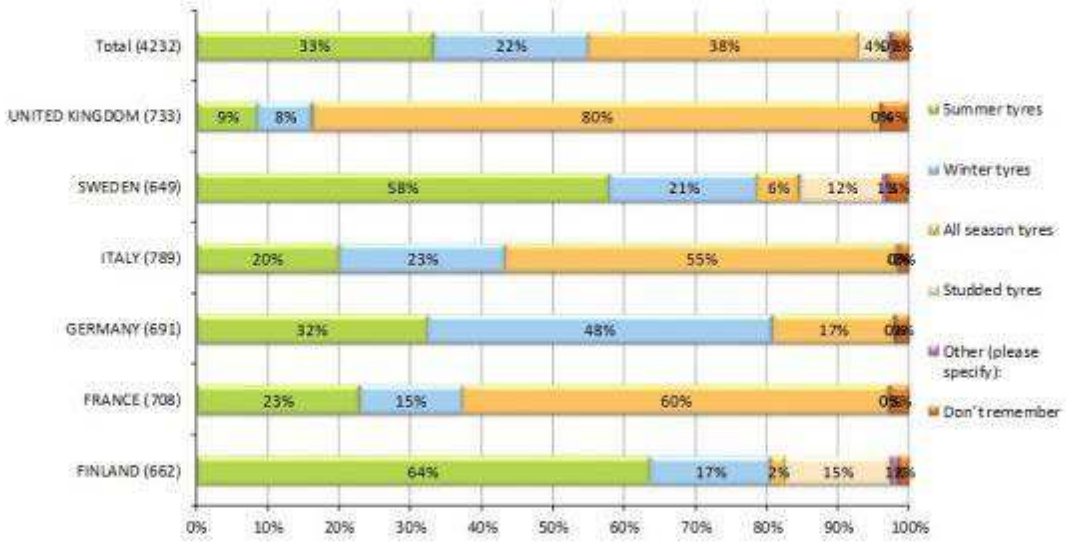
usemeeds

Agenda

- Background
- All car owners
- **Buyers of new tyres for passenger car 2013-2015**
- Buyers of new (not used) passenger car 2013-2015

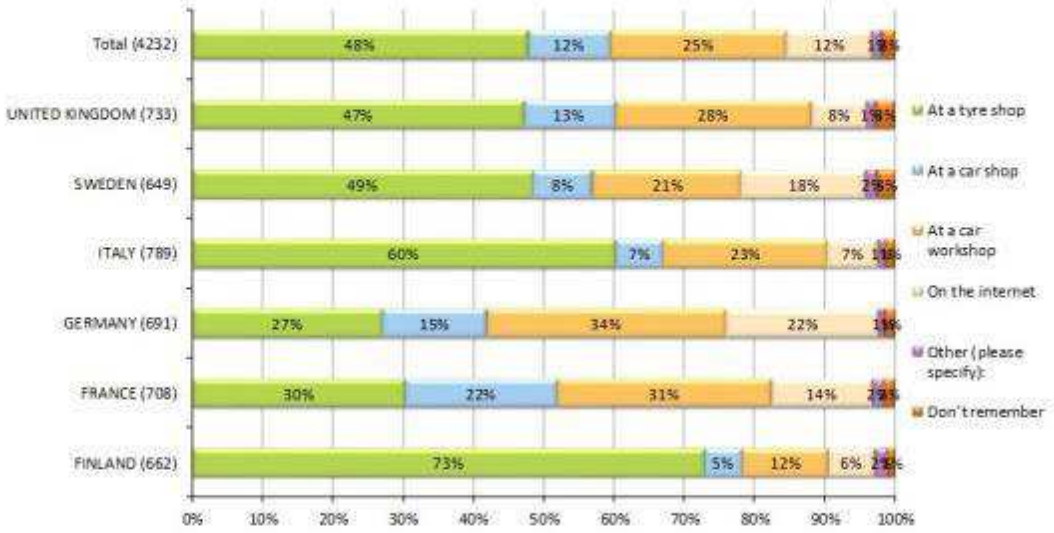
userneeds

What type of tyres did you buy?

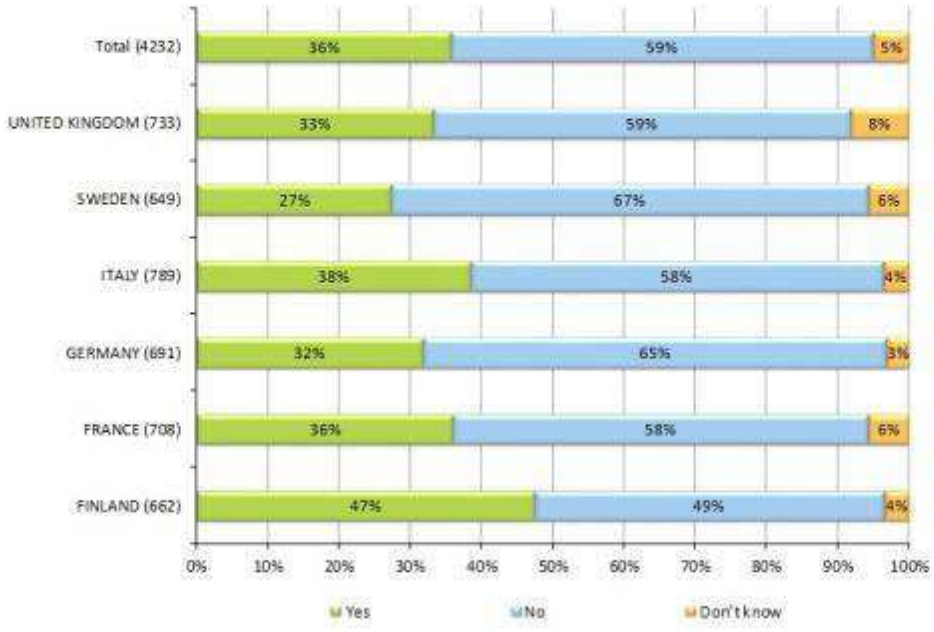


userneeds

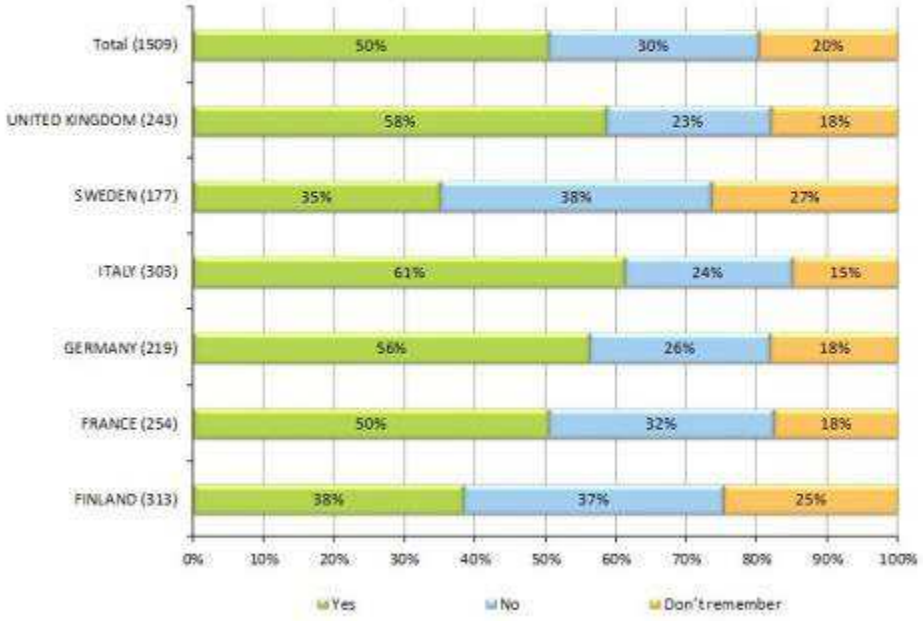
Where did you purchase the tyres?



Did you see the tyres displayed in a shop before the purchase?

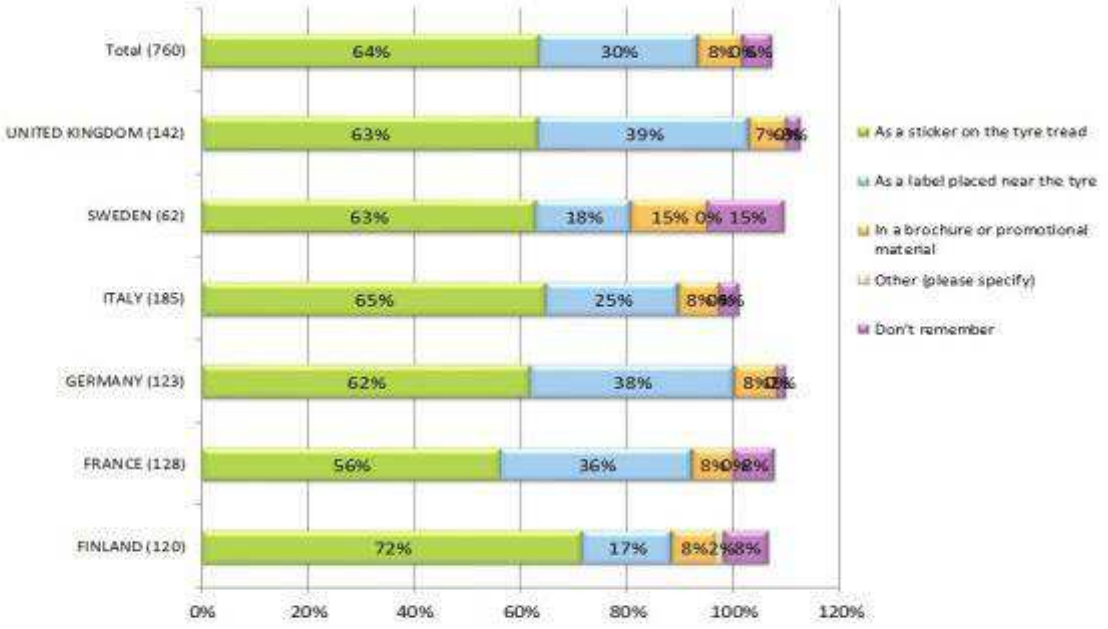


Did you notice the tyre label when you were in the shop?



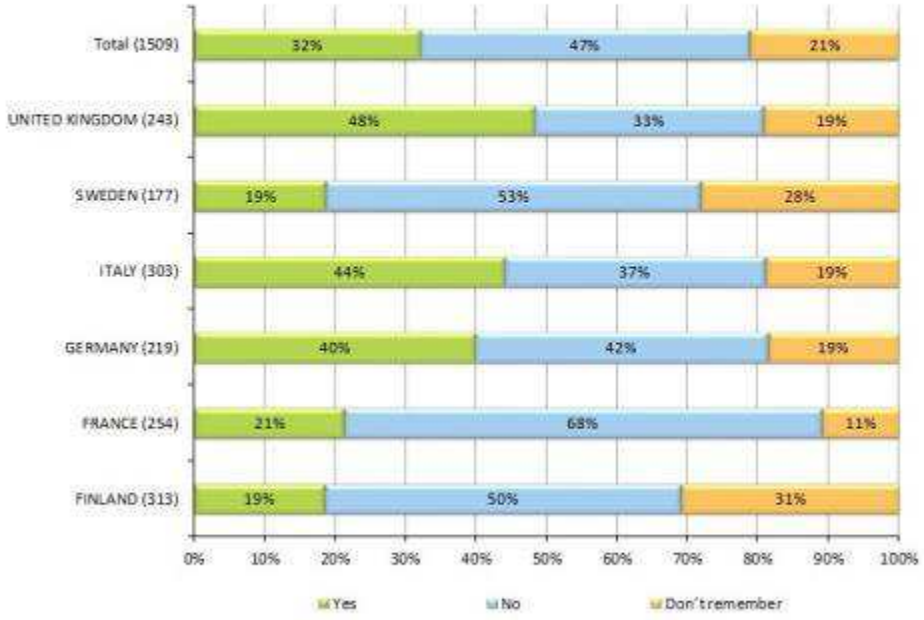
userneeds

Where was the tyre label placed?

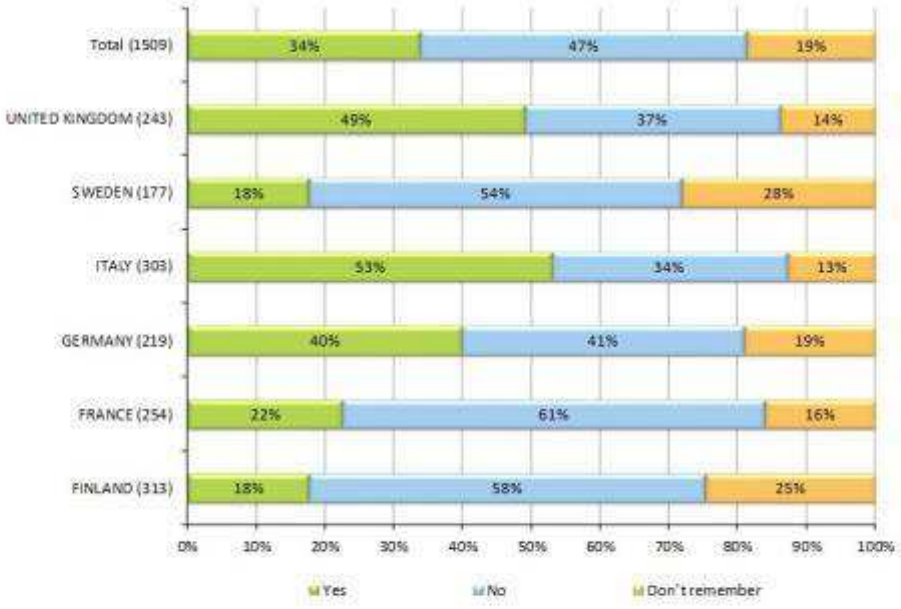


userneeds

Did the seller make you aware of the tyre label?

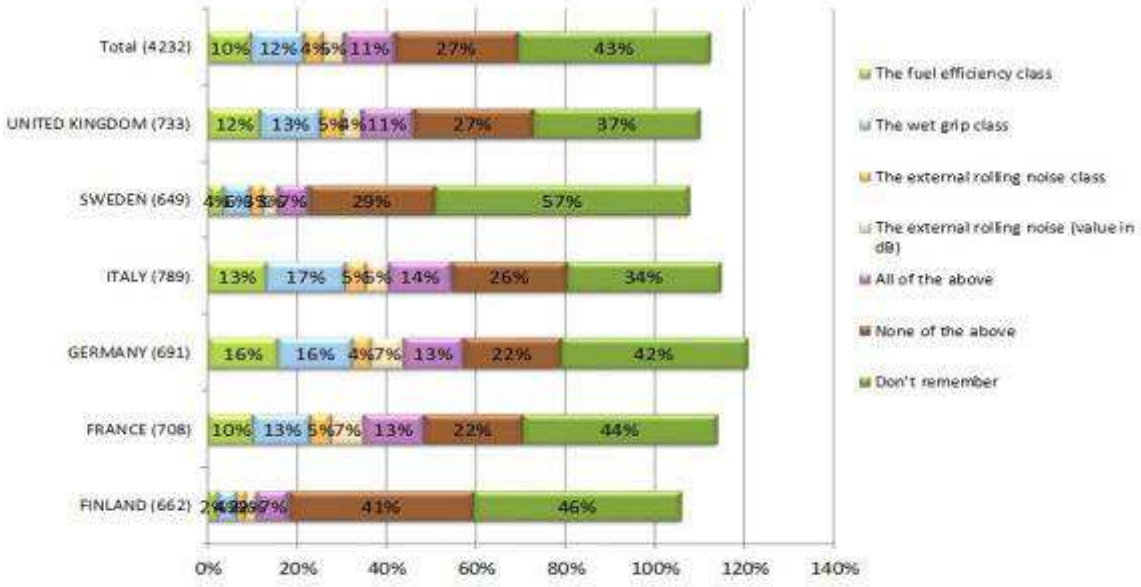


Did you get help from the seller to understand the information on the tyre label?



Was any of the following information stated on/with the bill, when you purchased the tyres?

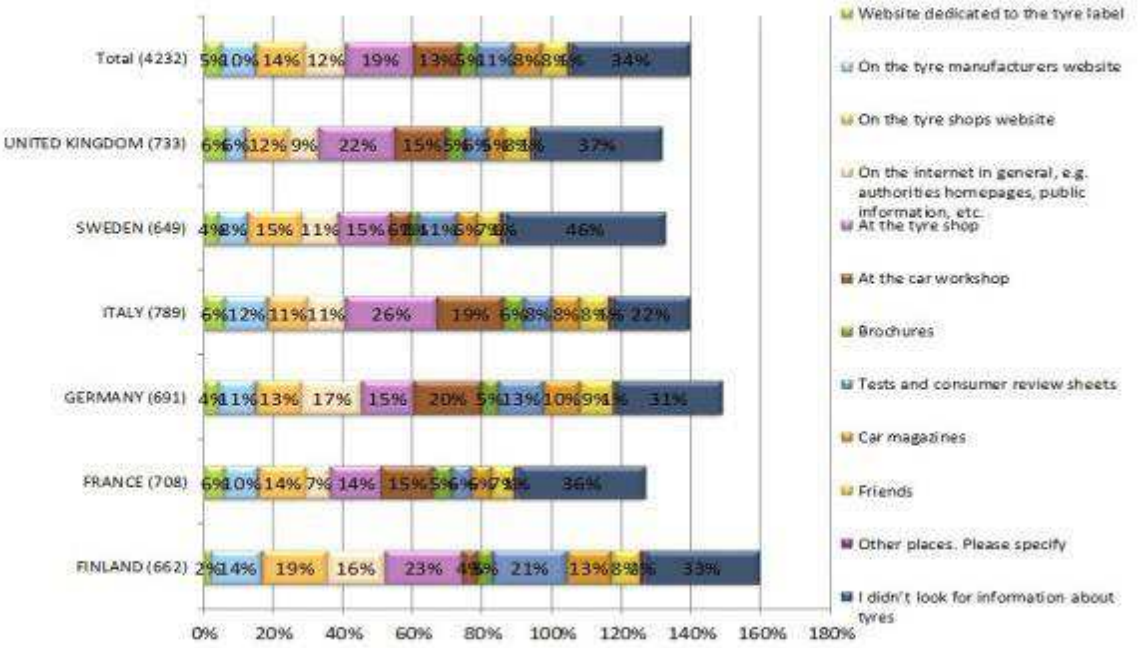
Please select all those that apply



userneeds

Where did you find information about the tyre label before you made your last purchase?

Please select all those that apply



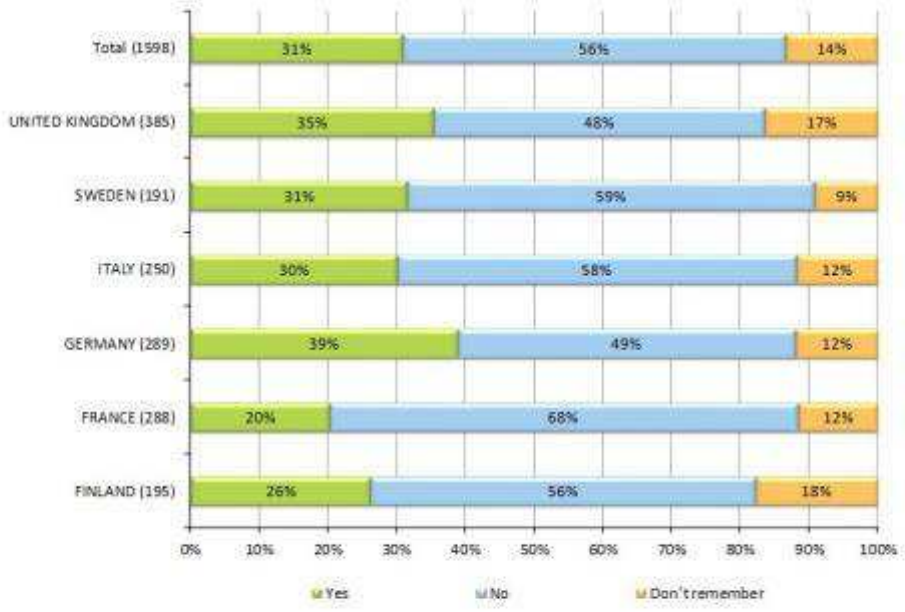
userneeds

Agenda

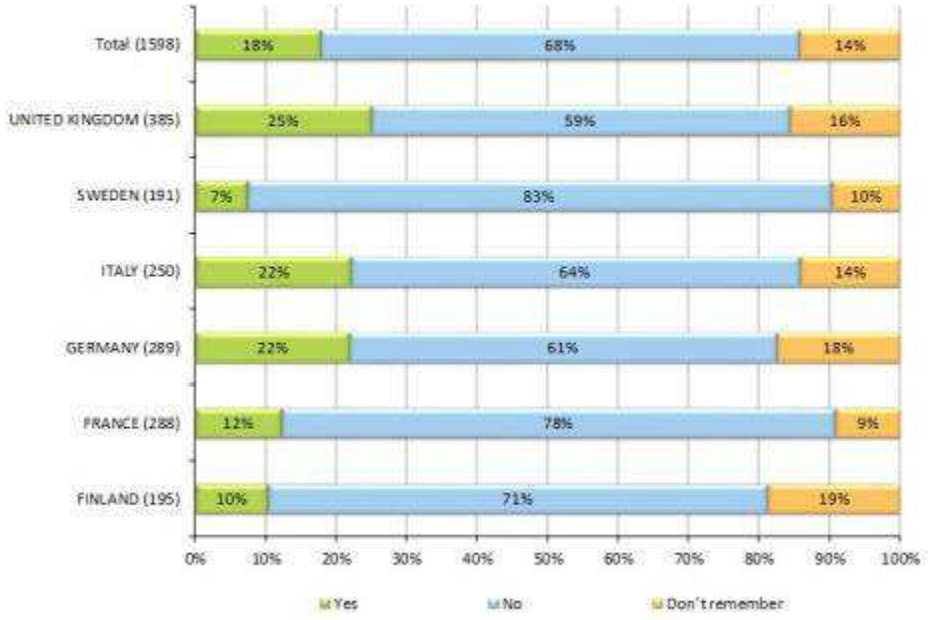
- Background
- All car owners
- Buyers of new tyres for passenger car 2013-2015

Buyers of new (not used) passenger car 2013-2015

At the point of sale (in a shop), were you offered a choice between different types of tyres when you purchased your last new passenger car?



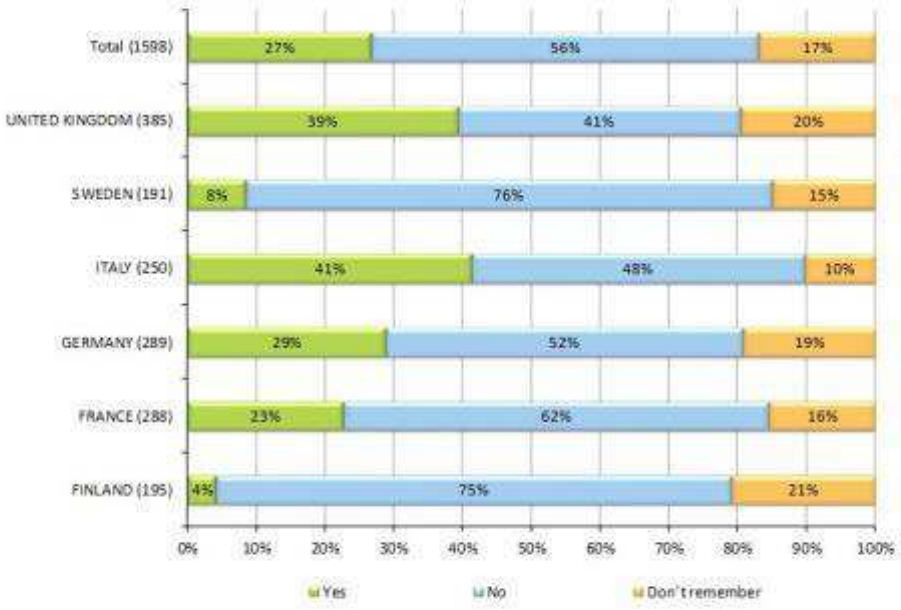
Did the car retailer make you aware of the tyre label before the sale?



usermeeds

Before the sale, did the car retailer provide you with information about each of the tyres offered for the following tyre performance areas:

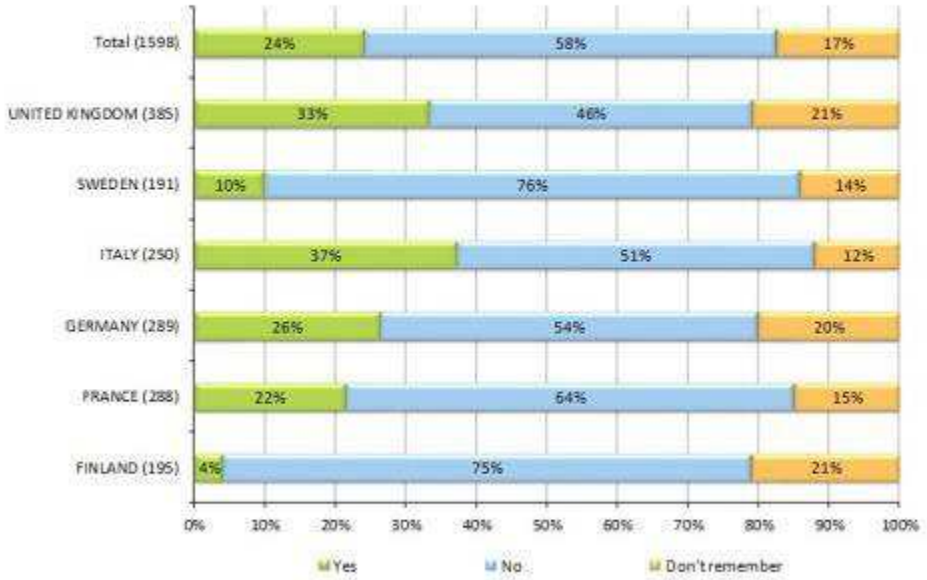
The fuel efficiency class



usermeeds

Before the sale, did the car retailer provide you with information about each of the tyres offered for the following tyre performance areas:

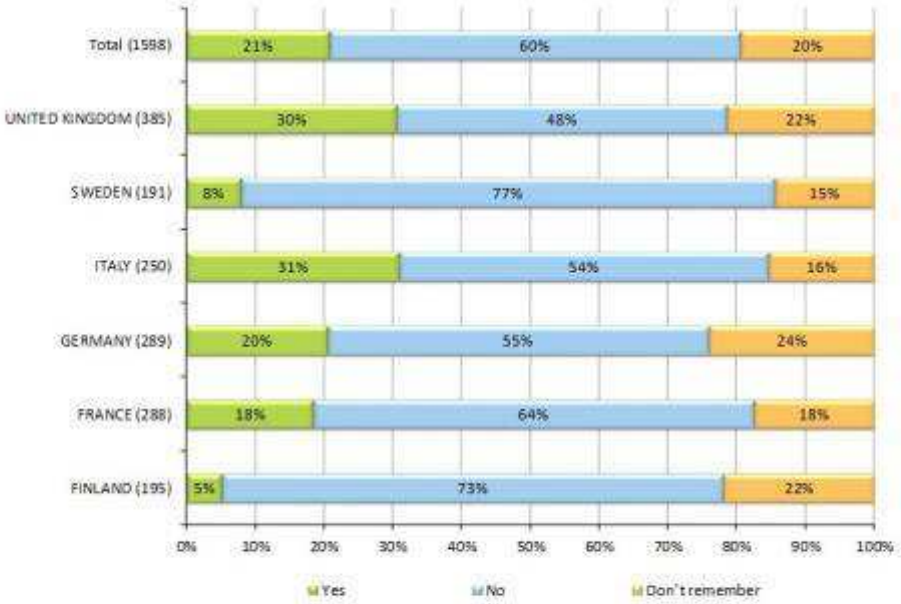
The wet grip class



usemeeds

Before the sale, did the car retailer provide you with information about each of the tyres offered for the following tyre performance areas:

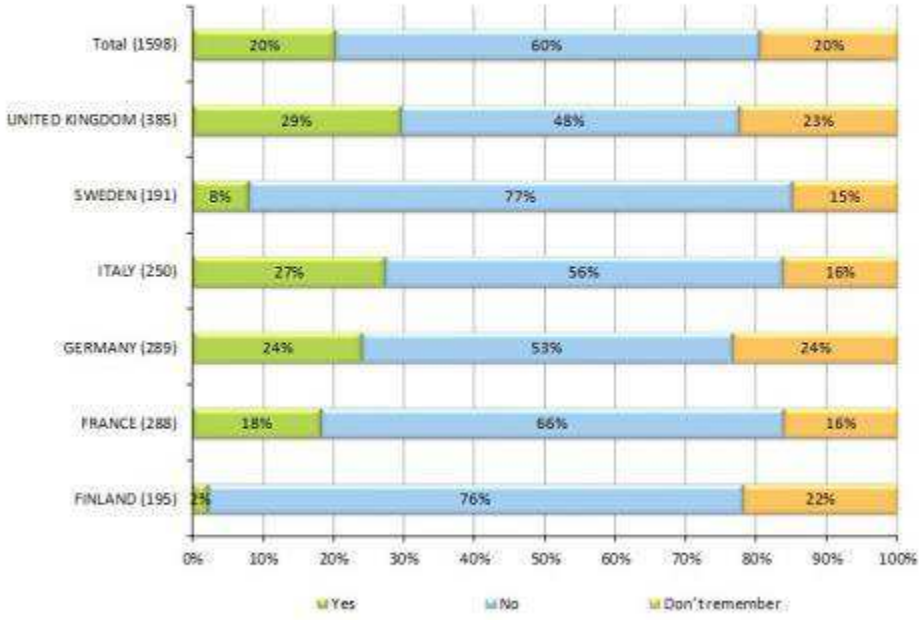
The external rolling noise class



usemeeds

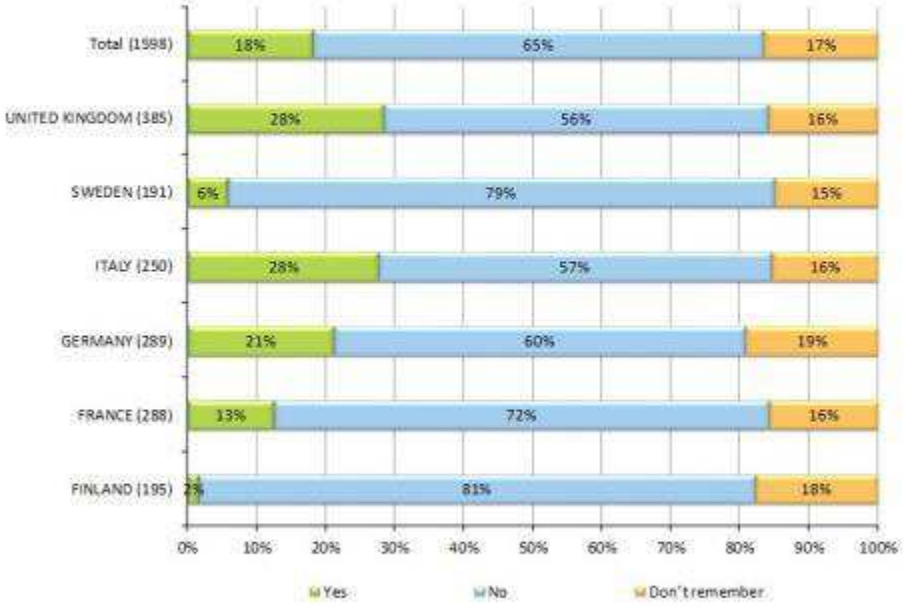
Before the sale, did the car retailer provide you with information about each of the tyres offered for the following tyre performance areas:

External rolling noise (value in dB)



userneeds

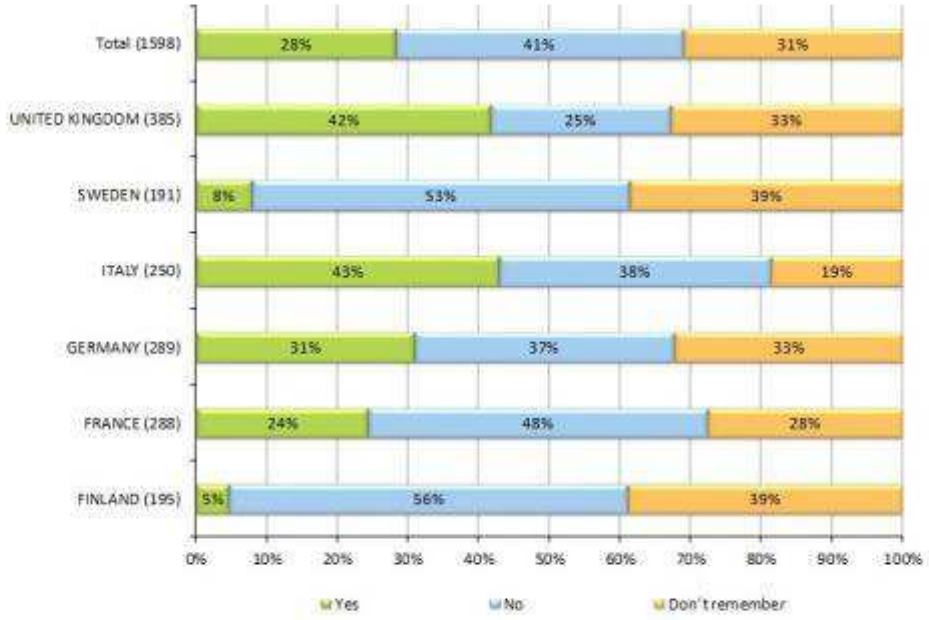
Did you get help from the car retailer to understand the fuel efficiency class, the wet grip class and/or the external rolling noise?



userneeds

Was the following information included in the technical promotional material?

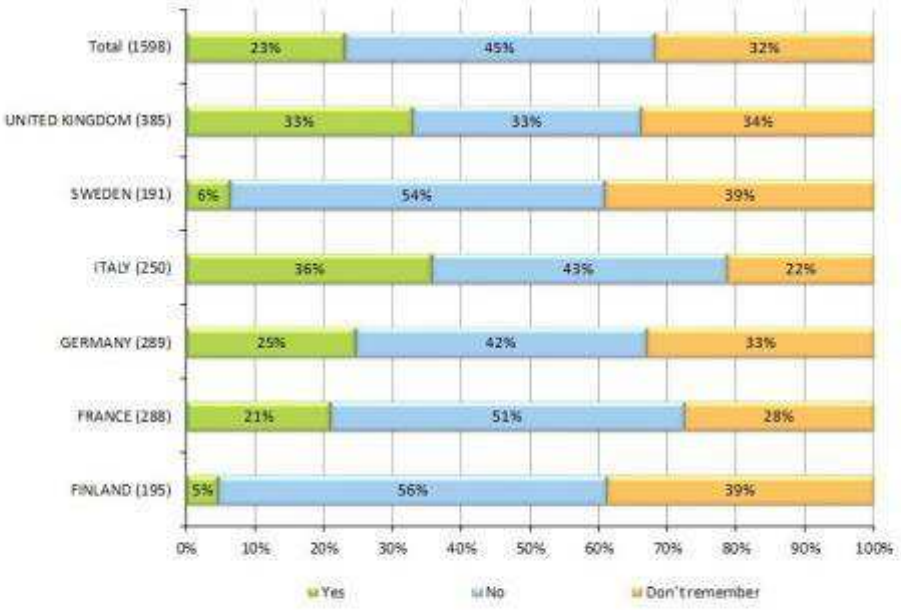
The fuel efficiency class



usemeeds

Was the following information included in the technical promotional material?

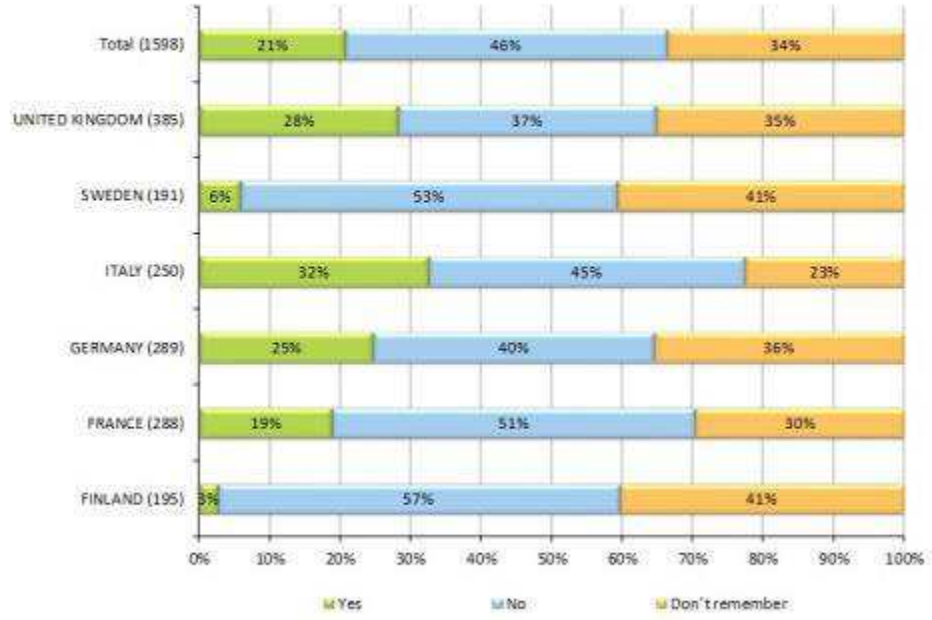
The wet grip class



usemeeds

Was the following information included in the technical promotional material?

The external rolling noise class



Was the following information included in the technical promotional material?

External rolling noise (value in dB)

Appendix 2: Methods and analytical models

I. GENERAL ASSUMPTIONS

- The development of RRC and WG are based on expected market shares of each label class in the future, which differs in each scenario.
- C1 vehicle fleet consists of 41% diesel and 59% petrol (ACEA, 2017)
- C2 vehicle fleet consists of 88% diesel and 12% petrol (ACEA, 2017)
- C3 vehicle fleet consist of 96% diesel and 4% petrol (ACEA, 2017)[105]
- C1 vehicles drive 13,500 km per year on average
- C2 vehicles drive 21,000 km per year on average
- C3 vehicles drive 57,500 km per year on average
- EU HICP rates are used to convert all prices to 2017 fixed prices[106]
- Vehicle fleet data was obtained from ACEA: http://www.acea.be/statistics/article/Report-Vehicles-in-Use
- Fuel prices were obtained from: https://www.eea.europa.eu/data-and-maps/indicators/fuel-prices-and-taxes/assessment-7
- Road safety and accident data was obtained from: https://ec.europa.eu/transport/road_safety/specialist/statistics_en#
- Road safety costs was obtained from: https://ec.europa.eu/transport/road_safety/specialist/knowledge/measures/monetary_valuation_of_road_safety_en and http://heatco.ier.uni-stuttgart.de/HEATCO_D5.pdf

- **INFORMATION EFFECT**

The methodology to assess effect of label information on purchase behaviour is based on the article "The Impact of Sustainability Information on Consumer Decision Making"107. In the article over 40,000 online purchases were assessed, and it was found that certain types of sustainability information had a significant impact on purchase intentions. Direct users—those who intentionally sought out sustainability information—were most strongly influenced by sustainability information, with an average purchase intention rate increase of 1.15 percentage points for each point increase in overall product score, reported on a zero to ten scale. However, sustainability information had, on average, no impact on non-direct users.

- Direct users were assumed to be those finding the label parameter analysed "very important" according to the 2016 consumer survey.
    - Find fuel efficiency "very important": 34%
    - Find wet grip "Very important": 62%
    - Find external rolling noise "very important": 21%

105 http://www.acea.be/uploads/statistic_documents/ACEA_Report_Vehicles_in_use-Europe_2017_FINAL2.pdf
106 http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tec00118&plugin=1
107 Dara O'Rourke and Abraham Ringer, Journal of Industrial Ecology, 2015 "The Impact of Sustainability Information on Consumer Decision Making", link: http://onlinelibrary.wiley.com/doi/10.1111/jiec.12310/abstract

- Also, for each scenario it was considered how many already uses the label in their purchasing decision, and only the additional influenced end-users were assumed to be impacted.

- **STOCK MODEL ASSUMPTION**

Sales figures were received from the industry organisation ETRMA[108] back to 2003 and backed up by sales data from the market research organisation GfK[109]. The sales data are seen in the table below.

Table 63: Tyre sales in million units

Sales in millions	2006	2008	2010	2012	2014	2016	2017
C1 replacement	231.46	224.30	249.72	226.42	236.60	248.10	253.31
C1 OEM	59.09	77.61	74.64	71.12	73.80	79.47	80.06
C2 replacement	25.72	24.92	27.75	25.16	26.29	27.57	28.15
C2 OEM	4.96	7.51	4.98	4.98	5.35	6.68	6.72
C3 replacement	12.76	11.42	11.56	9.61	12.19	13.97	14.88
C3 OEM	3.35	4.74	2.72	3.33	3.20	3.65	3.94
Total	**337.33**	**350.50**	**371.36**	**340.62**	**357.44**	**379.44**	**387.06**

Source: ETRMA and GfK

Average tyre lifespans were based on assumptions regarding the expected tyre life in km and km driven per year for each vehicle type as shown in the table below. The assumptions were primarily based on background data form the Ecodesign Impact Accounting[110].

Table 64: Assumption on tyre lifespans and mileage

Tyre type	Expected life in km	Average distance driven per year, km	Average tyre lifespan, years
C1	56 700	13 500	4.2
C2	71 400	21 000	3.4
C3	200 000	57 500	3.5

Source: Ecodesign Impact Accounting background calculation model, 2017.

Further assumptions used in the stock model:

Table 65: Further assumptions made in the stock model

C1 share out of C1 + C2 sales	90%
Share of C1 OEM	21% of C1 replacement market
Share of C2 OEM	25% of C2 replacement market
Share of C3 OEM	25% of C3 replacement market
Number of tyres per vehicle in stock – C1 (Calculated)	5.7 (approx. 1/3 have two sets of tyres)
Number of tyres per vehicle in stock – C2 (Calculated)	4.1 (approx. 2,5% have two sets of tyres)
Number of tyres per vehicle in stock – C3 (Calculated)	12.7 (different number of wheels on different trucks/busses)

Sources; ETRMA, Ecodesign Impact Accounting

108 http://www.etrma.org/statistics-2
109 http://www.gfk.com/about-gfk/about-gfk/
110https://ec.europa.eu/energy/sites/ener/files/documents/Ecodesign%20Impacts%20Accounting%20%20-%20status%20January%202016%20-%20Final-20160607%20-%20N....pdf

- **BAU SCENARIO ASSUMPTIONS**

- 2008 Impact Assessment No-Label scenario was used as basis for RRC market distribution, however, not all tables added up to 100% market. These have been adjusted.
- For C3 an entirely new market distribution had to be estimated for the BAU scenario, since the 2008 IA was unrealistically low compared to actual market data.
- The three tables below show the percentage market shares assumed for each tyre type (C1, C2, C3):

Table 66: BAU Rolling resistance market shares for C1 tyres

RRC bands	6 to 7	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12	Above 12	Market average
Band average	6.5	7.5	8.5	9.5	10.5	11.5	13.3	
2004	0%	0%	1%	4%	12%	24%	60%	**12.30**
2012	0%	1%	6%	5%	16%	29%	43%	**11.79**
2013	0%	1%	7%	6%	19%	37%	30%	**11.48**
2014	0%	1%	8%	7%	22%	43%	19%	**11.20**
2015	0%	1%	9%	8%	27%	55%		**10.76**
2016	0%	1%	9%	8%	28%	54%		**10.75**
2017	0%	1%	11%	12%	40%	36%		**10.49**

Source: 2008 Impact Assessment

Table 67: BAU Rolling resistance market shares for C2 tyres

RRC bands	5.5 - 6.5	6.5 - 7.5	7.5 - 8.5	8.5 - 9.5	9.5 - 10.5	above 10.5	Market average
Band average	6	7	8	9	10	11.75	
2004	0%	0%	3%	11%	26%	61%	**10.68**
2013	0%	1%	4%	18%	42%	35%	**10.30**
2014	0%	1%	4%	21%	50%	23%	**10.06**
2015	0%	1%	6%	27%	67%		**9.60**
2016	0%	1%	6%	27%	67%		**9.60**
2017	0%	1%	8%	46%	45%		**9.35**

Source: 2008 Impact Assessment

Table 68: BAU Estimated rolling resistance market shares for C3 tyres

RRC bands	Below 4	4 to 5	5 to 6	6 to7	7 to 8	Above 8	Market Average
Band average	3.7	4.5	5.5	6.5	7.5	9.8	
2004	0%	0%	3%	28%	33%	38%	**7.81**
2013	0%	2%	5%	34%	26%	34%	**7.78**
2014	0%	2%	5%	35%	29%	29%	**7.67**
2015	0%	2%	5%	36%	58%		**6.99**
2016	0%	3%	6%	37%	54%		**6.93**
2017	0%	3%	6%	45%	46%		**6.85**

Source: Viegand Maagøe, estimates based on real-life market data

- Wet grip was only given in the 2008 Impact Assessment for C1 superficially.
- The market distribution of wet grip classes in the BAU Scenario for the three tyre types (C1, C2, C3) therefore had to be estimated by extrapolating form real-life market data.
- The estimated market shares are shown in the three tables below.
-

Table 69: BAU Wet grip market shares for C1 tyres

Wet grip classes	A	B	C	E	F	Market average
Class average, C1	1.6	1.47	1.32	1.17	1.0	
2012	1%	3%	15%	30%	51%	**1.12**
2017	1%	4%	19%	35%	41%	**1.15**

Source: estimated based on 2008 Impact Assessment and real-life data (with label)

Table 70: BAU Estimated wet grip market shares for C2 tyres

Wet grip classes	A	B	C	E	F	Market average
Class average, C2	1.45	1.32	1.17	1.02	0.9	
2012	1%	3%	15%	30%	51%	**0.99**
2017	1%	4%	18%	32%	45%	**1.01**

Source: estimated based on 2008 Impact Assessment and real-life data (with label)

Table 71: BAU Estimated wet grip market shares for C3 tyres

Wet grip classes	A	B	C	D	E	F	Market average
Class average, C3	1.3	1.17	1.02	0.87	0.72	0.6	
2012	1%	3%	15%	15%	15%	51%	**0.75**
2017	1%	4%	18%	18%	19%	40%	**0.78**

Source: estimated based on 2008 Impact Assessment and real-life data (with label)

The Noise level was given in the 2008 Impact Assessment, but TOL had data available for the market distribution as far back as 2008, which was used as basis for the BAU noise level for each tyre type (C1, C2, C3). A very limited development in average noise was expected in the BAU scenario until 2017. The 2008 data and the 2017 estimated value are shown in the table below:

Table 72: average noise level in BAU scenario

	2008 average noise, dB	**2017 average noise, dB**
C1	71.20	71.05
C2	72.51	72.35
C3	72.00	71.85

Source: 2008 TOL data and 2017 estimated

- **CURRENT LABELLING SCENARIO MODEL**

Only tyres sold on the replacement market, i.e. to replace tyres on a vehicle already in use, are expected to be affected by the label Regulation. This assumption was made for the following reasons:

- It is not mandatory to always show the tyre label for tyres sold with new vehicles, but only if the end-user is offered a choice between different tyres.
- The 2016 consumer survey showed that less than 5.6% of end-users were offered a choice and were shown the label information for different tyres when purchasing a new vehicle
- The tyres are not expected to be the primary focus of end-users when purchasing a new vehicle, but rather the car itself is important.

The entire energy consumption of all tyres (including OEM tyres) are included in the modelling, but only the replacement tyres are expected to change significantly in terms of the performance parameters on the label.

The following data and assumptions were used in the modelling of the current labelling scenario:

- The OEM performance level for RRC, WG and Noise was assumed equal to the BAU performance levels, i.e. only the replacement tyres are affected by the label
- Before 2012: Linear interpolation from 2008 Impact Assessment estimated performance in 2004.
- All performance parameters (for all tyres) are assumed to follow the BAU scenario until 2009, from when linear interpolation is made to 2012, where real-life market data is available.
- 2012-2017 based on real-life data from TOL (<1% difference from GfK data) giving market distributions for rolling resistance, wet grip and noise (see tables below)

The 2016 Review Study showed low degree of market surveillance, and the few tests that have been performed show a high rate of non-compliance. This low compliance rate is taken into account in the BAU Scenario, but since no actual EU-wide non-compliance rates are available, the following assumptions have been made:

- 10% of tyres on the market does not live up to the performance appearing on their label.
- The non-compliant tyres are assumed to be on average **3 classes lower** than stated on the label.

Table 73: Current label Rolling resistance market shares for C1 tyres

RRC class	A	B	C	E	F	G	Market average	**Market average with non-compliance**
Class average	6.3	7.4	8.7	10	11.5	12.4		
2012	0%	3%	29%	42%	24%	1%	9.92	**10.28**
2013	1%	6%	36%	39%	17%	1%	9.64	**10.01**
2014	0%	5%	36%	43%	15%	1%	9.63	**10.00**
2015	0%	5%	38%	42%	14%	0%	9.57	**9.93**
2016	0%	5%	34%	43%	17%	1%	9.68	**10.05**
2017	0%	6%	37%	42%	15%	1%	9.59	**9.96**

Source: Data from TOL (Tyres On-Line, Germany).

Table 74: Current label Rolling resistance market shares for C2 tyres

RRC class	A	B	C	E	F	G	Market average	**Market average with non-compliance**
Class average	5.3	6.4	7.7	8.9	10.2	10.8		
2012	0%	1%	26%	56%	15%	2%	8.80	**9.13**
2013	0%	4%	20%	44%	28%	3%	8.97	**9.30**
2014	0%	6%	25%	41%	25%	2%	8.82	**9.15**
2015	0%	5%	29%	40%	24%	1%	8.77	**9.10**
2016	0%	4%	25%	42%	27%	3%	8.92	**9.25**
2017	0%	4%	28%	41%	25%	2%	8.83	**9.16**

Source: Data from TOL (Tyres On-Line, Germany).

Table 75: Current label Rolling resistance market shares for C3 tyres

RRC class	A	B	C	D	E	F	Market average	**Market average with non-compliance**
Class average	3.8	4.7	5.7	6.7	7.7	8.6		
2012	2%	10%	33%	37%	16%	3%	6.07	**6.43**
2013	2%	11%	33%	37%	15%	2%	6.34	**6.70**
2014	1%	10%	36%	36%	14%	2%	6.30	**6.66**
2015	1%	7%	29%	38%	20%	5%	6.28	**6.64**
2016	1%	7%	29%	40%	18%	4%	6.54	**6.90**
2017	0%	16%	44%	26%	13%	1%	6.50	**6.86**

Source: Data from TOL (Tyres On-Line, Germany).

Table 76: Current label Wet grip market shares for C1 tyres

Wet grip class	A	B	C	E	F	Market average	**Market average with non-compliance**
Class average	1.6	1.47	1.32	1.17	1.04		
2012	10%	27%	61%	9%	3%	1.36	**1.32**
2013	18%	37%	52%	8%	3%	1.39	**1.35**
2014	21%	37%	52%	8%	3%	1.40	**1.35**
2015	23%	40%	50%	8%	1%	1.41	**1.36**
2016	21%	38%	49%	11%	3%	1.40	**1.35**
2017	26%	41%	48%	9%	3%	1.41	**1.36**

Source: Data from TOL (Tyres On-Line, Germany).

Table 77: Current label Wet grip market shares for C2 tyres

Wet grip class	A	B	C	E	F	Market average	**Market average with non-compliance**
Class average	1.45	1.32	1.17	1.02	0.9		
2012	2%	29%	61%	8%	1%	1.21	**1.16**
2013	3%	27%	56%	13%	1%	1.20	**1.15**
2014	5%	31%	49%	15%	1%	1.21	**1.16**
2015	6%	32%	45%	17%	0%	1.21	**1.16**
2016	6%	30%	43%	20%	1%	1.20	**1.16**
2017	8%	34%	38%	18%	1%	1.22	**1.17**

Source: Data from TOL (Tyres On-Line, Germany).

Table 78: Current label Wet grip market shares for C3 tyres

Wet grip class	A	B	C	D	E	Market average	**Market average with non-compliance**
Class average	1.3	1.14	1	0.85	0.7		
2012	11%	65%	21%	3%	0%	1.12	**1.07**
2013	4%	46%	47%	2%	0%	1.07	**1.03**
2014	5%	47%	45%	3%	0%	1.08	**1.03**
2015	6%	53%	38%	3%	0%	1.09	**1.04**
2016	2%	39%	54%	4%	0%	1.06	**1.01**
2017	3%	42%	51%	4%	0%	1.06	**1.02**

Source: Data from TOL (Tyres On-Line, Germany).

Table 79: Average market noise levels in Current label scenario

Year	C1	C2	C3
2012	70.81	71.93	71.78
2013	70.67	71.98	72.19
2014	70.86	72.07	72.05
2015	70.80	72.03	71.71
2016	70.84	72.15	71.71
2017	70.73	71.97	71.69

Source: Data from TOL (Tyres On-Line, Germany).

- **EFFECT OF ROLLING RESISTANCE ON FUEL CONSUMPTION**

- Based on the calculations form the official "fuel savings calculator" [111]

- Fuel savings calculator is based on measurements performed by IDIADA for the European Commission[112]

111 https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficient-products/tyres

- In the calculations a share of 50% urban driving and 50% non-urban driving was assumed

The following formula correlating fuels savings (in %) and change in rolling resistance forms the basis of the fuel savings calculator, and is the one used in this study:

$$Fuel\ consumption\ change\ (\%) = K * \frac{RRC_{old} - RRC_{new}}{RRC_{old}} * 100\%$$

Where RRC_{old} in this case refers to BAU1 (actual data), RRC_{new} refers to BAU0 rolling resistance and K is a factor calculated by IDIADA based on actual measurements of cars driven on a test lane with different tyres. The K factor depends on type of tyre (and thus vehicle), the share of urban and non-urban driving and whether the rolling resistance is increasing or decreasing. K-factors are shown in Table 22. In the scenario calculations 50/50 share of urban and non-urban driving was assumed.

Table 80: K-factors used in calculation of fuel consumption from RRC development

RRC development	Road type	C1	C2	C3
Increase in RRC	Urban	0.104	0.098	0.095
	Non-urban	0.158	0.118	0.112
	Average (50/50)	0.131	0.108	0.1035
Decrease in RRC	Urban	0.145	0.109	0.106
	Non-urban	0.183	0.125	0.118
	Average (50/50)	0.164	0.117	0.112

Source: IDIADA background report on the fuel savings calculator

- **EFFECT OF WET GRIP ON SAFETY**

The societal costs related to a change in tyre wet grip rating have been estimated using a methodology from a 2014 study by TNO on Potentials benefits of Triple-A tyres in the Netherlands[113]. The general approach is shown in the figure below. It shows a relation between the grip level of the tyre, the braking distance and the resulting impact speed of an accident. The degree of personal injury (fatal, severe, slight) can be described as a function of impact speed and accordingly the distribution between fatal, severe and slightly injured people can be translated into societal costs.

112 http://www.applusidiada.com/en/aboutUs/inbrief
113 TNO

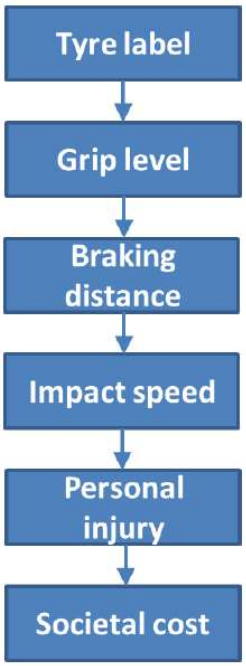


Figure 24 Methodology flow diagram[114]

Data and assumptions

- Data has been gathered through a number of sources but are all based on data from the CARE database - **C**ommunity database on **A**ccidents on the **R**oads in **E**urope. Direct sources are referenced in footnote when relevant.
- Road accident fatalities[115] are divided into mode of transportation:
    - Passenger cars (C1 tyres)
    - Lorries <3.5 tons (C2 tyres)
    - Heavy goods vehicles >3.5 tons (C3 tyres)
    - Buses (C3 tyres)
    - Pedestrians and bicycles (assumed to be inflicted by vehicles)
- Number of injuries is not distributed on mode of transportation[116] and is therefore assumed to be the same as for fatalities. The distribution between severe and slight injuries are based on rough estimates[117]:
    - 19% Severely injured
    - 81% slightly injured
- It is assumed that improved wet grip only affects accident on wet road. The share of accidents on wet road was 9%[118] in 2015. The share is assumed to be constant through the whole modelling period.
- The distribution of accidents by road type are divided into the following based on 2015 numbers[119]:
    - Urban – 37,3%
    - Rural – 55,0%

114 TNO
115 https://ec.europa.eu/transport/road_safety/sites/roadsafety/files/pdf/statistics/dacota/asr2017.pdf
116 https://ec.europa.eu/transport/road_safety/sites/roadsafety/files/pdf/observatory/historical_evol.pdf
117 https://ec.europa.eu/transport/road_safety/specialist/statistics_en#
118 https://ec.europa.eu/transport/road_safety/sites/roadsafety/files/pdf/statistics/dacota/asr2017.pdf
119 https://ec.europa.eu/transport/road_safety/sites/roadsafety/files/pdf/statistics/dacota/asr2017.pdf

- Motorway – 7,8%
- The distribution is assumed to be the same through the whole modelling period.

- Projections of fatalities and injuries in the baseline up to 2030 are based on historic trends.

Wet grip

Wet grip refers to the capacity of a tyre to brake on a wet road. The wet grip is applicable to all tyre types (C1, C2, C3), and is determined based on the wet grip index (G) according to the A-G scale specified in Table 23**Table 25**. The value of the wet grip index should be calculated based on either the average deceleration in m/s^2 or the peak brake force coefficient, which is unit-less, and compared to a Standard Reference Test Tyre (SRTT).

Table 81: G limit values for wet grip scales of the three tyre types C1, C2 and C3

C1 tyres		**C2 tyres**		**C3 tyres**	
G	Wet grip class	G	Wet grip class	G	Wet grip class
1,55 ≤ G	A	1,40 ≤ G	A	1,25 ≤ G	A
1,40 ≤G ≤ 1,54	B	1,25 ≤ G ≤ 1,39	B	1,10 ≤ G ≤ 1,24	B
1,25 ≤ G ≤ 1,39	C	1,10 ≤ G ≤ 1,24	C	0,95 ≤ G ≤ 1,09	C
Empty	D	Empty	D	0,8 ≤ G ≤ 0,94	D
1,10 ≤ G ≤ 1,24	E	0,95 ≤ G ≤ 1,09	E	0,65 ≤ G ≤ 0,79	E
G ≤ 1,09	F	G ≤ 0,94	F	G ≤ 0,64	F

Regulation 661/2009 sets out minimum wet grip requirements for C1 tyres only. For normal tyres the limit value is ≥1.1.

Braking distance

There is a clear relation between wet grip level and braking distance as seen in the table below. E.g. wet grip level F has a 55% longer braking distance than wet grip level A. To simplify the calculations a linear trend has been assumed making it possible to calculate the change in braking distance as a function of wet grip index (G). The ratio is assumed equal for all three tyre types (C1, C2, C3), but will of course vary due to different wet grip intervals.

Table 82: Braking distance for different wet grip levels compared to rating A. Assumed equal for C1, C2 and C3 tyres.

Tyre label	Increased braking distance (index)
A	**100**
B	**111**
C	**124**
D	**132**
E	**141**
F	**155**

Impact speed

The TNO study acquired data on the average impact speed for accidents at three different road types: urban, rural and motorway as seen in the table below. This data is assumed to be the reference in the baseline scenario.

Table 83 Average initial vehicle speed and impact speed of different accident scenarios

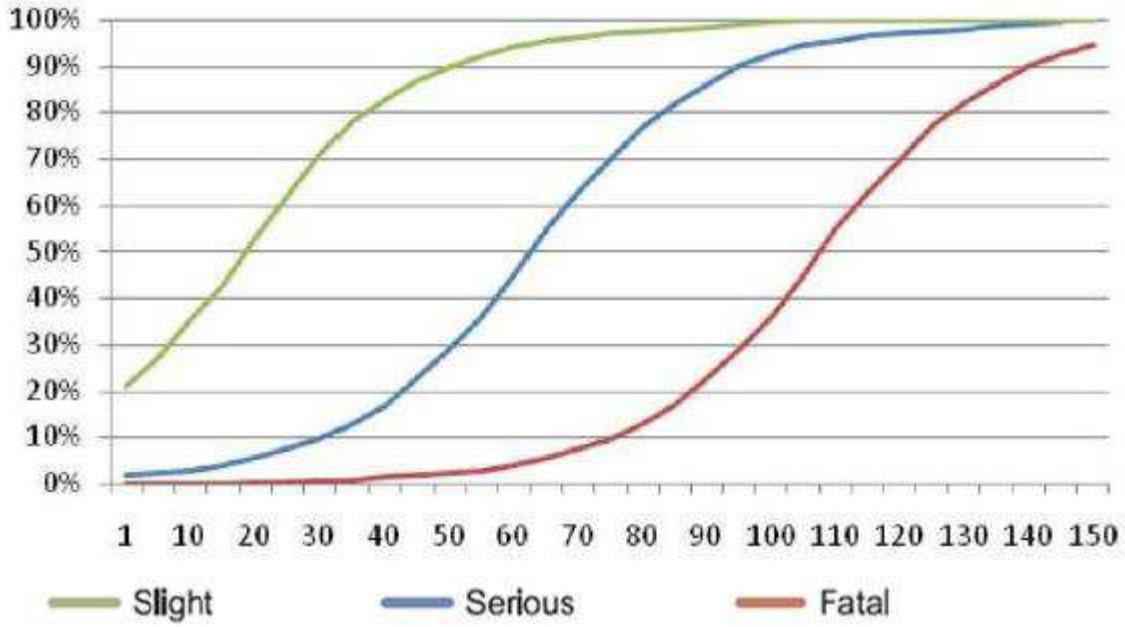
Accident scenario	Urban road car to car	Rural road car to car	Motorway car to car
Initial speed (km/h)	50	80	120
Impact speed (km/h)	30	46	91

For simplification it is assumed that a change in braking length will give an equal change in impact speed. E.g. a 10% reduction in braking length will reduce the impact speed in an accident by 10%. In reality, the relation between braking distance and impact speed will have an exponential trend and will vary depending on the initial speed.

Personal injury

The impact speed can be translated into injury risk for different levels of injuries (slight, serious, fatal) as seen in the figure below. The higher the impact speed the higher is the risk of a fatal accident.

Figure 25 Injury risk of passenger car occupants as a function of impact speed (km/h)[120]



Based on the average accident impact speed the distribution of injury types has been calculated in the table below. This is the baseline injury distribution. Since this is a theoretic distribution it is only used to determine the relative change for the three injury types between the baseline and each scenario. When the relative change has been calculated it can be coupled with the absolute number of fatalities, seriously injured and slightly injured in the baseline.

120 TNO study

Table 84 Baseline distribution of injury types based on average accident impact speeds for different road types

Road type	Impact speed (km/h)	Fatalities	Serious injuries	Slight injuries	No injury
Urban	30	1.6%	7.1%	63.4%	27.9%
Rural	46	1.8%	22.7%	62.8%	12.7%
Motorway	91	23.7%	61.2%	13.8%	1.4%

- **SOCIETAL COSTS**

The estimation of societal costs of accidents is based on values from the 2006 HEATCO report[121] recommended by the Commission for monetary valuation of road safety. It includes estimates for three different injury types – fatal, severe and slight – for individual countries in the EU-25. The values vary greatly between Member States and correlate to the GDP of the Member State. The valuation of the three remaining Member States has therefore been estimated based on GDP. The modelling approach uses a weighted average cost value for each injury type covering the whole of EU-28. The number of fatalities and injuries for each Member State have been used as weighting factors.

Values given in the HEATCO report are 2002 prices and have therefore been converted to the current price level based on the inflation rate (see Table 27).

Table 85 Societal costs based on injury types[122]

Injury type	**Societal costs thousand EUR (2017)**
Fatal	1,673
Severe	251
Slight	19

- **ECONOMY AND EMPLOYMENT**

The industry turnover has been used as a measure of economic impact and used to quantify employment changes within the industry.

Turnover and employment have been divided into three sectors:

- Manufacturer
- Wholesale
- Retail

Manufacturer

Data for manufacturer turnover has been acquired from EUROSTAT[123] for 2012-2016 (see Table 28). Data for number of employees are from ETRMA[124], which has been upscaled to EU-28 based on ETRMA's market share.

[121] Developing Harmonised European Approaches for Transport Costing and Project Assessment - http://heatco.ier.uni-stuttgart.de/HEATCO_D5.pdf

[122] Converted to 2017 price level - Developing Harmonised European Approaches for Transport Costing and Project Assessment - http://heatco.ier.uni-stuttgart.de/HEATCO_D5.pdf

Table 86 Turnover and employees - tyre manufacturers

Year	Turnover million EUR	Employees	Turnover/ employee EUR
2012	17,634	257,434	68,501
2013	16,800	258,440	65,007
2014	16,813	260,124	64,635
2015	16,801	272,018	61,764
2016	16,836	281,839	59,738
Avg.	**16,977**	**265,971**	**63,929**

The average turnover of 63,929 EUR/employee has been fixed throughout the whole modelling period and therefore assumed to be constant. Similar the mark-up factor relative to the retail turnover, calculated to an average of 2, is assumed constant through the whole modelling period.

Wholesale

It was not possible to acquire data for either turnover or employment for the tyre wholesale sector. Instead estimates on turnover are based on a suggested mark-up factor of 1.25 relative to manufacturer turnover. Number of employees is calculated based on a labour productivity of 59,241 EUR/employee[125], which is an average for all industries. It is unknown if the tyre wholesale industry deviate from this.

Retail

The yearly retail turnover has been estimated based on tyre prices and total sales numbers. The price of a tyre is determined by its combination of rolling resistance and wet grip category. The general trend is the higher the category the higher the price. Prices for C1, C2 and C3 tyres are seen in the following three tables. C1 and C2 prices are based on total sales numbers and total turnover for five major EU markets[126] giving an accurate estimate of the individual unit prices.[127] Some label class combinations have limited sales which were considered too small to give a representative estimate of the unit price. These have been adjusted based on linear interpolation and marked with a (*) in the tables below.

Similar data were not available for C3 tyres, which were therefore collected through an online web shop[128], giving a relatively low sample size. Results should therefore be considered with care.

123 Sold production, exports and imports (NACE Rev. 2) – Product codes 22111100, 22111355, 22111357
124http://www.etrma.org/uploads/20170912%20-%20Statistics%20booklet%202017%20-%20alternative%20rubber%20section%20FINAL%20web1.pdf and personal correspondence with ETRMA.
125 http://www.eurocommerce.eu/retail-and-wholesale-in-europe/facts-and-figures.aspx
126 Germany, France, UK, Spain, Italy
127 GfK data
128 http://www.daekonline.dk Based on 180 tyre models.

Table 87 Unit price matrix - 2017 EUR – GfK data – C1 tyres. *Identified as an outlier and adjusted

RRC – WG	A	B	C	E	F
A	121.8	92.2			
B	94.6	91.0	86.2		
C	101.4	89.9	86.4	78.1	66.3
E	124.5	96.6	76.0	73.7	73.7*
F	115.0	107.8	63.0	70.7	70.7*
G	80.7	103.3	80.0	61.8	

Table 88 Unit price matrix - 2017 EUR – GfK data – C2 tyres. *Identified as an outlier and adjusted

RRC - WG	A	B	C	E	F
A					
B	140.6	126.8	125.4*	124.6*	123.9
C	119.7	124.4	106.0	104.5	117.1
E	112.1	121.5	94.8	100.4	70.3
F	116.9	114.5	95.1	100.5	100.5*
G	77.1	77.4	81.4*	85.3	

Table 89 Unit price matrix - 2018 EUR – C3 tyres. *Identified as an outlier and adjusted[129]

RRC - WG	A	B	C	D	E
A	581,00*	555,25*	503,72		
B	520,50*	535,81	519,41		382,93
C	505,24	532,66	535,44	506,99	410,08
D	491,38*	477,60	529,07	360,48	368,68
E			546,86		

The division of each label class is too broad to track yearly developments. therefore the modelling is based on the exact rolling resistance coefficient (RRC) and wet grip index for each year. Consequently, unit prices must be subdivided as well, making it possible to identify a certain unit price based on a specific combination of RRC and wet grip index. The relation between label class and RRC/WG can be seen in the tables below. It is assumed the unit price of a specific label class corresponds to the middle of the interval (given in brackets below). To calculate a specific unit price in between label classes a linear interpolation has been applied.

Table 90 Relation between label class, rolling resistance and wet grip – C1 tyres

Label Class	RRC	WG
A	<6.6 (6.3)	>1.54 (1.6)
B	6.6 – 7.7 (7.2)	1.54 – 1.40 (1.47)
C	7.8 – 9.0 (8.4)	1.39 – 1.25 (1.32)
E	9.1 – 10.5 (9.8)	1.24 – 1.10 (1.17)
F	10.6 – 12.0 (11.3)	<1.10 (1.04)
G	>12 (12.4)	

129 http://www.daekonline.dk Based on 180 tyre models.

Table 91 Relation between label class, rolling resistance and wet grip – C2 tyres

Label Class	RRC	WG
A	<5.5 (5.3)	>1.39 (1.45)
B	5.6 – 6.7 (6.2)	1.39 – 1.25 (1.32)
C	6.8 – 8.0 (7.4)	1.24 – 1.1 (1.17)
E	8.1 – 9.2 (8.7)	1.09 – 0.95 (1.02)
F	9.3 – 10.5 (9.9)	<0.95 (0.89)
G	>10.5 (10.8)	

Table 92 Relation between label class, rolling resistance and wet grip – C3 tyres

Label Class	RRC	WG
A	<4.1 (3.8)	>1.24 (1.3)
B	4.1 – 5.0 (4.6)	1.24 – 1.1 (1.17)
C	5.1 – 6.0 (5.6)	1.09 – 0.95 (1.02)
D	6.1 – 7.0 (6.6)	0.94 – 0.8 (0.87)
E	7.1 – 8.0 (7.6)	<0.8 (0.72)
F	>8.0 (8.5)	

The average tyre unit price for a specific year is coupled with annual sales data acquired from ETRMA giving an estimate of the turnover in the retail sector. This is done for all three tyre types C1, C2 and C3. Subsequently, it is possible to calculate market turnovers for the manufacturer and wholesale sector based on estimated mark-up factors seen in the table below. Coupled with productivity data (turnover/employee) seen in the same table, the number of employees is calculated.

Table 93 Labour productivity and mark-up factors used in the modelling

Sector	**Turnover/employee EUR**	**Mark-up factors**
Retail	25.511	2
Wholesale	59.241	1,25
Manufacturer	63.929	1

Annex 6: Results

This annex provides further graphs and tables of the results from the model calculations made by Viegand Maagøe, for which the underlying data and assumptions are presented in Annex 4.

1. List of policy options, including modified policy option

Short name	Description
BAU	Baseline – Business as usual. How the market would develop without changing the current regulation
PO2	Policy Option 2. Non-legislative measures only
PO3	Policy Option 3. Legislative amendments
PO3B	As policy option 3, but without the effect of rescaling the label classes
PO3C	As policy option 3, but without the effect of third-party independent testing
PO3D	As policy option 3, but without the effect of online labelling
PO3E	As policy option 3, but without the effect of the Digital Registration database
PO3F	As policy option 3, but without the effect of mandatory labelling of OEM tyres
PO4	Policy Option 4: Option 2 + Option 3. Non-legislative and legislative amendments are all applied
PO4B	As policy option 4, but without the effect of rescaling the label classes
PO4C	As policy option 4, but without the effect of third-party independent testing
PO4D	As policy option 4, but without the effect of online labelling
PO4E	As policy option 4, but without the effect of the Digital Registration database
PO4F	As policy option 4, but without the effect of mandatory labelling of OEM tyres

2. End user expenditure

End user purchase prices for C1, C2 and C3 tyres (price per tyre) are shown in the three tables below.

Table 94: End user purchase prices in each scenario and sub-scenario for C1 tyres

PO short name	2017	2020	2025	2030
BAU	83	85	87	89
PO2	83	86	88	89
PO3	83	90	91	94
PO3B	83	89	90	91
PO3C	83	87	90	92
PO3D	83	89	91	94
PO3E	83	88	91	93
PO3F	83	89	91	94
PO4	83	90	91	92
PO4B	83	89	90	90
PO4C	83	88	90	91
PO4D	83	90	91	93
PO4E	83	90	92	93
PO4F	83	89	91	93

Table 95: End user purchase prices in each scenario and sub-scenario for C2 tyres

PO short name	2017	2020	2025	2030
BAU	97	97	100	103
PO2	97	100	103	106
PO3	97	107	107	105
PO3B	97	108	113	115
PO3C	97	102	103	100
PO3D	97	104	105	103
PO3E	97	103	103	99
PO3F	97	107	107	105
PO4	97	112	117	119
PO4B	97	110	114	115
PO4C	97	106	113	115
PO4D	97	110	117	118
PO4E	97	108	115	117
PO4F	97	110	117	119

Table 96: End user purchase prices in each scenario and sub-scenario for C3 tyres

PO short name	2017	2020	2025	2030
BAU	528	525	523	525
PO2	528	519	520	519
PO3	528	516	521	523
PO3B	528	514	518	518
PO3C	528	517	521	526
PO3D	528	519	521	527
PO3E	528	519	523	527
PO3F	528	516	519	525
PO4	528	515	514	517
PO4B	528	515	518	516
PO4C	528	514	514	512
PO4D	528	511	516	514
PO4E	528	514	515	514
PO4F	528	511	516	512

The three graphs below show the development in total end-user expenditure in terms of total cost of ownership (TCO) for C1, C2 and C3 tyres respectively.

Figure 26: End- user net expenditure (Total Cost of Ownership, TCO), for C1 end users

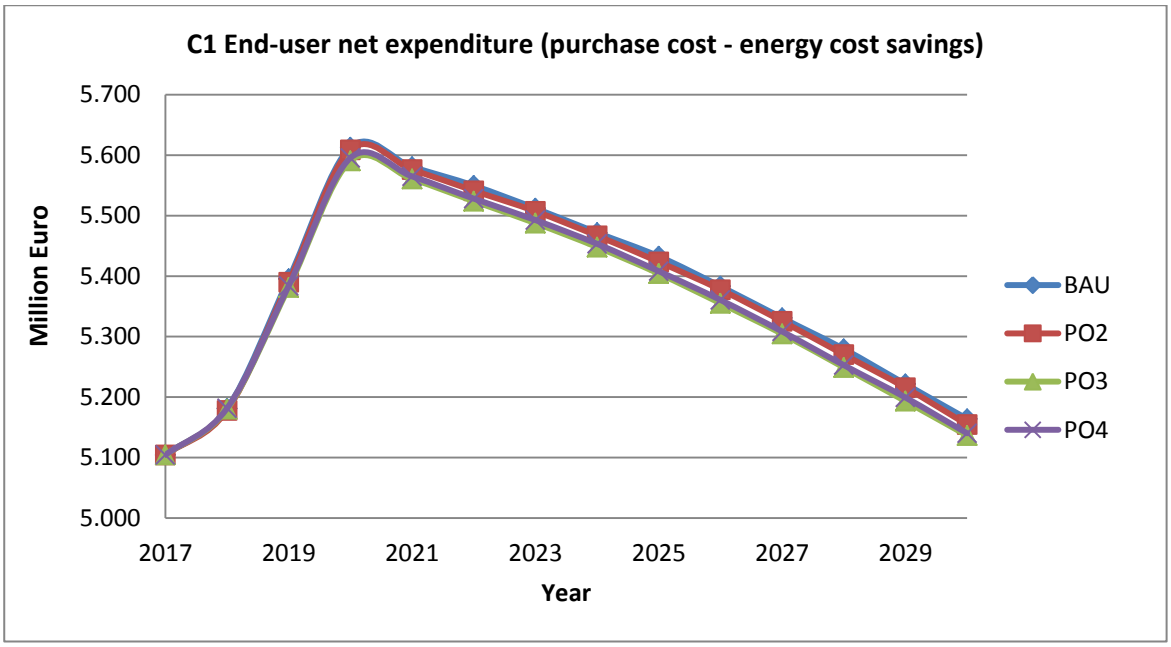


Figure 27: End- user net expenditure (Total Cost of Ownership, TCO), for C2 end users

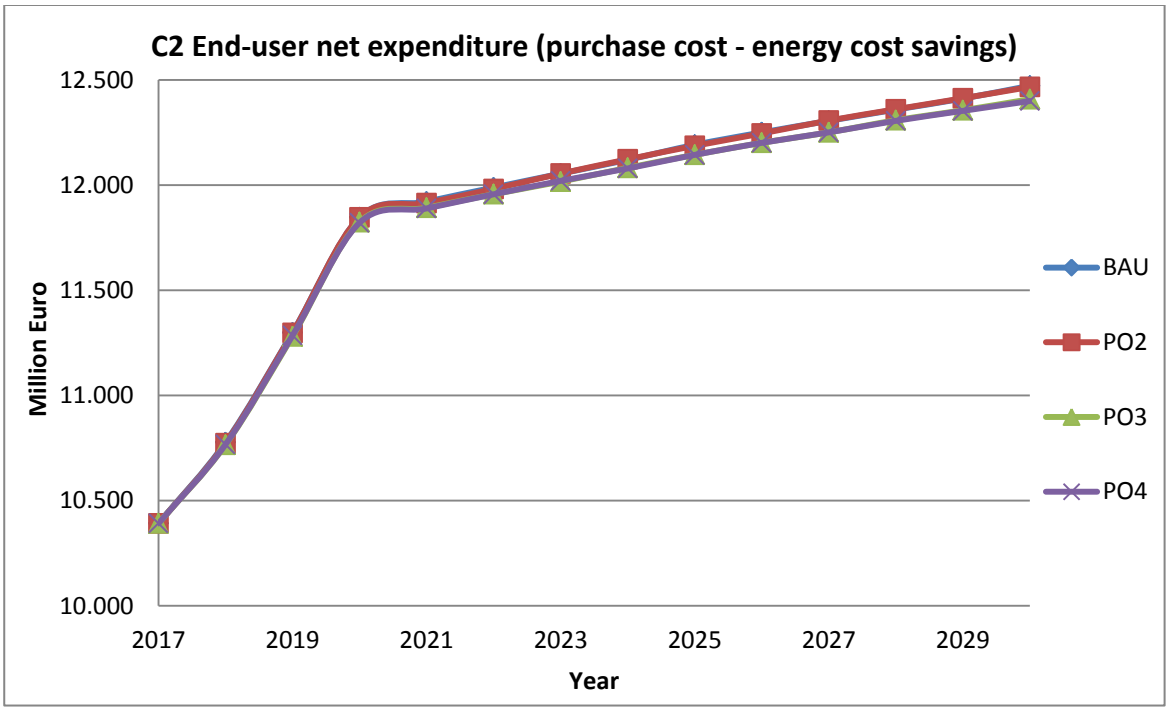
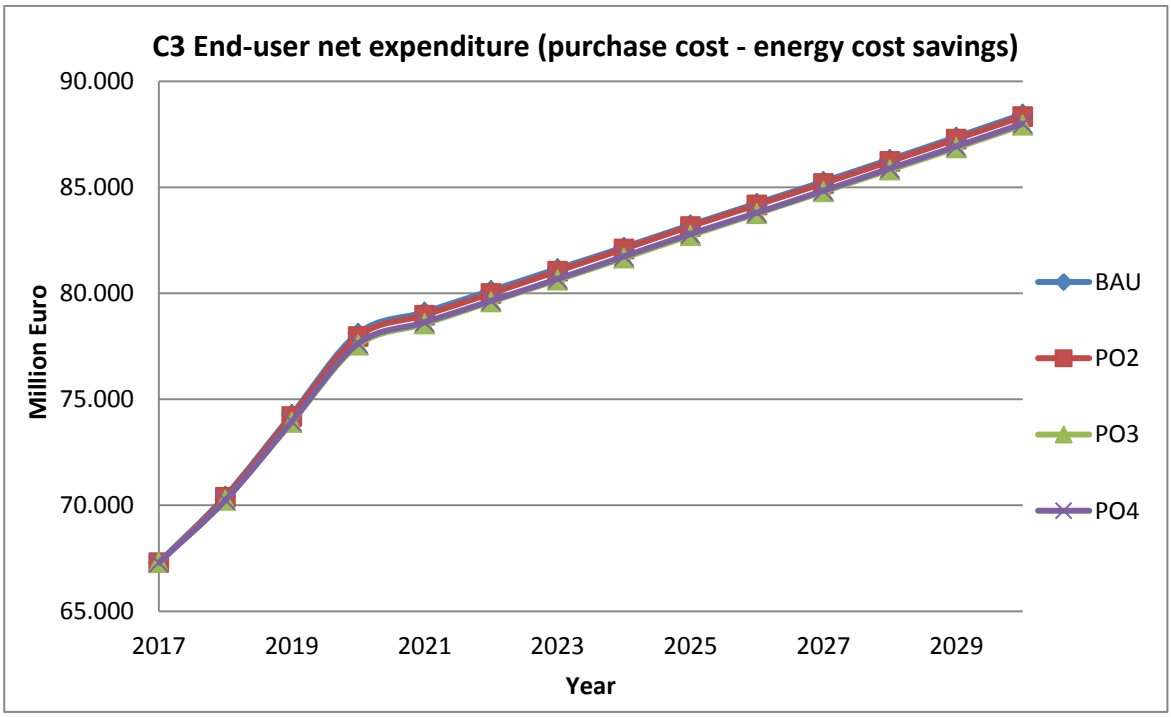
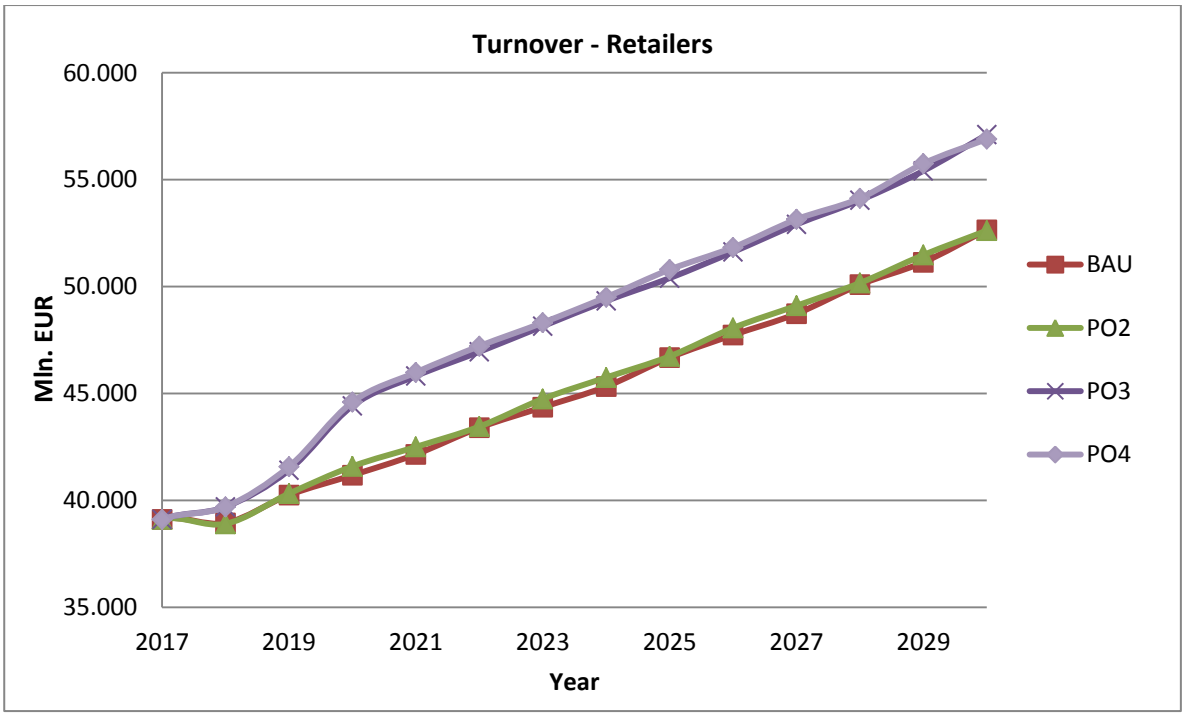
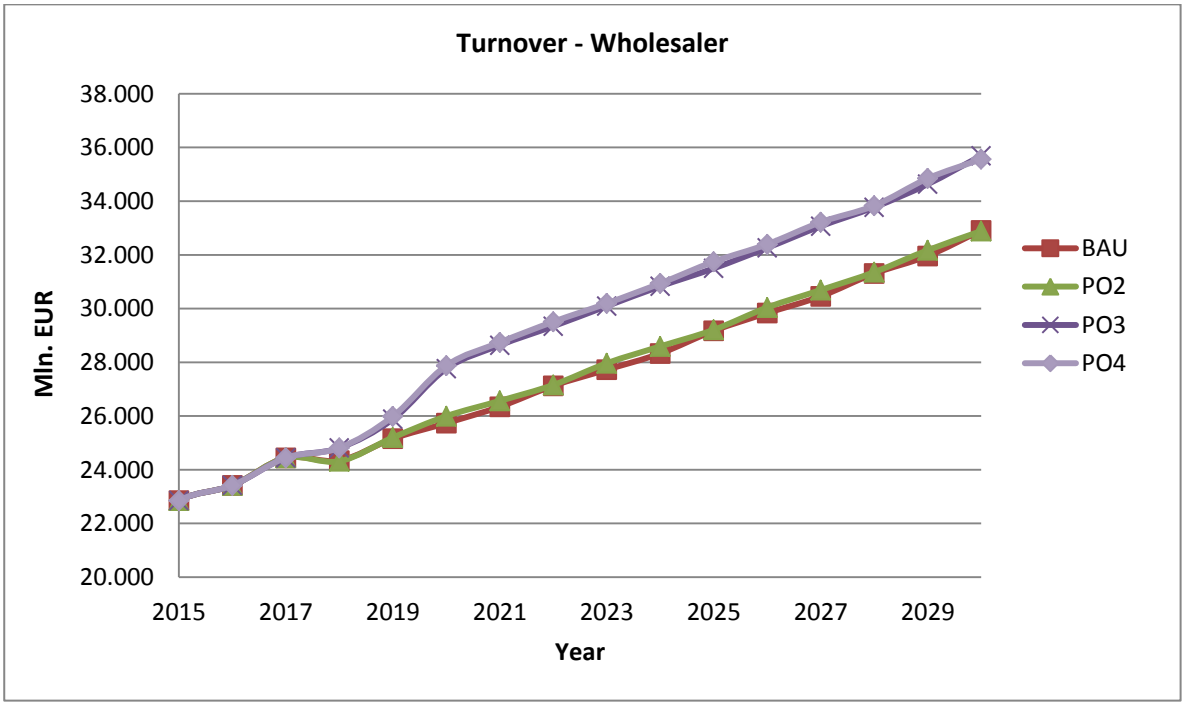


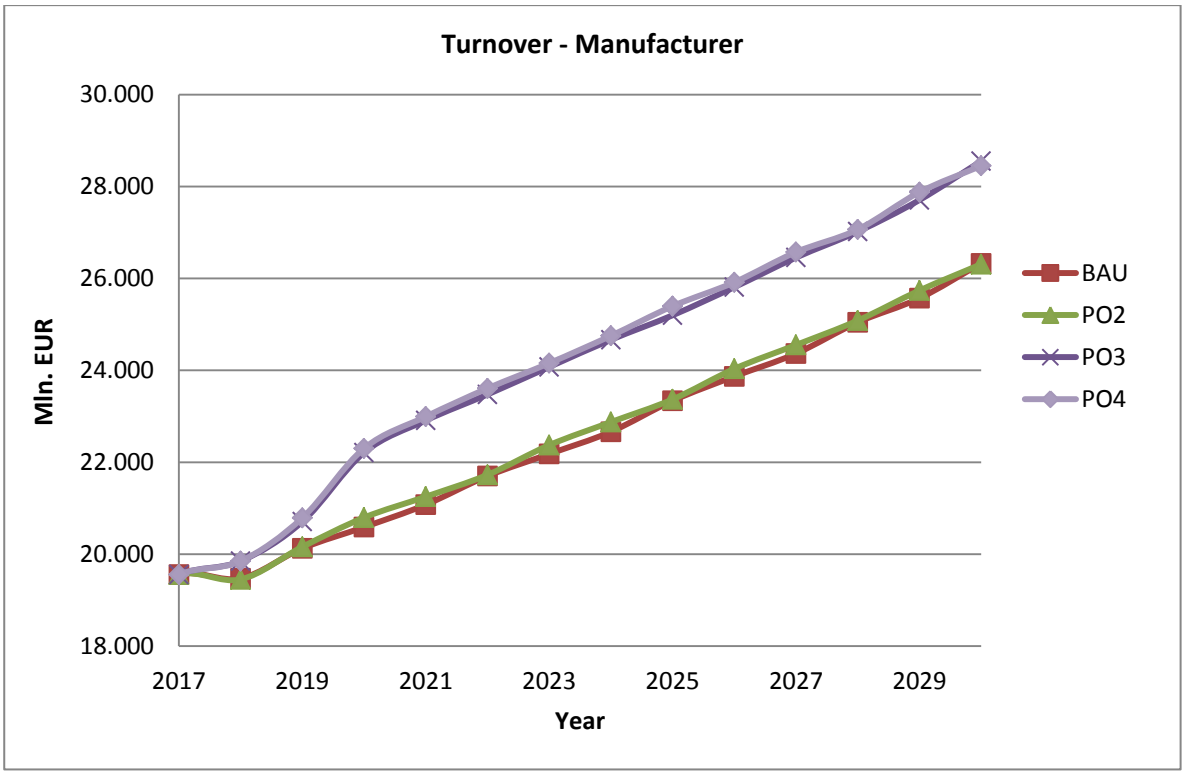
Figure 28: End-user net expenditure (Total Cost of Ownership, TCO), for C3 end users

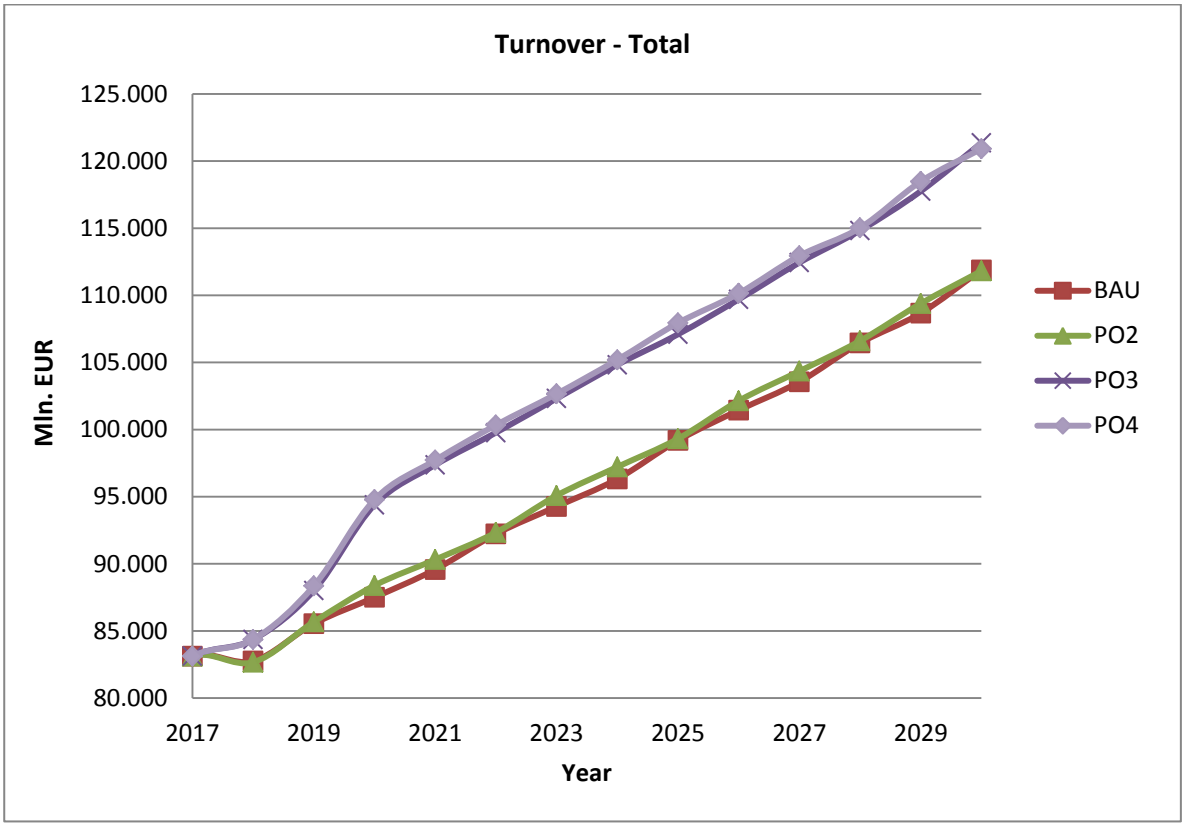


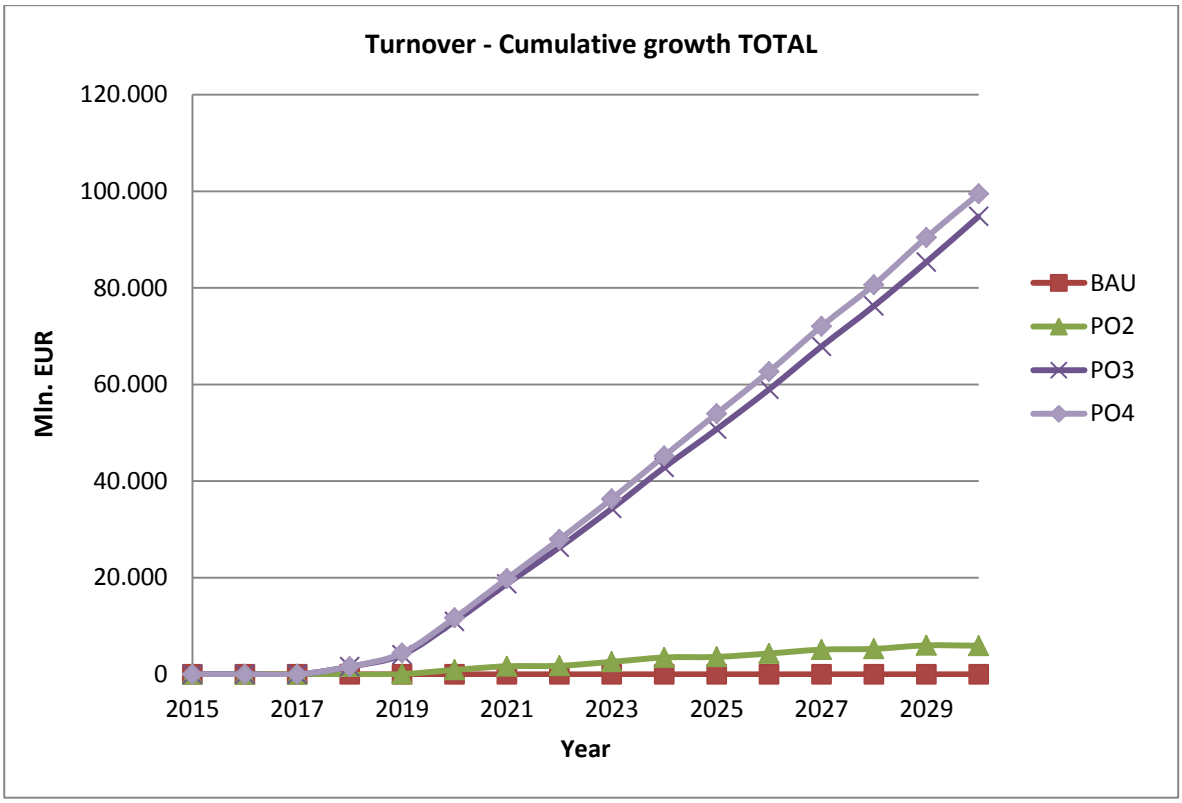
3. Economy: Business turnover

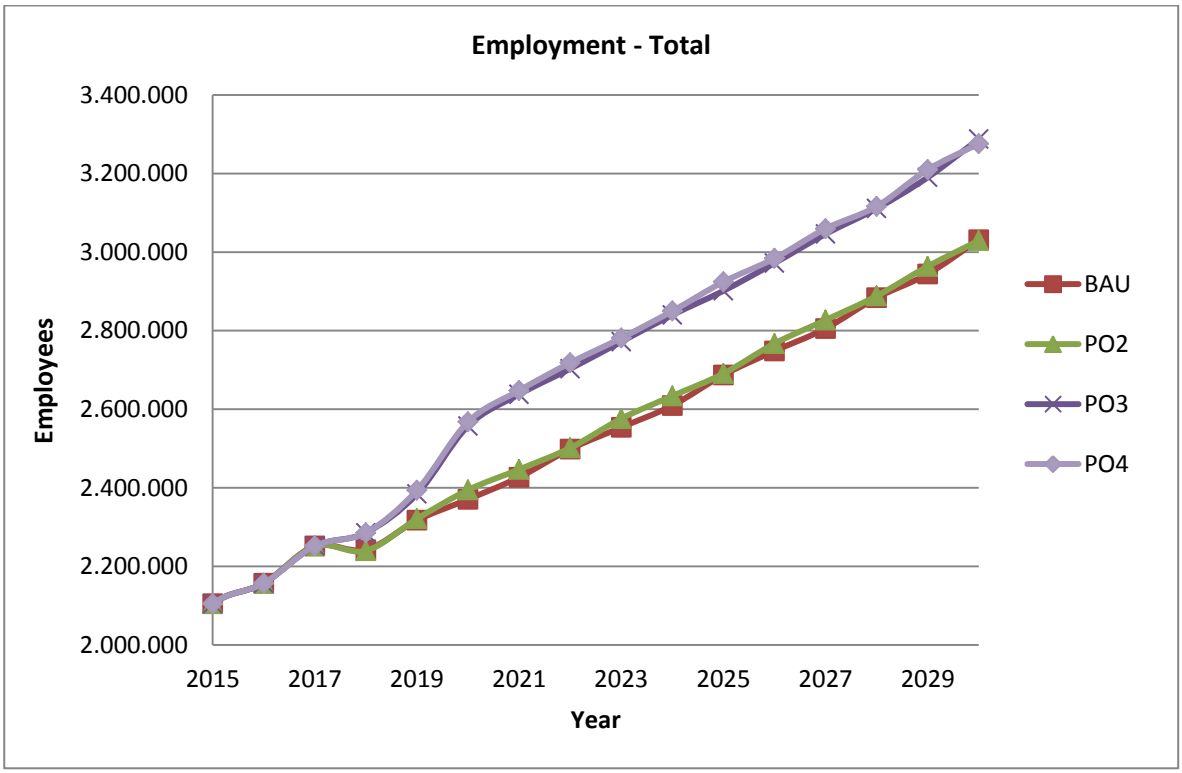




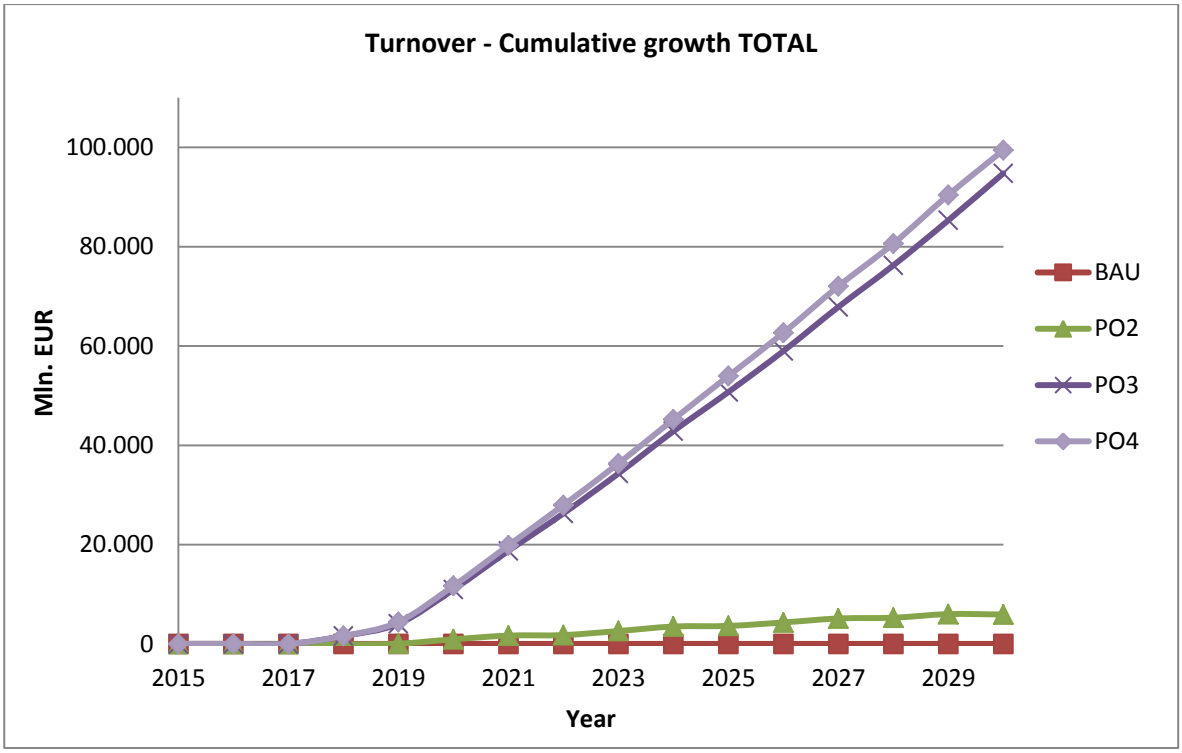

Turnover - Manufacturer
30.000
28.000
26.000
24.000
22.000
20.000
18.000
Mln. EUR
2017
2019
2021
2023
2025
2027
2029
Year
BAU
PO2
PO3
PO4

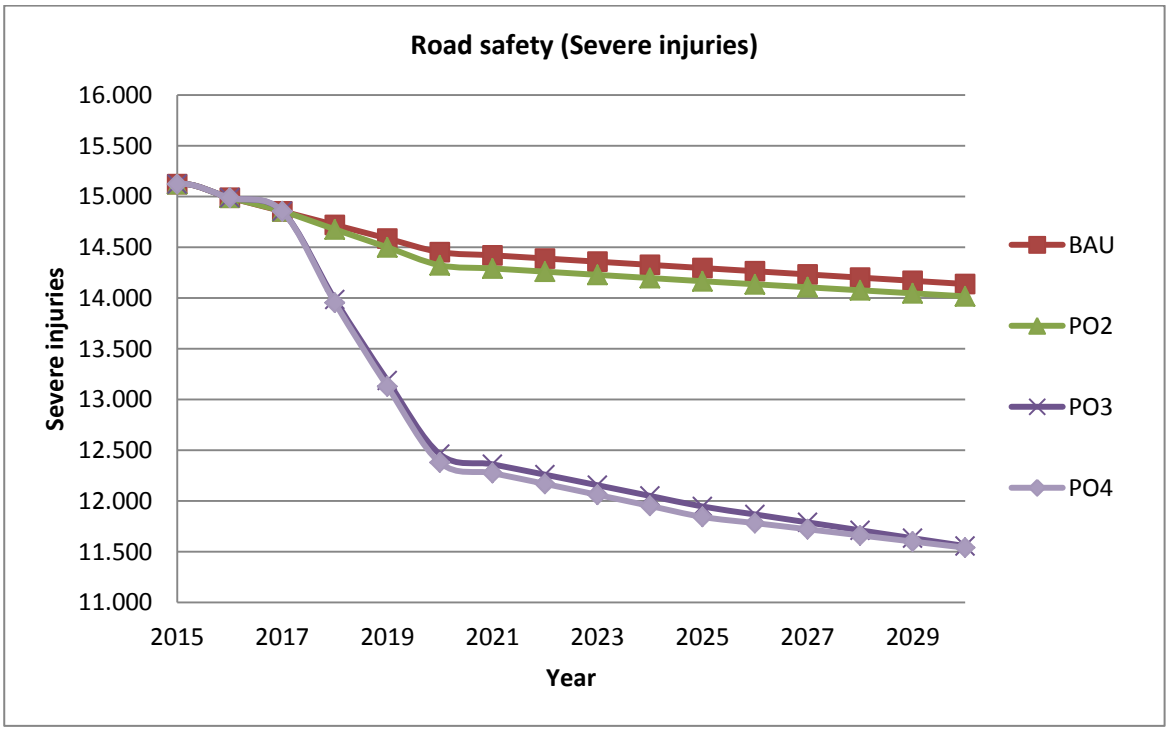

Turnover - Total
125.000
120.000
115.000
110.000
105.000
100.000
95.000
90.000
85.000
80.000
Mln. EUR
2017
2019
2021
2023
2025
2027
2029
Year
BAU
PO2
PO3
PO4

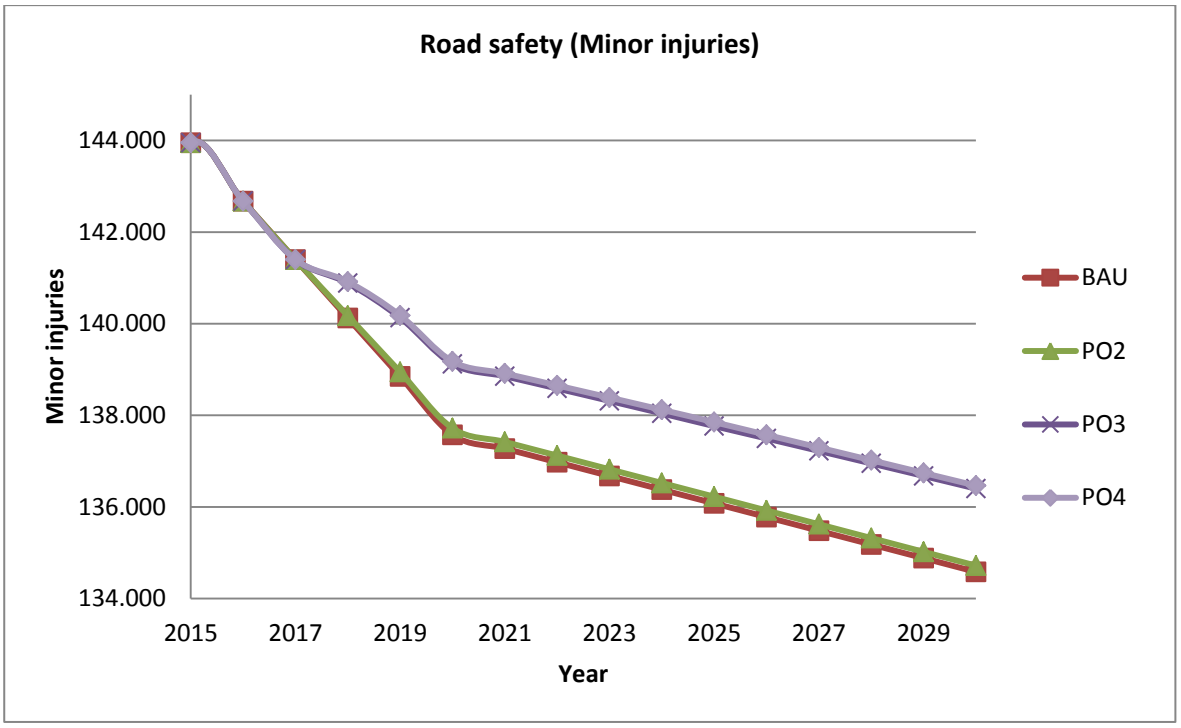

Turnover - Cumulative growth TOTAL
120.000
100.000
80.000
60.000
40.000
20.000
0
Mln. EUR
2015
2017
2019
2021
2023
2025
2027
2029
Year
BAU
PO2
PO3
PO4

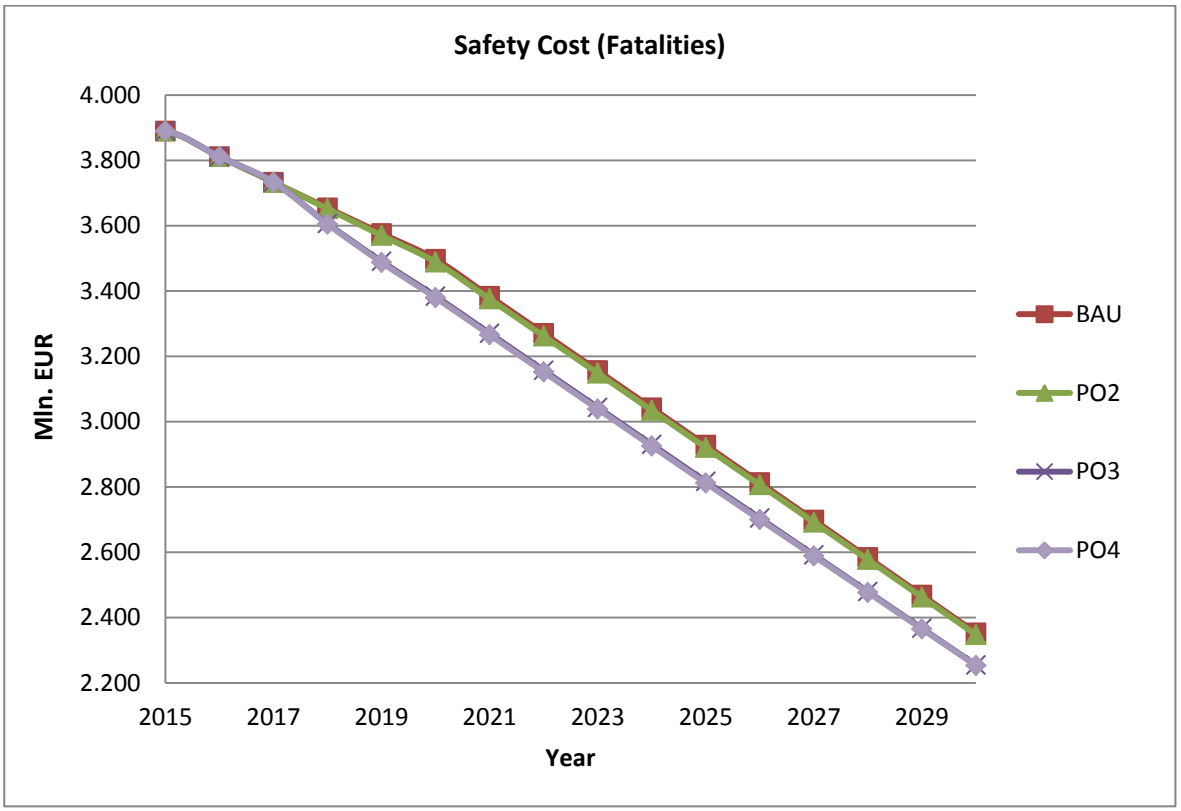

Employment - Total
3.400.000
3.200.000
3.000.000
2.800.000
2.600.000
2.400.000
2.200.000
2.000.000
Employees
2015
2017
2019
2021
2023
2025
2027
2029
Year
BAU
PO2
PO3
PO4

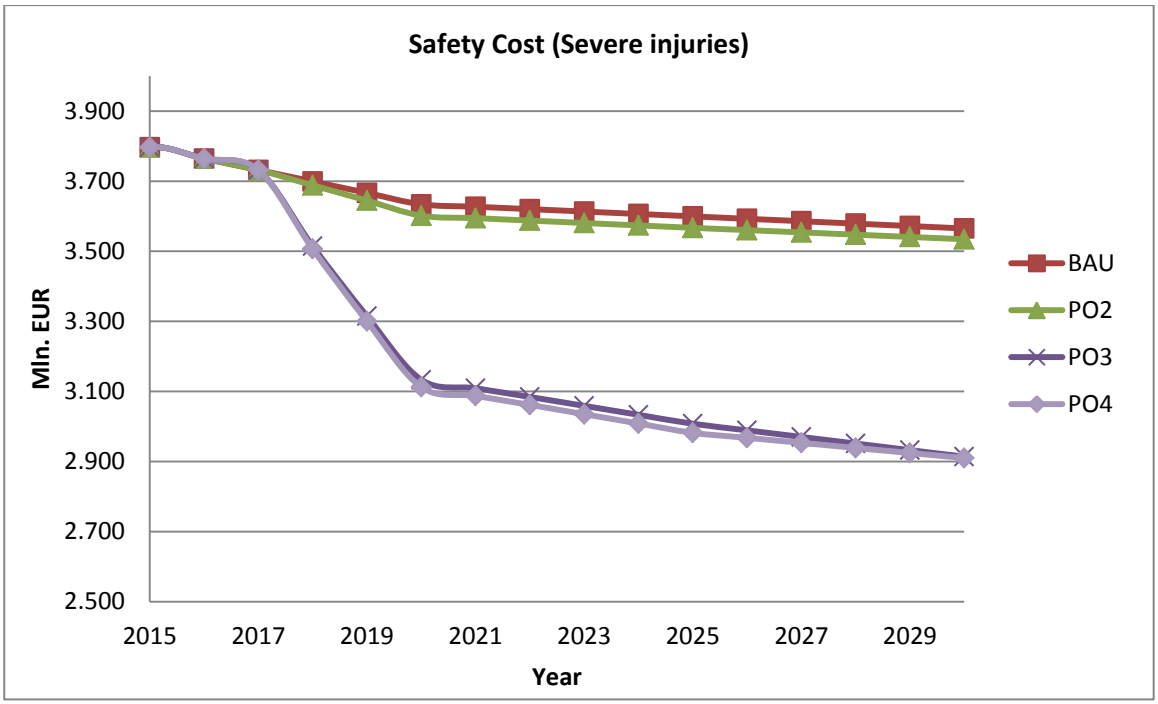
4. Safety and safety costs

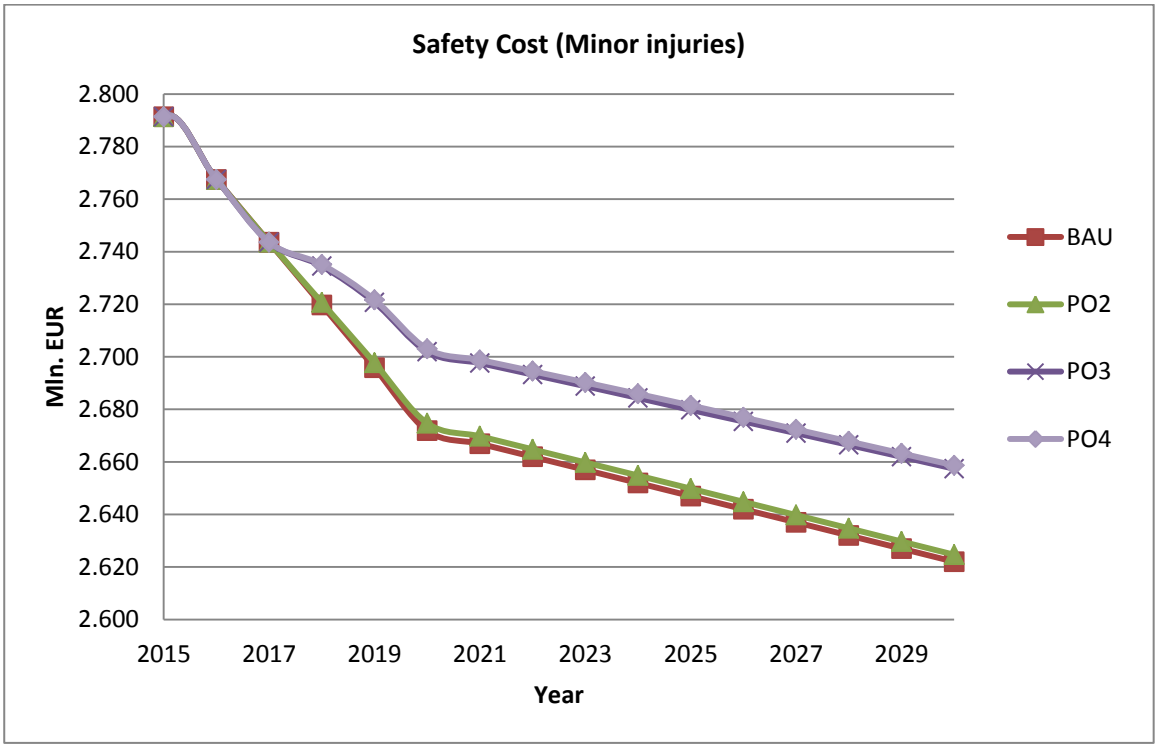


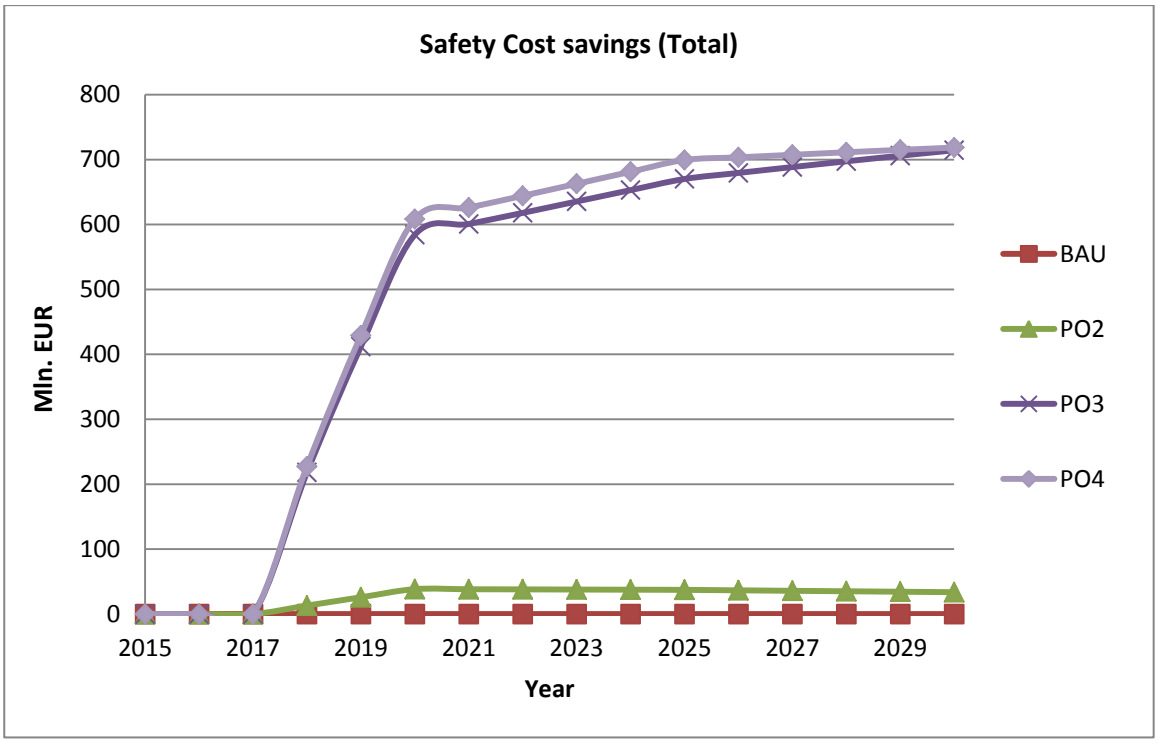



Road safety (Minor injuries)
144.000
142.000
140.000
138.000
136.000
134.000
Minor injuries
2015
2017
2019
2021
2023
2025
2027
2029
Year
BAU
PO2
PO3
PO4


Safety Cost (Fatalities)
4.000
3.800
3.600
3.400
3.200
3.000
2.800
2.600
2.400
2.200
Mln. EUR
2015
2017
2019
2021
2023
2025
2027
2029
Year
BAU
PO2
PO3
PO4

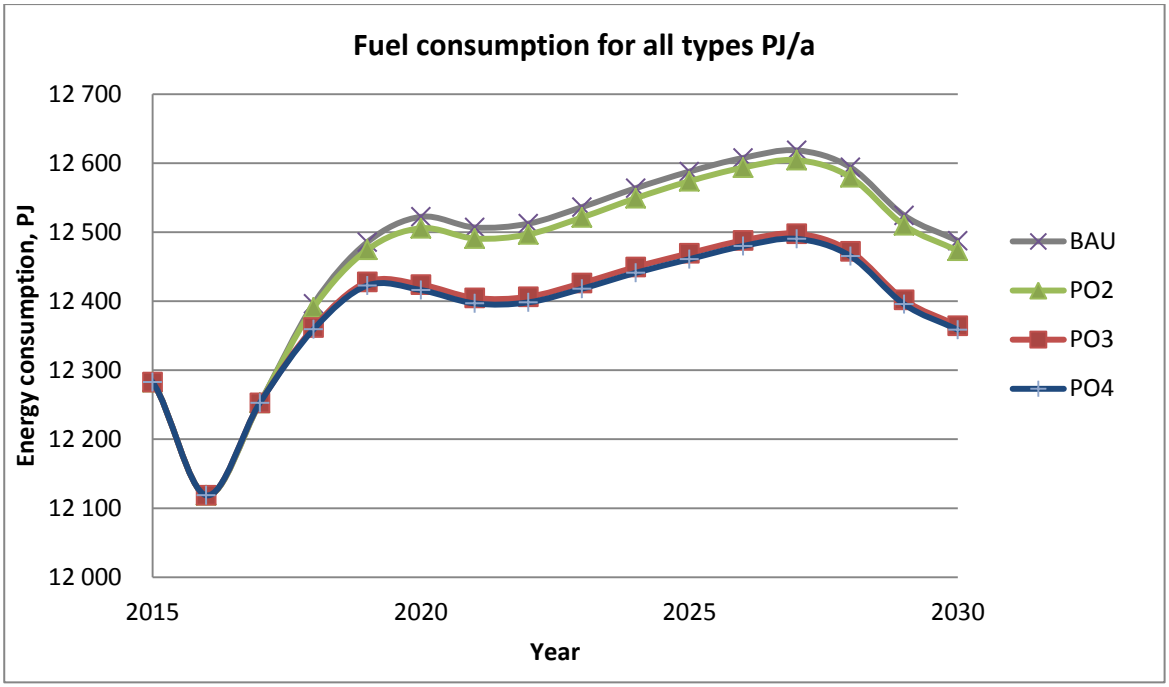

Safety Cost (Severe injuries)
3.900
3.700
3.500
3.300
3.100
2.900
2.700
2.500
Mln. EUR
2015
2017
2019
2021
2023
2025
2027
2029
Year
BAU
PO2
PO3
PO4

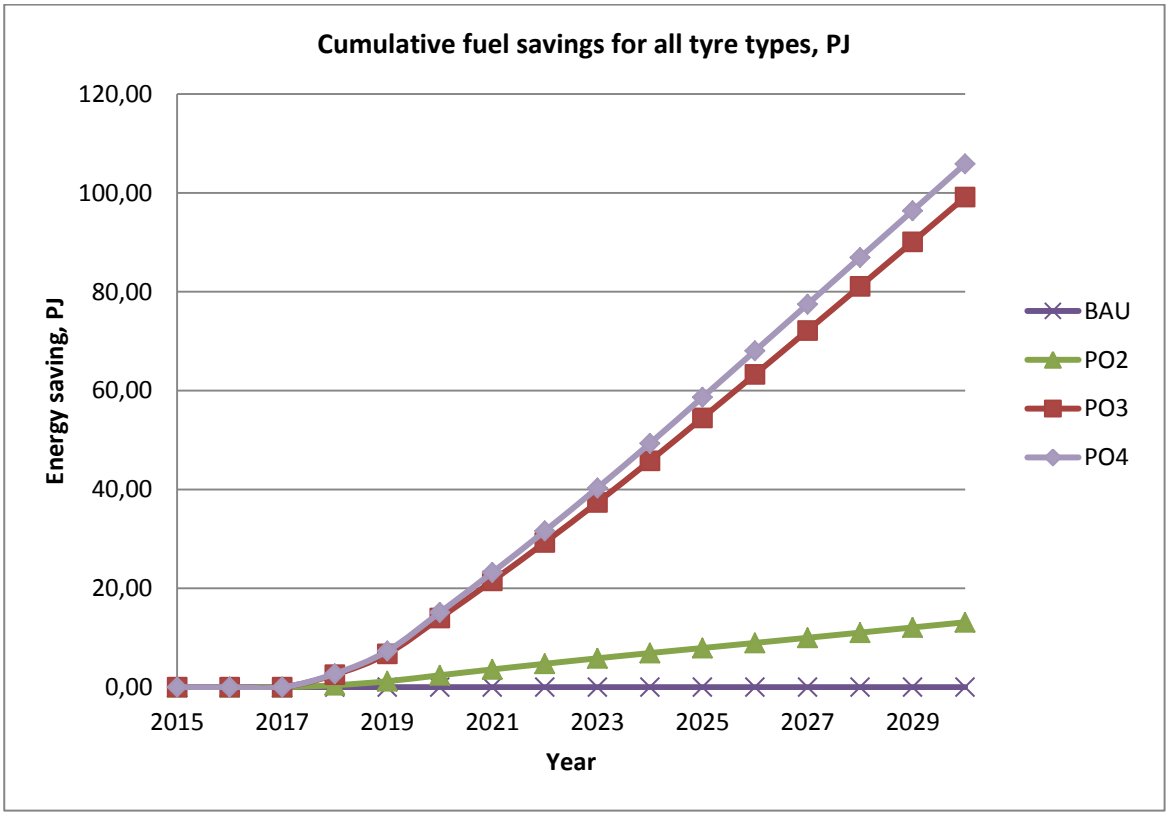

Safety Cost (Minor injuries)
2.800
2.780
2.760
2.740
2.720
2.700
2.680
2.660
2.640
2.620
2.600
Mln. EUR
2015
2017
2019
2021
2023
2025
2027
2029
Year
BAU
PO2
PO3
PO4

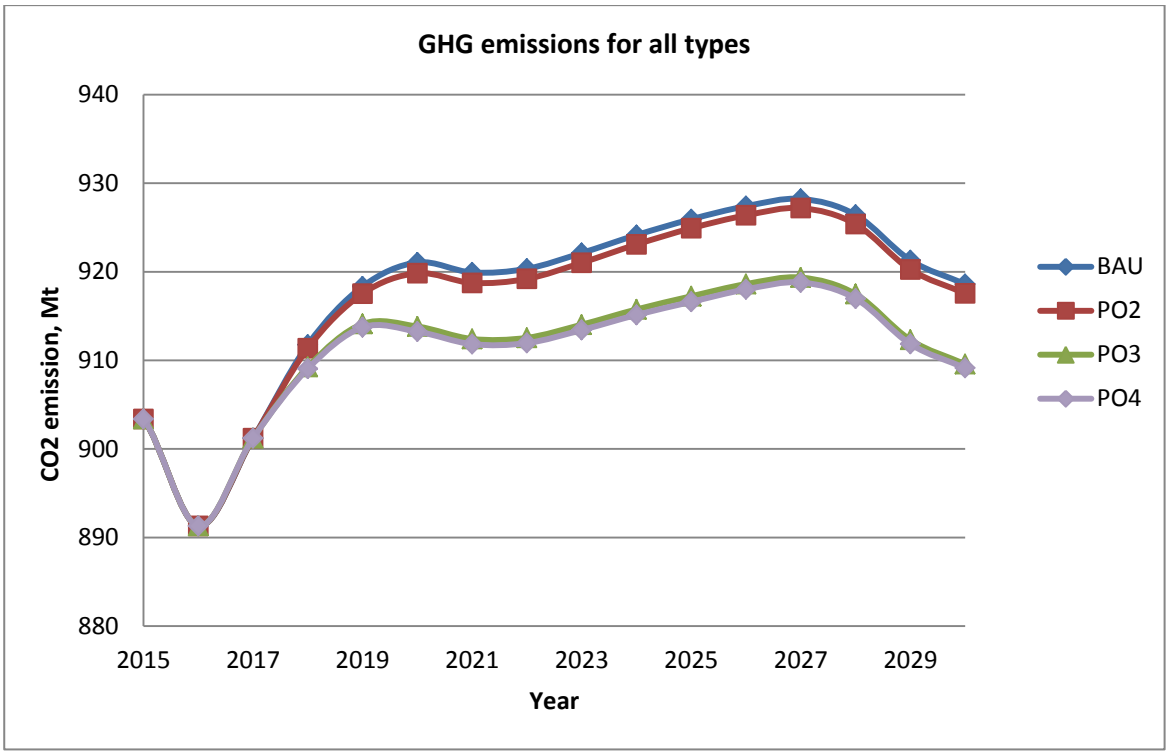

Safety Cost savings (Total)
800
700
600
500
400
300
200
100
0
Mln. EUR
2015
2017
2019
2021
2023
2025
2027
2029
Year
BAU
PO2
PO3
PO4

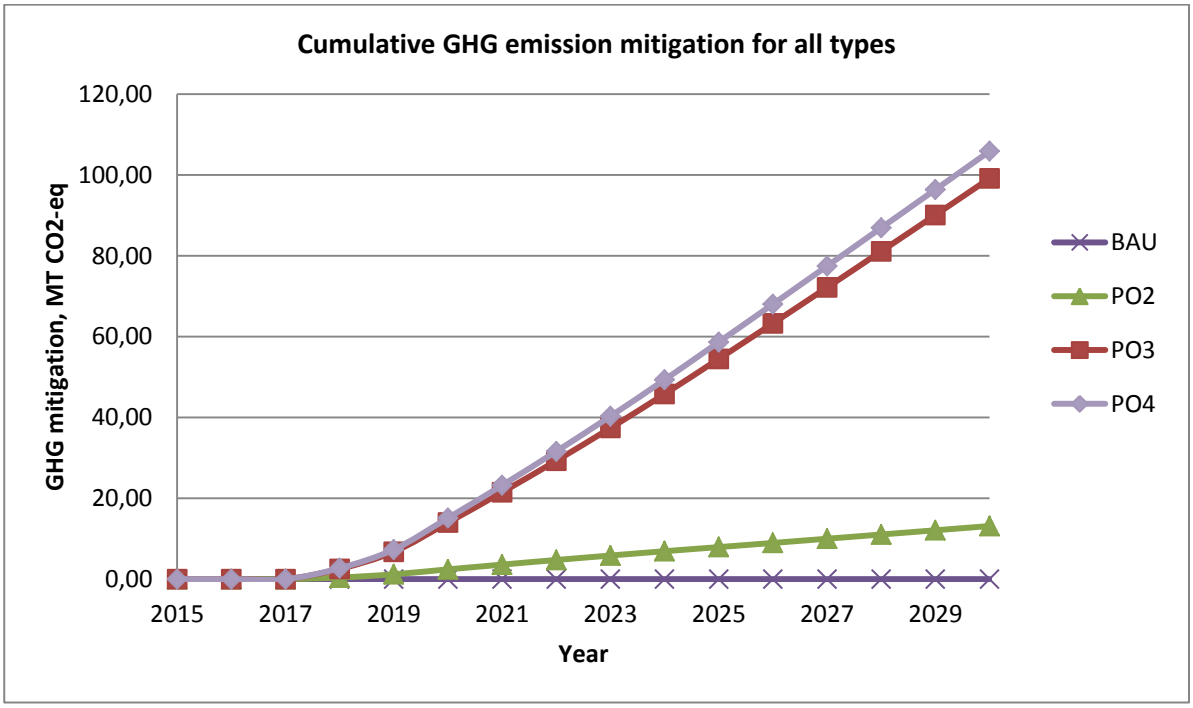

Safety Cost savings cumulative TOTAL
9.000
8.000
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0
Mln. EUR
2015
2017
2019
2021
2023
2025
2027
2029
Year
BAU
PO2
PO3
PO4

5. Energy and GHG emissions






GHG emissions for all types
940
930
920
910
900
890
880
CO2 emission, Mt
2015
2017
2019
2021
2023
2025
2027
2029
Year
BAU
PO2
PO3
PO4


Cumulative GHG emission mitigation for all types
120,00
100,00
80,00
60,00
40,00
20,00
0,00
GHG mitigation, MT CO2-eq
2015
2017
2019
2021
2023
2025
2027
2029
Year
BAU
PO2
PO3
PO4

Annex 7: Glossary

Term or acronym	*Meaning or definition*
RRC	Rolling Resistance Coefficient
WG	Wet Grip
BAU	Business as Usual
PO2	Policy Option 2
PO3	Policy Option 3
PO4	Policy Option 4
OPC	Open Public Consultation
SRTT	Standard Reference Test Tyre
MSA	Market Surveillance Authority
C1 Tyres	Passenger car tyres
C2 Tyres	Light commercial vehicle tyres
C3 Tyres	Medium and Heavy commercial vehicle tyres
LCV	Light Commercial Vehicle
HCV	Heavy Commercial Vehicle
TCO	Total Cost of Ownership
LCC	Life Cycle Cost
GHG emissions	Greenhouse Gas emissions
OEM tyres	Original Manufacturer Equipment tyres (supplied with new vehicles)
TLR	Tyre Labelling Regulation, Regulation (EC) 1222/2009
GSR	General Safety Regulation for motor vehicles, Regulation (EC) No 661/2009
Type Approval Process	The tyre testing process under the GSR
OPC	Open Public Consultation
MS	Member State
3-PMSF	3-Peak Mountain Snow Flake
ICSMS	The internet-supported information and communication system for the pan-European market surveillance
ADCO groups	Administrative Cooperation Groups
SMEs	Small and Medium Enterprises
DALY	Disability Adjusted Life Years
VOLY	Value of One Life Year

Retreading	Thee worn-out tread of the tyre is replaced with a new one, which can be repeated as long as the casing integrity is guaranteed, and which extends the life of used tyres
Studded tyres	Tyres with metal studs embedded within the tread in order to increase the traction of the tyre, in particular on ice.