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COMMISSION STAFF WORKING DOCUMENT

IMPACT ASSESSMENT

Accompanying the document

**Proposal for A Directive of the European Parliament and of the Council
amending Directive 2009/33/EC on the promotion of clean and energy-efficient road
transport vehicles**

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1. INTRODUCTION

This Impact Assessment uses abbreviations and technical terms. These are explained in the glossary in Annex 7 of this Impact Assessment.

1.1. Policy context

The 2017 State of the Union Address gives a clear message: the EU should become a world leader on decarbonisation. The promotion of sustainable transport is a key element of the common transport policy. The Commission's European Strategy for Low-Emission Mobility, published in July 2016,¹ confirms that by 2050 GHG-emissions from transport as well as pollutant emissions should be firmly on the path towards zero-emission by then.

The Commission's Communication "Europe on the Move: an agenda for a socially fair transition towards clean, competitive and connected mobility for all"² from May 2017 notes: increased production and uptake of clean vehicles, alternative fuels infrastructures and modern system services making use of data economy offers multiple benefits to citizens, Member States and industries.

With the Paris Agreement on Climate Change in force, the transition to a modern and low-carbon economy needs to accelerate. The June 2017 European Council recognised the Paris Agreement as a "key element for the modernisation of the European industry and economy". It translates into a global competition for market shares, technology, and brains that will develop the innovations of the future.

Around 95% of vehicles on Europe's roads still have an internal combustion engine. The European Strategy for Low-Emission Mobility makes clear that deployment of low- and zero-emission vehicles will need to increase substantially in order to meet long-term climate, energy and environmental objectives of the Union, in addition to using the most innovative conventional fuels. Such acceleration is highly relevant for maintaining long-term competitiveness of the transport sector, given dynamic global market developments. The strategy indicates the relevance of public procurement in supporting the transition to a modern and low-carbon economy. It notes that *"to support demand the Commission is working [...] on incentives in public procurement rules, in the context of the revision of the Clean Vehicles Directive."*³

This initiative forms part of the overall effort to create an Energy Union that tackles long-term energy and climate objectives and delivers on the Paris Climate Agreement, among other. It is part of a package of mobility initiatives adopted as part of the Mobility Package approach of the Commission in 2017. It is particularly complementary to the legislative proposal for setting new CO₂ emission performance regulations for cars and vans post 2020 – together, both policy initiatives create a coherent market push-and-pull approach.

1.2. Legal context

Currently, purchases of services, works and supplies by public authorities in the EU account for approximately 14% of GDP. To create a level playing field for all businesses and to increase transparency, EU law sets out minimum harmonised public procurement rules through Directives 2014/24/EU and 2014/25/EU. These horizontal public procurement rules organise the way public authorities and certain public utility operators purchase goods, works and services.

Directive 2009/33/EC on the promotion of clean, energy-efficient road vehicles (known as the Clean Vehicles Directive, in the rest of this Impact Assessment report abbreviated as: the Directive) complements this horizontal public procurement legislation. By making a mandatory requirement to

¹ COM (2016) 501 final

² COM (2017) 283 final

³ COM (2016) 501 final

account for operational life-time energy and environmental impacts in procurement of road vehicles, it seeks to promote and stimulate the market for clean, energy-efficient vehicles. The Directive introduced the principle of sustainability into the public procurement law of the Union. An increased uptake of clean, energy-efficient passenger cars, buses, coaches and trucks shall improve transport's contribution to reducing emissions of CO₂ and certain pollutant emissions (particulate matter (PM) (PM), nitrogen oxides (NO_x) and non-methane hydrocarbons (NMHC), to increasing energy efficiency and to promoting competitiveness of the industry.

The Directive is an important complement to other policy instruments that address European policy objectives on climate change, energy and environment in the vehicles sector. They include:

- Performance standards for CO₂ emissions of passenger cars (Regulation 2009/443/EC) and light commercial vehicles (Regulation 2011/510/EC), seeking to reduce the average CO₂ emissions from vehicle fleets of manufacturers;
- Common technical requirements for the type-approval of motor vehicles, engines and replacement parts with respects to emissions from heavy-duty vehicles (Regulation 595/2009/EC), setting requirements concerning emissions from motor vehicles, among other;
- Limits on tailpipe pollutant emissions (Regulation 2007/715/EC) and real-world emissions performance (Regulation 2017/1154) to contribute to reduction of pollution emissions of light-duty passenger and commercial vehicles;
- Fuel quality requirements (Directive 2009/30/EC) and targets on the share of renewable energy sources (Directive 2009/28/EC) to improve the sustainability of transport fuels;
- Minimum requirements for infrastructure deployment for alternative fuels (Directive 2014/94/EU) that require Member States to establish national policy frameworks for the establishment of a minimum of recharging and refuelling infrastructure;
- Consumer information on fuel economy and CO₂ emissions in respect of the marketing of new passenger cars (Directive 1999/94/EC) to increase transparency and improve awareness.

The Directive delivers additional value to these policy instruments: it provides a demand-side market stimulus. It is the only instrument that addresses the demand-side at a European level. The other instruments mainly focus on vehicles or fuel requirements or seek to inform consumers.

The CO₂-emission performance standards for cars and vans provide the main regulatory framework for car manufacturers to reduce CO₂ emissions from vehicle fleets. The Directive is supposed to function in a market push-and-pull approach with the CO₂ emission performance standards. Public procurement, particularly in the context of larger fleets, can provide relevant additional market demand; particularly in markets with very low market take up of low- and zero-emission and other alternative fuels vehicles. It can provide vehicles and infrastructure to start the market, increases their public visibility and improve their public readiness perception. The Directive particularly provides incentives for the clean vehicles development in the heavy-duty transport market: Currently, no regulatory requirement for CO₂ emissions from heavy-duty transport vehicles exist at European level.

The Directive requires contracting authorities, entities and certain operators for the discharge of public transport passenger services⁴ to take into account operational life-time energy and environmental impacts when purchasing road transport vehicles. Contracting authorities, entities and operators may also consider other environmental impacts in their procurement decisions. The Directive applies to purchases of vehicles above the thresholds for procurement volumes set by Directives 2014/24/EU and 2014/25/EU⁵; it does not cover all contracts by public bodies for road transport vehicles.

⁴ Operators within the meaning of Regulation (EC) No 1370/2007.

⁵ Thresholds for supply and service contracts of central government are €135.000, for other contracting authorities €209.000 and €418.000 for utilities. Other thresholds apply to works contracts and to social and other specific services.

Contracting authorities, entities and affected operators have different options for complying with the requirement to consider life-time energy and environmental impacts (Art. 5 of Directive 2009/33/EC). They can set technical specifications for energy and environmental performance in the documentation for the purchase of the road vehicles. Or they can include energy and environmental impacts in the actual purchasing decision, using these impacts as award criteria in cases where a procurement procedure is applied. In case where impacts are monetised, the Directive prescribes a methodology for the calculation of operational lifetime costs (Art. 6 of Directive 2009/33/EC). The Directive also provides the data to be used for energy content of motor fuels, cost of emissions and life time mileage of road transport vehicles (Annex to Directive 2009/33/EC). It does not specify a reporting obligation for contracting authorities, entities and affected operators.⁶

The Directive provides mandatory minimum requirements for public procurers in the field of road transport vehicles. In addition, the Commission has set up a voluntary initiative with the Green Public Procurement Criteria (GPP).⁷ In the field of transport, the GPP criteria stipulate a set of more demand criteria for clean vehicle procurement. They are meant to help those public authorities that wish to go beyond the minimum requirements of the Directive.

1.3. Evaluation of the implementation

A REFIT ex-post evaluation⁸ was carried out in 2015. It also investigated the possibility of repealing the Directive. The evaluation used a combination of desk analysis and consultation activities, including targeted interviews and a survey among contracting authorities, entities and operators.

The evaluation concluded that the Directive had a very limited impact on its main policy objective, namely no really impact on the market uptake of clean vehicles (low- or zero-emission vehicles and other alternatively fuelled vehicles). Many public procurement decisions continue to be driven by a focus on lowest price of purchase tendering, the evaluation found. A better alignment of public procurement criteria at European level has not been achieved, which was another objective of the Directive. Action under the Directive has also marginally contributed to the reduction of CO₂ and air pollutant emissions, another objective of the Directive (box 1).

Box 1: Key outcomes of the 2015 ex-post evaluation under REFIT

- Effectiveness

The evaluation estimated a low impact of up to 5.5% CO₂ emissions reduction for passenger cars procured and 2.3% for vans procured compared to the baseline.⁹ This estimate does not fully account for the impact of other policies. It concluded no real impact on NMHC, NO_x and PM emissions for passenger cars; and only a marginal impact (0.01%) for vans, trucks and buses.

- Efficiency

The evaluation pointed to a low overall benefit-to-cost ratio. Due to data gaps, cost and benefits estimates have a wide range. Benefits were estimated to range in between EUR 42.6 to EUR 521.1 million compared to total cost (purchase and operational cost) of around EUR 34.6 to EUR 341 million. The evaluation estimated rather low administrative cost of ~EUR 2.3 million per year. It suggested that this was mainly due to the limited use of the monetisation methodology and the limited impact of the Directive on changing actual procurement decisions.

- Value added

Given the limited market impacts, a similar outcome might have been achieved by market actors in the absence of the Clean Vehicles Directive, the evaluation concluded.

⁶ The Commission has to report on the implementation of the Directive. The first report was released in 2013 (COM (2013)214 final). In 2015, the Commission published the ex-post evaluation of the Directive.

⁷ See <http://ec.europa.eu/environment/gpp/pdf/criteria/transport.pdf>

⁸ Brannigan, C. et al (2015): Ex-post evaluation of Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles, Final report, study contract no. MOVE/A3/119-2013, European Commission, Brussels.

⁹ In the absence of emission data for buses and trucks, these were not assessed.

- *Coherence*

The evaluation noted that transposition options undermined coherence in implementation of the Directive. The monetisation methodology puts a greater emphasis on energy efficiency compared to environmental impacts, which benefits diesel passenger cars, and hence can undermine European air quality policy objectives.

- *Relevance*

The evaluation conservatively estimated that volume of contracts under the reach of the Clean Vehicles is up to EUR 13 billion p.a. Public procurement can provide a meaningful trigger for market development, particularly in the market segment of urban buses. It needs to be understood as a demand-side stimulus that complements and reinforces other policy levers, such as the CO2 emission performance standards for passenger cars and vans.¹⁰

The ex-post evaluation identified shortcomings in the overall scope of the Directive and a lack of clear provisions for vehicle purchase as key problem drivers. In addition, it noted the complexity of the monetisation methodology, which has limited its use by public bodies. Section 2 of this Impact Assessment builds on these initial findings.

The evaluation concluded that a repeal of the Directive was unlikely to have a significant negative impact on the overall market for passenger cars and vans because shares of publicly procured vehicles in overall market transactions are low. Contrary, a repeal of the Directive was likely to have a larger negative impact on the market segment of urban buses, where public demand is the main market driver. Moreover, repealing the Directive would send a wrong policy signal to public bodies and their contractors. The purpose of using public procurement to stimulate market uptake of clean vehicles and to contribute to reducing transport emissions was still relevant, the evaluation concluded.

The evaluation recommended to retain the Directive, but to revise it. It made a number of specific recommendations on how to improve clarity and ambition of the Directive. Table 1.1 lists these recommendations and notes how the Impact Assessment reflects them.

Table 1.1: Links between specific recommendations of the ex-post evaluation and the Impact Assessment

Specific policy recommendations (SPR) from the evaluation	Impact Assessment
<i>SPR1</i> : There needs to be more clarity as to what can be considered a clean vehicle	Section 2.2.2 recognises this problem; section 5.1.2 pre-screens measures for the design of a definition; section 5.3 and 5.4 present different conceptual approaches under policy options 3 and 4.
<i>SPR2</i> : Encourage higher levels of ambition with regards to clean vehicles purchased required by the Directive	Section 2.1 and 3.3 pick up on this problem and its implications. section 5.1.2-5.1.4 pre-screen different policy measures; which are reflected in policy options 2,3,4 and 5 in section 5.
<i>SPR3</i> : Facilitate the use of the monetisation methodology (if retained)	Section 2.2.3 recognises this problem. Section 5.1.3 screens possible measures to facilitate the use, including a mandatory use requirement, which is reflected in policy option 5 (section 5.3.5)
<i>SPR4</i> : Future consideration of well-to-wheels emissions should be assessed	Section 5.2.2 assesses the feasibility of this recommendation.
<i>SPR5</i> : Extend the scope of the Directive	The Impact Assessment explores the relevance of this problem in section 2.2.1; it screens different policy measures in section 5.1.1 All policy options (section 5) include variants of policy measures to extend the scope
<i>SPR6</i> : Resolve the challenges posed by the lack of, or inaccurate data	The evaluation referred to needs for improving provisions for vehicle emission and energy consumption data. This topic is outside the realm of the "Clean Vehicles" Directive.

¹⁰ Market volumes were calculated on the basis of information contained in the Tender Electronic Daily Database <http://ted.europa.eu/TED/main/HomePage.do>

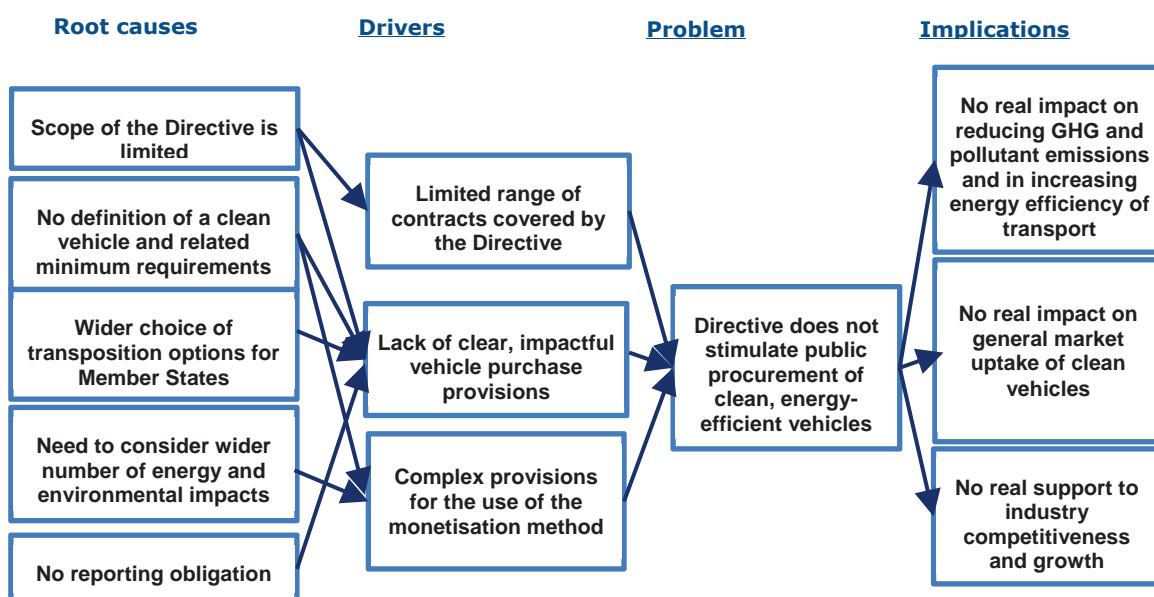
<i>SPR7</i> : Introduce a voluntary framework to facilitate Member State reporting	Section 2.1.1 and policy options 2,3, 4 and 5 tackle the issue of reporting (section 5).
<i>SPR8</i> : Explore potential for a Commission initiative on cross-border procurement	The Commission is facilitating action on joined up or joint public procurement, for example through a European Clean Bus Deployment Initiative. It is also encouraging its use through funding instruments like the Connecting Europe Facility. It was not considered part of this Impact Assessment, as it is not the objective of the Clean Vehicles Directive to facilitate financing of vehicles.

2. WHAT IS THE PROBLEM AND WHY IS IT A PROBLEM?

As noted, the transition to a modern and low-carbon economy has become an everyday reality since the Paris Climate agreement. The 2017 State of the Union address succinctly notes: the EU has to become a world leader in decarbonisation. With dynamically accelerating global markets for low-emission mobility and transport solution it is clear that the European mobility sector must remain among the best of the world. The transition to low- and zero-emission mobility needs to considerably accelerate in order to meet long-term climate and energy objectives of the Union.

As described in greater detail in section 2.1.2, the share of clean, low- and zero-emission and other alternative fuels vehicles in the Union is still considerably low. Competitiveness of the European transport sector in these sectors is challenged by global market developments. For example, China has overtaken the EU as a lead market for zero-emission bus technologies.¹¹ Public procurement can play a role as a market lever. However, at current, public bodies are not using public procurement in an effective manner in order to help accelerate the market uptake of low- and zero-emission or other alternatively fuelled vehicles. The volume of those vehicles that are publicly procured remains small in the whole of the Union. In recital 15, the Directive notes that "procurement of vehicles for public transport services can make a significant impact on the market, if harmonised criteria are applied at Community level". This has not been achieved yet. Annex 8 to this Impact Assessment notes several national policy initiatives to strengthen the use of public procurement for market uptake of clean vehicles, going beyond the requirements of the Directive.

Figure 2.1: Problem tree



¹¹ International Energy Agency (2016): Global EV outlook 2016, Paris, IEA.

2.1. What is the nature and size of the problem? What are its implications?

2.1.1. *The Directive does not stimulate the public procurement of clean vehicles*

Public bodies have purchased rather small volumes of low- and zero-emission and other alternatively fuelled vehicles under the scope of the "Clean Vehicles" Directive.¹² For the time period of 2009-2015, an approximate average of 4.7% (or ~2,7k vehicles) of all new public passenger vehicles purchases, of 0.4% (or 0,02k vehicles) of all new vans purchases, of 0.07% (or 0,006k vehicles) of all rigid trucks purchases and of 1.7% percent (or 0,13k vehicles) of all new buses represented battery-electric, fuel-cell electric, plug-in hybrid or natural gas vehicles (see table 2.1).

Results from the 2015 ex-post evaluation further corroborate these findings. In a survey among 156 contracting authorities, 87% of the respondents noted to have procured conventionally fuelled vehicles through contracts falling under the "Clean Vehicles" Directive. Only 4% noted to have bought battery-electric, hybrid or natural gas vehicles.

Table 2.1: Vehicles purchased by public bodies under the scope of the "Clean Vehicles" Directive

Vehicle type	Powertrain/fuel	Average purchases by public bodies (2009-2015)	
		Absolute	%
Passenger cars	Petrol/Diesel	56.7k	95.3
	Alternative fuels (battery-electric, fuel-cell electric, PHEV, LPG, CNG, E85)	2.7k	4.7
Vans	Petrol/Diesel	7.4k	99.6
	Clean (low- and zero-emission) (battery-electric, fuel-cell electric, PHEV, LPG, CNG, E85)	29	0.4
Rigid trucks	Diesel/Diesel Hybrid	9k	99.9
	Clean (low- and zero-emission) (battery-electric, fuel-cell electric, LPG, CNG)	6	0.07
Buses	Diesel/Diesel Hybrid	7.8k	98.3
	Clean (low- and zero-emission) (battery-electric, fuel-cell electric, PHEV, LPG, CNG)	133	1.7

Source: Ricardo (2017) Support Study for the Impact Assessment of the revision of the Clean Vehicles Directive.

This is a conservative estimate. The Impact Assessment support study has estimated the number of publicly procured vehicles based on information from the European Tender Electronic Database (TED).¹³ The level of publication of public tenders at EU level is still low.¹⁴ It is possible that both the number of contracts and the market shares of clean vehicles are underestimated. In the absence of a reporting obligation under the Directive, new registrations or vehicle stock for public sector vehicles are not commonly registered across the EU. In addition, there is little data available on the types of vehicles procured, or their lifetime use. Further information has been gathered from Member States. The Impact Assessment Support Study provides further detail on the approach.

¹² In the absence of a clear definition of clean vehicles, the analysis included all vehicles defined by Art. 2 of Directive 2014/94/EU on alternative fuels infrastructure. These alternatively fuelled vehicles are expected to have low- or zero-emissions at the tailpipe. See Impact Assessment Support Study for further details on the approach.

¹³ All procurements that fall under the procurement procedures set out in Directives 2014/24/EU and 2014/25/EU are required to be published in TED. These criteria are applied for vehicle procurement contracts under the Directive.

¹⁴ European Commission (2016) European Semester Thematic Factsheet: Public Procurement, https://ec.europa.eu/info/sites/info/files/european-semester_thematic-factsheet_public-procurement_en.pdf

2.1.2. *Implication: Limited impact on general market uptake*

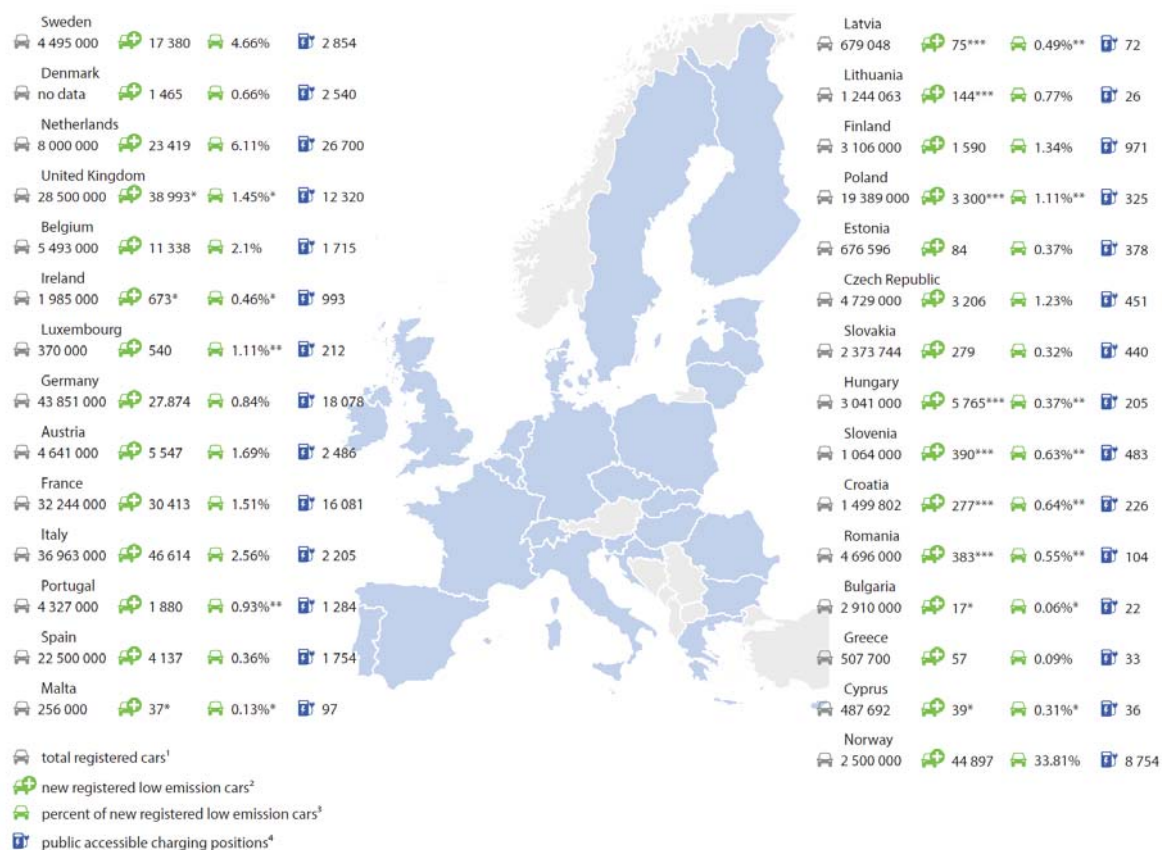
In many instances, public procurement has not effectively helped the general market uptake of those vehicles. As figure 2.2 shows, market shares of these vehicles, and particularly the market shares of zero-emission vehicles (battery-electric, fuel cell electric), are still low. For example, the EU market share of battery-electric and plug-in hybrid electric passenger vehicles in new registrations was 1.15% in April 2017.¹⁵ Deployment of these vehicles is also unevenly spread across Member States. In some Member States, a real market hardly exists (see fig. 2.2).

A detailed example concerns the impact on the urban bus market segment. Here, Member States show an uneven record. Data from case studies carried out for this Impact Assessment show a higher share of alternatively fuelled buses in the total bus fleet of the Czech Republic (13.3% CNG buses, and 19.7% electric trolley buses), but a rather low share in the bus fleet of Germany (2.4% of the total bus fleet). In Sweden, approximately 5.6% of new bus registrations concerned CNG or battery-electric buses. A public transport survey among operators in 2013 found a market share of 1.2% for battery electric buses and of 7% for CNG-buses.¹⁶

Figure 2.2: Number of newly registered alternatively fuelled vehicles and public/semi-public charging points in European Member States, 2017

¹⁵ European Alternative Fuels Observatory, April 2017, www.eafo.eu

¹⁶ 3IBS survey, as reported in the ZEEUS Ebus report, a.a.o.



Source: European Alternative Fuels Observatory (access 15 July 2017), www.eafo.eu

Figure 2.2 shows that registration numbers of alternatively-fuelled vehicles are generally low; and very low in quite a few Member States. The finding is corroborated when looking into the data on new car registrations by fuel type over the past years. Table 2.2 presents data for EU-15. The EU-15 include all advanced clean vehicle markets in the EU. In the wake of the discussion about real-world car emissions and policy intentions to restrict access of diesel cars in a number of cities, consumers are buying more petrol cars. Even in this sample of Member States with more advanced markets, the share of alternative fuelled cars has been stagnating over the past years: a slight rise in plug-in hybrids and battery-electric vehicles has been met by a decrease of other alternative fuels (natural gas) vehicles.

Public procurement is hence still relevant as a demand-side stimulus, particularly in Member States with low overall market shares of clean, low- and zero-emission and other alternative fuels vehicles. Even when the number of publicly purchased clean vehicles is small in total, it can help sustain a market that is obviously still in its beginning in all Member States.

Table 2.2: Registration of new cars in the EU15 according to fuel type

	Diesel	Petrol	Alternative Fuels			Total alternative fuels
			Hybrid-electric	Electric chargeable	Other alternative fuels	
2014	53.6%	42.3%	1.5%	0.6%	2.0%	4.2%

2015	52.1%	43.5%	1.7%	1.2%	1.6%	4.5%
2016	49.9%	45.8%	1.9%	1.1%	1.2%	4.2%

EU 15: AT, BE, DE, DK, ES, FI, FR, GR, IE, IT, LU, NL, PT, SE, UK.

Source: ACEA (2017) *alternative fuels vehicle registration in the EU*, www.acea.eu

Achievement of the average CO₂-emission performance targets for fleets of passenger cars and vans in the EU would be helped by additional public demand for low- and zero-emission or other alternative fuels vehicles. The uncertainty about vehicle demand is visible in Member States planning for alternative fuels infrastructure: the analysis of the national policy frameworks under Directive 2014/94/EU shows strong variances in levels of ambition and clarity.¹⁷ Additional public demand for clean vehicles will contribute to security of investment into recharging and refuelling infrastructure.

In many cases, public bodies still decide on the basis of the upfront purchase price.¹⁸ Purchase prices of clean vehicles are still considerably higher compared to conventionally fuelled vehicles. For example, the average purchase price of a battery-electric bus is roughly double the price of a conventionally fuelled diesel bus. A business model based on total cost of ownership can reduce the cost gap, as successful examples of larger bus fleet deployment show (box 3). Public procurement provides a framework in which to validate new operating and business models.

Box 3: Examples of public procurement of clean (low- and zero-emission and other alternative fuels) buses

The majority of procurements of battery-electric buses still include contracts for fewer vehicles, mostly in view of equipping a particular bus line.¹⁹ In a few cases, public authorities have started procure a larger number of battery-electric or fuel-cell electric buses. For example, Eindhoven and the Region of Helmond have started in 11 December 2016 a new fleet of 43 articulated electric buses (18 meter), covering 9000 km every weekday. It surpassed 1 million electric kilometres in April 2017. The city of London is operating a fleet of 73 standard electric buses (12 meter). Through joining up procurement efforts with the help of the European Fuel Cells and Hydrogen Joint Undertaking, 142 fuel-cell electric buses will be deployed across 9 locations, supporting their further commercialisation. Several cities and regions, including London, Ile-de-France Region, Berlin, Copenhagen, or Hamburg have announced to stop purchasing conventionally fuelled buses in the near-term.

2.1.3. Implication: no real impact on reducing GHG and air pollutant emissions from transport and increasing energy efficiency

The transport sector was responsible for 24% of EU greenhouse gas emissions in 2015; road transport accounted for 73% of the transport emissions.²⁰ Emissions from road transport in 2015 were still 19% higher than in 1990, despite the decrease observed between 2007 and 2013.²¹ The ex-post evaluation analysed the contribution from publicly procured vehicles under the Clean Vehicles Directive to emission reduction and energy efficiency increase in transport. It found them to be largely limited:

- *Impact on CO₂-emissions:* A maximum 5.5% improvement in tank-to-wheel emissions for publicly procured passenger cars and 2.3% for vans compared to the baseline was estimated.²² No change in performance compared to the baseline was detected for heavy-duty vehicles.

¹⁷ [Add Communication on Alternative Fuels Infrastructure Action Plan once adopted]

¹⁸ The contracting authorities' survey showed: 75% of responding public authorities using environmental impacts as award criteria noted that they put the majority weight on price. Moreover, a large majority of those using technical specifications noted that they looked at price and compliance with existing Euro norms.

¹⁹ ZEEUS Ebus report, a.a.o.

²⁰ This share does not cover emissions from international shipping (not part of the 2020 and 2030 climate & energy targets).

²¹ European Environment Agency (2017): GHG data viewer available at <http://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer>

²² For passenger cars/vans, the analysis is based on a cross-sectional comparison of the CO₂ performance of vehicles purchased by public authorities under the Directive, and the typical CO₂ performance of similarly-sized vehicles purchased in the wider market at the same time.

- *Impact on air pollutants:* No effects on NMHC, NO_x and PM emissions for passenger cars and only a marginal impact (0.01%) for vans, trucks and buses were estimated.²³ The transport sector is the biggest contributor to NO_x emissions (46% of overall EU emissions in 2014).
- *Impact on energy efficiency:* The "Clean Vehicles" Directive had affected up to 1.8 percent of the overall fuel-efficient vehicles sales in the EU. Depending on the type of vehicle, trade-offs between energy-efficiency increase and air pollution impacts have to be considered.²⁴

2.1.4. *Implication: No real support to EU industry competitiveness and growth*

The ex-post evaluation indicated that the volume of procurements targeted by the Directive amounted up to EUR 13.7 billion annually.²⁵ Compared to other policy levers, public procurement exercises a limited impact on innovation in light-duty vehicle technologies. It impacts more strongly the heavy duty transport market, particularly buses, but also special service trucks (e.g. waste collection). Lack of public demand can have an impact on competitiveness of this industry. In the ex-post evaluation, a survey was carried out with 36 contractors that supply vehicles to public authorities (table 2.3). Only a few mentioned that the Directive has had a considerable impact (and here in the area of trucks). A majority in the survey noted that the Directive either had no impact at all or only little impact; most often, respondents answered with "do not know", which indicates a low level of awareness about the Directive itself.

Table 2.3: Impact of Clean Vehicles Directive on the sales and deliveries of clean vehicles to public bodies by vehicle suppliers (n=36)

Types of vehicles	Not at all	A little	A moderate amount	A great deal	Do not know
Passenger cars	6	3	2	0	12
Buses or coaches	5	3	2	0	15
Light (<3.5 t) commercial vehicles	6	5	3	1	9
Heavy good vehicles (trucks other than waste)	4	5	1	2	13
Special service vehicles – waste collection and trucks	11	4	6	3	10
Special emergency vehicles	5	4	2	0	12

Source: ex-post evaluation of the Clean Vehicles Directive, Brannigan et al, 2015, a.a.o.

²³ Only a marginal number of procurers moved to Euro VI/6 standards before they became obligatory. Accordingly, it was modelled that Euro standards were introduced six months early for 1% of all procured vehicles.

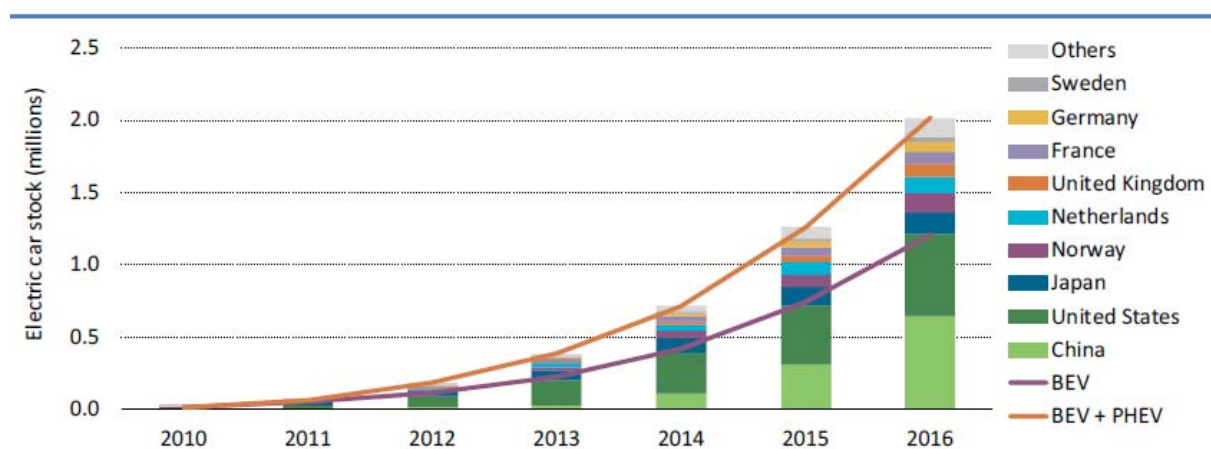
²⁴ Diesel vehicles have a higher energy efficiency compared to petrol vehicles. However, because of higher NO_x emissions diesel vehicles also have a higher negative impact on air pollution. 13% of procurers in the survey of the ex-post evaluation noted that they use the monetisation methodology. Comparing their procurement practice to the procurement practice of survey respondents for the two other options (technical specifications and award criteria) showed that the share of diesel vehicles is also 13% higher, eliminating all marginal air pollution improvements.

²⁵ Based on the analysis of the Tender Electronic Daily database (TED).

European manufacturers have not switched to larger manufacturing capacity for alternatively felled vehicles, and particularly battery-electric vehicles yet. While the EU could catch up to other regions with respect to producing vehicles, this is not true for all parts of the value chain, including particularly decisive parts such as batteries.²⁶

Taking the example of battery-electric vehicles, global market developments are driven by markets in China, the United States and a few European markets (see figure 2.3). Over the past years, competitiveness of international competitors in all segments of the market has grown. In 2016, China surpassed the United States in total electric care stock, with a rapidly growing market for battery-electric vehicles that supports domestic manufacturers. China and the US together account for approximately 60% of the global market and the EU for approximately 28%. According to the International Energy Agency, around 70.500 vehicles were registered in the nine leading markets in the EU²⁷, compared to 71.000 vehicles in the United States and 146.720 vehicles in China in 2015.

Fig. 2.3 Evolution of the global electric car stock, 2010-2016



Notes: The electric car stock shown here is primarily estimated on the basis of cumulative sales since 2005. When available, stock numbers from official national statistics have been used, provided good consistency with sales evolutions.

Source: International Energy Agency (2017): *Global EV outlook 2017: two million and counting*, IEA: Paris

Global dynamics in the segment of battery-electric buses are particularly relevant, as these are heavily influenced by public procurement. Chinese bus manufacturers, for example, are now also operating in the European market. According to data from the European Alternative Fuels Observatory, Chinese manufacturers hold a market share of 11.2% in battery-electric bus registrations in 2016.²⁸ Public procurement in China has helped to establish a strong global lead market. While the EU is one of the leading regions for R&I on bus developments, the Asia-Pacific Regions is now hosting the largest producers of buses and batteries (box 4).²⁹

²⁶ JRC (2015) Electric vehicles in the EU from 2010 to 2014 – is full scale commercialisation near? JRC: Ispra. While five years ago most of the EVs sold on the EU market were imported from other regions of the world, from 2014 the EVs produced within the EU as share of total EU registered EVs neared 70%. Most of the important players with respect to EV related components (e.g. battery cells and packs, electric motors, control systems) are headquartered outside the EU.

²⁷ France, Germany, Italy, Netherlands, Norway, Portugal, Spain, Sweden and United Kingdom

²⁸ See <http://www.eafo.eu/vehicle-statistics/buses/top-10> (access 16.06.2017).

²⁹ ZEEUS eBus project report, a.a.o.

Box 4: Promotion of battery-electric bus deployment in China

China has witnessed a rapid increase on sales of battery-electric buses over the past three years. According to the International Energy Agency, China is leading the global deployment of electric bus fleets. The global electric bus stock is estimated to count 173 000 buses (2015 figures), out of which ~150 000 are battery-electric. 98% of the global stock is situated in China. The stock grew nearly six-fold in between 2014 and 2015, noting the relevant impact of public support from the Chinese government.³⁰

In November 2015 the Chinese Ministry of Transport, the Ministry of Finance and the Ministry of Industry and Information Technology jointly released a new regulation, which obligates local governments and relevant stakeholders to promote the integration of electric buses in public transport fleets. In this context, the share of new energy buses in public transport is targeted to rise to 30%, 60% and 80% until 2019 regarding specific provinces or cities. In Beijing, for instance, a share of 80% in 2019 is anticipated.

2.2. What are the main drivers of the problem?

Three main drivers underpin the main problem (see figure 2.1).

2.2.1. Driver 1: Limited range of contracts covered by the Directive

Due to the provisions of Art.3, the Directive does not cover all public procurement contracts, which limits its possibilities to trigger a larger market uptake. Analysis carried out for this Impact Assessment estimates that the Directive covered 14% of all publicly purchased passenger cars, 18.5% of all publicly procured vans, 74.7% of all publicly procured rigid trucks and 43.3% of all publicly procured buses in the period 2009-2015 (see table 2.4).

Art.3 of the Directive stipulates:

- The Directive applies to contracts above the threshold of horizontal European procurement law. Service contracts below the €135,000 threshold for central public sector authorities and below the €209,000 threshold for sub-central contracting authorities are not covered by the Directive.³¹ Table 2.2 illustrates that this requirement substantially reduces the number of publicly procured vehicles affected by the Directive.
- Moreover, the Directive does not cover all contracts that are above the procurement thresholds. It only applies to purchase of vehicles. It does not cover other forms, e.g. such as the lease, rent or hire-purchase of vehicles. It is estimated that this affects at least 23% of all contracts above the threshold (see Table 2.5).
- Finally, the Directive covers purchases by contracting authorities and operators “for the discharge of public service obligations under a public service contract ... on public passenger transport services by rail and by road”. This definition does not cover operators for other public services for transport of persons or goods (e.g. waste collection, special transport services for the elderly people or people with a disability).

³⁰ International Energy Agency (2016) Global EV Outlook 2016, Paris, IEA; ZEEUs eBus project report, a.a.o.

³¹ Directive 2014/24/EU (repealing Directive 2004/18/EC) and Directive 2014/25/EU on procurement by entities operating in the water, energy, transport and postal services sectors (repealing Directive 2004/17/EC). In addition to the sub-central and central public sector thresholds, utilities have a threshold of EUR 418.000 for supplies and services contracts.

Table 2.4: Comparison of total annual new vehicle registrations, estimates of the total number of publicly procured vehicles from the Clean Vehicles Directive ex-post evaluation and estimates of public vehicle purchases and clean vehicle purchases falling under the Clean Vehicles Directive

Vehicle / service	EU total new registrations (annual average 2009-2015)	Proportion of which is purchased by the public sector – CVD Ex-post evaluation (annual average 2012-2014)	Total vehicles procured (purchases/leases/services) reported in TED (annual average for 2009-2015)	CVD scope Vehicles purchased by the public sector (average 2009-2015)	Proportion of vehicles purchased by the public sector which are clean vehicles ³² (average 2009-2015)
Passenger cars	13.7 million	405k vehicles 3.4% of EU new car registrations	68.5k vehicles 0.5% of EU new car registrations	56.7K vehicles 14% of public purchases 0.4% of EU new car registrations	2.7k vehicles 4.7% of public purchases 0.02% of total registrations
Light commercial vehicles	1.5 million	40k vehicles 2.8% of EU new van registrations	9.4k vehicles 0.61% of EU new van registrations	7.4k vehicles 18.5% of public purchases 0.5% of EU new van registrations	29 vehicles 0.4% of public purchases 0.002% of total registrations
Rigid trucks	120k	12k vehicles 6.4% of EU new rigid truck registrations	13.5k vehicles 11.25% of EU new rigid truck registrations	9k vehicles 74.7% of public purchases 7.5% of new EU new rigid truck registrations	6 vehicles 0.07% of rigid trucks purchased 0.005% of total registrations
Buses	29k	18k vehicles 75% of EU new bus registrations	12.7k vehicles 43.11% of EU new bus registrations	7.8k vehicles 43.3% of public purchases 26.5% of EU new bus registrations	133 vehicles 1.7% of buses purchased 0.45% of total registrations

Source: based on Ricardo (2017): *Support Study to the Impact Assessment of the Clean Vehicles Directive*

³² Defines a clean vehicle as one that uses alternative fuels, as defined in Article 2(1) of Directive 2014/94 and qualified in policy option 4 of this Impact Assessment.

Table 2.5 Number of vehicles publicly procured by vehicle type and type of contract (Average for 2009-2015 period, on the basis of the TED database)

Type of vehicle	Type of contract	Number of vehicles procured (Average 2009-2015)	% share
Passenger Car	Lease	11,019	16%
	Purchase	56,750	83%
	Services	745	1%
	Total	68,514	100%
Van	Lease	914	10%
	Purchase	7,388	79%
	Services	1,088	12%
	Total	9,389	100%
Truck	Lease	4,191	31%
	Purchase	8,968	67%
	Services	298	2%
	Total	13,457	100%
Bus	Lease	1,293	10%
	Purchase	7,799	61%
	Services	3,604	28%
	Total	12,696	100%
Total	Lease	17,417	17%
	Purchase	80,905	78%
	Services	5,735	6%
	Total	104,057	100%

Sources: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

In the Open Public Consultation for this Impact Assessment, 67% (87 out of 130 contributions) strongly or somewhat agreed that it was a relevant problem driver. In the targeted consultation activities, experts from public authorities, transport operators and manufacturers agreed that the scope of the Directive limits its market impact.

2.2.2. Driver 2: Lack of clear, impactful vehicle purchase provisions

Art. 5 (3) of the Directive does not include clear vehicle-related purchase provisions. It notes the principal need to address energy and environmental concerns in technical specifications, but does not specify further vehicle requirements. Similarly, it notes the possibility to use environmental impacts as awards criteria, but does not set further specifications for their weighting. In the end, the success of the Directive depends on the willingness of public bodies to act, but it does not stimulate the decision for a clean vehicle purchase as such. The implementation has not sent clear, long-term signals to the market. In the survey among contracting authorities in the ex-post evaluation, a total of 63 (out of 156) respondents (or 40%) noted that they used the option to set technical specifications. Close to all of these respondents demanded vehicles that complied with existing Euro VI standards. A total of 68 (out of 156) respondents (or 44%) respondents noted that they use environmental and energy impacts as award criteria. Of those respondents, 75% noted that environment criteria made up less than 20% in the weighting of impacts in the purchase decision.³³

A large majority of respondents (84%, 109 out of 130 contributions) to the Open Public Consultation strongly or somewhat agreed that the lack of a clear definition undermines the practical relevance and

³³ 14% of survey respondents noted that they used quantification methods (Brannigan et al, a.a.o.).

market signals of the Directive. In this context, 73% (95 out of 130) also strongly or somewhat agreed that the absence of clear minimum procurement targets is a key problem driver.

The lack of clear vehicle-specific criteria is combined with the lack of alignment of procurement criteria at EU level that could trigger better market impact. The Directive provides different options to include operational life-time environmental and energy impacts in purchase decisions.³⁴ Nearly all Member States have transposed all options into national law.³⁵ Following the lack of specific provisions such as a definition of a clean vehicle or weighting of impacts, the implementation of the Directive has not led to a greater use of harmonised criteria for public procurement and additionally not to greater harmonisation in determining life-time operational environment and energy cost.

58% (75 out of 130) respondents to the Open Public Consultation strongly or somewhat agreed that the opportunity to choose between transposition options has furthered the variety of public procurement approaches. It has undermined the Directive's objective as cited in Recital 11: the application of harmonised criteria at EU level should lead to a significant market impact.

2.2.3. Driver 3: Complex provisions for the use of the monetisation methodology

At the time of the adoption of the Directive in 2009, mandatory inclusion of operational life time cost into purchase decisions was regarded to be the best way to influence the market (see recital 16 of Directive 2009/33/EC). Monetisation of external effects appeared promising.

In the contracting authorities' survey during the ex-post evaluation, 13% (from 156 respondents) noted that they had monetised impacts. Of those 13%, only 29% (6 out of 21) noted that they had used the methodology as defined by the Directive, which is a mere minority.

The rare use of the monetisation methodology has been confirmed in the consultation activities for this Impact Assessment.³⁶ Interviewees noted that the methodology is complex to apply. Relevant expertise is often missing. Moreover, in the absence of any harmonised EU standard for measuring fuel consumption or CO₂ emissions from heavy duty vehicles, use of the methodology is restricted. During the Open Public Consultation for this Impact Assessment, 46% (59 out of 130) of respondents strongly agreed and 22% (28 out of 130) somehow agreed that the rare use of the methodology is due to the perceived complexity of the provisions of the Directive.

In addition to the concerns about the complexity, there are concerns about the suitability of the methodology, which might also explain the limited use. In the ex-post evaluation survey with 156 authorities, 34% of respondents objected to the appropriateness of the methodology and its parameters for a good evaluation of environmental and energy impacts. Only 18% agreed; and 46% did not express an opinion. The methodology gives greater emphasis to energy efficiency compared to pollutant and CO₂ emissions. The methodology confers higher scores to conventionally-powered fuel efficient vehicles, including diesel vehicles, which creates a bias towards diesel vehicles.

As part of the Open Public Consultation, 59% (77 out of 130) of respondents strongly or somewhat agreed that the methodology is too complex and can benefit diesel vehicles. A substantial increase of its use in an unchanged manner can actually lead to an increase of the problem at hand.

³⁴ As noted this includes a) setting technical specifications, b) establishing relevant award criteria, c) monetising the operational costs as an award criterion or d) any combination of the above.

³⁵ An overview of the transpositions is available in the ex-post evaluation study annexed to this Impact Assessment. Since the evaluation, also Slovenia and Czech Republic have changed their national acts and cover all options.

³⁶ See stakeholder consultation synopsis report in Annex

2.3. Who is affected by the problem?

Citizens are affected by the lack of contribution from publicly procured vehicles to the reduction in CO₂ and air pollutant emissions. More than 85% of the urban population is exposed to fine particulate matter (PM_{2.5}) at levels deemed harmful to health by the WHO. In 2013, PM_{2.5} was responsible for more than 400000 premature deaths per year in the Union, in spite of emission reductions in previous years. NO₂ exposure resulted in up to 70000 premature deaths per year in the Union.³⁷ Climate change impacts are also found to have direct human health impacts, including illness or premature death from flooding, rainfalls, storms or heat.³⁸

Public reactions to high levels of air pollution are recorded in form of lawsuits. Corresponding, several courts have ruled against public authorities, noting failure to comply with legal air quality requirements.³⁹ Public authorities are starting to react, adapting, among others, measures such as urban access restriction schemes. A limited availability of clean vehicles sold at comparatively high prices affects public bodies' ability to accelerate fleet transitions towards low-emission mobility solutions.

Manufactures of low- and zero-emission and other alternatively fuelled vehicles and recharging infrastructure technologies face investment risks, particularly in the heavy-duty sector. In the absence of policy certainty and secure larger-scale tenders on a regular basis, it can be difficult to plan for larger production capacity. Similarly, investment decisions by energy providers and grid operators are affected: deployment of a larger number of battery-electric buses, for example, can have huge repercussions for local energy grids, but investments into a stable and smart grid are affected by the uncertainty about vehicle demand. A long-term policy framework would help investment planning.

In general, all relevant public and private actors need to change behaviour. Public bodies can have a stronger impact through purchasing clean vehicles large enough to matter for industry production and investment at scale. Captive fleet solutions (vehicles and infrastructures) can be advanced. Manufacturers need to extend the number of available vehicles, improve their reliability and bring purchase prices down. Manufacturers and standardisation organisations need to continue working on common standards. Public authorities, manufacturers and suppliers can impact the problem by developing suitable business models for the whole chain of purchase, operation and maintenance.

2.4. How would the problem evolve, all things being equal?

The Directive will continue to exercise a very limited impact on the market uptake of clean (low- and zero-emission vehicles). The multiple alternative implementation options, including a lack of detail of provisions for the actual public procurement of clean vehicles, will continue to sustain the current diversity of public procurement policy practices at Member State level.

As noted in Annex 6 (box 1) of this Impact Assessment Report, some Member States or single regions or cities have already put ambitious public procurement frameworks into place that set minimum procurement requirements for clean, i.e. low- and zero-emission or other alternative fuels vehicles. In the baseline scenario, some Member States and contracting authorities, entities and operators therein will continue to use vehicle procurement to drive forward the markets. However, they will continue to set punctual incentives and market stimulus for single markets within the Union. They cannot substitute the lack of a EU-wide coherent minimum level of common policy ambition for the procurement of vehicles that translates a market impetus beyond the frontrunners of this policy

³⁷ European Environment Agency (2016): Air quality in Europe – 2016 report, Copenhagen.

³⁸ European Environment Agency (2016): Urban adaptation to climate change in Europe, Copenhagen.

³⁹ The European Court of Justice established the "right to clean air" for EU citizens in 2008. In UK, the Supreme Court ruled in 2013 that the government is failing in its duty to protect people from harmful effects of air pollution, concerning cases from 16 UK cities. In Germany, lawsuits and court sentences have applied in an increasing number of cities, including Berlin, Bonn, Aachen, Darmstadt, Cologne, Dusseldorf, Essen, Gelsenkirchen, Frankfurt/Main or Stuttgart. An overview of relevant lawsuits can be found at <http://legal.cleanair-europe.org/en/legal/eu/>

development. On their own, the relevant share in overall vehicle markets transactions of public procurement in single Member States remains too small. In a larger set of Member States, the main effort will be on substituting older conventional vehicles with modern conventional vehicles.

In the baseline scenario, around 2.1 million vehicles are projected to be publicly procured⁴⁰ between 2020 and 2035 under purchase, lease or services contracts (Table 2.6). Battery- and fuel-cell electric, plug-in hybrid and, natural gas vehicles would represent around 7% of publicly procured vehicles in 2020, going up to 16% by 2035. Over the 2020-2035 period, clean vehicles would thus represent around 12% of the total vehicles procured, which represents an improvement, but still under-utilises the potential of public procurement to contribute to a low-emission mobility transition. Without further action, their increasing share would be mostly driven by cost reductions of technologies.⁴¹ A description of the Baseline scenario assumptions is provided in Annex 4 "Analytical models used in preparing the impact assessment" and further in the Impact Assessment Support Study.

A sensitivity analysis has been performed for buses, using information on market prospects provided by key vehicle manufacturers and transport operators for the bus market, which differ from the reference scenario. The upper bound of the number of clean vehicles procured in Table 2.6 (in brackets) corresponds to more optimistic assumptions on the uptake of clean buses.

The structure of the vehicles procured (i.e. the share of clean vehicles) would not be significantly different from that of the vehicles registrations in the Baseline scenario, however. Therefore, without further action, the Directive will result in limited impact on the market uptake of clean (low- and zero-emission vehicles).

Table 2.6: Baseline development of clean vehicle procurement under purchase, lease and services contracts for buses

	2020	2025	2030	2035	2020-2035 (cumulative)
Vehicles procured per year	119,550	131,960	139,040	142,020	2,139,680
Number of clean vehicles procured per year	8,140 (10,170)	14,040 (17,570)	19,860 (24,960)	22,440 (27,530)	261,260 (325,730)
% of clean vehicles of total vehicles procured per year	7% (9%)	11% (13%)	14% (18%)	16% (19%)	12% (15%)

Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

From an industry perspective, uncertainty over demand will continue to persist, particularly in the area of heavy-duty transport. In an increasing number of cases, public tenders with a focus on clean, alternatively fuelled transport solutions could be awarded to foreign competitors. Given the long lead times for fleet renewal, the contribution to low-emission mobility will remain limited. CO₂ and air pollutant emissions from publicly procured vehicle will not be significantly reduced.

⁴⁰ Publicly procured vehicles cover passenger cars, light commercial vehicles, buses and heavy goods vehicles.

⁴¹ Technology costs assumptions draw on an update of the EU Reference scenario 2016. This update (i.e. Baseline scenario) builds on the EU Reference scenario 2016 but additionally includes some updates in the technology costs assumptions (i.e. for light duty vehicles) and few policy measures adopted after its cut-off date (end of 2014) like the Directive on Weights and Dimensions, the 4th Railways Package, the NAIADES II Package, the Ports Package, the replacement of the New European Driving Cycle (NEDC) test cycle by the new Worldwide harmonized Light-vehicles Test Procedure (WLTP). It has been developed with the PRIMES-TREMOVE model (i.e. the same model used for the EU Reference scenario 2016) by ICCS-E3MLab. A detailed description of the this scenario is available in the Impact Assessment accompanying the Proposal for a Directive amending Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures, SWD (2017) 180.

The revision of the Directive forms part of a comprehensive set of measures, including supply and demand side measures and enabling conditions. The effect of demand-side measures is dependent on supply-side measures, and vice versa. More stringent vehicle CO₂ standards could reduce the direct impact of the Directive on emissions but would also make it easier to achieve its objectives and reduce its compliance costs. While CO₂ emission standards are better placed for delivering significant CO₂ emissions reductions in the road transport sector, the revision of the Directive could provide a useful complementary contribution by incentivising the renewal of vehicle fleets.

The baseline scenario assumes the implementation of the CO₂ standards for cars and vans in line with current legislation, as required by Better Regulation principles.⁴² No policy action to strengthen the stringency of the target is assumed after 2020/2021 in the baseline. More stringent CO₂ standards for cars and vans post-2020 would result in a higher share of clean vehicles in the new vehicle fleet and thus in the total vehicles procured in the baseline. Consequently, the impact of policy options in terms of uptake of clean vehicles and environmental impacts may be more limited when compared to such alternative baseline. This is due to the overlapping effects between policies. In other words the combined effect of more stringent CO₂ standards for cars and vans and revised procurement rules under the Directive would be lower than the sum of their individual effects.⁴³

⁴² Regulation (EC) No 443/2009, amended by Regulation (EU) No 333/2014 and Regulation (EU) No 510/2011, amended by Regulation (EU) No 253/2014; CO₂ standards for cars are assumed to be 95gCO₂/km as of 2021 and for vans 147gCO₂/km as of 2020, based on the New European Driving Cycle (NEDC) test cycle, in line with current legislation.

⁴³ A quantification of the combined effects of such types of policy measures has been presented in the Staff Working Document accompanying the EU strategy on low-emission mobility (SWD(2016) 244 final).

3. WHY SHOULD THE EU ACT?

3.1. The EU's right to act

Directive 2009/33/EC is based on Art 192 of the Treaty establishing the European Union.

The European co-legislator principally underlined the role and relevance of public procurement to contribute to the achievement of long-term EU environmental, climate and energy as well as growth and competitiveness objectives with the adoption of the Clean Vehicles Directive. It is also confirmed by Directive 2014/24/EU on public procurement and Directive 2014/25/EU on procurement by entities operating in the water, energy, transport and postal services sectors.

3.2. Subsidiarity check

Transport, environment and procurement law remain shared competences. But the sectorial harmonization of procurement rules is an EU competence. Problems linked to the current text of the Directive could not be achieved by measures on other levels since Member State jurisdiction ends at the national borders. There is a clear need for EU action.

EU intervention is limited to provide for a minimum level direction to public demand to stimulate a (cost) effective contribution to the widely agreed market uptake of clean vehicles. It helps ensuring a simpler, better coordinated approach. All measures are considered to be principally proportionate in terms of their impacts. They do not principally intervene into Member State competence to organise the provision of (public) transport; and they also do not principally constrain the ability to choose the most relevant technology. As noted in section 3.4 the principal ability of contracting authorities, entities and affected operators to choose technologies according to needs is not affected, as this initiative only targets a minimum share of procurement within a Member State through a technological-neutral low-emission mobility approach and leaves full choice of conventional and innovative technologies for the remaining rest. This initiative also does not tend to intervene directly into the decision-making procedures at local and regional level, but addresses the national level, where Member States are granted the flexibility to adapt the implementation according to domestic conditions and comparative capabilities.

Reduction of CO₂ include a clear and widely accepted cross-border dimension. Member States have the means to promote more fuel-efficient vehicles, e.g. through public procurement. In the lack of clear policy provisions and their consistent applications, effectiveness will be subject to the willingness of other countries applying similar measures. Air pollution is mostly a local externality and must be addressed primarily at local level. But the large scale of the air pollution problem and its move across Member States and cities (see section 2.3) as well as the large scale of potential impacts of climate change justifies actions at all levels of governance to address the problems. This perception also underpins key parts of the European acquis.

Public demand is a relevant market driver in the heavy-goods sector and particularly for urban buses. A minimum level direction is required to create certainty of demand which helps investment planning and scaling of production capacity. Without such action, future global competitiveness of the European transport sector could be undermined in this market segment.

3.3. EU added value

Action at EU level helps ensuring greater clarity and long-term policy signal for market actors. It ensures a simpler and more effective policy framework to guide public procurement of clean vehicles, thus contributing to key EU policy objectives on growth, jobs and competitiveness as well as on completing the Energy Union.

As persistent challenges such as climate change and air pollution remain on the policy agenda, actions to tackle them should make best use of possible synergies. Without specific new provisions in the Directive, a bottom-up approach through different national policies will not provide the clear and stable long-term policy framework that can effectively help leverage relevant market investments in the whole of the Union. Setting up a clear definition of clean vehicles will effectively inform other procurement policies at national, regional and local levels, and thus create better policy coherence and greater market certainty. This initiative also has important synergy effects with the proposal for new CO₂ emission performance standards for cars and vans post-2020, ensuring additional demand for low- and zero-emission vehicles.

An effective, long-term common policy framework enables joining up procurement and reaching market impact much more effectively. The revised Directive can contribute to competitiveness and long-term growth of the transport sector; particularly in the heavy goods sector, where it is the key market demand driver for alternatively fuelled urban buses. Better coordinated action will support the functioning of the internal market. Such an approach is best placed to accelerate the needed cost reductions and enable economies of scale. The revised Directive can help guide future EU funding and financing in the area of transport and mobility: a definition of clean vehicles can underpin priority setting for EU funds. Better coordinated public procurement can add to the needed demand for the recharging and refuelling infrastructure that is being implemented under Directive [2014/94/EU](#) on alternative fuels infrastructure.

Actions under the policy options of this initiative could contribute to simplifying the implementation of the Directive by replacing the current vague provisions with clear requirements and removing the broader choice of implementation mechanisms. This policy initiative is also well-timed, as a number of public bodies in Member States have started to procure innovative clean vehicles technologies at larger scale. The measures considered under the different policy packages of this initiative can take this momentum and extend it beyond the current group of front-runner cities and regions. Coupled with targeted support opportunities at EU level through both funding and intelligent financing, it seems possible to address the gap and trigger market growth in all Member States.

3.4. Why act now?

Markets for low- and zero-emission and other alternative fuels vehicles need to accelerate to greater mass market use, the Low-Emission Mobility Strategy of the Commission notes. All available policy levers are needed in an intelligent policy mix in order to incentivise purchase of vehicles and leverage investment into infrastructures. As table 2.2 shows, consumers are still cautious with embracing low- and zero-emission and other alternatively fuelled vehicles. Key concerns relate to reliability and accessibility of recharging, choice of models and their purchase prices. While some markets in Member States have seen increased growth (though at a low overall level), other markets in Member States are not picking up (figure 2.2).

Policy certainty is needed at a time when cities and regions are implementing new approaches to clean, sustainable mobility and when manufacturers are planning large-scale investments into new powertrain technologies and their infrastructures (see box 4). Demand is still considerably low in many domestic markets of the Union. These vehicles are needed for an effective contribution from transport to reaching long-term climate, energy and environmental policy objectives of the Union. Increasingly, low- and zero-emission vehicle technologies also shape the future market and competitiveness of the transport sector.

Box 4: List of OEM announcements on battery-electric car ambition (by April 2017)

- BMW has announced a target of 0.1 million electric car sales in 2017, and of 15-25% of the BMW group's sales by 2025.
- Chevrolet (GM) has announced a target of 30 thousand annual electric car sales by 2017.

- Daimler has announced a target of 0.1 million annual electric car sales by 2020
- Ford has announced the ambition to introduce 13 new electric car models by 2020
- Honda has announced to have two thirds of group sales in 2030 consist of electrified vehicles (battery-electric and plug-in hybrid)
- Renault-Nissan aspires to have cumulative sales of electric cars by 2020 of 1.5 million
- Tesla has announced to target sales of 1 million electric cars by 2020
- Volkswagen has announced a target of 25% of group sales by 2025 to be electric vehicles
- Volvo just announced that every car from 2019 onwards will have an electric motor, and launching 5 fully electric cars in between 2019 and 2021.

Source: *International Energy Agency (2017): Global EV outlook 2017: two million and counting, IEA: Paris*

This outlook changes the prospects for contracting authorities, entities and specific operators: in the future, they will have a much better ability to choose from an increasingly larger palette of vehicles. Cost reduction is expected to happen in quickly accelerating markets⁴⁴. The benefits and cost-efficiency of such clean vehicles are clearly demonstrable over time, contributing to attractive, quiet multi-modal solutions in public transport and to overall improvements in air quality and noise reduction, among other (see section 6).

Public fleet procurement of clean vehicles can influence private purchases of clean vehicles. Under conditions of perceived risk and uncertainty, consumers tend to favour known, familiar solutions. Increased visibility of clean vehicles and their infrastructures in day-to-day transport increases public confidence that the technologies are mature and trustworthy. This concerns particularly Member States, where the market take up is still very low (see section 2.1.2) and where suitable infrastructure does not exist everywhere. Moreover, private consumers are generally found to slowly pick up innovative products unless all elements of the requisite infrastructure are available.⁴⁵ If public recharging and refuelling infrastructure (e.g. for buses, trolleybuses or trams) is available for private users (pedelecs, cars, taxis, vans, delivery trucks) it can incentivise the purchase of those vehicles.⁴⁶ This is relevant particularly for people who do not have a private garage.

A substantial share of passenger cars (~50%) is not privately owned but belongs to a corporate fleet or to a public fleet.⁴⁷ Large-scale public fleet operators can find it easier to adopt low- and zero-emission and other alternative fuels vehicles due to different conditions of scale. Employees can benefit from the possibility to familiarise themselves with the new technology in an environment that is free of individual purchase risks. This can also facilitate information and education of further potential users. Documented are cases, where fleet solutions have knocked on private vehicle purchases. It is, however, difficult to directly quantitatively account how public procurement will impact on private purchases, as the individual decision to purchase a vehicle is influenced by different factors.

This policy initiative is part of a package of policy initiatives to support the transition to a low-emission mobility in the EU. The need to accelerate efforts is a widely noted European policy ambition. The 2017 State of the Union address notes that the EU needs to become a world leader on decarbonisation. The 2017 Mobility Package Chapeau Communication underlines that Europe must lead the transition to a low-emission mobility. Global competition dynamics require sufficient action now if the European transport sector is to maintain and expand its competitiveness in these future growth markets⁴⁸.

⁴⁴ Mc Kinsey (2017) Electrifying insights. How automakers can drive electrified vehicle sales and profitability.

⁴⁵ Transportation Research Board and National Research Council. 2015. *Overcoming Barriers to Deployment of Plug-in Electric Vehicles*. Washington, DC: The National Academies Press.

⁴⁶ For example, in London multi-purpose public rapid charging hubs will also be used for all newly licensed taxis that have to be zero-emission capable as of 2018.

⁴⁷ Mc Kinsey (without year): *Evolution: electric vehicles in Europe: gearing up for a new phase?*

⁴⁸ COM(2017)283 final.

As part of the package, new CO₂ emission performance standards for passenger cars and vans post 2020 are being proposed. Further actions on heavy-duty vehicles' CO₂ emissions have been announced.⁴⁹ In a policy package approach that includes contributions from public and private market actors the revision of the Clean Vehicles Directive ensures that all available policy levers – on the supply and the demand side - are utilised. In tandem with the CO₂ emission performance standards for cars and vans the revision of this Directive ensures that incentives are set up for the same type of vehicles through both a market push-and-pull logic, whereby the public procurements provides a particular stimulus for domestic markets with very low market shares and for the heavy-duty vehicle market, mainly on urban buses. Moreover, the EU is also publishing an EU actin plan for alternative fuels infrastructure to support the further implementation of Directive 2014/94/EU on alternative fuels infrastructure, where a EU backbone infrastructure for recharging should be completed on the TEN-T core network corridors by 2025, including full equipment of urban nodes. Investment into infrastructure is increasingly sought be taken in form of captive fleet models, where vehicles and infrastructures are realised together. Public procurement is of importance in this context.

Securing additional demand is important, also in view of global market dynamics and potential shifts in global competitiveness (see figure 2.3). Chinese OEMs have announced sales targets of 4.5 million battery-electric vehicles by 2020.⁵⁰ The Chinese government has announced a forthcoming requirement for every car manufacturer that sells more than 30.000 vehicles in China to comply with a sales quota of 10 percent of battery-electric vehicles.⁵¹ This policy is expected to have a strong impact on the market for zero-emission vehicles.

Moreover, the current approach of the Directive that sought to put the emphasis on the internalisation of external energy and environmental impacts has not yielded any significant market impact. Provided that there is flexibility in implementation, changing the governance approach of the Directive towards a greater directional market uptake of low- and zero-emission and other alternative fuels vehicles is coherent with both policy principles of low-emission mobility and technological neutrality.

Action does not prescribe choice of a specific technological but remains neutral in view of the broader choice of low- and zero-emission and other alternative fuels technologies. A minimum share target would leave technology choice of all clean conventionally and alternatively fuelled vehicles for the major part of the procurement, while a flexible approach to implementation within the Member State ensures that capacities can be best used and tailored to specific regional and local circumstances.

⁴⁹ Add reference when available

⁵⁰ International Energy Agency (2017): Global EV outlook 2017: two million and counting, IEA: Paris

⁵¹ <https://www.bloomberg.com/news/articles/2017-09-28/china-to-start-new-energy-vehicle-production-quota-from-2019> (access 20/10/2017).

4. WHAT SHOULD BE ACHIEVED?

4.1. General and specific objectives

The general objective of this initiative is to accelerate the public procurement of clean, i.e. low- and zero-emission or other alternatively fuelled vehicles in the Union.

This should help stimulate the needed market uptake of these vehicles. It should further improve the contribution from the transport sector to the reduction of CO₂ and air pollutant emissions and contribute to competitiveness and growth, particularly in the heavy-duty transport sector. In addition, this initiative supports more effective public procurement policies at domestic level, which are better aligned in terms of strategic direction and market impact. It should reduce information cost for public and private actors and simplify the implementation process.

The specific objectives (SO) for the revision of Directive 2009/33/EC are as follows:

- SO1: Ensure that the Directive covers all relevant procurement practices
- SO2: Ensure that the Directive supports clear, long-term market signals
- SO3: Ensure that the Directive provisions are simplified and effective to use

4.2. Links to the problem, synergies and trade-offs

The objectives are directly linked to the problems identified in section 2 (figure 2.1). There are synergies among the objectives. Addressing the limited scope of the Directive will help with improving clear market signals, while providing clear provisions for vehicle purchase will address the current lack of long-term market signals and address fragmentation of policies.

There are trade-offs for CO₂ and air pollutants emissions when using the monetisation methodology: the methodology requires the purchase of the vehicle that is the most cost-effective in view of all its internal and external cost. This could lead to situations where public bodies either continue to purchase conventionally fuelled vehicles, because their overall cost are still lower due to the initial purchase cost. In this case, impacts on emission reductions are limited. Or, in view of updated external cost figures, it can lead to situations where public bodies should only buy low- and zero-emission vehicles, because they are most cost-effective. In this case, public bodies are confronted with high upfront costs.

Simplification of EU law could be achieved, if a clear definition and related minimum procurement targets were to be established. These can provide clear, long-term policy orientation, while avoiding calculation methodologies that are complex to use. There could be a trade-off between a continued choice of implementation mechanism (clean vehicle definition and target versus monetisation methodology) and the objective of creating stronger market signals and more effective procurement procedures within and in between Member States. The necessity for continuing this approach of dual implementation mechanisms under the current Clean Vehicles Directive needs to be analysed.

Trade-offs exist between costs and benefits for public bodies, industries and citizens. The latter two benefit from the action taken by public bodies to procure clean, low- and zero-emission and other alternative fuels vehicles in form of positive impacts on quality of life and market demand for new vehicles. Public bodies have to weigh increased cost with increased benefits over time and impacts on public service obligations. If there is a too strong requirement for upfront investment into innovative clean technologies, it could impact on the ability of providing relevant public transport services (including reduction of serviced bus lines, for example), which would conversely undermine key policy priorities for supporting multi-modality in European cities and regions.

On the other hand, clean vehicle procurement provides numerous opportunities to make public transport more attractive, by enabling smoother, quiet travel and by providing new opportunities for

route design (including for new services such as in-door bus stops, enabling new possibilities for better customer service (e.g. in shopping malls).

From a European industry point of view, a key question concerns competitiveness vis-à-vis foreign competitors and their ability to service mobility needs of public bodies.

4.3. Consistency with other EU policies and Charter of Fundamental Rights

The main objective of this initiative is fully in line with the main objectives of other legislative and non-legislative initiatives to support the deployment of clean, low- and zero-emission vehicles at European level. It is consistent with long-term EU policy objectives on climate, energy and environment policies.

It supports the proposal for the post-2020 CO₂ emission performance standards for light duty vehicles, where it reinforces the policy orientation, builds on the same thresholds for low- and zero-emission vehicles and adds further demand for low- and zero-emission vehicles. Automakers in their contribution to the public consultation for the revision of this Directive have noted the consistency and relevance of a strong public procurement mandate under an amended Directive.

This initiative also supports the action plan on alternative fuels infrastructure that reinforces the implementation of Directive 2014/94/EU on alternative fuels infrastructure, which has been published as part of the Mobility Package II. The action plan seeks to stimulate better exchange of Member States on alternative fuels infrastructure deployment and investment by both public and private actors, to further orient market actors to greater aligned action and to test innovative financing models for interoperable infrastructure. In all occasions, public procurement is a key supporting lever.

The objectives of this initiative are mutually supportive to the objectives of revising the voluntary Green Public Procurement Criteria of the European Commission in the field of transport. The objectives for this initiative are furthermore coherent with the Charter of Fundamental Rights, in particular by applying a non-discriminatory approach to single contracting authorities, entities and relevant operators.

5. WHAT ARE THE VARIOUS OPTIONS TO ACHIEVE THE OBJECTIVE?

5.1. Preliminary screening of potential measures to achieve the stated objectives

A pre-screening of main policy measures was done to identify the most acceptable and feasible measures to address the identified problems. An initial long list was created on the basis of the outcomes of the ex-post evaluation. In the Open Public Consultation and through targeted consultation activities during this Impact Assessment, the Commission asked key stakeholders for their opinion on the relevance and feasibility of policy measures on this long list of policy measures relative to achieving the policy objectives presented in section 4.

The most important of those measures are screened in terms of their relevance, feasibility or proportionality as well as key outcomes from the public consultation. Based on this screening, some of the measures have been recommended for a more detailed analysis and subsequent use in the policy packages as presented in section 6. The other remaining measures were then discarded.

5.1.1. Potential measures to ensure that the Directive covers all relevant procurement practices

Four different measures were proposed and discussed.

1. Extend the scope by removal of the procurement thresholds

Under this measure, the thresholds for contract volumes (see section 2.2) as required by the horizontal public procurement law of the EU would be removed. Two alternative variants of this measure were discussed: A complete removal, according to which the Directive would apply to all contracts, and an alternative variant of replacing the current threshold with a new threshold.

Comment: Views in the Open Public Consultation (130 responses in total) were mixed. A large majority of respondents from companies (76% (28 out of 37) and particularly from NGOs (84% (24 out of 29) supported this measure as a very relevant, relevant or somewhat relevant measure. No majority of public authorities (48%, (11 out of 23) noted it to be relevant, but 60% of contracting authorities (6 out of 10) considered this measure very relevant, relevant or somewhat relevant. In total, 72% of respondents (or 94 out of 130) agreed it was relevant or somewhat relevant. However, in targeted consultations, representatives of public and contracting authorities noted that the measure, while being highly relevant, would have a strong impact on administrative burden of public and contracting authorities. It would particularly affect smaller public authorities. All experts from public authorities advised against this measure.

Indeed, removal of the procurement threshold could extend the range of application of the Directive considerably (as noted in Table 2.1). Considerations of proportionality and acceptability speak against this measure, however. The current procurement thresholds of horizontal public procurement law (Directives 2014/24/EU and 2014/25/EU) are aligned with the thresholds set out in the WTO's Agreement on Government Procurement (GPA). They are set to avoid the unnecessary development of a multitude of different thresholds that would apply otherwise. A policy approach based on no thresholds or also lowered thresholds would disproportionately increase the administrative burden of the Directive and would go against coherence with horizontal public procurement rules.

Preliminary conclusion: Discard, because the measure affects policy coherence, is not in line with subsidiarity, strongly increases administrative burden, and despite of its relevance, is not likely to get the necessary political support.

2. Extend the scope by including vehicles rented, leased or hire-purchased

Public authorities can rent, lease or hire-purchase vehicles instead of purchasing them. The relevance of the practice of renting, leasing and hire-purchasing differs per Member State. On average it is found to affect 23% of all contracts currently noted in the EU's Tender Electronic Database. It represents a relevant contract volume (Table 2.2).

Under this measure, the scope of the Directive would be extended to cover vehicles that are leased and hire-purchased. The public procurement thresholds under the Directive would apply as would the minimum procurement requirements for purchase of vehicles, if these were to be adopted. The Directive would also be extended to cover vehicles that are rented by public authorities. In this case, rental fleets would need to be compatible with public authorities' requirements for the environmental performance of the vehicles they rent.

Comment: This measure received consistent strong support from all target groups in the Open Public Consultation. Also 75% of public authorities (16 out of 21) and 90% of contracting authorities (9 out of 10) regarded this measure as either very relevant, relevant or somewhat relevant. During targeted consultations, experts from public authorities noted the relevance of this measure. Yet they noted the need for a flexible approach: to make sure it does not substantially increase administrative burden and takes into account the wider diversity of contractual arrangements in this area. One representative noted challenges for rental companies as these currently have low shares of clean vehicles. However, it should be possible to adapt with appropriate lead time for introduction of such a requirement.

Preliminary conclusion: retain for further analysis, because of its relevance and as a large part of the key stakeholders support this measure.

3. Extend the scope by including additional transport services procured by public authorities

Public authorities regularly contract operators to provide services. These operators use their own vehicles. Under this measure, contracts for transport services other than public passenger transport would be added to the scope of the Directive, following the thresholds of the horizontal public procurement law. Operators in charge of these contracts would need to be compatible with public authorities' requirements for the environmental performance of the vehicles they rent.

Comment: Different services, including bus services, postal and courier services or waste collection services, could be included under this measure. The principle approach of such a scope extension received general support from a majority of respondents to the Open Public Consultation. The level of support differed among key target groups though. 55% of public authorities (12 out of 21) noted it to be very relevant, relevant or somewhat relevant as well as 90% of contracting authorities (9 out of 10). Contributions of companies (90%) and NGOs (79% (23 out of 29) also regarded this measure to be very relevant, relevant or somewhat relevant. In the targeted consultation, a few representatives of public authorities highlighted that contractual arrangements between public authorities and private operators are quite diverse and could be difficult to set up and monitor. They required a flexible approach that would be simple to implement.

Indeed, a challenge that could arise is that in many cases the suppliers of services provide the same services using the same vehicles to multiple purchasers, including businesses. Some services are often provided by SMEs, e.g. school transport services. Based on feedback during the consultation, it was concluded to keep the potential inclusion of bus, waste collection and postal/courier services for further analysis.⁵² Rather than setting an additional, separate, minimum requirement for transport services, the fleets of the relevant operators running services for public authorities should be included as part of overall minimum procurement requirement, if it was to be set up.

⁵² These constitute predominant public authorities transport service contracts. Note that postal and courier services are classified as social services and hence exempted from the general provisions of the horizontal public procurement Directives 2014/94/EU and 2014/25/EU. However, in the targeted interviews carried out for this Impact Assessment, representative of two main postal/courier companies noted the relevance of keeping this measure for further analysis.

Preliminary conclusion: Retain for analysis, because of its impact and broader support from key target groups. However, the measure should be confined to bus services, waste collection services and postal and courier services, as defined by their respective Common Procurement Vocabulary codes. These reflect the more significant services that involve transport that are procured by public authorities.

4. Extend the scope to all contracts that have a major transport element

This policy measure would cover contracts with a ‘major transport element’, for example vehicles used as part of infrastructure contracts. Contractor fleets then would need to demonstrate that they are compatible with the overall minimum requirements as set up by the Clean Vehicles Directive.

Comment: This measure did not get a majority support from public authorities (47% (10 out of 21) in the Open Public Consultation. In the targeted consultations, experts from public authorities referred to the needs of clearly defining the elements of the contracts that will fall under the responsibility of this measure. There was stronger support from contracting authorities and NGOs where 70% (7 out of 10) and 72% (21 out of 29) noted this measure to be very relevant, relevant, somewhat relevant respectively. Respondents from companies also strongly supported this measure (67% or 25 out of 37 noted it as very relevant, relevant, somewhat relevant). However, close to every fifth respondent to the OPC noted "I do not know", underlining uncertainties about this measure.

This measure presents a number of challenges, not least in identifying how it might be applied in practice. One possibility is to set a definition of a major transport element, e.g. in proportion of contract value. It will need to differ by type of contract and conditions for transport components of a wide range of specific contracts will need to be set. The other possibility is to define the types of contracts with thresholds (such as for example construction, transport infrastructure, maintenance contracts, catering services). This would again require considering separate types of contracts. However, the main purpose of these contracts is not the purchase of road transport vehicles.

Preliminary conclusion: Discard, because the measure is increasing administrative burden and despite of its relevance, is not likely to get the necessary political support.

5.1.2. Potential measures to ensure clear, impactful vehicle purchase provisions

With regard to the vehicle purchase provisions of Art. 5 of the Clean Directive, two main measures were proposed, with sub-options for their alternative design:

- a) setting up a definition of a clean vehicle
- b) establishing related minimum action requirements.

Those measures would require discarding the current vehicle purchase provisions of the Directive (Art 5 (3) (a) of Directive 2009/33/EC). The current provisions of Art. 5 (3) (b) would either be removed or kept, if a decision was taken to maintain the approach of using the monetisation methodology as a parallel choice option.

In addition, measures were proposed to make the monetisation methodology more effective to use.

Finally, a measure was proposed to focus the amended Directive only on heavy-duty vehicles and leave the market segment of light-duty vehicles to voluntary policy action.

5.1.2.1. Definition of a clean vehicle

Defining a clean vehicle consists of two elements: the criteria to be used and the threshold to be applied. Six different approaches were discussed.

1. Defining a clean vehicle on the basis of its CO₂ tailpipe emissions

Under this approach, vehicles below a threshold of CO₂ tailpipe ("tank-to-wheel") emissions would be classified as clean. Varying the threshold from high to lower or zero emission can define the level of ambition.

Comment: this approach can be used without any problem for light duty vehicles. The level of ambition for publicly procured clean vehicles could be defined on the basis of the CO₂ emission performance standards post-2020 for cars and vans. However, a mechanism to measure such emissions and related CO₂ emission performance standards are still under development for heavy duty vehicles (HDVs) and buses⁵³. Standards for buses and for certain categories of trucks could be applicable from the early 2020s. In view of preparing a legislative proposal for the revision of the Directive, a specific CO₂ emission threshold for HDVs could not be set, but would need to be delayed to a later stage, when the respective emission profiles and related overall emission performance standards have been set. It could then be adopted through a delegated procedure.

There were concerns in the Open Public Consultation that this approach will not adequately cover the totality of emissions that occur during the production of the energy or fuel that is used to power the vehicle. Around 50% of respondents (n=129) noted this approach to be not or somewhat adequate. However, the Clean Vehicles Directive concerns the purchase of road vehicles. Requiring public authorities to take into account both the vehicle and the fuel or electricity/source concerned could add to administrative burden, while adding problems of monitoring actual implementation.

Preliminary conclusion: retained for further analysis, because of feasibility for cars and vans and coherence with other policy initiatives. The combination of CO₂ emissions with air pollutant emissions should be analysed.

2. Defining a clean vehicle on the basis of its CO₂ life-cycle emissions

Under this approach, vehicles below a threshold of life-cycle ("well-to-wheel", in the following: WTT) CO₂ emissions would be classified as clean. Varying the threshold from high to low or zero emission can define the level of ambition.

Comment: The feasibility of setting emission thresholds for LDVs and HDVs is the same as it is for the tailpipe emissions approach. However, there are several additional complications to the setting of WTT-based thresholds in the context of the Directive. Factors for each vehicle and fuel type would need to be set. Potential factors already exist in the amendments to the Fuel Quality Directive (2009/30/EC) and the Renewable Energy Directive (2009/28/EC) for biofuels and biogases and their fossil fuel alternatives. But factors to be used for electricity or hydrogen would require considerable discussion in the absence of a methodology fully consolidated with all stakeholders. Problems could arise whether upstream emissions have to be counted as emissions of the energy or of the transport sector and how they would be counted under the different policy requirements for the sectors. A WTT-approach is also not the basis for the approach to setting CO₂ emission performance standards for cars and vehicles. Its adoption as part of the Directive would increase policy fragmentation; and its legislative adoption could risk presenting values that are already challenged by the time of transposition.

Considerations about the complexity of the approach and its applicability in the legislative context speak against its use. The prospects of broad-scale political support appear non-certain. A majority of respondents to the Public Consultation for this Impact Assessment regarded this measure as adequate (61% (n=122)), but only a slight majority of respondents from the public authorities (52% (11 out of 21)). Of the contracting authorities, a majority rejected the adequacy of the approach (6 out of 10).

⁵³ Moreover, such standards will be developed for trucks in the first instance and only later for buses.

Preliminary conclusions: Discarded for further analysis, because of consideration of feasibility and anticipated difficulties with political support.

3. Defining a clean vehicle on the basis of its air pollutant emissions

Under this approach, clean vehicles could be defined as vehicles below a specific threshold of air pollutants, in relation to RDE values included in the certificates of conformity of vehicles.

Comment: this approach can be used without any problem for cars and vans. By 2021, all new cars and LCVs will have to meet the RDE Euro standards (all new cars to be no more than 50% above Euro 6 standards). The actual values of certain air pollutants will be included on the certificates of conformity of vehicles. These could be used to further define a clean vehicle – but only for cars and LCVs – in the context of the revised Directive. Any threshold would need to go beyond RDE to generate additional impact and could require real-world compliance with Euro 6, or beyond. Going beyond the legislative requirements could yield questions as to the proportionality of the measure. For buses and trucks, the Euro VI emission standards already deliver emissions reductions in the real world. Such requirement would not yield improvements; any threshold would need to exceed Euro VI, where the future development is not clear. This measure got broad support during the Open Public Consultation (75% agreed (n=122), with broad support among from all target groups.

Preliminary conclusion: retain for analysis, in spite of the shortcoming for heavy-duty vehicles. The combination of air pollutants with CO2 emissions for cars and vans should be analysed.

4. Defining a clean vehicle on the basis of a wider set of environmental criteria

Under this approach, clean vehicles would be defined with regard to a broader set of environmental criteria following the Green Public Procurement core criteria for transport of the European Commission.⁵⁴ These would add vehicle noise and potentially other pollutant emissions.

Comment: In principle, this approach would broaden the scope of current environmental and energy impacts under the Directive, as the core set of Green Public Procurement (GPP) transport criteria focus also on all exhaust emissions, eco-driving and award additional points to the use of alternative fuels and noise reduction. Particularly adding the element of noise puts up a challenge: the reduction potential in marginal noise damage costs is difficult to assess as it is context-dependent on the number and level of noise emissions of the other surrounding vehicles. There is currently no widely agreed set of vehicle-noise related damage cost data available, making a legislative approach on a European level difficult. The voluntary GPP criteria are also designed to provide a more ambitious approach, supporting those authorities that want to go beyond the mandatory minimum requirements of the Directive. The interplay of a mandatory minimum level for all public bodies and of a voluntary policy framework to orient further-going ambition should be kept in place.

Preliminary conclusion: discarded, because of problems with availability of information and particularly the challenge of noise.

5. Defining a clean vehicle on the basis of its use of an alternative fuel⁵⁵

Under this approach, a clean vehicle would be defined as a vehicle using an alternative fuel.

⁵⁴ The GPP criteria are a voluntary tool. They comprise of core and comprehensive criteria. Core criteria are those suitable for use by any contracting authority across the Member States and address the key environmental impacts. They are designed to be used with minimum additional verification effort or cost increases. The comprehensive criteria are for those public bodies that wish to purchase the best environmental products available on the market.

⁵⁵ Following the definition of Art. 2 Directive 2014/94/EU, with the qualifications noted in chapter 5.2

Comment: this approach is applicable to all market segments of passenger cars, vans, trucks and buses. An applicable legal definition exists with Art. 2 of Directive 2014/94/EU on alternative fuels infrastructure. Member States are implementing the Directive, and hence there is clarity about the type of vehicles that fall under the remit of the Directive. There is no need for defining an entry threshold. As part of the Open Public Consultation, a slight majority (52%, (n=122) considered this measure adequate, including also a slight majority of public authorities (52% (11 out of 21)).

Preliminary conclusion: Retain for analysis, in view of its practical relevance for all market impacts, and principal support from the public consultation.

6. Defining a clean vehicle as a vehicle with zero-tailpipe emissions.

Under this approach, clean vehicles would be defined as vehicles that have no tailpipe emissions.

Comment: this approach can be used without any problems for cars, vans, trucks and buses; the technologies that fit this approach are mainly battery-electric and fuel-cell electric vehicles. Concerns raised in the public consultation and in expert interviews about a definition based solely on tailpipe zero-emissions concerns limits to the choice of technologies and higher cost to authorities, though more in the short-term. Only 33% (7 out of 21) of public authorities considered it adequate. 66% of contracting authorities (4 out of 6) considered it not adequate. At least in the short-term and potentially longer, HDV applications will need a wider range of alternative fuels. Zero-emission technologies particularly for trucks are not mass-market ready.

Preliminary conclusion: retain for analysis, because of the political priority to accelerate zero-emission vehicles. It is necessary to analyse options for integrating a specific target for zero emission vehicles in the broader overall target and related requirements to count them preferentially towards the fulfillment of a possible target.

There was a strong support for combining a specific emission threshold for CO₂ emissions and an emission threshold for air pollutant emissions, in the case an emission threshold-based approach would be used to define a clean vehicle. All key target groups to the consultation supported majorly the combination of thresholds under such an approach.⁵⁶

5.1.2.2. Setting a minimum requirement for action

A clean vehicle definition needs to be applied in practice to establish a clear, long-term policy orientation. It links to a discussion about how to set a minimum action requirement.⁵⁷ Under a definition of a clean vehicle based on its emissions, the threshold for the emissions and the target for the share of the procurement would interact. Under the definition of a clean vehicle based on its fuel, only the target for the share of the procurement would be taken into account.

Six different measures have been proposed and discussed. These measures do not all represent different approaches. Measures 3 to 6 present gradual refinements of the main measure of fixing a minimum share requirement over time compared to full or proportional share requirement per contract, particularly in view of feedback from targeted interviews during the stakeholder consultation.

1. Define an emission threshold and require its application in all procurement contracts

⁵⁶ See the stakeholder consultation synopsis report for further information.

⁵⁷ Here is it important to note the link between the threshold applied by a potential clean vehicles definition (in case of emission-based approaches) and the ambition level of the target. For example, if the threshold was very ambitious (e.g. defining clean vehicles as zero-emission vehicles) the minimum requirement for vehicle purchase would have to be relatively low. Otherwise, public bodies would face comparatively high cost of achieving the target. If, again, the threshold was of low ambition, a minimum requirement for vehicle purchase could be more ambitious.

Under this approach, a clean vehicle definition would be based on a common threshold (e.g. CO₂ emissions of vehicles). The definition would then apply to the purchase of all vehicles above the procurement threshold of EU procurement law, including the lease, rental and hire-purchase of all vehicles and to a certain percentage of the fleets of operators providing specified transport services.

Comment: no minimum requirement would need to be set. The definition will affect the totality of all authorities' procurements. This approach is not feasible for any definition based on alternative fuels. It would impose comparatively high costs for public bodies. In terms of tailpipe emissions, a threshold could be set at the level of the next CO₂ emission performance standard for cars and vans. However, this approach would lack a clear impulse for a larger market uptake of zero-emission vehicles, which is a political priority. Gradually tightening the threshold over time can address this challenge.

A slight majority of respondents to the Open Public Consultation agreed to this approach (53%, (n=122). However, it is largely driven by agreement by NGOs⁵⁸, whereas public authorities (47% (10 out of 21) disagreed, but only 29% (6 out of 21) agreed), contracting authorities (40% (4 out of 10) agreed) and companies (46% (17 out of 37 agreed) were more reserved about the measure.

Preliminary conclusion: Discard for future analysis, because the approach could either financially and technologically constrain public authorities, if the ambition level is too high, or lack market impact, if the ambition level is set too low.

2. Define a more ambitious emissions threshold and require a proportion of the vehicles to be procured under each contract

Under this approach, every purchase contract should have to comply with a requirement of a minimum share of vehicles following a definition of clean vehicles with a more ambitious emission threshold. This would also apply to vehicles procured in each lease, rental or hire-purchase contract and in each operator's fleet that are providing specified transport services under contract to public bodies.⁵⁹

Comment: The Open Public Consultation did not produce a clear picture. A slight majority of respondents agreed to this measure (54% (n=108), but only 38% (8 out of 21) of public authority respondents and 50% (5 out of 10) of contracting authorities respondents agreed to it. In the targeted interviews, representatives of public transport operators, and also of contractors, raised concerns about the practicability of imposing a minimum requirement on every contract: Oftentimes, clean and other vehicles were not procured through the same contract. The need to combine different types of vehicles may not allow the public authority to procure the best vehicle of either type. Moreover, variety of types of contract would increase the administrative burden of monitoring the implementation of the minimum requirement.

Preliminary conclusion: discard for further analysis, because it would considerably increase the administrative burden of the Directive.

3. Define a higher threshold and require a proportion of the vehicles to be procured over a fixed period of time

Under this approach, public bodies and operators would have to purchase a certain proportion of their procurement over a fixed period of time as clean vehicles, following the definition of a clean vehicle.

⁵⁸ 72% of representatives of NGOs were in favour (21 out of 29);

⁵⁹ In the latter case the required percentage would be less than the percentage required when a vehicle is purchased, leased, rented or hire-purchased.

This would also apply to vehicles procured in each lease, rental or hire-purchase contract and in each operator's fleet that are providing specified transport services under contract to public bodies.⁶⁰

Comment: This approach is better suited than the approach based on each contract. It also met the broadest average support in the Open Public Consultation (58% agreed (n=128), but public authorities remained more reserved (43% (9 out of 21) strongly or somewhat agreed). However, the approach is also meeting challenges. One challenge is to define an adequate period of time and a relevant monitoring (each type of vehicle would need to be monitored) that does not add substantially to administrative burden. Smaller public authorities do not procure vehicles as frequently as larger authorities.⁶¹ Self-reporting through a central procurement portal could be used to address this challenge; and a specific code in the Common Procurement Vocabulary of the EU will help. Being imposed to each public body and operator, it is likely to non-proportionally increase the administrative burden.

Preliminary conclusion: Discard for future analysis, because of impacts on administrative burden.

4. Define a higher threshold and set a target for a future year on vehicle procurement

This approach modifies the previous approach: all public bodies and operators would need to comply with a minimum requirement of clean vehicles as noted for the previous approach. However, the requirement would only apply to a specific future year in order to minimise impact on reporting.

Comment: For procurement, leasing, rental and hire-purchase, this approach has similar challenges to those already discussed for a time-based approach. However, it has a lower impact on administrative burden, as the requirements only apply to the final year. A fleet-based approach could set a target that, for example, all public authority bus fleets should contain a certain proportion of clean buses by 2030. Even if it would be potentially challenging to monitor, it would at least set a direction for the market, which would be clear both for manufacturers and for public authorities. If such a target was applied to the public authority procurement of transport services, e.g. bus services, the same target could be applied to these fleets, i.e. those of contractors providing services to public authorities.

Preliminary conclusion: Discard, because of impacts on administrative burden.

5. Define a higher threshold and set a target for vehicle procurement for a future year, but leave it to each Member State on how to achieve it

This approach further modifies the previous approach. The same requirements apply, but compliance with the minimum requirement would need to be demonstrated at the level of the Member State, not at the level of individual authorities or operators.

Comment: This approach would add considerable flexibility. Member States would have the possibility to adjust the implementation to their domestic circumstances. They could, for example, differentiate between more and less advanced cities. In this way, national financial support could focus on the cities that are most in need or most capable of developing the infrastructure for and utilising clean vehicles. With such an approach, there would still be a clear direction in terms of the development of the market, but action could become domestically better targeted. In the targeted consultations, representatives of public authorities and particularly of public transport operators supported such a measure, as it would leave greater flexibility to the implementation process.

Preliminary conclusion: retain for future analysis, because it enables a more flexible implementation of a possible definition and related target.

⁶⁰ In the latter case the required percentage would be less than the percentage required when a vehicle is purchased, leased, rented or hire-purchased.

⁶¹ In case of a short time period (~ 1 year) some public authorities might only make one procurement. Here, the minimum requirement would basically apply per contract, with all of the challenges noted above.

6. Define a higher threshold and leave it to Member States how to act on it

Under this approach, the Directive would require Member States to transpose the definition of clean vehicles, but it would not specify any further condition for the use of the direction but the request for a national policy framework according to the competencies in the Member State.

Comment: This approach would provide the greatest flexibility to Member States. It would give a common reference framework in the form of a clean vehicles definition that can help policy development in Member States. Compared to the other approaches, it contains a higher risk of non-appropriate action and hence lack of market impact, particularly in less advanced Member States. This approach would not establish a common and stable European market signal. Financial support could be used to incentivise higher ambition. However, financial support cannot be scheduled through the Directive itself, but would be dependent on other policy instruments.

Preliminary conclusion: retain for future analysis, because it allows the further analysis of a fully flexible, non-directional approach.

5.1.2.3. Differentiation of a minimum procurement requirement

In addition, there is further need for a differentiation of a possible minimum procurement target by Member State. All expert interviews pointed to the need for a differentiation: setting the same requirement for all Member States would risk setting a minimum requirement that could be meaningless for some Member States, but too challenging for others.

Five different measures were proposed and discussed for the differentiation of a target. Table 5.1 lists the different measures and the assessment of their suitability.

Table 5.1 Approach to differentiating a minimum procurement requirement by Member State

Measure	Strengths	Weaknesses
1. Reflecting a Member State's GDP	<ul style="list-style-type: none">Reflects differences in wealth between Member States, and so potentially the ability to finance the procurement of clean vehicles	<ul style="list-style-type: none">GDP can vary a lot between citiesDoes not (necessarily) link to environmental needsNo direct link with a procurement target
2. Based on a city's GDP	<ul style="list-style-type: none">Reflects differences in wealth between cities, and so potentially the ability to finance the procurement of clean vehicles	<ul style="list-style-type: none">Does not (necessarily) link to environmental needsNo direct link with a procurement targetComplex to calculate, as there are hundreds of citiesProblems with application to public authorities that are not city authorities
3. share of population living in urban areas	<ul style="list-style-type: none">Reflects differences in size of population	<ul style="list-style-type: none">Does not (necessarily) link to environmental needsNo direct link with a procurement targetIs complex, as there are hundreds of citiesProblems with application to public authorities that are not city authorities
4. Based on differentiation of Member States under the proposed ESR ⁶²	<ul style="list-style-type: none">Directly related to environmental needDifferentiation reflects economic capacity (related to GDP)	<ul style="list-style-type: none">Does not take into account the GDP of different citiesESR does not relate to specific sectors

⁶² based on the way in which GHG emissions reductions needs are developed under the proposed Effort Sharing Regulation.

Measure	Strengths	Weaknesses
5. Based on the extent of a city's lack of compliance with EU air quality limits	<ul style="list-style-type: none"> • Directly related to a relevant environmental need in a city • Can help target needs 	<ul style="list-style-type: none"> • Does not take account of a city's (financial) ability to procure CVs • Enforcement and monitoring becomes administratively complex • Not clear how this would apply to public authorities that are not cities • Not clear how to translate into a long-term stable market orientation

Source: own analysis

Further comment: It was decided to discard measure 2 and 4 in the first step because of conditions of proportionality and non-compatibility with other policy initiatives. It was decided to further analyse measures 1, 3 and 5, also in view of their potential combinations. Measure 5, again, appears relevant as it introduces a direct relevant environmental need into the differentiation of the Member States target. However, the further analysis did not showcase how such a differentiation requirement could reasonably well be implemented in practice. A lack of compliance cannot be estimated ex-ante over the long-term time frame up to 2030. Moreover, it would be complex to set such a requirement into a procurement Directive. It could also undermine the aim of having a simplification of the implementation process of the Clean Vehicles Directive. It would also increase the administrative burden of monitoring and enforcing this requirement.

In terms of measures 1 and 3, their sole use and a combination of the measures were further investigated. Measure 1 is an adequate proxy for the economic capacity of Member States to roll-out of clean (low- and zero-emission) vehicles and their infrastructures. Measure 3 allows for considering the impact of different levels of urban density and hence problem exposure. Eurostat data for population in cities and sub-urban areas provide a robust data base for the assessment. A combination of both measures using a weighted average was regarded, however, most promising, as it best reflects both the important dimension of economic capacity and problem pressure. Further information on this approach is provided in annex 6 and in the Impact Assessment support study.

Preliminary conclusion: retain measures 1 and 3 and analyse the possibility of a weighted combined approach to differentiating targets for Member States. Discard measures 2, 4 and 5, but keep the option to reference measure 5 in a recital of the Directive.

5.1.2.4. Focusing on heavy-duty transport vehicles

This approach would reduce the overall scope and direction of the legal requirements of the Directive to the market segment of heavy-duty vehicles only. Light-duty vehicle procurement would be removed from the Directive and left to voluntary action by Member States.

Comment: the reasoning behind this measure is that public procurement is most relevant as a market driver in the area of heavy-duty transport, particularly urban buses (see table 2.4). At the same time, this is a segment of the market, where low- and zero-emission technologies are still challenged by their price. Scale of market can only come through public demand. To be most effective, the requirements of the Directive could be concentrated on this market segment, as there is sufficient market dynamic in the light-duty vehicle markets.

While this reasoning is principally sound, a number of concerns have been raised: First of all, market uptake of low- and zero-emission light-duty vehicles is very low quite a few Member States (see fig. 2.3). Public procurement can still send an important stimulus in these nascent markets. Given the overall low registration numbers for low-and zero-emission vehicles (see table 2.2) the most effective and efficient combination of all policy levers is still needed to accelerate the needed low-emission mobility transition. Second, the Directive interacts with other policy levers, such as the CO₂ emission

performance standards for cars and vans. Stricter requirements for manufacturers can be combined with a better certainty of demand for vehicles. This interplay would be lost. Third, against this background, a reduction of scope would send a wrong policy signal to public authorities. Following the trend of the last years (see table 2.2) it could incentivise a stronger switch to petrol cars, with further impacts of emissions of CO₂.

Preliminary conclusion: discard, because of the perceived need to use all policy levers to support the low-emission mobility transition in all market segments in all Member States, in spite of the principal relevance to focus efforts on priority areas.

5.1.3. *Potential measures to ensure simplified, more effective to use provisions*

The focus was on pre-screening measures to revise the monetisation methodology.

Six main measures were presented and discussed:

1. Discard the current monetisation methodology

This measure would discard the current monetisation methodology.

Comment: the survey with public and contracting authorities during the 2015 ex-post evaluation showed a limited use of the monetisation methodology. Accordingly, a repeal of the common methodology would lead to a simplification of the implementation of the Directive. The use of monetisation of external cost could still be promoted through adequate guidance documents, reflecting different approaches. It would provide those public bodies that already use different methodologies the opportunity to continue using their tailored approaches. Other public bodies that are principally interested could determine which method would suit their needs.

Preliminary conclusion: retain for further analysis, in line with the Inception Impact Assessment.

2. Change the monetisation methodology into simple financial analysis of lifetime fuel costs

This measure would replace the current approach to using life-time operational cost with an approach using life-time fuel cost. It could be easier to use, which could support greater use.

Comment: The approach using life-time fuel cost would tend to confer an even stronger advantage to diesel vehicles compared to petrol vehicles. It would even more strongly discourage investment into clean vehicles. Fuel duties would also not encourage air pollution reduction. External cost for air pollution would need to be added.

Preliminary conclusion: discard for further analysis, because it would aggravate the current problem.

3. Update external cost values for air pollutants and CO₂

This measure would include updating the emissions cost factors in light of scientific progress and index emissions costs to inflation to avoid erroneously undermining true emission costs, on the basis of the EU handbook on external cost valuation. Updating the values would make the use of the methodology more attractive to authorities as values would better reflect the external costs of vehicles.

Comment: revision of external cost figures is needed. Price values as included in the EU handbook on external cost valuations are considerable higher than those included in the Directive.⁶³ One also needs to note that CO₂ cost under conventionally fuels would still remain lower. A revision of the current handbook is underway, which could provide a challenge in terms of timing. Revision of values for

⁶³ External cost values are around four times the values given in the Directive for CO₂ and three times the values given for NO_x.

CO₂ and air pollutants was supported by all key target groups in the consultation phase, including a more regular update of the methodology (83% (n=129) support CO₂, and 90% (n=129) support air pollutants) should the overall approach to monetisation of impacts be kept.

Preliminary conclusion: retain for future analysis, because of the relevance to improve emphasis on air pollutant and CO₂ emissions.

4. Using real world vehicle emissions and adjust damage cost to the geography of vehicle use

This measure would require taking population density into account in the methodology, as well as using real world emission data.

Comment: These measures could help better reflect differences in real world exposure compared to the average, and hence make the use of the methodology more attractive for authorities from the point of view that local context conditions are better represented. However, these measures would considerably increase the complexity of the use of the methodology. They were not consulted.

Preliminary conclusion: discard for future analysis, because of complexity increases.

5. Include noise emissions

Under this measure, damage cost from noise emissions from vehicles would be added as a relevant impact to the monetisation methodology.

Comment: A slight majority of respondents to the public consultation regarded this option as important (22.6% as very important, 29.6% as important (n=130). However, further discussion with experts and further analysis as part of the Impact Assessment Support Study underlined the complexity of the exercise. The reduction potential in marginal noise damage costs is difficult to assess as it is context-dependent on the number and level of noise emissions of the other surrounding vehicles. There is currently no widely agreed set of vehicle-noise related damage cost data available.

Preliminary conclusion: Discard for future analysis, because of concerns about applicability.

6. Require a mandatory use of the monetisation methodology

This measure would require a mandatory use of the monetisation methodology for monetisation of impacts of road vehicles. Alternatively, if the current approach to set up technical specifications was abolished and no definition of a clean vehicles were to be introduced, the approach to monetise environmental and energy impacts would become the sole approach to be used by authorities.

Comment: this approach would substantially change the current policy framework for clean vehicle procurement at European level. The lack of a requirement to use this approach to internalising operational life time cost has led to its limited use. It could potentially lead to a strong impact in terms of market uptake of clean vehicles, provided that the updated figures adequately improve the relevance of environmental impacts in the methodology. However, it will also substantially increase the administrative burden for public and private actors, at least initially.

Preliminary conclusion: retain for analysis, because of the potential impact on vehicle procurement.

5.2. Principle approaches to the design of policy options

The approaches to the design of policy options follow the specific policy objectives of this initiative (section 4.1). Policy options should address all the objectives, at least to some extent. The measures retained after the pre-screening offer three principal approaches (section 5.1) to address the three specific policy objectives:

1. varying the overall scope of the Clean Vehicles Directive: it will lead to an increase in the volume of contracts that are affected by the Directive (SPO1). Measures retained after the pre-screening include extending the scope to vehicles rented, leased or hire-purchased as well as to extend to specific transport service contracts other than public passenger transport.
2. varying the level of ambition and scale of requirements for vehicle purchase in the Clean Vehicle Directive will lead to a greater number of clean vehicles procured (SPO2). Measures retained after the pre-screening included approaches to setting up a definition of clean vehicles and to setting up a target for minimum procurement requirements, including different possibilities for differentiating between Member States and between light- and heavy-duty transport vehicles as well as different approaches to review the monetisation methodology.
3. varying the level of obligation for public bodies will affect the effectiveness of use of the Directive (SPO3). It considers the degree to which a revision of the Clean Vehicles Directive intervenes into the content and process of procurement by public bodies. The measures retained after the pre-screening include using the legal instrument of a Directive (which can be varied in the detail of its provisions) or a Regulation. Furthermore, a repeal of the Directive provides the opposite possibility for fully reducing the level of obligation.

These three principal approaches should be combined in the design of policy options, to the extent possible. Wherever possible, the scale of policy ambition should be raised linearly. Annex 5 provides further detail information.

5.3. Policy options

5.3.1. Overview of policy options

From the analysis in section 5.1 it appears that the specific objectives for this initiative could be addressed by using different combinations of the screened policy measures in form of different policy options. In addition, the Inception Impact Assessment has noted that at least one policy option should include the monetisation methodology as the only option and that at least one policy option should include a clean vehicle definition and related minimum action requirements as the only option. The pre-screening also illustrated that there are several appropriate criteria for defining a clean vehicle.

Policy options have been designed in a way that they reflect an increasing level of ambition, but also an increasing level of intervention (see table 5.1)

Table 5.1 Overview of policy options

Nr.	Policy option description	Degree of ambition	Level of intervention
PO1	This policy option repeals the Clean Vehicles Directive. Support to public authorities and the market is provided through soft policy measures such as guidance, recommendations and voluntary policy initiatives.	-	-
PO2	This policy option lightly revises the Clean Vehicles Directive. It introduces a definition of clean vehicles and sets up a requirement for Member States to adopt a national policy framework that should set an ambition level for 2030. However, setting the level of ambition and the scope is the entire responsibility of Member States. The policy option also includes a possibility to use a revised monetisation methodology. Member States have to make a binding choice between the approach of using the clean vehicle definition and national policy frameworks and the approach of using the revised monetisation methodology. The scope of the Directive is not changed, but it does not preclude the inclusion of other contracts	+	+

	(such as rent, lease, hire-purchase, or transport services) into the national policy frameworks by Member States, which should be recommended.		
PO3 *	This option thoroughly revises the Clean Vehicles Directive. It extends the scope of the Directive to vehicles rented, leased or hire-purchased as well as specific transport service contracts. It sets up a clean vehicles definition and sets up related minimum procurement target, based on an emission-based threshold combining CO ₂ and air pollutant thresholds for light-duty vehicles. It does not set up such a definition for heavy-duty vehicles, as emissions from these vehicles are not regulated. Two different sub-options test impacts of a moderate (PO3a) and a high (PO3b) policy ambition.	++	++
PO4 *	This option thoroughly revises the Clean Vehicles Directive. It extends the scope to vehicles rented, leased or hire-purchased as well as specific transport service contracts. It sets up a clean vehicles definition and sets up related minimum procurement target, based on an alternative fuels basis for light- and heavy-duty vehicles. Two different sub-options test impacts of a moderate- (PO4a) and a high (PO4b) policy ambition.	+++	+++
PO5	This option replaces the Clean Vehicles Directive with a Regulation that prescribes to public bodies the use of a revised monetisation methodology to set monetised impacts as the award criteria for vehicle procurement. It is also based on an extended scope like in PO3 and PO4.	++++	++++
PO6 **	This option combines the approach to addressing light-duty vehicles in PO3 with the approach to addressing heavy-duty vehicles in PO4, while enabling the Commission to use a delegated to set-up CO ₂ and air pollutant thresholds for heavy-duty vehicles once the regulatory requirements have been set at European level. In terms of scope it follows the same approach as PO3 and PO4	+++	+++

- *less compared to the status quo*

+ *moderate increase compared to the status quo*

++ *stronger increase compared to the status quo*

+++ *stronger increase compared to the status quo*

++++ *strong increase compared to the status quo*

* *the differentiation in the level of policy ambition and level of intervention among PO3 and PO4 is due to the fact that PO4 considers both light- and heavy-duty vehicles, whereas PO3 only considers light-duty vehicles.*

** *PO6 has a decrease in ambition compared to PO5, as it was added to the list of options a bit later.*

Source: Own analysis

Table 5.2 presents an overview of the specific policy objectives, retained policy measures and links to the different policy options.

Table 5.2 Overview of specific policy objectives, measures and links to policy options

Specific policy objectives & policy measures	Policy Options					
	PO1	PO2	PO3	PO4	PO5	PO6
<i>SPO1 Ensure that the Directive addresses all relevant procurement processes</i>						
Recommendation to Member States to make use of extending the scope of national policy frameworks	-	✓				
Expanding the scope of the Directive to vehicles rented, leased or hire-purchased	.		✓	✓	✓	✓

Expanding the scope to vehicles used in specific service contracts other than public passenger transport	-		✓	✓	✓	✓
<i>SPO2 Ensure that the Directive sends clear market signals</i>						
Setting up a definition of clean vehicles to procure	-	✓	✓	✓		✓
Setting a minimum procurement target at national level	-		✓	✓		✓
Different requirements for light-duty and heavy-duty vehicles	-			✓		✓
Requiring mandatory use of monetisation of external effects	-				✓	
Requiring national policy frameworks	-	✓				
Requiring regular reporting	-	✓	✓	✓	✓	✓
<i>SPO3 ensure that the Directive's provisions are simplified and more effective to use</i>						
Discard the monetisation methodology	-		✓	✓		
Discard technical specifications approach	-				✓	
Update the monetisation methodology	.	✓			✓	
Discard the current choice of implementation mechanisms	-		✓	✓	✓	

Source: Own analysis

5.3.2. Policy option 1 (PO1): repeal of the Directive

This policy option repeals the Directive. The specific objectives would be addressed through different non-legislative instruments, including awareness raising and promotion of the use of the voluntary green public procurement criteria established by the European Commission. Under this option, existing EU financial guidelines for moving towards low- and zero-emission vehicles⁶⁴ will be revised based on guidance or recommendations by the Commission. Voluntary action of market actors will be encouraged, such as for example the European Clean Bus Deployment Initiative.⁶⁵ The focus is entirely on voluntary actions at European level and on action to be taken at domestic level.

5.3.3. Policy option 2 (PO2): providing a definition of clean vehicles and requiring Member States to set up national policy plans or use the monetisation methodology

This policy option proposes a number of moderate changes to the current Directive to make it better fit for purpose and address the three specific policy objectives at least to some extent.

Description of the option

This option does not make changes to the scope of the Directive. The option requires Member States to make a binding choice between two principal approaches:

⁶⁴ SWD(2013)27

⁶⁵ Under this initiative, which is facilitated by the European Commission, different cities and regions as well as manufacturers have committed to exchange procurement planning and collaborate to advance projects for deployment at greater scale. See https://ec.europa.eu/transport/themes/urban/cleanbus_en

- Either implement a common definition of clean vehicles on the basis of tailpipe emissions as defined in the Directive with related requirements for follow-up action
- Or require all public bodies to procure vehicles on the basis of their monetised internal and external cost, for which the use of the updated monetisation methodology is binding.

For the definition of a clean vehicle, this option would set a low-ambition common definition of a clean vehicle on the basis of a CO₂-tailpipe emission threshold of 50 gCO₂/km for passenger cars and for vans as well as a threshold with respect to RDE air pollutant emissions having a conformity factor of 1. The threshold follows the current threshold for low-emission vehicles under the CO₂ emission performance regulation. It enables a broader palette of vehicles to be purchased, in line with the expectation to exert a moderate improvement compared to the current situation, including all battery- and fuel-cell electric vehicles, plug-in hybrid and natural gas vehicles with stronger biogas blend.⁶⁶

As noted in the screening of options, the definition will not include an emission-based threshold for heavy duty transport vehicles (buses, trucks).

If Member States decide to adopt a common clean vehicles definition, the Clean Vehicles Directive would require Member States to adopt related national policy frameworks. These frameworks:

- should set a target for the uptake of clean vehicles by public procurement by 2030. However, the Directive would not define further conditions for the targets or the measures. This would remain the discretion of Member States;
- include reporting on their implementation every three years;
- would follow the scope of the Directive. This policy option would recommend to Member States to include other types of contracts and services into national policy frameworks.

If Member States decide to transpose the monetisation methodology, they would have to transpose a revised methodology with updated CO₂ and air pollutant values on the basis of the EU handbook on external cost monetisation (see section 3 and annex 3 of the Impact Assessment Support Study).

To support the overall implementation of the Clean Vehicles Directive, Member States would be obliged to report every three years on the implementation of the Directive, starting in the year 2026. To support this reporting, a common code for low- and zero-emission vehicles could be introduced into the Common Procurement Vocabulary of the EU.

How does this policy option address the specific policy objectives?

SO1: ensure that the Directive addresses all relevant procurement practices

- This option addresses this specific objective to a light extent. Member States are entitled to include other contracts (rent, lease, hire-purchase) or transport-related service into national policy frameworks. There is no obligation - the main focus is on establishing the common definition of clean vehicles or on ensuring the use of the revised monetisation methodology.

SO2: ensure that the Directive provides clear market signals

⁶⁶ This emission threshold allows for registration of all alternatively fuelled vehicles (battery-electric, fuel-cell electric, natural gas, plug-in hybrids) as well as a few innovative conventional vehicles technologies. It has been set to reflect a situation by which public authorities can draw on this broader, but also lower-ambition portfolio of technologies. The threshold is coherent with the analytical work underpinning the 2016 Low-Emission Strategy, where the EU CO₂-2030 scenario (assuming a 30% of energy efficiency by 2030) assumes CO₂ thresholds of 80 gCO₂/km in 2025 and 70 gCO₂/km in 2030. Other emission-thresholds also exist (the current regulation for CO₂ emission performance standards for cars and vans stipulates 50 gCO₂/km as the threshold for low-emission vehicles under the super-credit scheme).

- This option provides a common definition. In case Member States decide to transpose this option, it creates a common point of orientation for public procurement policies at national level and on the basis of a national policy framework a clear market signal. The level of ambition can, however, not be impacted, but it would rely on the willingness of Member States to take action.

SO3: ensure that provisions are simplified and effective to use

- Updating the CO2 and air pollutant related values of the monetisation methodology would make the methodology more effective.
- Retaining a choice for Member States to either transpose the clean vehicles definition and related requirement to set up a national policy framework or to transpose the requirement to use environmental impacts as award criteria and the revised monetisation methodology approach in case monetisation should make the implementation simpler. Member States would have to make a choice to select one of the two approaches.

5.3.4. Policy Option 3 (PO3): providing a definition based on emission thresholds and setting up minimum procurement requirements for light-duty vehicles

This policy option thoroughly revises the Directive. It increases the level of ambition, but also the level of intervention. It addresses all three specific policy objectives. Particularly it:

- introduces a common definition of clean vehicles on the basis of an emissions-threshold (tank-to-wheel) for light-duty vehicles,
- adds a target for Member States for a minimum share in the total procurement of light-duty vehicles following the clean vehicles definition,
- introduces measures to extend the scope of the Directive and
- removes the monetisation methodology.

Yet PO3 still keeps a considerable degree of flexibility: it is left to Member States to decide how the minimum targets related to the clean vehicles definition will be delivered.

Description of the policy option

The policy option extends the scope of the Directive. It would

- include vehicles leased, rented or hire-purchased by public authorities. The definition of clean vehicles and the minimum target set at the level of the Member State should be applied to vehicles leased and hire-purchased in line with the conditions set for the implementation of the target. Application of the minimum target should also be applied to vehicles rented by public authorities accordingly. If applicable, the fleet providers would have to comply with the minimum requirements set for the years 2025 and 2030. As with the purchase of vehicles, the procurement thresholds of Directives [2014/24/EU](#) and [2014/25/EU](#) apply.
- include in the list of "selected transport services" bus services, waste collection services and postal and courier services, as defined by their respective Common Procurement Vocabulary codes. This covers some of the more significant services that public authorities procure in addition to public passenger transport. Rather than setting an additional minimum requirement for these services, the operator fleets providing the services should be entitled for inclusion in the counting of the overall minimum target of the Member State, if deemed applicable.

The policy option introduces a common definition of a clean vehicle for light-duty vehicles, based on a vehicle's tailpipe CO₂ emissions and in addition, its RDE air pollutant emissions, and defines related minimum procurement targets for Member States for the years 2025 and 2030. Setting two target years is necessary to avoid that action towards meeting the target is delayed, but also to support a gradual increase of ambition over time. The year 2025 is in close enough proximity to the entry of the force of a revised Directive in order to ensure timely impact. Yet it also leaves enough time for public authorities to adapt their planning cycles.

This policy option takes a two-tiered approach to test the impacts of different levels of ambition in the two target years of 2025 and 2030 for light-duty vehicles. As noted in the pre-screening of measures, no definition and related minimum target is provided for heavy duty vehicles.

- In the two sub-options the definition of a clean vehicles is set as follows:
 - o PO3a (moderate ambition):
This sub-option introduces for 2025 a threshold of 50 gCO₂/km for cars and vans, following the same reasoning as in PO2, but making this approach mandatory to use for all Member States and connecting it to a minimum procurement target.⁶⁷ In addition, it introduces a threshold with respect to RDE air pollutant emissions: vehicles should have a conformity factor of 1 (i.e. 0% meaning that they meet Euro 6 standards as originally defined). As the CO₂ threshold would not go much beyond the average CO₂ emission fleet standard in 2030, the CO₂ threshold is lowered in 2030 to 25 gCO₂/km for passenger cars and 40 gCO₂/km for vans.⁶⁸ The threshold with respect to RDE air pollutant emissions is lowered to a conformity factor of 0.8 (i.e. 20% below Euro 6 standards).
 - o PO3b (high ambition):
This sub-option sets a threshold of 25 gCO₂/km for cars and 40 gCO₂/km for vans by 2025, coupled with a threshold with respect to RDE air pollutant emissions of having a conformity factor of 0.8 (i.e. 20% below Euro 6 standards). In 2030, the CO₂ threshold is lowered to zero gCO₂/km for cars and vans, as it is expected that zero-emission technologies are established in the market by the time and as it is intended to keep a strong innovation impulse and market support of public procurement intact. .
- On the basis of the definition a target for Member States for a minimum share in the total procurement of light-duty clean vehicles is set up. Member States can decide how to deliver their minimum requirement, e.g. apply it to all or to selection of contracting authorities, entities and operators, providing considerable flexibility to adapt to regional and local conditions.
 - o The minimum share remains the same for 2025 and 2030: the increase in ambition is realised through changes to the entry threshold of the clean vehicles definition. Annex 6 of this Impact Assessment provides further detail on this approach.
 - o Following an analysis of initial ambition levels for the target setting, a medium average European ambition level of setting a target for 35% of all public procurement of vehicles to include vehicles following the definition of clean vehicles has been chosen as the basis for further differentiation at Member State requirements based on expert judgement and further analysis in the context of the Impact Assessment Support Study (annex 6 of this Impact Assessment). It provides a reasonable sense of

⁶⁷ See footnote 57.

⁶⁸ These thresholds have been set in alignment with the proposed thresholds for low-emission vehicles under the legislative proposal for CO₂ emission performance standards for cars and vans post 2020 (*to be confirmed when available*)

ambition compared to the baseline, but is also feasible to achieve.⁶⁹ Moreover, it leaves public bodies within the flexibility of agreeing to the implementation of the minimum target at national level considerable choice for technologies, not constraining their principal ability to choose the technology preferred, as the target contains to a minimum share counted at Member State level.

- Member State requirements have been differentiated through combining the criterion of GDP per capita and the criterion of shares of population living in urban and intermediate regions. Further detail on the corresponding minimum requirements for Member States is provided in the Annex 6 of this Impact Assessment Report.

A specific focus is on supporting zero-emission vehicles in form of a specific counting:

- Vehicles that meet the threshold in this option would count as 0.5 clean vehicles for complying with the minimum target. The exception concerns vehicles with zero-tailpipe CO₂ emissions. These vehicles count as one clean vehicle for the purpose of complying with the minimum target. This measure aims to give a higher weighting to zero-emission vehicles without weakening the overall minimum target. The double-counting is abandoned in case of those Member States where the minimum target exceeds 50% of the overall volume of public procurement, with a cut-off at the 50% mark.⁷⁰

The policy option removes the current dual choice of implementation mechanisms and with it the monetisation methodology.

To support the implementation of the Directive and monitoring of the progress towards common minimum procurement targets, Member States would be obliged to report every three years on the implementation of the Directive, starting in the year 2023 with an intermediate report and in 2026 with a full report on the minimum procurement target. To support this reporting, common codes for low- and zero-emission vehicles in the Common Procurement Vocabulary of the EU should be complemented to enable easy reporting under the Tender Electronic Daily Database.

How does this policy option address specific policy objectives?

SO1: ensure that the Directive addresses all relevant procurement practices

- The expansion of the scope of the Directive brings a considerable number of vehicle contracts under the responsibility of the Directive (see table 2.5).
- It keeps a proportionality of impact on administrative burden by respecting the common procurement thresholds of Directives 2014/24/EU and 2014/25/EU. Similarly, it allows including operator fleets providing the services in the counting of the overall minimum requirement of the Member State.

SO2: ensure that the Directive provides clear market signals

⁶⁹ As part of the initial analysis, different levels of ambition for setting up a minimum target requirement in relation to the baseline development were tested (annex 6 of this Impact Assessment). A low, medium and high ambition target was developed with European average values of 20% (low ambition), 35% (medium ambition) and 50% (high ambition). These values were chosen in view of their expected impacts relative to the projected baseline developments.

⁷⁰ It supports the main policy priorities of the Commission's European Low-Emission Mobility Strategy, namely to improve the take up of low-emission alternative energies and to accelerate the roll-out of zero-emission vehicles. It still leaves considerable flexibility of authorities when it comes to the whole vehicle fleet. Here it is clear that procurement of conventionally fuelled vehicles should also best reflect the state-of-the-art technologies for increasing the energy efficiency and improving the emission reduction from internal combustion engines.

- This option provides a clear long-term market signal for the light-duty transport sector. It ensures that a specific minimum share of clean vehicles is purchased, rented, leased or hire-purchased by public bodies with a transparent orientation for two target years (2025 and 2030) as defined by Member States. In this context, it puts particular emphasis on the promotion of low- and zero-emission vehicles, in line with the priority of the European Low-Emission Mobility Strategy. However, it does not address heavy-duty vehicles, as there is currently no legal requirement for CO₂-emissions from heavy-duty vehicles.
- At the same time, it provides flexibility for implementation in Member States: it is up to Member States authorities to define how to implement the overall target, i.e. to allocate requirements to all or to a subset of contracting authorities, entities and operators. In this context, this policy option would set up a recommendation through recitals of the Directive on the relevance to focus action on urban agglomerations that are concerned by exceedance of air quality limit values as defined in the Acquis. A significant gap between the geographical concentration of public procurement action and the concentration of exceedance of air quality limit values should give rise to recommendations for reprioritising the actions under the minimum target.

SO3 – ensure that the Directive's provisions are simplified and effective to use

- Removing the current choice of transposition options helps to simplify the implementation of the Directive; no major practical implications are expected due to the limited use of the methodology in practice. Setting a clear definition and minimum procurement requirements will support the more effective implementation of the Directive. This position has also been shared by a majority of stakeholders in the consultation process.⁷¹ Setting up the approach to deliver on the minimum target will require upfront coordination in Member States, but it will be guided by clear provisions. Reporting will be facilitated through complete codes on low- and zero-emission vehicles in the Common Procurement Vocabulary of the EU.

5.3.5. Policy Option 4 (PO4): providing a definition based on alternative fuels and setting up related minimum procurement requirements for all vehicles

This policy option adopts the same principal approach to the revision of the Clean Vehicles Directive as PO3, but with important differences. It:

- introduces a common definition of clean vehicles on the basis of alternative fuels,
- adds a target for Member States for a minimum share in the total procurement of light- and heavy-duty vehicles following the clean vehicles definition,
- introduces measures to extend the scope of the Clean Vehicles Directive and
- removes the monetisation methodology.

Compared to PO3, this policy options addresses both light- and heavy-duty vehicles, which is a considerably larger scope of ambition. Compared to PO3, there is also no interplay between an entry threshold of tail-pipe emissions and a minimum target for procurement of vehicles. In PO4, the level of ambitions is only realised through the level of the minimum target. The definition based on the alternative fuels remains the same.

Description of the policy option

⁷¹ In the Open Public Consultation, the approach to require public bodies to meet minimum procurement targets based on a clean vehicles definition only found on average the greatest support among all participants (56% (73 out of 130)). In comparison, only 36% (47 out of 130) supported a continuation of the current dual approach.

PO4 extends the scope of the Directive like in PO3. It would

- include vehicles leased, rented or hire-purchased by public authorities. The definition of clean vehicles and the minimum target set at the level of the Member State should be applied to vehicles leased and hire-purchased in line with the conditions set for the implementation of the target. Application of the minimum requirement should also be applied to vehicles rented by public authorities accordingly. If applicable, the fleet providers would have to comply with the minimum requirements set for the years 2025 and 2030. As with the purchase of vehicles, the procurement thresholds of Directives 2014/24/EU and 2014/25/EU apply.
- include in the list of "selected transport services" bus services, waste collection services and postal and courier services, as defined by their respective Common Procurement Vocabulary codes. This covers some of the more significant services that public authorities procure in addition to public passenger transport. Rather than setting an additional minimum targets for these services, the operator fleets providing the services should be entitled for inclusion in the counting of the overall minimum requirement of the Member State, if deemed applicable.

PO4 also introduces a common definition of a clean vehicle for light and heavy-duty vehicles. As PO3, it defines related minimum procurement target that are differentiated for the years 2025 and 2030, following the same rationale for choosing these two years as under PO3. Other than PO3, PO4 also differentiates the procurement targets for light- and heavy-duty vehicles for these two target years, as the definition basis of alternative fuels allows for such differentiation. As in PO3, PO4 includes two sub-options to test both a low- (PO4a) and high policy ambition (PO4b). In particular:

- PPO4 follows a qualified definition on the basis of Article 2(1) of Directive 2014/94⁷², with the same specific counting approach for zero-emission vehicles as in PO3. In addition to battery- and fuel-cell electric vehicles, vehicles capable of using natural gas will be counted only as fully contributing to the minimum target if it can be demonstrated that there is a contract to procure bio-methane, or other means of accessing bio-methane, e.g. from a municipally-owned facility, in sufficient capacity to ensure full operation of the vehicle.⁷³ It hence allows, within the context of the overall low-emission mobility approach, a full choice of technologies.
- Other alternative fuels vehicles are counted with 0.5 towards meeting the requirements of the target. Biofuels and synthetic and paraffinic fuels are not counted as part of the minimum procurement target, but are, of course, not prevented otherwise.⁷⁴
- PO4 establishes a related minimum target at the level of the Member States. The minimum target is differentiated by Member States and further by light- and heavy-duty vehicles (annex 6 of this Impact Assessment)⁷⁵. The two sub-options include:

⁷² Art 2 (1) 2014/94/EU includes the following fuels: electricity, hydrogen, biofuels as defined in point (i) of Article 2 of Directive 2009/28/EC, synthetic and paraffinic fuels, natural gas, including bio-methane, in gaseous form (compressed natural (CNG)) and liquefied form (liquefied natural gas (LNG) and liquefied petroleum gas (LPG)).

⁷³ This is to avoid a situation by which natural gas buses are fuelled with natural gas, but are being declared as zero-emission vehicles with reference to their use of bio-methane. Moreover, as in PO3, the same qualification applies that this rule of double-counting is not used for procurement targets that exceed 50% of the overall procurement volume, with a sharp cut off.

⁷⁴ Biofuels as defined in point (i) of Art. 2 of Directive 2009/28/EC. As noted in the Commission's European Low-Emission Strategy (COM (2016)767) as well as in the Commission's Strategic Transport Research and Innovation Agenda (STRIA) (SWD (2017)223) these fuels have their particular relevance as alternative fuel options in aviation and shipping. Their use does not imply any changes in vehicle technology, making it necessary to demonstrate the fuel use over the life-time of the vehicle. It would add a complex burden on the procurement to add the fuel cost to the vehicle cost, while the contribution of the fuels to the required reduction of air pollutants is under discussion. PO4 does not exclude the use of biofuels or paraffinic fuels in fuelling those vehicles in the fleet of any public body that are not counted as part of the minimum procurement target.

- PO4a (moderate ambition):
A moderate ambition approach of 20% in 2025 and 35% in 2030 for passenger cars and vans; of 5% in 2025 and 10% in 2030 for trucks and of 30% in 2025 and 50% in 2030 for urban buses. The setting of the mandate levels follows expert judgement and further analysis in the context of the Impact Assessment Support Study, taking into account recent market forecasts for vehicles and their differentiation by market segments and the impact of the level of ambition relative to the projected baseline.⁷⁶
 - PO4b (high ambition)
a high ambition approach of 35% in 2025 and 50% in 2030 for passenger cars and vans; 10% in 2025 and 15% in 2030 for trucks and of 50% in 2025 and 75% in 2030 for urban buses, following the same reasoning for their design as in PO4a but with a much higher market impact in mind. The comparatively high values for urban buses are justified based on the recent market forecasts delivered by public transport operators for the deployment of low- and zero-emission bus solutions and ongoing policy and market action in Member States.⁷⁷
- As in PO3, further modulation of Member State requirements was undertaken on the basis of combining criteria of GDP per capita and data on urban population density in the respective Member State to get to a weighted assessment of economic capacity and problem exposure. Further information is provided in annex 6 of this Impact Assessment.

The policy option removes the current dual choice of implementation mechanisms and with it the monetisation methodology.

To support the implementation of the Directive and monitoring of the progress towards common minimum procurement targets, Member States would be obliged to report every three years on the implementation of the Directive, starting in the year 2023 with an intermediate report and in 2026 with a full report. To support this reporting, common code for low- and zero-emission and other alternative fuels vehicles should be complemented in the Common Procurement Vocabulary of the EU.

How does this policy option address specific policy objectives?

SO1: ensure that the Directive addresses all relevant procurement processes

As in PO3, the expansion of the scope of the Directive brings a considerable number of vehicle contracts under the responsibility of the Directive (see table 2.5). Other than in PO3, PO4 covers a larger amount of contracts due to the fact that it addresses both light- and heavy-duty vehicles.

Like PO3, it keeps a proportionality of impact on administrative burden by respecting the common procurement thresholds of Directives 2014/24/EU and 2014/25/EU. Similarly, it allows including operator fleets providing the services in the counting of the overall minimum requirement of the Member State; where the burden impact is, however, larger due to its application to both light- and heavy-duty vehicles. The concrete implementation of the target is the task of Member States.

⁷⁵ To account for differences in market maturity of light-duty and heavy-duty vehicle technologies. But it should also help ensure that some effort is targeted on the – more expensive – heavy-duty transport sector in order to provide an increased market

⁷⁶ See ZEEUs ebus report (a.a.o), McKinsey (2017) a.a.o, IEA (2017) a.a.o.

⁷⁷ See ZEEUs ebus report (a.a.o)

SO2: ensure that the Directive sends clear market signals

There is a clear long-term market signal indicated by the minimum procurement target. As in PO3, recitals under this option would clearly note the need to take into account urban agglomerations that are particularly concerned by exceedance of air quality limit values as defined in the Acquis. A significant gap between the geographical concentration of public procurement action and the concentration of exceedance of air quality limit values should give rise to recommendations for reprioritising the actions under the target.

SO3 – ensure that the Directive's provisions are simplified and effective to use

Removing the current choice of transposition options helps to simplify the implementation of the Clean Vehicles Directive; no major practical implications are expected due to the limited use of the methodology in practice. Setting a clear definition and minimum procurement targets will support the more effective implementation of the Directive. This position has also been shared by a majority of stakeholders in the consultation process.⁷⁸ Setting up the approach to deliver on the minimum target will require upfront coordination in Member States, but it will be guided by clear provisions. Reporting will be facilitated through clear codes on low- and zero-emission vehicles in the Common Procurement Vocabulary of the EU.

5.3.6. Policy Option 5: setting up a Regulation to use the monetisation methodology as the sole approach to informing vehicle procurement

This policy option is the most ambitious policy option. It fundamentally changes the overall governance framework of clean vehicles procurement. It is the option that most strongly increases the level of intervention in Member State: it replaces the current Clean Vehicles Directive with a Regulation on the promotion of clean vehicles.

Description of the policy option

PO5 prescribes to public entities, contracting entities and operators the use of energy and environmental impacts as award criteria in purchase decisions on the basis of monetisation of these impacts. To this end, the Regulation defines the approach to monetisation of impacts on the basis of the revised current monetisation methodology.

This option has a considerable strong impact to harmonise public procurement criteria in Member States. The provisions of the Regulation would apply with immediate effect to all affected public entities, contracting entities and affected operators, but not before the year 2020 to provide time for public bodies to adapt and prepare. It would provide all market actors with clear regulatory framework, but at the cost of no flexibility for local and regional authorities to use other methodologies that would be adjusted to their specific local contexts.

In terms of revising the scope of the Clean Vehicles Directive, PO5 would adopt the same approach as PO4. However, the difference here is that actors providing vehicles for rent, lease or hire-purchase or actors providing specific transport services would not have to fully comply with the conditions of the minimum requirement in terms of securing a share of their fleets. Rather they would have to demonstrate compliance with the use of the methodology for all their purchases, which increases the level of obligation compared to PO4.

The Regulation would set new values for CO₂ and air pollutant emissions on the basis of the EU handbook on external cost monetisation (see Impact Assessment Support Study, section 3 and Annex

⁷⁸ In the Open Public Consultation, the approach to require public bodies to meet minimum procurement targets based on a clean vehicles definition only found on average the greatest support among all participants (56% (73 out of 130)). In comparison, only 36% (47 out of 130) supported a continuation of the current dual approach.

3 for further detail). The use of the methodology would apply to all public procurements above the common procurement thresholds of Directive 2014/24/EU and 2014/25/EU. It would require public bodies to use the revised methodology for monetising all internal and external cost of vehicles to be purchased and determine the vehicle on this basis.

Under this option, reporting on the outcomes under the Regulation would be required from 2027 onwards.

How does this policy option address the specific policy objectives?

SO1: ensure that the Directive addresses all relevant procurement processes

- PO5 fully addresses this policy objective, by extending the scope to contracts for rent, lease and purchase hire as well as specific transport service contracts where the methodology would need to be applied.

SO2: ensure that the Directive sends clear market signals

- Using a Regulation to directly target the use of the approach and the methodology with immediate effect after publication will strongly impact the procurement procedures of all related public entities, contracting entities and operators. It will hence streamline public procurement procedures in Member States. However, the use of the methodology will not specify, which vehicles will need to be procured. The outcomes will depend on the specific cases. Hence PO5 delivers less clear market signals compared to PO3 and PO4.

SO3 ensure that the Directive's provisions are simplified and effective to use

- The monetisation of energy and environmental impacts as award criteria in procurement decisions will be the only approach; hence simplifying the overall approach by giving up the current dual choice of implementation mechanisms. However, the use of monetisation as an approach in public procurement will make public procurement initially more difficult for those public bodies which have little experience and capacities. Due to the immediate and universal application of the Regulation a more effective use is also conditioned, though the monitoring and enforcement of the correct application of the Regulation will be difficult.

5.3.7. Policy Option 6: combining a emission-based and an alternative fuels based approach

Policy option 6 evolved in the context of the discussion about the previous five policy options. It adopts the approach to defining a clean vehicle in the light-duty vehicle segments as described in option 3b. It empowers the Commission to adapt similar requirements for heavy-duty vehicles based on emission-based thresholds through a delegated act under this Directive once these have been established at EU level. Until then, the amended Directive would require Member States to conform to a minimum target for heavy-duty vehicles set on the basis of alternative fuels. In addition, this option adopts the same approach to extending the scope of the Directive as presented in options 3 and 4, and includes the same approach to reporting.

Description of the policy option

PO6 extends the scope of the Clean Vehicles Directive like in PO3 and PO4.

PO6 adopts the same approach to defining a clean light-duty vehicle as PO3b. Moreover, it empowers the Commission to set a definition for a clean vehicle on the basis of a combined CO₂- and air pollutant emission threshold in the area of heavy-duty vehicles once these requirements have been set by the European co-legislator by means of a delegated act under the amended Directive. Until then,

PO6 establishes a minimum target in the heavy-duty sector for Member States to meet on the basis of alternative fuels as defined in option 4b. Moreover, it adopts the same approach to reporting on the implementation of the minimum procurement target as option 4b.

How does this policy option address specific policy objectives?

SO1: ensure that the Directive addresses all relevant procurement processes

As in PO3b and 4b, the expansion of the scope of the Directive brings a considerable number of vehicle contracts under the responsibility of the Directive (see table 2.5). PO6 covers both light- and heavy-duty vehicles.

Like PO4b, it keeps a proportionality of impact on administrative burden by respecting the common procurement thresholds of Directives 2014/24/EU and 2014/25/EU. Similarly, it allows including operator fleets providing the services in the counting of the overall minimum requirement of the Member State; where the burden impact is, however, larger due to its application to both light- and heavy-duty vehicles. The concrete implementation of the target is the task of Member States.

SO2: ensure that the Directive sends clear market signals

As in PO4b, there is a clear, long term market signal. Moreover, recitals under this option would clearly note the need to take into account urban agglomerations that are particularly concerned by exceedance of air quality limit values as defined in the Acquis. A significant gap between the geographical concentration of public procurement action and the concentration of exceedance of air quality limit values should give rise to recommendations for reprioritising the actions under the target.

SO3 – ensure that the Directive's provisions are simplified and effective to use

Removing the current choice of transposition options helps to simplify the implementation of the Directive; no major practical implications are expected due to the limited use of the methodology in practice. Setting a clear definition and minimum procurement targets will support the more effective implementation of the Directive. This position has also been shared by a majority of stakeholders in the consultation process.⁷⁹ Setting up the approach to deliver on the minimum target will require upfront coordination in Member States, but it will be guided by clear provisions. Reporting will be facilitated through clear codes on low- and zero-emission vehicles in the Common Procurement Vocabulary of the EU.

6. ANALYSIS OF IMPACTS

6.1. Overview of impacts

This chapter presents the different economic, social and environmental impacts for the different policy options in comparison to the baseline. A quantitative assessment tool has been developed for this purpose, relying to the extent possible on input from an update of the EU Reference scenario 2016⁸⁰.

⁷⁹ In the Open Public Consultation, the approach to require public bodies to meet minimum procurement targets based on a clean vehicles definition only found on average the greatest support among all participants (56% (73 out of 130)). In comparison, only 36% (47 out of 130) supported a continuation of the current dual approach.

⁸⁰ This update (i.e. Baseline scenario) builds on the EU Reference scenario 2016 but additionally includes some updates in the technology costs assumptions (i.e. for light duty vehicles) and few policy measures adopted after its cut-off date (end of 2014) like the Directive on Weights and Dimensions, the 4th Railways Package, the NAIADES II Package, the Ports Package, the replacement of the New European Driving Cycle (NEDC) test cycle by the new Worldwide harmonized Light-vehicles Test Procedure (WLTP). It has been developed with the PRIMES-TREMOVE model (i.e. the same model used for the EU Reference scenario 2016) by ICCS-E3MLab. A detailed description of the this scenario is available in

The analysis combines quantitative and qualitative assessment, taking into consideration gaps in data availability and issues of data quality. Further information on the input assumptions used in the quantitative assessment tool is provided in the Annex 4 "*Analytical models used in preparing the impact assessment*" and in Annex 3 of the Impact Assessment Support Study.

The main economic, social and environmental impacts are summarised in this section, relative to the baseline scenario. As explained in section 2.3, sensitivity analysis has been performed for the baseline scenario, given more recent information on market prospects provided by key vehicle manufacturers and transport operators for the bus market. The detailed results of all policy options relative to this alternative baseline are provided in Annex 8 and in the Impact Assessment Support Study. They are mentioned in the sections below, where relevant.

6.2. Impacts of policy options on vehicle procurement

The quantitative analysis of economic, social and environmental impacts of the policy options is based on the assessment of the number of vehicles procured by powertrain type under each policy option as well as the available data on vehicle purchase and operating costs.

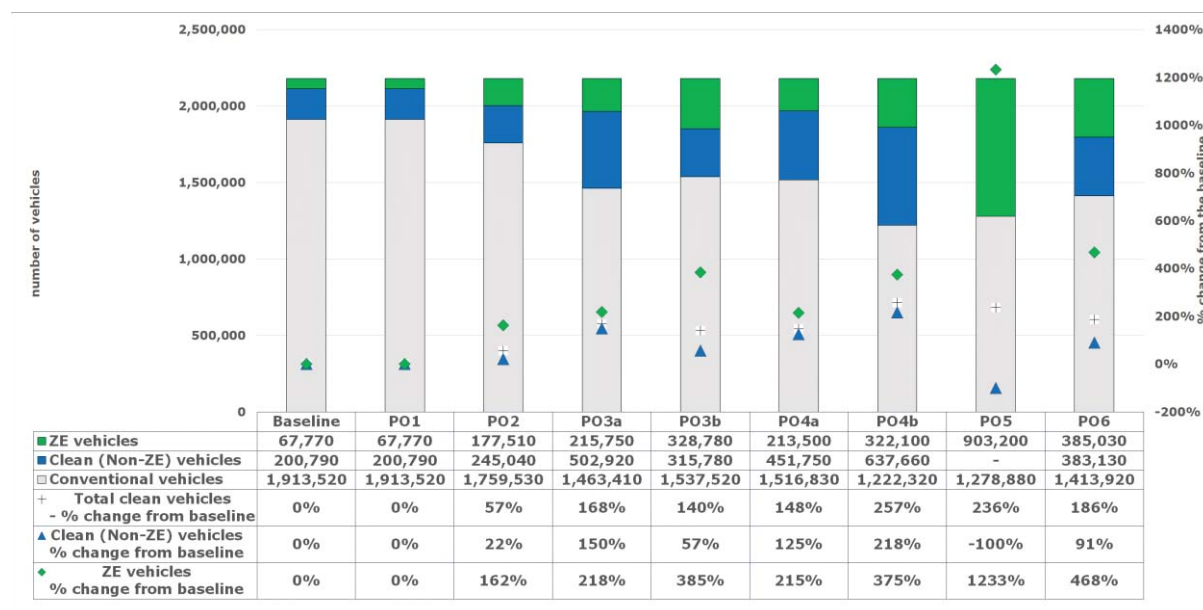
The policy options would not have a significant impact on the total number of vehicles procured during 2020-2035. But they would affect the composition of the fleet in terms of types of powertrains procured. Figure 6.1 presents the changes in the number of clean (low- and zero-emission vehicles) vehicles procured relative to the baseline scenario. It covers all vehicle types (i.e. passenger cars, vans, buses and heavy goods vehicles) and all types of contracts (i.e. vehicles procured under purchase, lease and services contracts).

PO4b shows the most significant impact in terms of number of clean vehicles procured, which is projected to be almost four times higher relative to the baseline during 2020-2035. This is particularly due to the early-on impact on urban buses. Setting up a Regulation to use the monetisation methodology in PO5 also shows significant impacts, with clean vehicles projected to be more than three times higher than in the baseline scenario. However, while PO4b incentivises the procurement of both low- and zero-emission vehicles, PO5 shifts the focus fully on zero-emission vehicles. PO3b and PO4a show relatively similar impacts on the total number of clean vehicles procured (139 to 148 % increase relative to the baseline scenario) but providing a definition of clean vehicles based on high ambition emission thresholds (in PO3b) leads to higher uptake of zero-emission vehicles. PO3a, setting a definition of clean vehicles based on moderate ambition emission thresholds, provides less incentives for the uptake of zero-emission vehicles than PO3b.

PO6 is the second best performing in terms of incentives for zero-emission vehicles after PO5, with zero-emission vehicles projected to be almost six times higher relative to the baseline during 2020-2035. PO2 mostly provides incentives for the procurement of zero-emission vehicles but its overall impact on clean vehicles procurement is more limited. The repeal of the Directive (in PO1) has no significant impact relative to the baseline.

the Impact Assessment accompanying the Proposal for a Directive amending Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures, SWD (2017) 180.

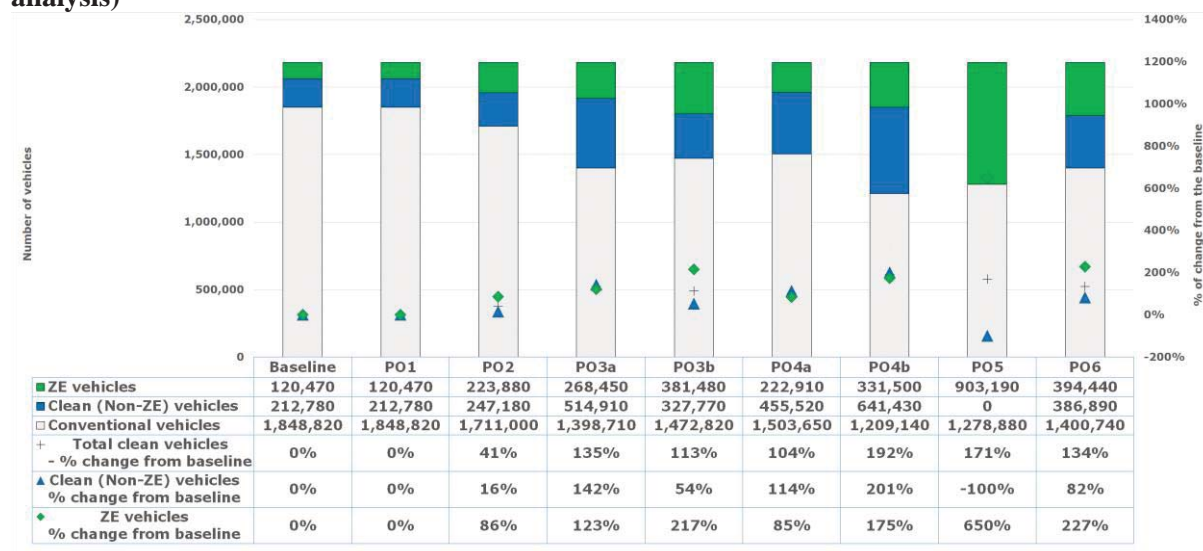
Figure 6.1 Impact of policy options on procurement of clean vehicles⁸¹ under purchase, lease and services contracts during 2020-2035 relative to the baseline scenario



Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

A detailed breakdown by vehicle category and type of powertrain is available in the Impact Assessment Support Study (Annex 8). The sensitivity check with the alternative baseline (see Figure 6.2) shows a lower impact of the policy options on the deployment of clean vehicles, because of the assumed higher number of low- and zero-emission buses in the alternative baseline. Again, a detailed breakdown is available in the Impact Assessment Support Study (Annex 9).

Figure 6.2 Impact of policy options on procurement of clean vehicles under purchase, lease and services contracts during 2020-2035 relative to the alternative baseline scenario (sensitivity analysis)

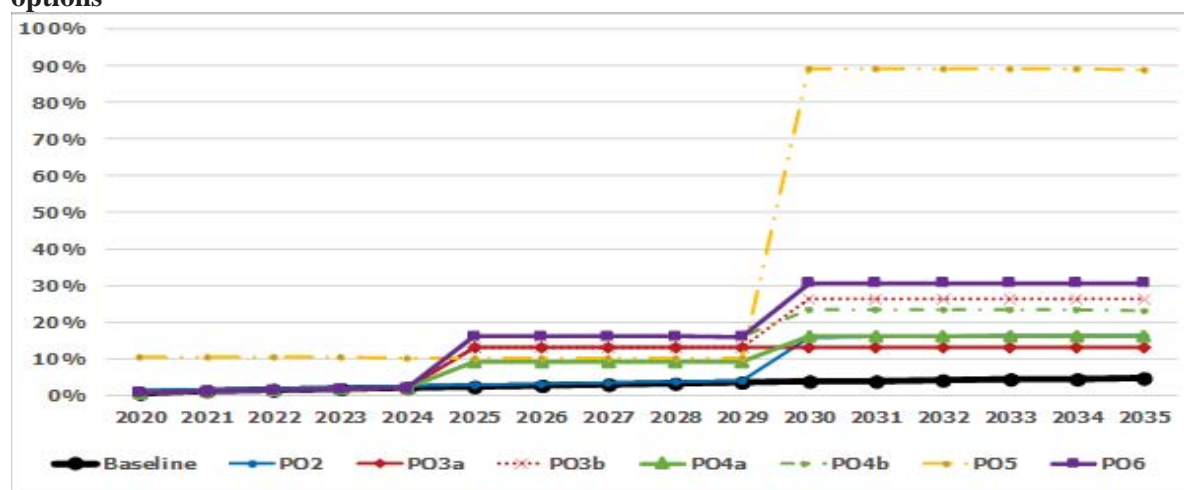


Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

⁸¹ Publicly procured vehicles cover passenger cars, light commercial vehicles, buses and heavy goods vehicles.

The time profile of the uptake of zero-emission vehicles procured is also a differentiator between policy options, as illustrated in Figure 6.3. While PO4b and PO6 lead to a significant share of zero-emission vehicles procured by 2025 (almost 20%), PO5 only has significant impact starting with 2030 (almost 90%). PO6 offers the best impact in terms of medium (2025) and longer-term (2030) impacts of all the other policy options, thus providing the best benefit to European citizens and companies.

Figure 6.3 Example of share of zero-emission vehicles⁸² under purchase, lease and services contracts in the total number of vehicles procured per year as a differentiator among policy options



Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

The analysis shows a relative even built up of impacts over time under POs 3,4 and 6 as seen from an overall level.

6.3. Economic impacts

Economic impacts include cost and benefits for public and private actors, including increases or reductions in purchase prices, operational cost, and administrative cost or other cost (e.g. reporting) as well as administrative and compliance cost and sales revenues for vehicle suppliers. Moreover, a qualitative analysis has considered impacts on competitiveness, SMEs and energy import dependency, as well as on the regional distribution of impacts and on the functioning of the internal market.

6.3.1. Impact on public bodies

Initial purchase cost of vehicles for public bodies are expected to increase, reflecting the higher roll-out of low- and zero-emission vehicles, which are expected to remain more expensive, compared to conventional vehicles (also due to their refuelling/recharging infrastructure needs), particularly in the heavy duty sector (see Table 6.1). Of all options, PO5 is expected to lead to the highest increase in upfront procurement cost (other policy options also incur higher upfront procurement cost), mainly driven by the procurement of battery-electric buses. However, even PO5 shows a relatively moderate increase of 12% compared to the baseline over the period of 2020-2035, whereas PO4b and PO6 lead to an increase of 5% compared to the baseline (Table 6.1).

In addition, administrative costs need to be factored in for public bodies, including one-off and continued costs for changing procedures to adapt to the provisions of the new legislation. Costs are also associated with setting up national monitoring and reporting as required under the policy

⁸² Publicly procured vehicles cover passenger cars, light commercial vehicles, buses and heavy goods vehicles.

options.⁸³ Annexes 3 and 7 of the Impact Assessment Support Study provide further information on cost breakdown and methodology. It is estimated that administrative cost will decrease under all policy options except PO5 (€ 1.3 million increase compared to the baseline) because of decreased information cost with regard to clean vehicle purchase provisions in most of the policy options.

Table 6.1 Estimated impact on procurement costs and administrative costs of policy options in comparison to the baseline – Net present value of additional cost of vehicles procured during the period 2020-2035 (in € million and % change)

	PO1	PO2	PO3		PO4		PO5	PO6
			PO3a	PO3b	PO4a	PO4b		
Procurement costs	0 (0%)	1,300 (1%)	1,960 (2%)	1,790 (2%)	2,550 (3%)	4,090 (5%)	11,030 (12%)	4,190 (5%)
Administrative costs	-3.7	-1.5	-2.5	-2.5	-2.5	-2.5	1.3	-2.5

Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

In comparison, total operational cost for public bodies (fuel cost and other fixed cost including vehicle insurance, maintenance and repair cost) are expected to decrease, including sizeable fuel cost savings (see Table 6.2). These are particularly relevant in PO5, but also sizeable in PO6 and PO4b. The cost reductions in PO3a, PO3b and PO2 are somewhat lower because of more limited impact on fuel cost savings.

Table 6.2 Impact on fixed costs and fuel costs for procurement authorities relative to the baseline – Net present value over the lifetime of procured vehicles⁸⁴ (in € million and % change)

	Baseline	PO1	PO2	PO3		PO4		PO5	PO6
				PO3a	PO3b	PO4a	PO4b		
Fixed cost (maintenance, repair, battery replacement)	47,170	0 (0%)	290 (1%)	-220 (0%)	-280 (-1%)	720 (2%)	1,070 (2%)	3,800 (8%)	1,040 (2%)
Fuel / energy cost	46,220	0 (0%)	-1,280 (-3%)	-800 (-2%)	-690 (-1%)	-1,730 (-4%)	-2,930 (-6%)	-14,100 (-31%)	-3,040 (-7%)
Total operational costs	93,390	0 (0%)	-990 (-1%)	-1,020 (-1%)	-970 (-1%)	-1,010 (-1%)	-1,860 (-2%)	-10,300 (-11%)	-2,000 (-2%)

Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

The additional procurement and administrative costs are lower when compared to the alternative baseline, which shows a larger roll-out of low- and zero-emission vehicles (see Annex 8 of the Impact

⁸³ Cost implications are estimated to be limited. Stakeholder interviews did not provide any estimates of the additional cost related to reporting obligations. Option analysis in the ex-post evaluation of the clean Vehicles Directive assumed moderate cost. While not directly comparable to the provisions of the Clean Vehicle Directive, Impact Assessments for other EU legislation, including for the Directive on Integrated Pollution Prevention and Control or for Regulation 561/2009, show limited cost of reporting obligations as well.

⁸⁴ The net present value is calculated over the 2020-2050 horizon to cover the lifetime of procured vehicles during 2020-2035.

Assessment Support Study). However, the reductions in operational costs (mainly fuel costs savings) are also lower.

It is relevant to note that not all benefits of the new technologies are accrued by those who have to bear the costs of implementing them, i.e. public authorities and operators (depending on organisational model) who will bear higher cost initially. Manufacturers and the broader public benefit mainly. This calls for related public support, where needed in view of higher purchase cost, a change in business models to total cost of ownership and more integrated budgeting approaches as successful examples of technology adoption demonstrate.

6.3.2. Impact on enterprises

Enterprises in the vehicle manufacturing sector are expected to benefit from increased revenues from the procurement of low- and zero-emission vehicles, with revenues being distributed among businesses involved in the procurement of vehicles (including vehicle dealers).⁸⁵ Table 6.3 shows estimated impact on total revenue, which is estimated to increase under all policy options.

Table 6.3 Impact on total revenue for businesses – Net present values for vehicles procured during 2020-2035 (in € million and % change - negative values indicate decrease in revenues)

	Baseline	PO1	PO2	PO3		PO4		PO5	PO6
				PO3a	PO3b	PO4a	PO4b		
Total revenue	88,450	0 (0%)	1,300 (1%)	1,960 (2%)	1,790 (2%)	2,550 (3%)	4,090 (5%)	11,030 (12%)	4,190 (5%)
Total administrative costs – average		-18.2	-7.3	-12.4	-12.4	-12.4	-12.4	6.7	-12.4

Source: Ricardo (2017) *Support Study to the Impact Assessment of the Clean Vehicles Directive*

It is expected that vehicle manufacturers will need to invest into production capacity, particularly for low- and zero-emission and other alternatively fuelled buses. However, the revision of the Clean Vehicles Directive should not lead to needs for significant investments into new technologies by manufacturers, with the exception of the market segment of trucks. Under PO4 and PO6, which are most ambitious for this segment, the share of these vehicles is assumed to grow to 15% in PO4a and to 22% in PO4b and PO6 by 2030.

In addition, contractors face administrative cost, particularly in cases of using the monetisation methodology, where vehicle suppliers have to collect additional information to support the calculation. Accordingly, PO2, PO3, PO4 and PO6 are expected to make the procurement procedures easier to follow for contractors and bring about slight administrative cost savings, even in the context of increased cost related due to the extension of the scope of the Directive.⁸⁶ In comparison, PO5 is expected to lead to a slight increase in total administrative cost per contract (see table 6.3)

⁸⁵ Impact on procurement cost is expected to equal the impact on business revenues from vehicle procurement. Vehicle dealers are expected to keep the standard mark up of up to 15 percent to the price per vehicle charged by manufacturers. Following UBS (2017), profitability of zero-emission vehicles should improve as of 2025. Shares of revenues will be taken by renting and leasing companies as well as companies providing transport services, given that the extension of the scope in PO2, PO3 and PO4 is expected to lead to an increase of 28 percent in the number of vehicles procured. Impacts on administrative cost are small compared to the impact on revenue from procurement of vehicles.

⁸⁶ In the ex-post evaluation, it was assumed that each bidder spends around 1 hour per bid and that, on average, there are 4 bidders per contract⁸⁶. A similar level of impact on the time needed has been assumed for the administrative cost to

6.3.3. *Impact on innovation*

Given the limited market share of public procurement in overall sales of passenger cars and vans the Clean Vehicles Directive is not expected to largely impact on innovation in the automotive sector. Innovation in technologies for cars and vans is primarily driven by the CO₂ emission performance standards. Greater scope for influencing the development of new technologies is expected in the market segment of trucks. Given the limited market size, the Clean Vehicles Directive will continue to play a supporting role to other policy levers such as possible CO₂ emission performance standards. However, as a demand-side stimulus it still plays a relevant role for securing a more stable environment for innovation action; and the requirements under the more ambitious policy options particularly will provide a better security for manufacturers to invest.

The strongest impact will likely occur in the market segment of urban buses, where demand for low- and zero-emission buses leads to changes of the market share of powertrains and related impacts on production capacities of manufacturers (see annex 9 of this Impact Assessment). Particularly battery-electric and plug-in hybrid vehicles deployment will induce innovation in vehicle and battery technologies, recharging technologies and energy grid system technologies. However, the maturity of these technologies has advanced; many cities are rolling them out or are planning to roll them out.⁸⁷

6.3.4. *Impact on SMEs*

No area was identified where significant and disproportionate cost for SMEs, in comparison to all enterprises, would result from the changes under the different policy options. SMEs that supply vehicles to the public sector may face greater challenges than larger enterprises – to adapt to demand changes for low- and zero-emission technologies.

SMEs in the rental and leasing business might face greater problems with adapting to meet revised vehicle requirements compared to larger competitors. However, these impacts are considered to be moderate, given that requirements are only introduced by 2025 and the fact that mature technologies in all market areas (except trucks) are already available or will become available (see section 3 and annex 3 of the Impact Assessment Support Study).

6.4. **Social impacts**

6.4.1. *Impacts on employment*

The policy options are expected to lead to increased revenues from public procurement for vehicle manufacturers and suppliers, due to increased sales of low- and zero-emission vehicles. These are expected to have an overall positive impact on the employment in the sector. Table 6.4 shows estimates, building on EU level data on the average turnover per employee in the motor vehicle sector.⁸⁸ PO5, PO6 and PO4b show the highest impacts in terms of additional jobs created, due to the large increase in the low- and zero-emission vehicles procured in these policy options. The analysis of impacts is too coarse to determine specific impacts over specific years, but in line with general studies on the impacts of employment and skills of the workforce in the transport sector due to the electrification of vehicles it can be assumed that positive impacts increase over time.

Table 6.4 Estimated gross employment effects over period 2020-2035 relative to the baseline

authorities. Thus, in the case of PP2 and PP3 a 50% reduction to the time needed is expected, while in the case of PP4, an increase of the time needed by 27%⁸⁶ would be in line with the impact on the time required for authorities

⁸⁷ See for an overview of most recent activities in the EU the ZEEUS project e-bus overview report, a.a.o.

⁸⁸ According to the most recent data from Eurostat (Eurostat, 2017) turnover per employee in the sector was €627,000. Thus, on the basis of the estimated impact on additional revenues for the vehicle manufacturing sector the estimate of the gross employment effects over the whole 2020-2035 period was provided. It is assumed that this ratio will remain constant over time and across the different technology types.

Vehicle type	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Total increase in revenue over 2020-2035 period (million €s)	0	1,300	1,960	1,790	2,550	4,090	11,030	4,190
Turnover (million €s) per employee in motor vehicle manufacturing	0.627							
Additional jobs created ⁸⁹	-	2,100	3,100	2,900	4,100	6,500	17,600	6,700

Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

6.4.2. Impacts on public health

All policy options analysed lead to reductions in the emission of harmful air pollutants, particularly NO_x (section 6.5.3). These are estimated to have positive, though limited impact on public health. Reflecting net present values of cost savings from reductions in environmental costs, Table 6.5 shows the estimates for the different policy options, relative to the baseline. PO5 stands out in terms of high benefits, which is in line with the expected higher cost. It also shows that PO6 and PO4b are the second-best performing policy options. Moreover, positive impacts on public health are expected from reduction of noise levels, mainly due to the increase in share of zero-emission buses under the different policy options.

Table 6.5 Cost savings from reductions in environmental cost compared to the baseline (in € million) – Net present value over the lifetime of the vehicles procured during 2020-2035

	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Total environmental costs	-	-850	-640	-650	-1,310	-2,190	-8,870	-2,240

Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

6.4.3. Distributional impacts and equal treatment of citizens

Distributional effects could arise, following potential implications of the options on the cost of particularly public passenger transport. Increased upfront procurement cost of low- and zero-emission vehicles could potentially impact on users of public transport in form of increased ticket prices or a reduced offer of services (e.g. frequency of buses serving bus routes). Increased cost might also lead to a slower replacement rate of older vehicles and in the longer term to a higher default rate.

On the other hand, users of public transport can also benefit from the procurement of those vehicles. Benefits include not only a more comfortable ride with less noise exposure, but also the possibility of opening up new bus routes in areas where access with conventionally fuelled vehicles was not possible (e.g. indoor bus stops in large public buildings) and hence increasing the service offer. The impact also depends on the concrete context of use for the vehicle under consideration.

The possibility of increases in price/cost of accessibility is more likely in the most ambitious PO5, compared to other policy options PO3a and b, PO4a and b, and PO6. It is expected that the most vulnerable user groups are protected on the basis of existing subsidy policies. Current practice of fleet transition in cities and regions is not strongly pointing to such problem. There is no evidence available that the principle of equal treatment of citizens (i.e. principle of non-discrimination of individual citizens) would be in any way affected by the policy options analysed.

⁸⁹ Numbers rounded to hundred.

6.4.4. Territorial impacts

In line with the Better Regulation guidelines, a Territorial Impact Assessment Workshop took place on May 11th 2017. It brought together 20 representatives of public authorities and general interest organisations (Annex 10 of the Impact Assessment Report provides a full account of the workshop). Workshop participants concluded that the policy options should, overall, have positive effects with no specific territories expected to be particularly affected. In particular they concluded:

- Effects are expected to be distributed quite equally throughout the European regions, when considering the impact on CO₂ emissions, PM10 emissions or R&D climate impacts. Concerning these aspects no strong regional distinction would be expected.
- Urban regions will benefit most from environmental benefits of the revision. This can be observed by the effects on the air pollutants NO_x and – to a slighter extent – PM10.
- An effective implementation of the revised Clean Vehicles Directive would contribute to establish better procurement procedures. This could support especially Eastern European regions in Latvia, Lithuania, Poland, Romania and Bulgaria as well as Italian and Greek regions and some Spanish regions in terms of effectiveness of procurement procedures.

Workshop participants concluded that the adoption of a clear definition of clean vehicles could support public bodies in the procurement of related vehicles and support the implementation of the Directive.

In that respect, workshop participants noted the advantages of PO3, PO4 and PO6. Workshop participants also highlighted the relevance of setting a right level of ambition: setting the level of ambition too high would cause prohibitive cost or non-compliance. Setting the level of ambition too low would risk continuing the current shortcomings of the Directive.

6.5. Environmental impacts

6.5.1. CO₂ emissions

The impacts of policy options on CO₂ emissions depend on changes in the share of low- and zero-emission vehicles in the publicly procured fleet. Table 6.6 shows the estimated cumulative impacts of the policy options over the lifetime of the vehicles procured during 2020-2035⁹⁰. All options lead to emission reductions and related cost savings compared to the baseline. PO5 delivers by far the highest reduction (-61% relative to the baseline) in the CO₂ emissions from publicly procured vehicles due to the large share of zero-emission vehicles procured, followed by PO6 and PO4b (17% reduction). Monetising the CO₂ emissions reductions, this translates into almost € 8.3 billion of external costs savings in PO5 over the lifetime of the vehicles procured in 2020-2035, expressed as present value.

Table 6.6 Cumulative impacts on CO₂ emissions and costs of policy options in comparison to the baseline - estimated effects over the lifetime of the vehicles procured during 2020-2035 in thousand tonnes CO₂ and % change

	Baseline	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
CO₂ emissions (thousand tonnes CO₂)									
All vehicles procured	241,230	0 (0%)	-14,900 (-6%)	-11,520 (-5%)	-11,340 (-5%)	-25,030 (-10%)	-41,270 (-17%)	-148,350 (-61%)	-41,850 (-17%)

⁹⁰ The net present value is calculated over 2020-2050 to cover the lifetime of procured vehicles during 2020-2035.

Costs (net present value in million €)									
All vehicles procured	13,860	0 (0%)	-800 (-6%)	-610 (-4%)	-600 (-4%)	-1,260 (-9%)	-2,090 (-15%)	-8,300 (-60%)	-2,140 (-15%)

Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

The analytical work underpinning the European Strategy for Low-Emission Mobility showed cost-effective emissions reductions of 18-19% for transport by 2030 relative to 2005.⁹¹ For road transport, this translates into a cut of about 206-221 million tonnes of CO₂ by 2030 relative to 2005⁹², 52 to 67 million tonnes additional reduction relative to the baseline. In 2030, the policy options assessed could save 560 to 6,710 thousand tonnes of CO₂ emissions (5 to 57% decrease) relative to the baseline (see Table 6.7). This represents between 1 to 13% of the additional road transport emission reductions needed on top of the baseline by 2030 relative to 2005 (around 3% for PO4b and PO6). However, the baseline scenario assumes the implementation of the CO₂ standards for cars and vans in line with current legislation.⁹³ No policy action to strengthen the stringency of the target is assumed after 2020/2021. More stringent CO₂ standards for cars and vans post-2020 would result in a higher share of clean vehicles in the new vehicle fleet and thus in the total vehicles procured in the baseline. Consequently, the impact of policy options in terms of uptake of clean vehicles and thus on the CO₂ emissions savings may be more limited when compared to such alternative baseline. This is due to the overlapping effects between these policies.

Table 6.7 Impacts on CO₂ emissions in 2030 relative to the baseline, in thousand tonnes and % change

	Baseline	Net change from the baseline (in thousand tonnes and % change)							
		PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
All vehicles procured	11,790	0 (0%)	-560 (-5%)	-590 (-5%)	-590 (-5%)	-950 (-8%)	-1,690 (-14%)	-6,710 (-57%)	-1,800 (-15%)

Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

6.5.2. Energy consumption

Over the lifetime of the vehicles procured, all policy options lead to savings in energy consumption compared to the baseline (table 6.8). Highest savings are projected in the policy options with strong monetary methodology. However, even under the strong assumptions of PO5, the level of savings remains small compared to the overall energy consumption in the transport sector.⁹⁴ This underlines the supporting role the Clean Vehicles Directive has for other policy levers in this area, including the CO₂ emission performance standards for cars and vans, but also potentially for trucks and buses.

Table 6.8 Cumulative impacts on energy consumption relative to the baseline - effects estimated over the lifetime of the vehicles procured during 2020-2035 (in thousand terajoules and % change)

	Baseline	Net change from the baseline (thousand terajoules and % change)							
		PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6

⁹¹ This outcome is in line with the 2011 White Paper which established a milestone of 20% emissions reduction by 2030 relative to 2008 levels, equivalent to 19% emissions reduction compared to 2005 levels, and with the 2050 decarbonisation objectives.

⁹² SWD(2016) 244 final

⁹³ Regulation (EC) No 443/2009, amended by Regulation (EU) No 333/2014 and Regulation (EU) No 510/2011, amended by Regulation (EU) No 253/2014; CO₂ standards for cars are assumed to be 95gCO₂/km as of 2021 and for vans 147gCO₂/km as of 2020, based on the New European Driving Cycle (NEDC) test cycle, in line with current legislation.

⁹⁴ PO5 is estimated to lead to savings of around 1.6 million terajoules over the period 2020-2050, compared to annual energy consumption in the transport sector of 12.3 million terajoules (Eurostat 2017).

	Baseline	Net change from the baseline (thousand terajoules and % change)							
		PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
All vehicles procured	3,340	0.0 (0%)	-140 (-4%)	-110 (-3%)	-100 (-3%)	-180 (-5%)	-320 (-10%)	-1,580 (-47%)	-340 (-10%)

Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

6.5.3. Air quality

The analysis of impacts on air pollutants covers impacts on non-methane hydrocarbons (NMHCs), nitrogen oxide (NOx) emissions and particulate matter (PM10). Table 6.9 shows that all policy options lead to NOx and PM10 reductions over the lifetime of the vehicles procured. Emissions of NMHC are expected to raise under all policy options except PO3a and PO3b. This is because of the reduced use of diesel vehicles and the increased use of petrol cars and vans over a longer period of time in PO2 and PO5 as well as the increased use of natural gas (CNG/LNG) vehicles in PO4a, PO4b and PO6. Further information on the breakdown of air pollutant emission reductions by vehicle category is provided in the Impact Assessment Support Study (Annex 8).

Table 6.9: Cumulative impacts on non-methane hydrocarbon (NMHC), NOx and PM10 emissions relative to the baseline - effects over the lifetime of the vehicles procured during 2020-2035

	Baseline	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
NMHC emissions savings (difference in tonnes and % change to the baseline)									
All vehicles procured	15,490	0 (0%)	1,220 (8%)	-1,470 (-9%)	-2,130 (-14%)	7,250 (47%)	8,140 (53%)	3,520 (23%)	6,180 (40%)
NOx emissions savings (difference in tonnes and % change to the baseline)									
All vehicles procured	116,380	0 (0%)	-7,070 (-6%)	-3,390 (-3%)	-6,330 (-5%)	-8,780 (-8%)	-15,670 (-13%)	-77,790 (-67%)	-15,900 (-14%)
PM10 emissions savings (difference in kg and % change to the baseline)									
All vehicles procured	4,610	0 (0%)	-250 (-5%)	-190 (-4%)	-330 (-7%)	-320 (-7%)	-570 (-12%)	-2,530 (-55%)	-650 (-14%)
Cumulative cost (net present value in million € and % change to the baseline)									
All vehicles procured	930	0	-50 (-5%)	-30 (-3%)	-50 (-5%)	-50 (-5%)	-100 (-11%)	-570 (-61%)	-100 (-11%)

Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

Over the lifetime of the vehicles procured, PO5 shows the biggest impact on the overall reduction of NOx and PM10 pollutants (67% and 55% reduction, respectively, relative to the baseline), followed by PO6 (14% decrease) and PO4b (13% and 12% decrease, respectively). It is important at this point to note the strong assumptions and large uncertainty that underpin PO5. The methodology basically assumed that an authority purchases always the vehicle that is most cost-effective considering its total internal and external cost, and no other vehicles. As shown in greater detail in the Impact Assessment support study, the implications are different for the market segments of cars, vans, buses and trucks.

PO3a and PO3b and PO4a and PO4b are also estimated to contribute to further reductions of air pollutants, but PO4 (a and b) performs much better compared to PO3 (a and b), because of the lack of impact on the heavy-duty segment in case of PO3 options. PO6 however performs better than both PO3 and PO4 due to the combined action on light duty (similar to PO3b) and heavy-duty segments (similar to PO4b). Additionally, positive impacts on concentrations of pollutants in urban areas are likely to be even more pronounced as reductions will occur for many vehicles which mostly operate in cities. The effect would be biggest for the policy options displaying high uptake of zero-emission vehicles like PO5, PO6, PO3b and PO4b.

6.5.4. Noise

Noise was not quantitatively assessed in the Impact Assessment. In general, a move from conventional vehicles to clean vehicles – particularly electric and fuel cell vehicles - will have a positive impact on overall noise levels. However, this impact will remain limited for cars and vans, since publicly procured vehicles still represent a very small share of the total fleet. The situation is different for heavy-duty vehicles and in particular buses. A recent survey of experiences with using battery-electric buses showed strong benefits in case of using battery-electric or fuel-cell electric buses, with lower benefits for natural-gas driven buses. However, quantification did not take place due to the lack of data, the context-dependency on measuring reduction in noise levels and related damage costs. The performance of the different POs on noise emission reduction should be in line with the number of low and zero-emission vehicles procured. Because PO5 leads to the highest estimate of low- and zero-emission vehicles, it is also considered having the strongest impacts on noise emission reduction. Because of the lack of impact on urban buses, PO2 is considered to be less effective than PO3.

7. HOW DO THE OPTIONS COMPARE?

7.1. Effectiveness

The effectiveness of the policy options must consider the extent to which these objectives are achieved. Table 7.1 presents the objectives and the indicators that have been developed to monitor the level of achievement of the objectives. The effectiveness of each policy option in achieving the objectives is presented in table 7.2, using the indicators described above.

Table 7.1 Linking of objectives to key indicators

General objectives	Specific objectives	Indicators
	Ensure that the Directive covers all relevant procurement practices	<ul style="list-style-type: none"> • Increase of number of public procurement contracts falling under the scope of the Clean Vehicles Directive
Support the market-uptake of low- and zero-emission vehicles	Ensure that the Directive supports clear, long-term market signals	<ul style="list-style-type: none"> • Increase of registrations of low- and zero-emission vehicles that are publicly procured
	Ensure that the Directive's provisions are simplified and effective to use	<ul style="list-style-type: none"> • Simplification and directional alignment of procurement procedures concerning road vehicles • Increased reduction of CO2 and air pollutant emissions • More effective use of monetisation methodology (where relevant)

Table 7.2: Effectiveness of policy options

Key: Impacts expected		O		✓		✓✓	
Strongly negative	Weakly negative	No or negligible impact	Weakly positive	Strongly positive		Unclear	
PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Specific objective1: Ensure that the Directive covers all relevant procurement practices							
Extension of scope to vehicles rented, leased, hire-purchased and to specific transport service contracts	Negative – Eliminate impact of the current Directive	No impact	Increase in number of vehicles covered by 28% on average, but no actual limits in place for buses and trucks that represent 33% of the scope extension	Increase in number of vehicles affected by 28% on average, with higher impact for trucks and buses	Increase in number of vehicles affected by 28% on average, with higher impact for trucks and buses	Increase in number of vehicles affected by 28% on average, with higher impact for trucks and buses	Increase in number of vehicles affected by 28% on average
Specific objective2: Ensure that the Directive supports clear, long-term market signals							
Number and share of clean vehicles procured	No or possibly even negative impact	Positive effect (total increase by 154 thousand vehicles or 7 p.p. increase in the share of clean vehicles procured) driven mainly by impact on clean buses	Positive effect (overall increase by 450 thousand vehicles or 21 p.p. increase in the share of clean vehicles procured) driven by increase in scope and share of clean passenger cars, vans	Positive effect (overall increase by 376 thousand vehicles or 17 p.p. increase in the share of clean vehicles procured) driven by increase in scope in higher share of clean passenger cars, vans	Positive effect with total increase by 397 thousand vehicles or 18 p.p. increase in the share of clean vehicles procured) driven by increase in scope and higher share of clean passenger cars, vans and buses	Positive effect with total increase by 635 thousand vehicles or 29 p.p. increase in the share of clean vehicles procured) driven by increase in scope and higher share of clean buses and passenger cars	Positive effect with total increase by 500 thousand vehicles or 23 p.p. increase in the share of clean vehicles procured) driven by higher share of clean passenger cars, vans and buses

Key: Impacts expected																			
**		*		O		✓		✓✓											
Strongly negative		Weakly negative		No or negligible impact		Weakly positive		Strongly positive											
PO1		PO2		PO3a		PO3		PO4											
				PO3a		PO3b		PO4a											
				PO3a		PO3b		PO4b											
Specific objective 3: Ensure that the Directive's provision are simple and effective to use																			
Greater alignment of procurement procedures		Strongly negative – current framework is discarded; no general common rules		Member States have to choose an option: Majority use of common definition, but follow-up unclear		Strong positive impact: common definition and action requirement		Strong positive impact: common definition and action requirement		Strong positive impact: common definition and action requirement		Strongest impact due to immediate effect of common procedure		Unclear		PO6		Strong positive impact: common definition and action requirement	

Key: Impacts expected

**		*		O		✓		✓✓		Unclear	
Strongly negative		Weakly negative		No or negligible impact		Weakly positive		Strongly positive			
PO1		PO2		PO3a		PO3b		PO4a		PO4b	
-	CO2 emissions	No impact	Reduction by 15 million tonnes (800 million cost savings)	Reduction by 12 million tonnes (€610 million cost savings)	Reduction by 11 million tonnes (€600 million cost savings)	Reduction by 25 million tonnes (1,260 million cost savings)	Reduction by 41 million tonnes (2,090 billion cost savings)	Reduction by 148 million tonnes (€8.3 billion cost savings)	Reduction by 42 million tonnes (2,140 billion cost savings)		
-	Air pollutants	No impact	Total damage costs reduction by €50 million mainly from reduction of NOx emissions, less so PM10	Reduction by €30 million mainly from reduction of NOx emissions, less so PM10	Reduction by €50 million mainly from reduction of NOx emissions, less so PM10	Reduction by €50 million mainly from reduction of NOx emissions, less so PM10	Reduction by €100 million mainly from reduction of NOx emissions, less so PM10	Reduction by €570 million mainly from reduction of NOx emissions, less so PM10	Reduction by €100 million mainly from reduction of NOx emissions, less so PM10		
	Use of monetisation methodology, where required	Negative impact – eliminate use and no adequate replacement	The use of the methodology is assumed to apply to 11% of the vehicles procured, in line with the findings from the ex-post evaluation on the current practice.	No use required, but adequate approach in place to ensure intended outcomes	No use required, but adequate approach in place to ensure intended outcomes	No use required, but adequate approach in place to ensure intended outcomes	No use required, but adequate approach in place to ensure intended outcomes	100% use of methodology by public bodies	No use required, but adequate approach in place to ensure intended outcomes		

PO1 either has no impacts or generates a negative impact compared to the current situation. PO2 contributes to the achievement of objectives to some extent, but its effectiveness is strongly dependent on the responses from Member States to the requirement of setting up policy action based on a clean vehicle definition or use of the monetisation methodology. PO3 shows average effectiveness against all the objectives, mainly because it lacks impacts in the heavy-duty segment. PO4 shows average to good effectiveness against all the objectives. In terms of vehicle uptake it is the most effective policy option, but in terms of vehicle emission reductions it is considered less effective than PO5, because it leads to a higher share of CNG and LNG vehicles than in other policy options. However, seen from the point of view of flexibility offered to cities and regions and the sizeable savings this is fully acceptable. PO6 combines the strengths of PO3 for an approach to light-duty vehicle procurement that is fully coherent with relevant CO₂ and air quality legislation at European level, while it addresses a temporary alternative fuels requirement for heavy-duty vehicles until the conditions are established for the adoption of a clean vehicle procurement approach based on emission-thresholds.

PO5 is most effective when it comes to the alignment of procedures (all authorities have to use the same procedure) and emission reductions (higher share of zero-emission vehicles). However, it is important to recall that the assessment of this PO is characterised by a considerable degree of uncertainty about the actual application of the methodology, which also holds true for PO2. Moreover, its positive impacts occur mainly in the segment of urban buses, whereas it is estimated to lead to greater numbers of conventionally fuelled passenger cars and vans compared to PO3, PO4 and PO6.

Against this background, PO3 and PO4 are more appropriate alternatives: they both have positive and sizable impacts, while uncertainty in the outcomes is lower. They also provide the necessary clarity in terms of the clean vehicle definition that should ensure a more consistent and coherent approach across the EU, even if different national thresholds apply. Both policy options also provide for a staged adoption of more demanding targets and simplify the implementation of the Clean Vehicles Directive by abandoning the monetisation methodology. However, they also have their shortcomings. If a pure emission-based threshold is chosen as in PO3, there is currently no possibility to extend such an approach to the area of heavy-duty vehicles, where public procurement of clean vehicles is an important market driver. PO4, on the other hand, establishes an approach that is not fully in line with the emission-based approach to CO₂ and pollutant emissions from vehicles that underpins other parts of the Acquis. Against this backdrop, PO6 appears as the most appropriate alternative as it has positive and sizeable impact, while uncertainty in outcome is lower compared to PO5 and in addition it improves policy coherence of clean vehicle legislation with other important EU legislation.

7.2. Efficiency

Efficiency concerns "the extent to which objectives can be achieved for a given level of resource/at least cost". The major costs of the policy options come in the form of procurement cost. These can be balanced against operational cost savings and the wider cost savings related to the achievement of the broader environmental and climate objectives (outlined above). As noted in Table 7.3, the net costs (or benefits) to the authorities and suppliers of vehicles were considered for the comparison of options.

Overall net cost savings are estimated for all policy options (see table 7.3).⁹⁵ PO5 stands out from all other policy options in terms of its net cost savings (with the caveat of the use of the monetisation methodology mentioned above). Among the other options PO6 stands out in terms of net cost savings (approximately EUR 4.3 billion in 2020-2035). It is hence appropriate to qualify it as the most appropriate efficient option, even if it leads to relatively small decreases in the net cost for procurement authorities (approximately EUR 53 million in 2020-2035) and higher net procurement cost (approximately EUR 2.2 billion over 2020-2035). Among all options PO5, PO6 and PO4b deliver the biggest impact in terms of increased revenues for manufactures and vehicle suppliers

⁹⁵ Excluding the issue of taxation, where losses in fuel taxes will occur, to be partially counterbalanced by increases in electricity taxes.

(approximately EUR 11 billion over 2020-2035 in PO5 and around EUR 4 billion in PO6 and PO4b), because it leads to the biggest market take-up of vehicles.

Table 7.3: Efficiency of policy options

Key: Impacts expected		O		✓		✓✓		Unclear
		Weakly negative	No or negligible impact	Weakly positive	Strongly positive			
Efficiency (values indicated represent present value over the reference period 2020-2035, in € million)								
	PO1	PO2	PO3	PO4	PO5	PO6		
	PO3a	PO3b	PO4a	PO4b				
a) Impact on procurement authorities for 2020-2035	Small cost savings associated with elimination of existing administrative costs (€3.7 million)	Net costs: €309 Procurement cost: €1,300 Operational cost savings: €990 Admin cost savings: €1.5	Net costs: €938 Procurement costs € 1,960 Operational cost savings: €1,020 Admin cost savings: €2.5	Net costs: €1,538 Procurement costs €2,550 Operational cost savings of €1,010 Admin cost savings: €2.5	Net costs: € 2,228 Procurement costs € 4,090 Operational cost savings €1,860 Admin cost savings: €2.5	Net costs: € 731 Procurement costs: €11,030 Operational cost savings: €10,300 Admin cost: €1.3	Net costs: € 2,188 Procurement costs € 4,190 Operational cost savings €2,000 Admin cost savings: €2.5	
b) Impact on businesses for 2020-2035 (increase of revenue and admin cost)	Admin costs savings: €18.2 million	Increase in revenues: €1,300 million Admin costs savings: €7.3	Increase in revenues: €1,960 Admin costs savings: €12.4 Cost savings: € 640	Increase in revenues: €2,550 Admin costs savings: €12.4 Cost savings: € 1,310	Increase in revenues: €4,090 Admin costs savings: €12.4 Cost savings: € 2,190	Increase in revenues: €11,030 Admin costs: €6.7 Cost savings: € 8,870	Increase in revenues: €4,190 Admin costs savings: €12.4 Cost savings: € 2,240	
c) Impact on total environmental costs over the lifetime of vehicles procured (2020-2035)	No impact	Cost savings: € 850	Cost savings: € 650	Cost savings: € 1,310	Cost savings: € 2,190	Cost savings: € 8,870	Cost savings: € 2,240	
Net cost for procurement authorities (a+c)	-€3.7	-€542	€298	€228	€38	-€8,139	-€53	

Key: Impacts expected				
**	x	O	✓	✓✓
Strongly negative	Weakly negative	No or negligible impact	Weakly positive	Strongly positive
Net cost	-€21.9	-€1,849	-€1,635	-€4,065
		-€1,675	-€2,335	-€19,162
				-€4,255
				Unclear

7.3. Coherence

The objectives of this initiative are in line with the Charter for Fundamental Rights and relevant EU policies in the field of vehicle emission control. The policy options are also principally in line with these, as they lead to better supporting the uptake of low- and zero-emission vehicles. By setting clearer objectives and measures, which simplify the implementation of the Clean Vehicles compared to the status quo, all POs except PO1 contribute to different degree to the actions aiming at creating a *Resilient Energy Union with a Forward-Looking Climate Change Policy*. Through better alignment of procurement procedures in Member States they also contribute to the actions aiming at achieving a *Deeper and Fairer Internal Market*. PO5, even though it does not provide a step-wise and proportionate directional alignment of public procurement practice, but a more far-reaching direct and binding harmonisation of procurement practice, contributes in this sense.

The different POs align with other relevant policy initiatives to differing degrees. For example, PO2 and PO3 (a & b) have a direct link with the policy framework regulating CO₂ emissions from passenger cars and vans, as it is based on an emission-based threshold approach. Similarly, PO4 (a & b) links closely to the implementation of Directive 2014/94/EU on alternative fuels infrastructure, where it ensures additional security of demand for the installed recharging and recharging infrastructure. PO6 links to both emission-control and alternative fuels legislation. However, the POs are more or less coherent as they all promote clean vehicles, just coming from a different starting point.

Compared to PO2 and PO3a and PO3b, PO4 & b performs better in terms of internal coherence, as it covers all market segments of passenger cars, vans, trucks and buses, which are rolled out over a predictable long timeframe. PO5 is not fully coherent in this regard, as it incentivises petrol cars first and then assumes a rather strict and swift change to full-scale electric cars with little predictability over time, whereas it leaves public authorities no flexibility for different technology solutions in the heavy duty sector. PO6, again, offers the best approach to policy coherence as it covers both light- and heavy-duty vehicles and links to CO₂ and air pollutant emissions from vehicle legislation, while establishing a clear pathway for addressing heavy-duty vehicles on the basis of alternative fuels until the conditions are given for addressing these vehicles through an emission-based approach.

7.4. Proportionality and subsidiarity

None of the options goes beyond what is necessary to achieve the objectives. However, one needs to note that PO5 could cause proportionality and subsidiarity concerns as it mandates the use of one methodology to underpin all procurements. Still, it will be the input from public authorities into the monetisation methodology that will determine the main outcomes. All other POs contribute only to some, but varying extent to the market uptake of low- and zero-emission vehicles. They all leave scope for Member States to define a trajectory for the implementation of the minimum targets through a technological-neutral low- and zero-emission and other alternative fuels mobility approach in full collaboration with their local and regional authorities while leaving the full choice of measures to upgrade the remainder of the fleet with efficient conventionally fuelled vehicles or other vehicles. Through this approach, Member States can effectively programme actions, and also better coordinate actions, which can make an effective contribution to the overall action needed for the implementation of the Paris Climate Summit agreements.

The application of the target at national levels gives national, regional and local authorities flexibility to adjust the implementation of the target to their particular circumstances. This can include taking into account specific domestic circumstances such as a strong focus on areas with high exposure to air pollution or areas which are characterised by an already sufficiently developed capacity for the implementation of such technologies. In total and as seen over the time period of implementation covered in this Impact Assessment, the additional costs are considered proportionate.

The choice of the legal instrument of a Directive appears appropriate for achieving the objectives. Repeal of the Directive and its replacement with soft legislative measures is not regarded to be able to achieve the objectives. The use of Regulation shows strong potential impacts, however stakeholders in the targeted interviews were on average reluctant to this option. It is clear that a Directive provides the flexibility needed to combine directional steer with adjustment to domestic circumstances.

7.5. Preferred option

Based on the assessment above, PO5 stands out in terms of overall impact, but also overall costs in view of reaching all specific objectives, and with a likely asymmetrical abrupt impact on the procurement of light and heavy duty transport vehicles. It constrains flexibility of public bodies, as it constrains vehicle purchase choice and creates additional information need, while not providing a clear long-term market orientation. At the other end of the spectrum PO1 does not contribute enough to the achievement of specific policy objectives, though certain market-driven action could be assumed.

PO2, PO3a and PO3b, PO4a and PO4b and PO6 are better balanced. The costs of reaching objectives are reasonable over the time frame of 2020-2035. Moreover, in comparison to PO5, these options – and here particularly PO3, PO4 and PO6 – deliver a better balance of medium (2025) and longer-term (2030) impact on the vehicle uptake and related positive benefits for citizens and companies alike. Again, PO6 stands out here in terms of delivering the strongest impact upfront (by 2025) and longer-term (2030) on zero-emission vehicles, which are key for making substantial deliveries on key citizens benefits (health, quality of life) and future growth and competitiveness of the sector, while leaving a principal choice of technology to contracting authorities, entities and operators.

In terms of effectiveness of delivery on all specific objectives, PO4b has a strong and immediate impact on the heavy-duty segment, whereas PO2 and PO3 lack this impact. In terms of contributing to the stated European policy priorities of advancing the use of low-emission, alternative fuels and of accelerated uptake of zero-emission vehicles, PO4b performs better than PO4a. While it is more ambitious and has higher costs, it also ensures a better contribution to the needed overall market uptake of these vehicles, to strengthening of global competitiveness of the sector (particularly in the area of urban buses) and to reductions in CO₂ and air pollutant emissions. However, PO4b lacks the full coherence of PO3 with other legislative requirements on reduction of pollutant emissions from vehicles.

Hence PO6 qualifies as the preferred option. It combines the strengths of PO3b for light-duty vehicles with the strengths of PO4b for heavy-duty vehicles. It sets up a clean vehicles definition and minimum procurement target for light-duty vehicles using an emissions-based threshold and combines it with a requirement to purchase a minimum share of alternatively heavy-duty vehicles until the regulatory conditions for an emission-based approach in the heavy-duty transport sector are in place. The Clean Vehicles Directive then would need to include the option to adopt a delegated act on setting an emission-based approach in the heavy-duty sector at a later stage. This combined preferred option best ensures a consistency with the current and upcoming proposal on CO₂ emissions from cars and vans. This means in particular that incentives would be provided to the same type of low- and zero emission vehicles through both policy initiatives.

7.6. Effectiveness in achieving the objectives to reduce regulatory burden

It is evident from the above assessment that the regulatory compliance cost related to this initiative would initially increase with the change to an approach of setting up a clean vehicles definition and related differentiated minimum procurement targets for the Member States. However, it is relevant to point out that there is wide agreement among representatives of key target groups of this initiative that a definition of clean vehicles would also provide clearer orientation and hence reduce administrative cost in the medium-to-long term, as there is no longer non-clarity about the choice between the current

two implementation mechanisms of the Directive and in addition complexity is reduced by giving up on the mandatory use of a specific methodology, if monetisation was to be used. It will enable public bodies to use approaches to monetisation which can be more flexibly aligned to their local circumstances.

Moreover, social benefits are expected to increase under this initiative. While these impacts are moderate compared to some other policy initiatives, the Commission's Low Emission Mobility Strategy and the more recent Communication on "Europe on the Move: an agenda for a socially fair transition towards clean, competitive and connected mobility for all"⁹⁶ make clear that all available policy levers are needed to reinvigorate the needed transition to a low-emission mobility in the Union.

Moreover, this initiative has a REFIT dimension in terms of simplifying and updating the current requirements for public procurement of clean and energy-efficient road vehicles so that they are fit for purpose including:

- Replacing the current choice of implementation mechanisms with a clear approach that provides long-term target-led policy orientation, while leaving flexibility for designing the concrete implementation at Member State level - this can lead to a much better awareness about procurement plans, about possibilities for synergies and related market impact and in the end cooperation that can help lower prices, also across borders. In the medium term this will facilitate more effective, better aligned procurement policies which are simpler to organise.;
- Simplification of the current purchase provisions for road transport vehicles through providing a clear and simple definition of the vehicles and related minimum targets for procurement action that provide market actors with certainty;
- Simplification of the current purchase provisions through discarding the need to use complex monetisation methodology when wishing to monetise impacts.

This simplification primarily affects national, regional and local authorities, but also has important implication for vehicle manufacturers and suppliers.

Further expanding and completing the Common Procurement Vocabulary to fully cover all relevant low- and zero-emission and other alternative fuels vehicles and further revising procurement notices under the Tender Electronic Daily (TED) database for low- and zero-emission and other alternative fuels road transport vehicles for both light and heavy duty transport will support an effective reporting on clean vehicle procurements under the amended Directive. Moreover, it can be assisted through information exchange and coordination under the Sustainable Transport Forum of the European Commission.

While regular reporting by Member States is expected to increase administrative costs, these are not expected to be significant. In some Member States, such reporting already exists and would only need to be slightly adapted. In other Member States, this reporting will have the benefit of creating a better understanding of actual efforts of public bodies to procure low- and zero-emission vehicles, which will increase market certainty and better exchange of information and good practice among public authorities that will help improve the transition to low-emission mobility. Monitoring and reporting on the implementation of the target will be facilitated through a much more coherent use of the TED database.

Public authorities at national, regional and local levels will have to discuss, within the realm of the specific set of responsibilities in the Member State, about the implementation of the minimum procurement target for the Member State. This will require an increased effort of discussion and

⁹⁶ COM (2017) 283 final

coordination in the beginning, but implementation should be facilitated by the initial agreement and more importantly will enable much better conditions of aligned or joined up procurement. In the end, public bodies will benefit from a better market response as there is a long-term, European policy framework in place.

Thus, from a REFIT perspective of clear, simple and effective regulation, it can be considered that PO2, PO3a and PO3b as well as PO4a and PO4b and PO6 perform better compared to the baseline.

8. HOW WOULD IMPACTS BE MONITORED AND EVALUATED?

Monitoring and evaluating a revised Clean Vehicles Directive should build on a simple approach that is transparent and easy accessible. It is not the intention to create a very complex and complicated system of key performance indicators.

The monitoring of specific policy objective 1 is rather straightforward. The monitoring will amount to checking the registration of public procurement contracts in the TED database, if specific code for low- and zero-emission road transport vehicles and transport services would be complemented in the Common Procurement Vocabulary (CPV) of the EU.

Along the same line, monitoring of specific policy objective 2 would be informed through the TED data base, with the benefit of simplification by adding a specific code for low- and zero-emission road transport vehicles. Reporting by Member States is important for monitoring the achievements of specific policy objective 3.

Significant impacts of the revised legislation are expected to materialise from 2025 onwards, following the preferred policy option. By that time Member States would be required to report on a three-yearly basis. In order to assess how the real-world effects of implementation correspond to the expected impacts the Commission, an ex-post evaluation of the effects of the legislation could be carried out in 2027. This would ensure a timely input into discussions about the need to adjust the requirements for 2030 on the basis of achievements so far.

8.1. Indicators

For the main specific policy objectives, the following monitoring indicators have been identified:

- Ensure that the Directive covers all relevant procurement practices:
 - The increase of number of overall contracts and of contracts addressing rental, lease or hire-purchase of vehicles as well as contracts covering specific transport services falling under the scope of the Clean Vehicles Directive will be monitored using the Tender Electronic Database of the European Commission.
 - Information received through the reporting by Member States will be used to cross-check and verify the data
- Ensure that the Directive supports clear, long-term market signals
 - The increase of numbers of publicly procured low- and zero-emission vehicles under contracts that fall under the realm of responsibility of the Clean Vehicles Directive. It will be monitoring through using the Tender Electronic Database of the European Commission. It will be investigated to what extent the Common Procurement Vocabulary can be updated with relevant codes for light- and heavy-duty low- and zero-emission vehicles to facilitate this assessment step. The benchmark will be the distance to target to the values for the target years of 2025 and 2030.

- The overall market uptake of low- and zero-emission vehicles. This will be monitored on the basis of relevant Commission sources of information, such as through the regular updates of the European Alternative Fuels Observatory.⁹⁷
- Ensure that the Directive's provisions are simplified and effective to use
 - In terms of assessing the level of alignment of provisions, the level of implementation of the revised Directive will be monitored, with the number of infringement cases being a central indicator.
 - In addition, the Commission will closely monitor on the basis of available public and private information the development of the overall procurement market and here the increase of number of public procurement that are either joined up or at least aligned in terms of their functional specifications.

8.2. Operational objectives

Based on the preferred options, the following operational objectives have been identified.

Operational objectives	Indicators
Bring contracts for lease, rental and hire-purchase of vehicles by public bodies under the responsibility of the Clean Vehicles Directive	Level of implementation of the provision by Member States (number of infringement cases)
Bring contracts for transport services (other than public passenger transport) by public bodies under the responsibility of the Clean Vehicles Directive	Level of implementation of the provision by Member States (number of infringement cases)
Introduce requirement to follow the definition and minimum procurement targets of the Directive for both light-duty and heavy-duty road transport vehicles	Number and extent of public contracts Level of implementation of the provision by Member States (number of infringement cases)
Introduce a requirement to monitor and report on public procurement of clean vehicles	Level of compliance: number and quality of reports received by the European Commission.

⁹⁷ www.eafo.eu



Brussels, 8.11.2017
SWD(2017) 366 final

PART 2/4

COMMISSION STAFF WORKING DOCUMENT

IMPACT ASSESSMENT

Accompanying the document

**Proposal for A Directive of the European Parliament and of the Council
amending Directive 2009/33/EC on the promotion of clean and energy-efficient road
transport vehicles**

{COM(2017) 653 final} - {SWD(2017) 367 final}

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9. ANNEX 1: PROCEDURAL INFORMATION CONCERNING THE PROCESS TO PREPARE THE IMPACT ASSESSMENT REPORT AND THE RELATED INITIATIVE

9.1. References

Lead: DG Mobility and Transport – DG MOVE

9.1.1. Organisation and timing

Inter-Service Group

- An Inter-Service Group (ISG) was set up in July 2016 with the participation of the following Directorates-General: Secretariat-General, Legal Services, Internal Market, Industry, Entrepreneurship and SMEs, Environment, Climate Action, Joint Research Centre, Competition, Energy. Directorate-General Regional and Urban Policy joined the Steering Group from the third meeting and Directorate-General Research and Innovation joined the Steering Group from the fourth meeting onwards.

The ISG met several times:

- On 04 July 2016 to discuss the Inception Impact Assessment, the Terms of Reference for the External Support Study and the draft consultation strategy.
- On 11 November 2016 to discuss the inception report of the External Support Study, the timing of the process and the draft questionnaire for the open public consultation.
- On 27 April 2017 to discuss the interim report of the External Support Study, the outcomes of the public consultation and the general orientation for the draft Impact Assessment Report.
- On 26 June 2017 to discuss the first draft Impact Assessment Report and the first draft External Support Study.
- On 06 July 2017 to discuss the draft Impact Assessment Report and the draft final External Support Study.
- On 13 July 2017 to discuss the draft final Impact Assessment Report.

Consultation activities

Consultation activities included the following elements. The stakeholder consultation synopsis report (Annex 2) provides a summary of the results:

- An Open Public Consultation was launched on 19 December 2016 and closed on 24 March 2017.
- Targeted interviews with key stakeholders were carried out in between December 2016 and March 2017.
- A meeting with stakeholders on the outcomes of the public consultation was organised on 28 April 2017.

Furthermore, a workshop with representatives of cities and regions on the territorial impacts of the initiative was organised on 11 May 2017. The findings of this workshop are summarised in the workshop report included in Annex 10.

Several informal meetings with representatives of Member States were organised:

- On 8 February 2017 with experts from Member States
- On 05 April 2017 with transport and environment attaches from Member States

- On 28 April 2017 with experts from Member States on the outcomes of the public consultation

The external study supporting the Impact Assessment started on 26 October 2016. The Inception Impact Assessment Report was approved on 09 February 2017. The interim report was approved on 24 May 2017. The draft final report was provided on 25 June 2017. The final report was approved on [add when approved] 2017.

Consultation of the Regulatory Scrutiny Board

The impact assessment was submitted to the Commission's Regulatory Scrutiny Board on 26 July 2017. The Regulatory Scrutiny Board issued a positive opinion with reservations on 15 September 2017. The Regulatory Scrutiny Board noted the transparent use of evaluation results and the particular effort to quantify the impacts in a well-structured and easy to read Impact Assessment. It furthermore considered that the final report should fully explain the value added of the initiative relative to other initiatives that affect road transport emissions, particularly the CO₂-emission performance standards. It should also consider the additional effects on private sector vehicle uptake. It noted that the Impact Assessment report should clearly explain the reasons for shifting focus from internalisation of external cost to procuring low- and zero-emission and other alternative fuels vehicles and its impact on technological neutrality. The opinion further noted the relevance of better distinguishing short-term and long-term net benefits and trade-offs of policy options, and to deliver greater detail on the content and implementation of policy options and their REFIT implications.

The final Impact Assessment report includes a comprehensive description of the value added of the initiative and its inter-linkages with other policy initiatives (particularly the CO₂-emission performance standards) in sections 1.2, 3.3 and 3.4 as well as 4.3. Public procurement can incentivise private sector vehicle take-up, particularly when public infrastructure is accessible to private users and when public visibility increases confidence and trust of consumers into the readiness of the technologies. Individual purchase decisions are influenced by a variety of factors, which makes it very difficult to quantify those knock-on effects. Hence they have been qualitatively described in section 2.1.

The IA report describes the value added and need to change the approach of the Directive in sections 3.3 and 3.4 and further in section 7: the current approach to internalisation of external cost has failed to trigger a market impact, because of the perceived complexity of the approach. With the expected increasing availability of low- and zero-emission and other alternative fuels vehicle as well as a number of corresponding policy initiatives at national and local levels, a focus on procuring a minimum share of these vehicles in a flexible implementation scheme has been found to deliver better results, while respecting the need for flexibility to adjust to local and regional circumstances. A comprehensive description of the rationale and the content of the policy options and their underlying logic has been included in section 5, building on the description of the process of pre-screening all possible measures in section 4.

Sections 5 and 7 further explain the implementation of the proposed approach and the role and relevance of reporting according to updated Common Procurement Vocabulary. The analysis of impacts and their description for the preferred policy option as well as all options has been substantiated and differentiated by the years 2025 and 2030, as shown for example in section 6.2. Trade-offs are discussed to the extent possible in sections 6 and 7 of the Impact Assessment Report.

Further information on the sensitivity of the baseline relative to other policy initiatives has been added to section 2.4, which could not be quantified due to constraints imposed by the process of finalising the CO₂ emission-performance standards.

Evidence used and external expertise

The starting point to the drafting of the Impact Assessment report was the ex-post evaluation from 2015. Information provided by the stakeholders through the stakeholder consultation activities were a main source of information (see Annex 2). It was completed by information provided ad hoc by different stakeholders to the Commission.

Another source of information has been the work of the expert group on alternative fuels in cities in DG MOVE's Sustainable Transport Forum. Information has also been provided through the process of revising the Green Public Procurement Criteria of the EU.

In the context of the Commission's approach to Territorial Impact Assessment of this proposal, a meeting with experts of cities and regions was organised on 11 May 2017.

Finally, the Impact Assessment relies to a considerable extent on an accompanying study performed by Ricardo AEA, which is available in the annex to the Impact Assessment Report. Overall, the sources used for the drafting of the Impact Assessment report are numerous, largely exhaustive and representative of the different stakeholder groups.

10. ANNEX 2: STAKEHOLDER CONSULTATION SYNOPSIS REPORT

10.1. Introduction

In the context of the preparation of the Impact Assessment, stakeholders were consulted on the problem definition, policy measures and likely impacts and relevance of action at European level. Consultation activities sought both qualitative (opinions, views, suggestions) and quantitative (data, statistics) information. The consultation process engaged main target groups through different methods, combining an Open Public Consultation (OPC) with targeted consultations with key stakeholders. Targeted consultations included exploratory and in-depth interviews and a short questionnaire for public procurement authorities. Expert interviews were also conducted for the preparation of case studies. Targeted consultations were carried out by the external consultant.

The consultation strategy had identified the following key target groups: public authorities at national, regional and local level in charge of transport and public procurement policy, contracting authorities at national, regional and local level¹, transport operators (if they are not contracting authorities); vehicle and equipment manufacturers/ suppliers, fuel producers and retailers; interest organisations representing societal interests and the general public.

All stakeholder groups were reached during the consultation: stakeholders affected by the policy, those who have to implement it and those with a stated interest in the policy. The participation to all consultation activities was overall balanced. Public and contracting authorities were less represented in the OPC compared to industry stakeholders and interest organisations. To compensate, targeted consultations mainly concentrated on public and contracting authorities.

The stakeholders' views do not represent the official position of the Commission and its services and thus does not bind the Commission. The input gathered corresponds to the objective of the consultation in both assessing the performance of the regulatory framework to date, providing insights into possible challenges and likely impacts of measures.

10.2. Methodology

10.2.1. Open Public Consultation

The Open Public Consultation (OPC) was conducted between 19 December and 24 March 2017 on the 'Your voice in Europe' website. It invited stakeholders' opinions on the key elements of the Impact Assessment: the main problem, its drivers and root causes, possible policy measures and their likely impacts and the relevance of EU level action. The questionnaire for the 12-week public consultation was prepared by DG MOVE, together with the members of the steering group. The external consultant summarised the submissions.

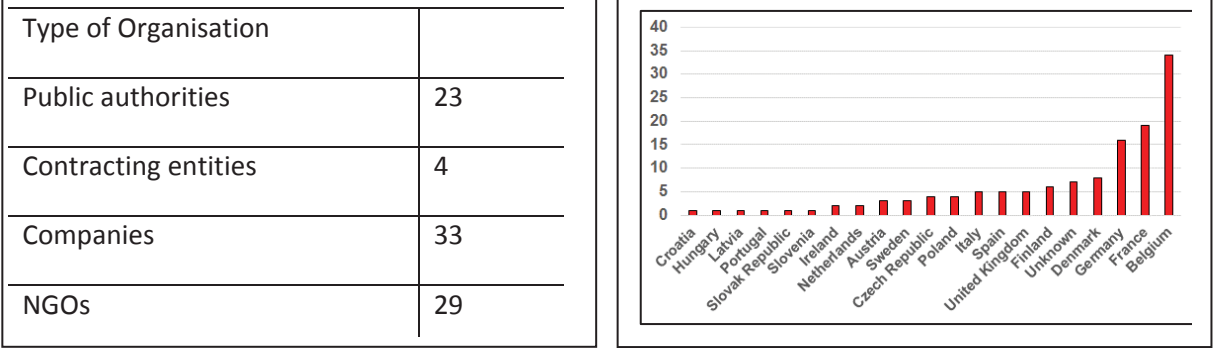
The OPC gathered a total of 130 contributions, including 115 replies from professional stakeholders operating in 20 Member States and 15 replies from citizens. The largest proportion of respondents was replying on behalf of a company, followed by non-governmental organisations (NGOs) and public authorities (e.g. ministry, agency, or other form of public administration).

Public and contracting authorities submitted fewer contributions than companies and non-governmental organisations. This is important to note as they have to implement the provisions of the Directive. However, the contributions of several large city networks are representative of the opinion

¹ Depending on the organisational model, a contracting authority can either be a public authority (ministry, agency, other form of public administration), a pure public procuring authority or a public or private company procuring on behalf of or for a public authority. This category was introduced to capture those actors who are primarily concerned with the procurement, not so much with the policy.

of their member cities and regions. They were acknowledged with a particular importance.² Participants from EU-13 Member States were underrepresented in the sample. This was compensated through additional interviews and a case study as part of the targeted consultations.

Figure 10.1 Overview of participants to the OPC according to type of organisation (left) and main country of operation (right) as declared by participants



Explainer: It is important to note that also 40% of the public authorities and 40% of the companies responding declared themselves to be also contracting entities

10.2.2. Targeted consultations

The external consultant collected information and opinions of key stakeholders through exploratory interviews in the beginning and in-depth interviews later on in the process. Interviews were carried out by phone, or face-to-face. They were based on questionnaires agreed with the Commission beforehand. In addition a short questionnaire on public procurement aspects was circulated among a sample of procurement authorities to collect further information on public procurement activities.

In total, 8 exploratory interviews were carried out. Participants represented public authorities, transport operators, manufacturers and interest organisations (see annex of this report). The interviews verified the problem analysis and collected initial feedback on the long list of policy measures.

In-depth interviews were carried out with 13 stakeholders. Participants represented procurement authorities, contractors operating on behalf of public authorities and European interest organisations (see annex of this report). Interviews collected detailed stakeholder feedback on principal policy measures. Information obtained helped to check completeness and principal feasibility of measures.

Case studies were conducted, based on desk research and expert interviews. The case studies analysed public procurement in four Member States (CZ, DE, IT, SE). Additional overview information was collected for a three Member States (ES, FR, UK). The annex provides further information.

In addition, a short procurers' questionnaire was sent to 51 procuring authorities. The aim was to cross-check and to extend further information on public procurement as obtained from the TED database. A total of 7 (13.7%) responses were received; further information is provided in the External Support Study for this Impact Assessment.

10.2.3. Meetings

A public meeting on the outcomes of the public consultation was organised on 28 April 2017 in Brussels. It brought together 61 participants.

² Moreover, the comparatively high number of responses from Belgium is reflects the fact that a larger number of European interest organisations with seat in Brussels contributed to the OPC.

The Commission also organised two meetings with expert representatives of Member States. The first meeting took place 08 February 2017 and discussed the general state of play and objectives of the policy initiative. The second meeting took place on 28 April 2017 and discussed the main outcomes of the public consultation for the Impact Assessment of the Clean Vehicles Directive.

The Commission organised a meeting on the assessment of territorial impacts of the revision of the Directive on 11 May 2017 in Brussels. It brought together 20 participants, representing individual cities and regions, city networks and European interest organisations. The results are presented in a separate annex of the Impact Assessment Report.

Minutes of all these meetings are presented in the appendix of this stakeholder synopsis report. The outcomes of the territorial Impact Assessment Workshop are discussed in a separate report (annex 10).

10.3. Analysis of results of the stakeholder consultation (OPC and targeted consultations)

The remainder of the report presents the main findings from the analysis of stakeholder contributions to the consultation process. These are structured following the areas of a) problem analysis, b) policy measures, c) impacts and d) relevance of EU level action.

10.3.1. Problem analysis

The large majority of contributions to the OPC agreed that it was important to use public procurement to stimulate the market for clean vehicles (67.4% very important, 18.6% important (n=130). Public authorities, contracting entities, manufacturers and NGOs did not deviate much in their opinions.

In the OPC, question 2 asked respondents about their opinion on the relevance of root causes that limit the impact of the Directive, including limits to the scope of the Directive, lack of a clear definition, lack of concrete minimum requirements for action or the approach of the monetisation methodology.

2.3.1.1 Limited scope

On average, a majority of OPC respondents regarded limitations in the scope of the Directive as a relevant root cause (n=130; 29% strongly agree, 38% somewhat agree). These responses are in line with findings from the targeted consultations: key stakeholders representing public authorities, but also transport operators acknowledged that the current Directive is not impacting on an increasing number of contracts that concern provision of transport services to public authorities.

2.3.1.2 Lack of a clear definition

OPC respondents widely agreed on the relevance of this root cause: 81% of public authorities', all of contracting authorities', 78% of company and 90% of NGO respondents to the OPC strongly or somewhat agreed that this is a relevant root cause of the lack of impact of the Directive. All stakeholders consulted in the targeted consultation underlined the relevance of this root cause.

2.3.1.3 Lack of minimum procurement targets

In terms of OPC responses, 62% of public authorities agreed or somewhat agreed to the relevance of this root cause. Agreement of companies (73% strongly or somewhat agree) and NGOs (76% strongly or somewhat agree) was stronger. Respondents from contracting authorities were split on the relevance of this root cause, with half of the respondents strongly or somewhat agreeing and half of them not. Targeted consultations generated a similar feedback: some of the public and contracting authorities noted that the lack of a clear definition was comparatively more important.

2.3.1.4 Fragmentation of procurement rules

Here, OPC respondents from public and contracting authorities were split on the topic. No clear majority was either agreeing or disagreeing to the relevance of this root cause. OPC respondents from companies and NGOs agreed to the relevance, but the agreement was less strong compared to other root causes (59% and 58% strongly or somewhat agree respectively). Targeted consultations did not generate detailed feedback on this root cause: principally, interviewees felt it was not as important as other root causes.

2.3.1.5 Complexity of the monetisation methodology

A majority of OPC respondents regarded this root cause to be relevant: while NGOs strongly agreed (72% strongly or somewhat agree), contracting authorities and companies (60% strongly or somewhat agree) and public authorities (57% strongly or somewhat agree) noted less strong support to the argument. In targeted interviews, transport operators and contractors emphasized the relevance of this root cause. Particularly representatives of public authorities noted that the requirements of the methodology often exceed the available knowledge and information base of public authorities.

10.3.2. Policy measures - expanding the scope of the Directive

A large majority of respondents to the OPC agreed that it is important to expand the scope of the Directive to address its limited impact (34% very important, 27% important and 14% somewhat important). No key target group issued a different opinion.

Stakeholders' opinions differed though, both in the OPC and in targeted consultations, on the relevance and effectiveness of the different measures under discussion. While none of the possible measures was overwhelmingly rejected by any key target group, different preferences were expressed: Representatives of public authorities and public transport operators noted that changes to the thresholds should anticipate impacts on administrative burden. Representatives of rental companies noted the need to anticipate impacts on rental and lease companies in case of an extension of the scope to vehicles rented, leased or hire-purchased.

2.3.2.1 Extending the scope by removing the procurement threshold

While public authorities noted slight majority support to this measure in the OPC (14 % very relevant, 23% relevant, 14% somewhat relevant), targeted consultation activities generated more sceptical views: interviewees majorly noted the practical implications, particularly the increase of administrative burden for smaller authorities. A similar outcome exists for contracting authorities: 60% of contracting authorities considered this measure very relevant, relevant or somewhat relevant. But in targeted consultations those actors referred to the administrative burden implications as well. OPC respondents from companies (75% very relevant, relevant, somewhat relevant) and particularly from NGOs supported this measure (81% very relevant or relevant).

2.3.2.2 Extending the scope to vehicles rented, leased or hire-purchased

This measure received consistent strong support from all target groups in the OPC. 75% of public authorities, 90% of contracting authorities, 81% of companies and 79% of NGOs regarded this measure as either very relevant, relevant or somewhat relevant. During targeted consultations, experts from public authorities noted the relevance of this measure. Yet they noted the need for a flexible approach that does not substantially increase administrative burden and takes into account the wider diversity of contractual arrangements in this area.

2.3.2.3 Extending the scope to private operators

This measure received general support from a majority of respondents to the OPC, but the level of support differed among target groups. Only a slight majority of public authorities agreed (55% very relevant, relevant or somewhat relevant), whereas the support from contracting authorities and companies was far more stable (both 90% very relevant, relevant or somewhat relevant). NGOs also strongly supported this measure (75% very relevant, relevant or somewhat relevant). In the targeted consultation, representatives of public authorities highlighted that monitoring of such a requirement could be a challenge in view of differentiated contractual situations between public authorities and private operators. They required a flexible approach that would be simple to implement.

2.3.2.4 Extending the scope by including all contracts with major transport elements

This measure did not get a majority support from public authorities in the OPC (19% very relevant, 14% relevant, 14% somewhat relevant). In the targeted consultations experts from public authorities particularly referred to the needs of clearly defining the elements of the contracts that will fall under the responsibility of this measure, which could be challenging. There was stronger support from contracting authorities and NGOs to this measure (70% and 72% very relevant, relevant, somewhat relevant respectively). In the OPC, respondents from companies also strongly supported this measure (67% very relevant, relevant, somewhat relevant). However, it is also relevant to note that close to every fifth respondent to the OPC noted "I do not know", underlining uncertainties about how to assess this measure.

10.3.3. Policy measures – changing the main implementation mechanisms of the Directive

Stakeholders confirmed the principal need to change the main implementation mechanisms through which the Directive seeks to stimulate the update of clean vehicles. 58% of all OPC contributions regarded changes to Art. 5 of the Directive on the provisions for the purchase of clean vehicles as very important, 17% regarded them as important. Similarly, close to 52% of all OPC contributions considered changes to the monetisation methodology as very important, 19% considered them important. A better adaptation of the provisions of the Directive to technical progress was viewed by three quarters of OPC participants as important (35% very important, 41% important).

However, opinions of stakeholders differed with regard to the relevance and effectiveness of the different principal measures for changing the provisions of the Clean Vehicles Directive.

2.3.3.1 Vehicle purchase on the basis of monetised impacts as award criteria

Measures concern changes to the methodology for calculating operational life time cost. The OPC asked participants about their opinions on further simplifying the methodology and/or making it more ambitious by updating cost figures, by broadening it to cover noise as an additional impact and by conditioning its use more strictly.

In all target groups, a majority supported the need for revising and updating the methodology. However, the outcomes of the OPC on the combination of implementation mechanism provide a clear context message: the option to base the revised Clean Vehicles Directive only on a definition and related minimum procurement mandate, while abandoning the monetisation methodology option, received the strongest support (see

The targeted consultations added more emphasis on the principal relevance of the approach: while it was judged to be theoretically well-placed to enable the selection of clean vehicles on the basis of their actual true cost, it was found to be difficult to implement in practice. All stakeholders agreed that the

current monetisation methodology is not fit for purpose. Some interviewees expressed their support to keeping a simplified methodology, whereas others requested its complete abandoning. One needs to note that the topic was not met by strong interest, or strong positioning by different target groups.

The OPC generated the following preferences of key target groups for measures on the revision of the monetisation methodology, provided it was to be retained:

- *Public authorities* gave strongest support to putting greater emphasis on air pollutants and CO₂ emissions (76% noted this to be very important, important or somewhat important for CO₂, and 72% for air pollutants). Three quarters of respondents also supported the extension to noise; however, only 14 percent noted "strong importance". Simplification was considered to be a second priority (67% very important, important or somewhat important). 75% of the respondents also considered a more effective update mechanism as strongly important, important or somewhat important. Participants were split on the question of a mandatory use: slightly more than half supported this measure (29% strongly agree, 24% somewhat agree).
- *Contracting authorities*: 60% considered the simplification of the methodology as very important, important, or somehow important. 70% considered it very important, important or somewhat important to update the CO₂ values of the methodology. Similarly, 80% of respondents considered update of values for pollutants to be very important, important or somewhat important. 80% of respondents considered the extension to noise as very important, important or somewhat important. A frequent update of the methodology was considered by 60% as very important, important or somewhat important. 60% agreed strongly or somewhat strongly to establish a binding requirement to follow the methodology, in case it was retained.
- *Companies*: 79 % considered the simplification of the methodology as very important, important, or somehow important. 80% considered it very important, important or somewhat important to update the CO₂ values of the methodology. Similarly, 91% of respondents considered update of values for pollutants to be very important, important or somewhat important. 77% of respondents considered the extension to noise as very important, important or somewhat important. The more frequent update of the methodology was considered by 78% as very important, important or somewhat important. 60% agreed strongly or somewhat strongly to establish a binding requirement to follow the methodology, in case it was retained.
- *NGOs*: 87% considered the simplification of the methodology as very important, important, or somehow important. 93% considered it very important, important or somewhat important to update the CO₂ values of the methodology. Similarly, 97% of respondents considered update of values for pollutants to be very important, important or somewhat important. 86% of respondents considered the extension to noise as very important, important or somewhat important. The more frequent update of the methodology was considered by 93% as very important, important or somewhat important. 65% agreed strongly or somewhat strongly to establish a binding requirement to follow the methodology, in case it was retained.

Discussions during meetings with Member States confirmed a rather limited use of the approach of monetising environmental impacts as such. During the Member State meeting in April 2017, France raised the point that the Commission should establish a working group to support better use of the methodology, provided it was to be retained. Germany also noted that the monetisation methodology reflects the state of thinking about clean vehicles at the time it was developed (around 2005); revision should not lead to a more complex methodology. However, Germany noted that Member States could be left with a choice of using the monetisation methodology or not. During the stakeholder meeting on the outcomes of the OPC, there was no considerable opinion raised in support of a revised monetisation methodology. One environmental NGO supported the abandoning of the approach as it was too complex and did not really lead to the desired outcome of supporting vehicle take-up.

2.3.3.2 Setting up a definition of clean vehicles

The principle of adding a definition of a clean vehicle received a lot of support from key stakeholders in the OPC and in the targeted consultation activities. However, as further corroborated in the exploratory and in-depth interviews, views diverged with regard to the most adequate approach to designing such a definition. The OPC asked about views on the suitability of basing such a definition on a tailpipe or well-to-wheel CO₂ emission threshold approach, on an air pollution threshold approach, on an alternative fuels approach, or on a zero-emission threshold approach. Responses to the OPC from key target groups were as follows:

- *Public authorities* expressed broader agreement to setting up a clean vehicle definition: 71% noted it to be very important, important or somewhat important. Public authorities either rejected the tail-pipe emission approach (41%), but also did not majorly support it (38%). 53% of respondents noted support to life-cycle emissions and 64% to a definition based on air pollutants, whereas 53% supported a definition on the basis of alternative fuels. Only, 34% supported a definition based on zero-emission approach. 52% also supported a combination in case of an emission-based approach.
- *Contracting authorities* signalled broader agreement to setting up a clean vehicle definition: 70% noted it to be very important, important or somewhat important. However, all conceptual approaches were rejected but the approach to base it on emission of pollutants: here, 70% of respondents noted that a basis of air pollutants should be regarded as completely or somewhat adequate.³ 70% also supported a combination in case of an emission-based approach.
- *Companies*: 78% noted it to be very important, important or somewhat important. 70% noted their support to a definition based on real-world air pollutants. 59% supported a definition based on alternative fuels as completely or somewhat adequate; 51% supported a definition based on life-cycle emissions as completely or somewhat adequate. The other approaches did not find a majority.⁴ 83% supported a combination in case of an emission-based approach.
- *NGOs*: 92% noted it to be very important, important or somewhat important. 55% supported a definition based on tail-pipe emission, whereas support for a life-cycle emission based approach was at 69%. 83% supported a definition based on air pollutants as completely or somewhat adequate, whereas there was no majority support for a definition based on alternative fuels (48% considered to be completely or somewhat inadequate). The other approaches did not find a majority.⁵ Similarly, a definition based on zero-tailpipe emissions only was regarded by 48% of respondents to be completely or somewhat adequate. 86% supported a combination in case of an emission-based approach.

Interviews and discussions during stakeholder meetings exhibited the different positions further. In the stakeholder meeting on 28 April 2017, environmental NGO representatives called for a tailpipe zero-emission approach, public transport operator representatives called for a tailpipe emission-approach and automotive representatives called for an alternative fuels approach. Other representatives, including some representatives of public authorities, supported a lifecycle-emission approach. The targeted interviews brought about a similar difference in opinions.

³ 70% found a definition based on a tailpipe emission approach to be completely or somewhat inadequate, whereas 60% of respondents regarded the life-cycle emissions approach to be completely or somewhat inadequate. 60% considered a definition on the basis of alternative fuels to be fully or somewhat inadequate; and 70% hold the same opinion of the zero-emission approach.

⁴ 64% found the definition to be based on a tailpipe emission approach to be completely or somewhat inadequate; and 72% hold the same opinion of the zero-emission approach.

⁵ 64% found the definition to be based on a tailpipe emission approach to be completely or somewhat inadequate; and 72% hold the same opinion of the zero-emission approach.

All stakeholders consulted acknowledged that any emission-based approach would work for light-duty vehicles, but not for heavy duty vehicles given the lack of existing regulatory standards. Conversely an approach based on alternative fuels could be applied to all market segments, but would pose a greater monitoring challenge in case of specific fuels such as biofuels. Here it would be needed to ensure that these fuels were actually used to fuel the vehicle. In the meeting with Member States, representatives of France and Germany noted that any definition should be simple to use, and not repeat setting up another complex approach that would not be helpful, like the monetisation methodology.

2.3.3.3 Setting up a minimum procurement mandate in relation to the definition

In the targeted interviews, all stakeholders agreed that there should be a clear mandate. But stakeholder preferences differed to a larger extent with regard to the design of the mandate. The OPC asked participants if contracting authorities and entities should be required to only purchase clean vehicles, following a definition in the revised Directive. Only representatives of NGOs agreed with a clear majority of 73%; in all other target groups a majority rejected this approach.⁶ In terms of approaches to defining a specific minimum share of the total number of procurements the following reactions from key target groups were recorded:

- *Public authorities:* 37% considered an approach based on the contract to be adequate, 43% agreed to setting up a specific percentage fixed over time. 62% disagreed to setting up a specific requirement for zero-emission vehicles per contract, but only 28 % disagreed to do so for a defined period of time. 48% agreed to this measure.
- *Contracting authorities:* Respondents were somehow split on how such a mandate should be set up: 50% considered an approach based on the contract to be adequate, 50% agreed to setting up a specific percentage fixed over time. 80% disagreed to setting up a specific requirement for zero-emission vehicles per contract, and 50% disagreed to do so for a defined period of time.
- *Companies:* Respondents were split on how such a mandate should be set up: 56% considered an approach based on the contract to be adequate, 59% agreed to setting up a specific percentage fixed over time. 66% disagreed to setting up a specific requirement for zero-emission vehicles per contract, and 51% disagreed to do so for a defined period of time.
- *NGOs:* there were not very diverging views among respondents: 65% agreed that it should be set up at contract level, but 65% also agreed that it should be set up as a percentage fixed over time. 68% agreed to setting up a specific requirement for zero-emission vehicles per contract, and 58% agreed to do so for a defined period of time.

Importantly, nearly all stakeholders noted in the targeted consultations the need for mandate differentiation. This should include differentiation of a minimum procurement mandate by Member States to account for differences in economic capacities to cope with low-emission technology transitions. It should furthermore include a differentiation according to light- and heavy-duty transport. The need for differentiating between light-duty and heavy-duty vehicles was also echoed in the stakeholder meeting by representatives of the public transport operators, and in the Member States workshop by the representative of Austria.

A majority of contributions to the public consultation (n=130; 30 % very important, 29 % important) noted the relevance of a requirement to report on minimum procurement mandate implementation in the Member States. Expert representatives in the two meetings on 8 February 2017 and 28 April 2017 noted the relevance of reporting, but also underlined the need for a pragmatic approach.

⁶ 29% of public authorities, 40 % of contracting authorities agreed 46% of companies agreed.

2.3.3.4 Setting the overall governance approach: keeping or abandoning the dual choice approach

The OPC asked participants about different principal approaches. The aim was to get views from participants if the revised Directive should be settled on one main implementation mechanism or leave it to Member States to make a binding choice between different implementation mechanisms. This concerns two principal possibilities:

- the revised Directive keeps an option for Member States: they can either follow the clean vehicles definition and set related minimum procurement mandates. Or they use impacts as award criteria based on the mandatory use of the revised monetisation methodology.
- The revised Directive settles for one of the two mechanisms as the sole approach.

On average, the approach that scored the largest support from all target groups was to settle the revised Clean Vehicles on an approach of providing a clean vehicle definition and related minimum procurement mandates: 73 respondents (or 57%) agreed or somewhat agreed to this option (n=129).

Public authorities: No clear majority views surfaced on this topic. 38% agreed that the revised Directive should establish a definition and keep the monetisation methodology, but require Member States to make a binding choice. 24% agreed that the revised Directive should be solely based on the use of the monetisation methodology. 48% agreed that the revised Directive should set up only a definition and a related minimum procurement mandate. 34% agreed that the revised Directive should establish such an approach but include also a specific requirement for clean vehicles.

Contracting authorities: Only 20% agreed that the revised Directive should establish a definition and keep the monetisation methodology, but require Member States to make a binding choice. 40% agreed that the revised Directive should be solely based on the use of the monetisation methodology. 50% agreed that the revised Directive should set up only a definition and a related minimum procurement mandate. 60% agreed that the revised Directive should establish such an approach but include also a specific requirement for clean vehicles.

Companies: Only 29% agreed that the revised Directive should establish a definition and keep the monetisation methodology, but require Member States to make a binding choice. 27% agreed that the revised Directive should be solely based on the use of the monetisation methodology. 49% agreed that the revised Directive should set up only a definition and a related minimum procurement mandate. 47% agreed that the revised Directive should establish such an approach but include also a specific requirement for clean vehicles.

NGOs: Only 34% agreed that the revised Directive should establish a definition and keep the monetisation methodology, but require Member States to make a binding choice. 27% agreed that the revised Directive should be solely based on the use of the monetisation methodology. 49% agreed that the revised Directive should set up only a definition and a related minimum procurement mandate. 47% agreed that the revised Directive should establish such an approach but include also a specific requirement for clean vehicles.

In addition, a slight majority of contributions to the public consultation (N=130; 30 % very important, 29 % important) noted the relevance of a requirement to regularly report on minimum procurement mandates. In the targeted interviews, representatives of public authorities noted that requirements on reporting obligations should not lead to a strong increase in administrative burden. They also noted the need for flexible solutions.

10.3.4. Impacts

The OPC asked respondents about their views on socio-economic and environmental impacts related to the possible measures discussed for the revision of the Clean Vehicles Directive.

In terms of economic impacts, the following general opinions were collected:

- Out of 129 respondents, 82 (or 63.5%) agreed or somewhat agreed that the revision will lead to growth and jobs in the manufacturing sector, due to stronger public demand for vehicles.
- Out of 127 respondents, 82 (or 63%) agreed or somewhat agreed that the revision will contribute to a bigger internal market and strengthened competitiveness of the transport sector.
- Out of 129 respondents, 92 (or 71%) agreed or somewhat agreed that measures discussed will lead to an initial strain on budgets of procuring authorities. Moreover, 75 of 129 respondents (or 58%) noted that the initial administrative burden of local authorities could increase. 102 respondents (or 79%) however also agreed or somewhat agreed that simplification of the monetisation methodology could ease the administrative burden of authorities. Similarly, 80 participants (or 62%) agreed or somewhat agreed that a clear definition of clean vehicles could reduce the administrative burden of authorities.
- There was a split view on the question, whether lower operational cost of low and zero-emission vehicles could reduce pressure on public budgets: Out of 129 respondents, 60 (or 46%) agreed or somewhat agreed, but 43 (or 33%) also disagreed or somewhat disagreed.

In interviews as well as in the stakeholder workshop and the territorial impact assessment workshop the relevance of a differentiated mandate was highlighted in this respect. Representatives of transport operators noted in targeted interviews, that any revision of the Clean Vehicles Directive should not overwhelm the principal economic capacity of transport operators: it could lead to constraints in the overall offer of public transport services. Public authorities' representatives also noted the need for local and regional flexibility. Representatives of environmental NGOs noted the prospects of falling battery prices and increased competitiveness of low- and zero-emission vehicles: further reduction of the price interval would decrease the cost impact, but markets also needed a clear signal.

In all consultation activities, there was very high agreement on positive environmental impacts. In the OPC, out of 129 respondents, 100 participants (or 77.5%) agreed or somewhat agreed to positive impacts on energy consumption reduction. 105 participants (or 81%) agreed or somewhat agreed to positive impacts on CO₂ emission reduction. 101 participants (or 78%) agreed or somewhat agreed to positive impacts on air pollutant reductions. Concluding, 100 participants (or 77.5%) underlined the positive impacts on human health stemming from reduction of emissions of air pollutants.

In total, 62 of 129 respondents (or 48%) strongly agreed that socio-economic benefits will overcompensate cost related to an increase in administrative burden, and 19 respondents (or 15%) somewhat agreed. 13 respondents (or 10%) strongly disagreed, and 6 respondents (or 5%) somewhat disagreed. Experts of public authorities in targeted interviews noted that long-term benefits could indeed outweigh the cost, but also noted that those who had to bear the cost would not be fully benefiting from these benefits. A stronger increase in the roll-out of low- or zero-emission vehicles would need to be met in a number of occasions by adequate public support.

10.3.5. Adequacy of other means of action

The OPC asked participants about their opinions on the adequacy of achieving the objectives of the Directive by means of other action, notably the use of soft legislative instruments (guidance notes, voluntary measures) rather than a legislative instrument. 42 respondents (or 32.5%) agreed or somewhat agreed this was a feasible approach. 68 respondents (or 62%) of respondents disagreed or

somewhat disagreed (n=129). In the stakeholder workshop in April 2017, none of the participants suggested that a repeal of the Directive was adequate. Also in the targeted interviews no stakeholder expressed such a position.

The OPC further asked participants about their opinions if the objectives of the Directive could be better achieved by the use of a Regulation. 44 respondents (or 34%) agreed or somewhat agreed to this question, 37 respondents (or 29%) of respondents disagreed or somewhat disagreed (n=129). Out of 21 responses from public authorities, 3 respondents (14.5%) agreed or somewhat agreed, 10 (or 48%) disagreed or somewhat disagreed and 8 (38%) stated "do not know" or "no answer", reflecting higher degree of uncertainty about this measure. A similar recording was made for contracting entities, where 5 (or 50%) respondents disagreed or somewhat disagreed, 2 (or 20%) agreed or somewhat agreed and 3 (or 30%) respondents did not know (n=10).

The targeted consultation activities yielded a very clear position on this question, however. In the stakeholder workshop in April 2017, representatives of city networks negated the adequacy of this measure. Some degree of flexibility was needed for procuring authorities to cope with different local context conditions. This position was also reflected in the targeted interviews with experts of public authorities. Experts from Member States in the meetings February and April also referred to the need of a flexible procurement mandate, which could not really well be guaranteed.

10.4. Conclusions and use of results

There was general support to using public procurement to further the uptake of clean vehicles in the Union. There was also a broad-scale agreement that the Clean Vehicles Directive in its current format is not fit for purpose and that shortcomings in the current Directive provisions are a key factor.

All main target groups of the consultation supported the need for setting up clearer requirements and increasing the level of ambition. A clear majority of all key target groups supported the extension of the scope of the Clean Vehicles Directive to better cover vehicles rented, leased or hire-purchased and transport service contracts other than for public passenger transport. The relevance of introducing a definition of clean vehicles was underlined by representatives from all target groups. Yet there were distinct differences among stakeholders on the preferred approach to setting up a definition and also to the level of ambition for related action requirements. A commonly recognised need concerned the need to define an approach that is simple to use and leaves amounts of flexibility to the final target groups of the Clean Vehicles Directive. Also, close to all stakeholders acknowledged that there are severe shortcomings in the current monetisation methodology. The majority of respondents to the OPC were in favour of abandoning the monetisation methodology in favour of a clean vehicle definition and related minimum action requirement for public bodies.

The results of the consultation were used in confirming the initial screening of the potential policy measures and in designing the policy options. Particularly, the different preferences for setting up a clean vehicle differentiation led to the two main approaches of using emission-based thresholds (in policy option 3) and of using alternative fuels based mandates (in policy option 4). Policy option 2 was developed to test the impacts of an approach with full responsibility for defining the level of ambition to the Member States. The differentiation of Member States mandates (in policy option 3 and 4) and the differentiation between mandates for light and heavy-duty transport (in policy option 5) were introduced following stakeholder feedback.

Also the combination of CO₂ and air pollutant emission thresholds was introduced in policy option 3. Results were also used to inform the design of the minimum mandate, with two target years based at the level of Member States rather than based at the level of the contract or for a fixed period of time. Widespread criticism of the monetisation methodology and doubts about its usefulness among a larger part of the stakeholders consulted informed the design of all policy options: in policy option 2 and 5

the methodology is being updated, in policy options 3 and 4 it is being discarded. These results are referred to in the different sections of the Impact Assessment.

10.5. Appendix to the stakeholder consultation synopsis report

10.5.1. Overview of stakeholder engagement

Further information on the process of stakeholder consultation through targeted interviews and questionnaires is provided in the External Support Study for this Impact Assessment.

Table 10.1: Stakeholder engagement activity – responsive stakeholders by type of organisation

Stakeholder type**	Stakeholder engagement activity – responsive stakeholders*					
	Open Public Consultation	Exploratory Interviews	Targeted interviews	Bilateral engagement ***	Workshops	Total
Business	33	-	-	1	-	34
NGO	29	-	1	-	1	30
Other	25	-	-	6	-	31
Individual	16	-	-	-	-	16
Business Procurer	4	-	-	-	-	4
Public Authority	23	6	9	5	14	57
Trade Association / EU-business interests	-	2	3	-	2	8
Total	130	8	13	12	17	180

* A number of stakeholders participated in more than one engagement exercise. In addition, one or more stakeholder represented multiple interests (for example; a city procurement unit officer who is also active in an EU-level interest group). In addition – this encompasses only stakeholders who participated, the total figures cannot be said to represent the total number of stakeholders who were contacted in the course of this study.

** Groups identified during the Open Public Consultation have been amalgamated into those shown in the table

*** Short questionnaires/ case studies

Table 10.2: Stakeholders contacted and interviewed as part of the exploratory interviews

Stakeholder	Contact	State of play
UITP (public transport)	Annika Stienen	UITP has provided written comments.
FEAD (municipal waste)	Margot Auvray	Declined as not involved in the CVD
ACEA (manufacturers)	Petr Dolejsi	Discussed the questions at an internal ACEA meeting on the 13 th December; has provided a written response
T&E (Transport and Environment)	Greg Archer	Interviewed (2 nd December)
Council of European Municipalities and the Regions (CEMR) (CCRE - francais)	Angelika Poth-Moegele (Dr)	Arthur ter Weeme of the Association of Netherlands Municipalities (VNG) was interviewed on behalf of CEMR on 12 th January.
European Metropolitan Transport Authorities (EMTA)	Ruud van der Ploeg	No response
European Cities and Regions networking for innovative transport solutions (POLIS)	Nicolas Hauw	Interviewed (25 th January)
EUROCITIES	Vanessa Holve	Interviewed (Jonas Ericson, City of Stockholm on behalf of Eurocities) (13 th December)
Local governments for sustainability (ICLEI)	Simon Clement	Interviewed (12 th December)
International Road Transport Union	Marc Billiet	IRU sought their members' views but received only one response - Duncan Buchanan from Road Haulage Association Ltd (UK, IRU member) was interviewed on 25 th January.

Table 10.3: Targeted stakeholder interviews – stakeholder type

Stakeholder type	Organisations interviewed
Procurement authorities (national, regional authorities, municipalities)	<ul style="list-style-type: none"> • Warsaw, Poland, EU13 • London, United Kingdom, EU15 • Municipality of Rijssen-Holten, The Netherlands, EU15 • City of Niort, France, EU15 • City, Sweden, EU15 • City, Ireland, EU15
Contractors (representative of EU-wide interests)	<ul style="list-style-type: none"> • Food Service Europe • DHL • GeoPost • Malta Post (members of EuropoSt)
EU Level stakeholders or associations (including NGOs representing environmental interests, city networks, interest groups representing alternative fuel producers and retailers)	<ul style="list-style-type: none"> • ICLEI • Eurocities • International Association of Public Transport (UITP)

10.5.2. Meeting with expert representatives of Member States

This meeting brought together expert representatives from UK, Finland, Ireland, Italy, Belgium, Slovakia, Estonia, Portugal, Czech Republic and Lithuania. After an exchange of information on relevant public procurement practice in the Member States present DG MOVE presented the state of play of the Impact Assessment of the Clean Vehicles Directive. DG MOVE also presented an overview of available opportunities for funding support at European level.

Several initiatives for public procurement of clean vehicles in Member States were presented, including support measures to battery-electric vehicles in Estonia, a governmental low emission task force and a green public procurement fund to finance clean buses in Ireland and a new public procurement act in Italy that obliges public authorities to procure green vehicles. In the UK, there is a national long-term vision of having every car and van comply with zero-emission standards by 2050. UK has adopted official government buying standards for vehicles to better inform public procurement, mandatory for central government, voluntary for any organisation. Finland noted in good experiences with clean bus procurement and related national information exchange system. In SK, a clean vehicle programme supports procurement of clean vehicles, complementing reduced vehicle registration fees, preferential parking and road charging/toll benefits. In Portugal a special environmental fund will be implemented in 2017 to subsidize electric vehicles. Tax exemption for electric vehicles is in place.

DG MOVE presented the state of play of the problem analysis and the initial screening of possible policy measures, as also included in the Open Public Consultation. Member States experts underlined the relevance of reporting, but also the need for simple and straightforward reporting. Simplification of the Directive should be a priority.

Experts noted that no formal positions have been taken in their Member States on the different parts of the revision of the Directive. Some Member State experts (United Kingdom, Finland) noted that ambitious results need ambitious targets, and that the public sector should take a lead. Also, some

Member States experts tentatively agreed that the extension of the scope should be discussed (Portugal). Experts underlined the relevance of keeping the current public procurement thresholds.

Experts also agreed to the relevance of a technology neutrality approach (CZ, IE, SK, BE, PT, FI). They also noted that the current values of the monetisation methodology are in need of an update.

10.5.3. Public meeting with stakeholders

A meeting with public stakeholders on the outcomes of the public consultation took place on 28 April 2017. It brought together 64 participants.

A public consultation was open from 19 December 2016 until 24 March 2017 to collect stakeholders' views in the context of the Impact Assessment of the revision of Directive 2009/33/EC on the promotion of clean, energy efficient road vehicles ("Clean Vehicles Directive").

This meeting was organised to provide stakeholders with an overview of the received contributions to the public consultation and hear the views of different stakeholders. After a presentation by the European Commission, Directorate-General for Transport and Mobility (DG MOVE), on the state of play and outcomes of the Public Consultation, an exchange of stakeholder's views on different aspects of the possible revision of the Clean Vehicles Directive took place.

This discussion was informed by presentations from different stakeholders (all presentations are available through the public consultation webpage for the revision of the Clean Vehicles Directive).⁷

DG MOVE informed participants that public consultation yielded 130 contributions from over 20 Member States. DG MOVE will carefully analyse the contributions.

Extension of the scope

- The need to anticipate impact on administrative burden of small public procurers when considering measures such as removal of the public procurement threshold.
- Several stakeholders noted the relevance of broadening the scope of the Directive, particularly in view of extension to vehicles rented, leased or hire-purchased and in view of extension to certain transport-relevant services.
- Monitoring of extension of the scope of the Directive would need to be met by a relevant reporting scheme.

Definition

1. There was general agreement about the benefits of having a clear definition.
2. Different views were raised with regard to the basis of a definition:
 1. Several stakeholders noted the relevance of combining GHG emissions and air pollution emissions and the relevance of using real-drive emission standards in the definition of a clean vehicle in case the definition was to be based on a emission-based approach;
 2. some stakeholders noted the need to consider other environmental impacts such as noise; other stakeholders supported basing a definition on the use of alternative fuels as defined in Directive 2014/94/EU.

⁷ https://ec.europa.eu/transport/themes/sustainable/consultations/2016-clean-vehicles_en

3. Yet other stakeholders suggested that clean vehicles should be defined on the basis of a zero-emission approach.
3. The need for keeping a technology-neutral approach was flagged repeatedly; also in view of establishing needed second-hand markets.
4. The need for improving policy coherence among different pieces of legislation, particularly in view of the implementation of Directive 2014/94/EU on alternative fuels infrastructure was broadly noted. Coherence is also relevant with regard to indicative policy targets as enshrined in e.g. the 2011 Transport White Paper and the Low-Emission Mobility Strategy, and their impact on reporting structures.
5. Discussions also showed different views about the relevance of a well-to-wheel approach as the basis of an emission-oriented definition of a clean vehicle: while several stakeholders strongly supported this, others noted problems of complexity of upstream emissions (also in a global context) and allocation of emissions to the energy or transport sector; another example of complex policy design should be avoided.

Mandating minimum action

1. Discussion about possible minimum procurement mandates underlined the variety of approaches at hand and also surfaced a broader range of stakeholder views. Stakeholders:
 2. noted the need for treating light-duty and heavy-duty transport sector differently,
 3. highlighted differences with regard to rural and urban transport;
 4. saw a need for flexibility of any mandate option with regard to implementation by public authorities and transport operators was requested
 5. underlined the relevance of mandate action, particularly in case of smaller entities.
 6. Purchase of new and of second-hand vehicles pose different procurement challenges. Total cost of ownership: more and better exchange of information and experience as well as capacity-building is needed; TCO perspective will change

Monetisation methodology

Some stakeholders supported abandoning the current methodology for monetising environmental impacts of vehicles as it was too complex, biased and not really used.

10.5.4. Meeting with representatives of Member States

DG MOVE organised a meeting with expert representatives of Member States on 28 April 2017 to present and discuss the outcomes of the public consultation. The meeting brought together representatives of Austria, Belgium, Denmark, Germany, Estonia, Ireland, France, the Netherlands, Poland, Slovenia, Romania and the United Kingdom.

DG MOVE presented the main state of play on the revision of the Clean Vehicles Directive note. The external contractor to the Impact Assessment, Ricardo, presented the main outcomes of the public consultation carried out in the context of this Impact Assessment.

Germany noted that only 30 per cent of the respondents expressed support to turning the Directive into a Regulation, indicating the need for flexibility for Member States.

Scope

France and Belgium noted its principal consent to extend the scope of the Directive to vehicles rented, leased and hire-purchased. Belgium also asked to carefully to consider the possible impacts on local authorities with the different measures under consideration.

Implementation mechanisms

Germany informed that the Federal Government has set up a quote that 10 of the federal government owned fleet has to be clean vehicle. No threshold applies to this quota. DE also noted that it will be relevant to have a definition of clean vehicles introduced, but also insisted that this definition should not be complicated.

Belgium also noted the principal relevance of a clean vehicles definition, but highlighted also the need for feasibility. There is not yet a common position on this; though CO₂ (life cycle) and air pollution thresholds appear most relevant. Going beyond the "clean" vehicle notion, for example through including a zero emission target could be considered. There is support to revising the monetisation methodology should it be retained, but noted that in this context simplification of the methodology is less a priority than putting greater emphasis on emission reduction, particularly on air pollution.

France noted on the monetisation methodology that, provided it should be retained, it should be revised in view of covering pollution with more weight. There is a need to have tools to support its use; a working group at EU level should be set up to revise the methodology and develop tools to use it. The methodology is not used in France.

Germany noted the relevance of giving Member States a binding choice to choose one of the main implementation mechanisms; the use of the methodology should not be principally binding. Any definition should not increase complexity of the Directive. Particularly the revision should not leave a complicated calculation methodology.

Austria highlighted that any discussion about a mandate needs to differentiate according to the different market segments.

Reporting

On reporting representatives updated on ongoing initiatives in their Member States and underlined the need for a simple and flexible solution.

Presentation of single policy frameworks in Member States

Belgium presented its policy approach to clean vehicle procurement. A procurement target is set for authority fleets of more than 20 vehicles (leased vehicles are included); setting of minimum technical specifications is informed by the Ecoscores tool, which allows the evaluation of the environmental performance of the vehicles on a well-to-wheel basis. There is no central reporting; no final account of the number of public procurement. The take up of joint public procurement is not clear.

France also presented its national policy framework, public sector leading by example, including the order on public procurement (2015) and the act on energy transition and green growth and related decree on purchase of low-emission vehicles (2017): federal public authorities have to purchase 50 per cent of low emission vehicles and local authorities 20 percent. There is no final definition of a low-emission vehicle, but different technologies (based on alternative fuels) are presented.

11. ANNEX 3: WHO IS AFFECTED BY THE INITIATIVE AND HOW?

The following key target groups of this initiative have been identified.

7. Public authorities at national, regional and local level in charge of transport policy and public procurement policy
8. Contracting authorities and entities at national, regional and local level (both public and private)
9. Transport operators (public)
10. Transport operators (private)
11. Vehicle and equipment manufacturers and suppliers
12. Fuel producers and retailers
13. Interest organisations representing societal interests, particularly on environmental topics

The remainder of this annex indicates how these actors are being affected by this policy initiative. It needs to be noted that the boundaries between the different target groups are not always clear. In some cases the public authority (defining the policy objectives for the public procurement) is a different public body compared to the contracting authority (in charge of the public procurement), in some cases it can be the same public body. A transport operator can also be the contracting entity. The remainder analysis hence can repeat information. Section 6 of the Impact Assessment already provides the (quantified) figures on cost and benefits occurred by public bodies, companies and wider public (socio-environmental impacts), which have to be read in conjunction.

Type of stakeholder	Practical implications
Public authorities at national level	<p>Organisational changes (change of administrative procedures to ensure rule compliance)</p> <p>Member State authorities will need to adapt existing national legislation to the provisions of the revised Clean Vehicles Directive. This will include different legislative and organisational changes, namely:</p> <ol style="list-style-type: none"> 14. <u>Set up and agree with regional and local authorities the allocation of the national public procurement mandate.</u> This will be the most challenging implication of the preferred policy option for Member State administration. 15. <u>Establish supporting guidance and change procurement practice:</u> Guidance to public bodies on new procurement procedures is needed (can be simplified through using guidance material developed at European level). Where public authorities are purchasing vehicles or transport service, they will have to adapt their practice. 16. <u>Reporting:</u> Member States administrations will have to consolidate reporting on the implementation of the minimum mandate by regional and local authorities. Provided that updates to the CPV vocabulary are made available, reporting could be facilitated as the number of publicly procured clean vehicles would be easy to identify. <p>Investment needs</p> <ol style="list-style-type: none"> 17. When affected in their role as contracting authorities, national public authorities will have to <u>invest into procurement of clean vehicles</u> (depending on the decisions taken domestically on the implementation of the minimum mandate).

	<p>18. <u>Administrative cost</u> of public procurement procedures are expected to be rather low.</p> <p>Cost</p> <p>19. The <u>purchase cost</u> for replacements to the national vehicle fleet is expected to increase (depending on the contribution to the national mandate), while <u>operational cost savings</u> also occur. However, given the fact that national authorities seldom run the more expensive public transport services, the additional cost over the total time period are not expected to be proportionally high, particularly when taking further cost decreases of vehicle technologies into account.</p> <p>20. Much more diverse cost impacts are expected in terms of impacts on <u>revenues from fuel taxes and electricity taxes</u>. Depending on the organisation of the national taxation system, increased procurement of clean vehicles leads to reduction in fuel tax revenue, but (depending on the technology) on increased in revenues from electricity taxes.</p> <p>Benefits</p> <p>21. Over time, operational cost savings should compensate the higher procurement cost (e.g. IEA estimates cost parity of conventional and non-conventional vehicles by 2030).⁸</p> <p>22. Economies of scale can be obtained through better alignment of procurement and also joint procurement</p>
Public authorities at regional and local level	<p>Organisational changes (change of administrative procedures to ensure rule compliance</p> <p>Similarly to the impacts on Member State authorities, namely:</p> <p>23. <u>Set up and agree with national authorities the allocation of the national public procurement mandate</u>: This will be the most challenging implication of the preferred policy option for all involved authorities</p> <p>24. <u>Change procurement practices</u>: public bodies need to adapt their practice to comply with the revised provisions of procurement law.</p> <p>25. <u>Reporting</u>: public bodies will have to consolidate reporting on the implementation of the minimum mandate. Provided that updates to the CPV vocabulary are made available, reporting could be facilitated as the number of publicly procured clean vehicles would be easy to identify. A national platform can support this exercise (see UK experience).</p> <p>Investment needs</p> <p>26. When affected in their role as contracting authorities, regional and local public authorities will have to <u>invest into procurement of clean vehicles</u> (depending on the decisions taken domestically on the implementation of the minimum mandate)</p> <p>27. <u>Administrative cost</u> of public procurement procedures are expected to be rather low.</p> <p>Cost</p>

⁸ International Energy Agency (2017) Global EV outlook 2016. Two million and counting, Paris IEA. Other studies (e.g. McKinsey (2017) Electrifying insights: how automakers can drive electrified vehicles sales and profitability) expect cost parity to arrive in the first half of the 2020s

	<p>28. The <u>purchase cost</u> for replacements to regional and local vehicle fleet is expected to increase (depending on the contribution to the national mandate), while <u>operational cost savings</u> occur. Over time (2020-2035) increasing cost parity of conventional and non-conventional vehicles should lead to a decrease if not closure in the cost gap.</p> <p>29. Cost are also impacted by the respective <u>organisational business model</u> (e.g. whether OPEX and CAPEX can be jointly assessed, or need to be treated separately) as well as the available public funding and financing support.⁹ Seen from a life-cycle cost perspective, there are already now examples where e.g. battery-electric buses are cost-competitive to conventional vehicles.¹⁰</p> <p>30. Economies of scale can be obtained through better alignment of procurement and also joint procurement.</p> <p>31. A better cost-benefit ratio might also be obtained by public authorities through increasing transparency of their procurement notice and encouraging open competition to get better bids.¹¹</p> <p>Benefits</p> <p>32. Over longer time period (2020-2035), operational cost savings should compensate the higher procurement cost (e.g. IEA estimates cost parity of conventional and non-conventional vehicles by 2030).¹²</p> <p>33. Depending on how public authorities organise vehicle access to their cities, additional benefits can increase from greater attractiveness of public transport (in the context of access restrictions for polluting vehicles, for examples), also due to the possibility of opening new routes in areas where this was not possible before (because e.g. of noise implications).</p> <p>34. Regional and local authorities can realise indirect benefits due to positive impacts on air pollution in cities and sub-urban agglomerations and related increases in the quality of living.</p>
<p>Contracting authorities and entities (can overlap with public authorities) at all levels of governance</p>	<p>Organisational changes</p> <p>35. Contracting authorities and entities (both public and private) incur rather limited administrative cost in adapting to the revisions of the revised Clean Vehicles Directive</p> <p>Investment needs</p> <p>36. Contracting authorities and entities (both public and private) will have to invest into new vehicles, if they are not already obliged by existing national, regional or local frameworks to do so.</p> <p>Cost</p> <p>37. The <u>purchase cost</u> for replacements to regional and local vehicle fleet</p>

⁹ At European level, for example, through funding under the European Structural and Investment Funds or the Connecting Europe Facility (CEF) or through the EU research and innovation programme Horizon 2020

¹⁰ Operation of battery-electric buses in the Amsterdam Schiphol region by TransDev is such an example.

¹¹ A recent review of overall European public procurement practice in the context of the European Semester process found that public procurement in many cases is still characterised by a lack of competition, as well as a very low level of demand aggregation. See https://ec.europa.eu/info/sites/info/files/european-semester_thematic-factsheet_public-procurement_en.pdf

¹² International Energy Agency (2017) Global EV outlook 2016. Two million and counting, Paris IEA. Other studies (e.g. McKinsey (2017) Electrifying insights: how automakers can drive electrified vehicles sales and profitability) expect cost parity to arrive in the first half of the 2020s.

	<p>is expected to increase (depending on the contribution to the national mandate), while <u>operational cost savings</u> occur. Over time (2020-2035) increasing cost parity of conventional and non-conventional vehicles should led to a decrease if not closure in the cost gap.</p> <p>38. Cost are also impacted by the respective <u>organisational business model</u> (e.g. whether OPEX and CAPEX can be jointly assessed, or need to be treated separately) as well as the available public funding and financing support.¹³ Seen from a life-cycle cost perspective, there are already now examples where e.g. battery-electric buses are cost-competitive to conventional vehicles.¹⁴</p> <p>39. Economies of scale may be obtained through better alignment of procurement and also joint procurement.</p> <p>Benefits</p> <p>40. Depends on the organisational model and the use cases.</p>
Transport operators (public)	<p>Impacts depend very much on the organisational model, which varies in the EU (most notably in view of the fact who actually owns the vehicles).</p> <p>41. In addition to the cost and benefit impacts noted above, transport operators face additional cost in terms of changing their operational management, related facilities for maintenance of vehicles and infrastructure as well as related cost for skilling their workforce.</p> <p>42. They may also incur benefits in terms of reduced health care cost for their employees (less noise exposure, smoother driving conditions, less pollutant exposure).</p>
Electric grid operators	<p>Depending on the type of vehicle technology used</p> <p>Organisational changes</p> <p>43. none</p> <p>Investment need</p> <p>44. Grid operators will have to invest into grid expansion and innovative technologies (e.g. smart metering) to cope with increased demand from recharging of vehicles.</p> <p>Cost</p> <p>45. Cost for expanding infrastructure</p> <p>46. Increased cost can be particularly occurred in case of equipping bus depots with recharging infrastructure.</p> <p>Benefits</p> <p>47. Include increase of revenues; depending on the business models revenue streams can vary.</p>
Manufacturers and suppliers of vehicles	<p>Organisational changes</p> <p>48. Limited cost are occurred in view of adapting to the changed provisions of the Clean Vehicles Directive</p>

¹³ At European level, for example, through funding under the European Structural and Investment Funds or the Connecting Europe Facility (CEF) or through the EU research and innovation programme Horizon 2020

¹⁴ Operation of battery-electric buses in the Amsterdam Schipol region by TransDev is such an example.

	<p>Investment needs</p> <p>49. Manufacturers and suppliers will have to invest into higher production capacities and technology development</p> <p>50. They will have to invest in skilling their workforce</p> <p>51. Their contractual relations with public authorities (e.g. maintenance, guarantees, liability) will need to be reviewed and revised</p> <p>Cost / benefits</p> <p>52. Manufacturer and suppliers are expected to largely benefit from increased revenues from the procurement of low- and zero-emission vehicles, with revenues being distributed among businesses involved in the procurement of vehicles (including vehicle dealers)</p> <p>53. They will have increased cost in terms of investment into production capacity and new technologies, but with the exception of the market segment of trucks, low- and zero-emission technologies are either mature or are becoming mature.</p> <p>54. Benefits will largely outweigh cost.</p> <p>55. Cost and benefits will not be evenly spread – particularly suppliers for conventional vehicle technologies will have to adapt, whereas suppliers for non-conventional vehicle technologies will largely benefit. This is mainly relevant for the bus segment; due to the limited market share of publicly procured passenger cars and vans.</p>
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12. ANNEX 4 ANALYTICAL MODELS USED IN PREPARING THE IMPACT ASSESSMENT

12.1. Introduction

A specific cost-benefit assessment tool had been developed in the context of the 2015 ex-post evaluation by Ricardo.¹⁵ It has been revised and updated in the context of the External Support Study for this Impact Assessment. The model was used to establish the quantitative baseline scenario and the impact of the analysed policy options. The tool is a spreadsheet-based model implemented in Microsoft Excel.

Box 12.1: Overview of the CVD IA cost-benefit tool

The Excel-based cost-benefit calculation tool that was developed for the ex-post evaluation quantitatively estimates the impacts of the Clean Vehicles Directive on overall pollutant and CO₂ emissions from vehicles procured during the period 2012-2014. These impacts are monetised (over the lifetime of the vehicles procured during the assessment period) and compared to additional capital and administrative costs incurred as a result of the Directive. For the Impact Assessment, the cost-benefit tool has been modified to develop a quantified baseline scenario that projects the total costs, as well as air pollutant and CO₂ emissions from publicly procured vehicles over the period 2020-2035. Costs are provided in monetary terms and EU average values. It has been expanded to include greater detail on alternatively fuelled vehicles and sensitivity options have been added to allow the assessment of an alternative baseline scenario for buses. Several key parameters used in the CVD Evaluation cost-benefit tool have been updated with more recent data and supplemented with relevant projections for the situation in future years, including were possible input from the EU Reference scenario 2016. The model is now referred to as the CVD Impact Assessment cost-benefit tool (= the tool).

Modelling results have been provided in monetary terms, separately for public bodies and companies. Cost have been disaggregated by a number of cost categories, including direct cost (vehicle purchase cost, operational cost) and indirect cost (administrative cost, reporting and compliance cost).

Modelling results have further been provided for CO₂ emission and air pollutants. The quantification and, where possible, monetisation of the environmental impacts is based on the assessment of the number and type of vehicles procured under each policy package combined with data on emissions for each vehicle type together with data on the unit cost of CO₂ and air pollutant emissions. The quantitative analysis of economic, social and environmental impacts of the policy options is based on the analysis of the number of vehicles procured by powertrain type under each policy option as well as the available data on vehicle purchase and operating costs.

The tool estimates public sector vehicles procured between 2020 and 2035. Four main types of vehicles are considered in the analysis:

56. Passenger cars,
57. Vans (light commercial vehicles),
58. Rigid trucks (with a gross vehicle weight <16 tonnes), and
59. Buses.

¹⁵<https://ec.europa.eu/transport/sites/transport/files/facts-fundings/evaluations/doc/2015-09-21-ex-post-evaluation-directive-2009-33-ec.pdf>

The tool includes a breakdown of each vehicle type into petrol (where relevant), diesel and different alternatively fuelled vehicles (AFVs). This means that, for example, plug-in hybrid electric vehicles are in a separate category, rather than being grouped together with other AFVs that may have different emissions profiles. The powertrain/fuel types match those shown in an update of the EU Reference 2016 scenario. Annex 3 of the Impact Assessment Support Study provides further information.

12.2. Model inputs and assumptions

Modelling inputs have been provided for each of the categories mentioned above. In order for the baseline for the CVD Impact Assessment to be comparable to other Impact Assessments currently underway, the majority of data inputs (e.g. technology costs, new registrations by type of powertrain, energy consumption and CO₂ emissions of new vehicles, etc.) have been obtained directly from an update of the EU Reference Scenario 2016 with the cut-off date for adopted policies end of 2016¹⁶, developed by the ICCS-E3MLab using the PRIMES-TREMOVE model. In cases where the required data is not available from PRIMES-TREMOVE, data from Ricardo Energy & Environment's SULTAN transport policy analysis tool has been used.¹⁷ For monetising the environmental costs savings, the 2014 Handbook on external costs of transport has been used.¹⁸ A full detailed overview of the different model inputs is provided in the Impact Assessment Support Study.

One of the key inputs into the tool is the number of vehicles publicly procured in the EU. As there is no European database that specifically records new vehicle registrations by type of owner (and type of fuel), data input has been generated from the Tender Electronic Database of the EU, where public contracts above the common procurement thresholds have to be published.¹⁹ As the assessment concerns the impacts of the Clean Vehicles Directive, which is conditioned by the public procurement thresholds, TED has been used to extract data on tenders for the period 2009-2015. Data in TED typically does not include information on the number of vehicles procured but includes information pertaining to the monetary value of the awarded contract. The evaluation study therefore estimated the number of vehicles purchased based on average prices of vehicles. The cost estimates used in this part of the analysis were derived from a survey of procurers also carried out during the evaluation study. The methodology to estimate the number of public procurements per year is summarised below:

60. Step 1: Extract 2009-2015 data from the TED database and identify the contracts relevant to vehicle purchases, hired vehicles and the procurement of transport services.

¹⁶ This update (i.e. Baseline scenario) builds on the EU Reference scenario 2016 but additionally includes some updates in the technology costs assumptions (i.e. for light duty vehicles) and few policy measures adopted after its cut-off date (end of 2014) like the Directive on Weights and Dimensions, the 4th Railways Package, the NAIADES II Package, the Ports Package, the replacement of the New European Driving Cycle (NEDC) test cycle by the new Worldwide harmonized Light-vehicles Test Procedure (WLTP). It has been developed with the PRIMES-TREMOVE model (i.e. the same model used for the EU Reference scenario 2016) by ICCS-E3MLab. A detailed description of the this scenario is available in the Impact Assessment accompanying the Proposal for a Directive amending Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures, SWD (2017) 180.

¹⁷ Exploration of EU transport decarbonisation scenarios for 2030, Ricardo Energy & Environment project for DG CLIMA, forthcoming

¹⁸ Source: https://ec.europa.eu/transport/themes/sustainable/studies/sustainable_en

¹⁹ As noted in a recent review of public procurement practice under the European Semester process, there is, however, no uniform compliance with the registration of contracts above the thresholds of EU public procurement law in TED. There are some Members States where the value of procurement published in relation to GDP is far below the EU average of 4.7% (2009–2014). Hence the TED data are likely to underrepresent the actual value of public procurement of vehicles.

61. Step 2: Identify the number of contracts in each category, the value of each contract and the types of vehicles procured (passenger cars, vans, rigid trucks or buses).
62. Step 3: Using average cost values per vehicle and the contract values, estimate the number of vehicles publicly procured per year (for each category – purchases, hired vehicles and transport services).
63. Step 4: Assume that on average, the fuel type split for public sector procurements is the same as the EU average (based on data from the REF2016+ scenario) and project the number of public sector procurements in future years.

For the market segment of urban buses, an alternative baseline was constructed for carrying out a sensitivity check against a higher baseline based on input provided by UITP and ACEA. Further information on each step is again provided in the Impact Assessment support study.

A number of assumptions have been made on the types of vehicles selected by public bodies under the different policy options. In the case of policy options 3 and 4 that include a definition of vehicles and related minimum procurement mandates available information on CO₂ and air pollutant emissions have been used to identify the powertrains that meet the criteria of the policy option and the share of the vehicles needed to meet the requirements of the option.

In case of the policy options 2 and 5, which make use of the monetisation methodology, several assumptions had to be taken. First, the PO2 leaves a binding choice to Member States whether to use the approach of setting up a national policy framework based on a clean vehicle definition provided by the Clean Vehicles Directive or to use the approach of monetising vehicle impacts. This requires an assumption about how many authorities will actually make use of the monetisation methodology. Second, in that case it has been assumed that authorities will select the vehicles with the least internal and external costs. Total costs (internal and external) have been calculated and the least expensive powertrain for each vehicle type has been identified. Annex 7 of the Impact Assessment Support Study provides further information on this assessment. In practice, it is not fully realistic that public authorities will only purchase one type of vehicle; a complete shift from petrol/diesel to battery-electric or LNG/CNG is unlikely. Yet this is the only option that is currently available to implement the principle logic of the monetisation approach.

Table 12.1: Ranking of vehicles by powertrain on the basis of total costs (internal and external) calculated using the monetisation methodology (1st: cheapest available technology in bold; unavailable powertrains below 1% in red)

Vehicle Type	2020	2025	2030	2035
Passenger cars	1-Petrol 2-E85 3-LPG 4-CNG 5-Diesel 6-PHEV Petrol 7-Electric 8-PHEV Diesel 9-Fuel Cell	1-Petrol 2-Electric 3-E85 4-PHEV Petrol 5-LPG 6-CNG 7-Diesel 8-PHEV Diesel 9-Fuel Cell	1-Electric 2-Petrol 3-PHEV Petrol 4-E85 5-LPG 6-CNG 7-PHEV Diesel 8-Diesel 9-Fuel Cell	1-Electric 2-Petrol 3-PHEV Petrol 4-E85 5-LPG 6-PHEV Diesel 7-CNG 8-Diesel 9-Fuel Cell
Vans	1-LPG 2-Petrol 3-CNG 4-PHEV Petrol	1-LPG 2-PHEV Petrol 3-Petrol 4-CNG	1-PHEV Petrol 2-LPG 3-Electric 4-Petrol	1-PHEV Petrol 2-Electric 3-LPG 4-CNG

Vehicle Type	2020	2025	2030	2035
	5-Electric 6-Diesel 7-PHEV Diesel 8-Fuel Cell	5-Electric 6-PHEV Diesel 7-Diesel 8-Fuel Cell	5-CNG 6-PHEV Diesel 7-Diesel 8-Fuel Cell	5-PHEV Diesel 6-Petrol 7-Fuel Cell 8-Diesel
Rigid trucks	1-Electric 2-Fuel Cell 3-LPG 4-Diesel Hybrid 5-LNG 6-Diesel	1-Electric 2-Fuel Cell 3-Diesel Hybrid 4-Diesel 5-LNG 6-LPG	1-Electric 2-Fuel Cell 3-Diesel 4-Diesel Hybrid 5-LNG 6-LPG	1-Electric 2-Fuel Cell 3-Diesel 4-LNG 5-Diesel Hybrid 6-LPG
Buses	1-Electric 2-Fuel Cell 3-Diesel Hybrid 4-Diesel 5-LPG 6-CNG	1-Electric 2-Fuel Cell 3-Diesel Hybrid 4-Diesel 5-LPG 6-CNG	1-Electric 2-Fuel Cell 3-Diesel Hybrid 4-Diesel 5-LPG 6-CNG	1-Electric 2-Fuel Cell 3-Diesel Hybrid 4-Diesel 5-LPG 6-CNG

12.3. Reliability and appropriateness of the cost-benefit tool

Public procurement of clean vehicles is a specific area of transport policy. General transport models are of little use and not really appropriate to analyse the impacts of policy options to change the public procurement framework at European level, as they do not adequately take into account and represent the specific conditions of public procurement of clean vehicles. A simpler cost-benefit tool as the one used for this Impact Assessment, and in the ex-post evaluation of the Clean Vehicles Directive, has the advantage of providing a transparent understanding of links between inputs, assumptions and outputs, more closely related to the reality of public procurement.

As noted in detail in the Impact Assessment Support Study a number of assumptions had to be made as input to the spreadsheet-based model implemented in Excel. These assumption reflect the thorough expertise of the study team in the field of transport and procurement of vehicles as well as, where relevant, related consultation of key stakeholders. The tool has been successfully used for the evaluation of the Clean Vehicles Directive. Together this should ensure the appropriate level of reliability needed for the Impact Assessment.

One of the most crucial inputs concerns the number of vehicles that are publicly procured in the Union, as well as the share of clean vehicles therein. There are shortcomings in using data from TED, but no other approach exists. The results from the analysis of TED have been cross-checked with experts from Member States and representatives of key stakeholders during the consultation meetings in April 2017 (see Annex 6 of the Impact Assessment Support Study). No comments were received that the results of the analysis are inappropriate for further use. The results have further been cross-checked with available information from external surveys and studies.

Accordingly, the results are considered to be robustly displaying the relevant trends in the baseline and in the policy options, and provide the appropriate means for comparing the baseline and the policy options between themselves.

13. ANNEX 5: PACKAGING OF POLICY OPTIONS

The preselection of measures and the subsequent packaging of policy options has been done in a way to ensure that the policy options address all of the identified specific policy objectives, at least to some extent.²⁰ The objective was to construct policy options that can illustrate impact of increased levels of policy ambition, so that policy makers can choose from a broader portfolio of options.

13.1. Principles for packaging of policy options

It is relevant to recall that the specific policy objectives (SPOs) for this initiative aim to

- SO1: Ensure that the Directive covers all relevant procurement practices
- SO2: Ensure that the Directive supports clear, long-term market signals
- SO3: Ensure that the Directive provisions are simplified and effective to use

Policy options should address all policy objectives, at least to some extent. Furthermore, there should be an increase of policy ambition throughout the policy options. Together, policy options should also represent different principal governance approaches to tackling the identified policy problem.

The measures retained after the pre-screening offer three principal approaches (section 5 of the Impact Assessment Report), which address the three specific policy objectives:

- 64. varying the overall scope of the Clean Vehicles Directive will lead to an increase in the volume of contracts that are affected by the provisions of the Directive (SPO1). Measures retained after the pre-screening included extending the scope to vehicles rented, leased or hire-purchased as well as transport service contracts other than public passenger transport.
- 65. varying the level of ambition and scale of requirements for vehicle purchase in the Clean Vehicle Directive will lead to a greater number of clean vehicles procured (SPO2). Measures retained after the pre-screening included approaches to setting up a definition of clean vehicles and to setting up a mandate for minimum procurement requirements, including different possibilities for differentiating between Member States and between light- and heavy-duty transport vehicles as well as different approaches to review the monetisation methodology.
- 66. varying the level of obligation for public bodies will affect the effectiveness of use of the Directive (SPO3). It considers the degree to which a revision of the Clean Vehicles Directive intervenes into the content and process of procurement by public bodies. The measures retained after the pre-screening include using the legal instrument of a Directive (which can be varied in the detail of its provisions) or a Regulation.

These three principal approaches should be combined in the design of policy options, to the extent possible. Wherever possible, the scale of policy ambition should be raised linearly.

13.2. Rationale behind the proposed packaging of policy options

To better orient the discussion, box 1 includes an overview of the final selected policy options. The packaging of policy options followed two principal steps:

- 67. First, review how to best reflect different levels obligation, providing different forms of flexibility to public authorities;

²⁰ PO1 departs from this rule as it was chosen to test the impacts of the repeal of the Clean Vehicles Directive and whether the objectives of the initiative could be reached by means of non-legislative action

68. Second, assess how to best reflect different levels of ambition for vehicle purchase requirements and how to best reflect different levels of ambition with regard to the scope of the Clean Vehicles Directive.

Table 13.1: Summary and comparison of policy options

Nr.	Policy option description	Degree of ambition	Level of intervention
PO1	This policy option repeals the Clean Vehicles Directive. Support to public authorities and the market is provided through soft policy measures such as guidance, recommendations and voluntary policy initiatives.	-	-
PO2	This policy option lightly revises the Clean Vehicles Directive. It introduces a definition of clean vehicles and sets up a requirement for Member States to adopt a national policy framework that should set an ambition level for 2030. However, setting the level of ambition and the scope is the entire responsibility of Member States. The policy option also includes a possibility to use a revised monetisation methodology. Member States have to make a binding choice between the approach of using the clean vehicle definition and national policy frameworks and the approach of using the revised monetisation methodology. The scope of the Directive is not changed, but it does not preclude the inclusion of other contracts (such as rent, lease, hire-purchase, or transport services) into the national policy frameworks by Member States, which should be recommended.	+	+
PO3 *	This option thoroughly revises the Clean Vehicles Directive. It extends the scope of the Directive to vehicles rented, leased or hire-purchased as well as specific transport service contracts. It sets up a clean vehicles definition and sets up related minimum procurement target, based on an emission-based threshold combining CO ₂ and air pollutant thresholds for light-duty vehicles. It does not set up such a definition for heavy-duty vehicles, as emissions from these vehicles are not regulated. Two different sub-options test impacts of a moderate (PO3a) and a high (PO3b) policy ambition.	++	++
PO4 *	This option thoroughly revises the Clean Vehicles Directive. It extends the scope to vehicles rented, leased or hire-purchased as well as specific transport service contracts. It sets up a clean vehicles definition and sets up related minimum procurement target, based on an alternative fuels basis for light- and heavy-duty vehicles. Two different sub-options test impacts of a moderate- (PO4a) and a high (PO4b) policy ambition.	+++	+++
PO5	This option replaces the Clean Vehicles Directive with a Regulation that prescribes to public bodies the use of a revised monetisation methodology to set monetised impacts as the award criteria for vehicle procurement. It is also based on an extended scope like in PO3 and PO4.	++++	++++
PO6 **	This option combines the approach to addressing light-duty vehicles in PO3 with the approach to addressing heavy-duty vehicles in PO4, while enabling the Commission to use a delegated to set-up CO ₂ and air pollutant thresholds for heavy-duty vehicles once the regulatory requirements have been set at European level. In terms of scope it follows the same approach as PO3 and PO4	+++	+++

- less compared to the status quo
- + moderate increase compared to the status quo
- ++ stronger increase compared to the status quo
- +++ strong increase compared to the status quo

++++ very strong increase compared to the status quo

* the differentiation in the level of policy ambition among PO3 and PO4 is due to the fact that PO4 considers both light- and heavy-duty vehicles, whereas PO3 only considers light-duty vehicles.

Concerning the first step of reasoning, the choice of the legal instrument and its design offers opportunities for differentiating the level of flexibility and obligation for public authorities:

69. Repealing the Clean Vehicles Directive offers the greatest form of flexibility to Member States, because there is no direct legal requirement.
70. Replacing the Directive with a Regulation offers the greatest form of direct impact, with high level of obligation and no room for flexibility.²¹
71. In between these two extreme options a revision of the Directive leaves room for differentiating the level of flexibility and obligation for authorities under the Directive. The main basis for variation here is the design of the definition of the Directive and a related minimum procurement mandate, as well as changes to the scope of the Directive.

Accordingly, it was decided to design at least one policy option that would repeal the current Directive, and one policy option that would replace the current Directive with a Regulation. In the final set of policy options, this is reflected in policy options 1 and 5 (see table A3.1).

13.2.1. Reasoning behind the design of PO1

The policy option repeals the Clean Vehicles Directive. It is assumed that the set of existing guidance and recommendations available at European level for the purchase of clean vehicles will be revised and made available in an updated format. This concerns particularly the "Guidelines on financial incentives for clean and energy-efficient vehicles"²². In addition, the current methodology and guidelines to its use would be published for voluntary use. Moreover, the Commission could support voluntary action of local and regional authorities and manufacturers through fora such as the Civitas Initiative and its annual forum conference²³, the Sustainable Transport Forum of DG MOVE²⁴ or through initiatives such as the European Clean Bus Deployment Initiative.²⁵

13.2.2. Reasoning behind the design of PO2, PO3 and PO4

The following conclusions informed the design of these policy options:

72. The degree of policy ambition is strongly affected by the decision to introduce minimum procurement mandates for Member States, or not. It is also affected by the design of the definition of clean vehicles and related possible minimum procurement mandates. Accordingly, it was decided for the packaging of the policy options:
 1. In a first step the level of ambition throughout the different policy options by establishing policy options that include, or not include, minimum procurement mandates for Member States, following a clean vehicles definition.
 2. In a second step, the design of the policy options with a clean vehicles definition and a minimum procurement mandate varied the strictness of the threshold for the definition and the scope of the minimum procurement mandate.

²¹ There are, however, implications for the use of some of the pre-screened measures: only the use of the monetisation methodology fits under this option.

²² SWD (2013)27

²³ <http://civitas.eu/>

²⁴ https://ec.europa.eu/transport/themes/urban/cpt/stf_en

²⁵ See for further information https://ec.europa.eu/transport/themes/urban/cleanbus_en

1. In a sub-step, the design of the policy options with a definition and a minimum procurement mandate sought to differentiate the level of ambition between light-duty and heavy-duty transport
 2. In a sub-step, the design of the policy options with a definition and a minimum procurement mandate sought to differentiate the level of ambition between Member States.
73. The degree of policy ambition is further affected by decisions on the scope of the Directive. Here, implementing a step-wise increase of the level of ambition would refer to gradual extensions of the scope of the Directive: one could, for example, either require the extension of the scope of the Clean Vehicles Directive to vehicles rented, leased or hire-purchase or to vehicles that are affected by specific transport services contracts (e.g. for transportation of elderly or handicapped people) or to both.
74. Moreover, the degree of policy ambition is further affected by the ability to choose from different implementation approaches or the need to follow one implementation approach. The Inception Impact Assessment had noted that policy options should test the impacts of giving up the current dual choice between either using technical specifications or using impacts as award criteria, coupled with monetisation. Accordingly, it was decided to also differentiate the policy options: PO 3 and PO4 discard the use of the monetisation methodology, PO5 solely builds on it (see table A3.1).

5.2.2.1 Designing PO2

Following the reasoning under point 1a above, PO2 was designed to set up a definition of Clean Vehicles at European level. It does not include further provisions on its use apart from the requirement that Member States should set up a national policy framework with a target for 2030. Member States are free to define the target and the related follow-up actions (see table A3.1).

PO2 should moderately change the level of ambition compared to the current status quo. It should also keep a higher degree of flexibility to Member States. PO2 hence leaves a (mandatory) choice for Member States in using either the approach of setting a national definition and related procurement action or in using the revised monetisation methodology to monetise energy and environmental impacts of vehicles. To follow the logic of moderate changes, PO2 does not include changes to the legal scope of the Clean Vehicles Directive. Member States should decide whether and how to include other contracts, while setting up their national policy frameworks.

The impact of this policy option is difficult to establish. As PO2 leaves a choice to Member States, the Impact Assessment needed to estimate, how many Member States would go for the one or other approach. Accordingly, two sub-options were created²⁶:

75. Sub-option 2a is based on the assumption that a limited number of Member States choose the monetisation option (following the ex-post evaluation findings on the use of the monetisation approach, this was set at 13%).
76. As a sensitivity check it was also assumed that half of the Member States choose the monetisation approach. This assumption underpins PO2b.

5.2.2.2 Designing PO3 and PO4

²⁶ In both cases, arbitrary assumptions underpin the Impact Assessment as it is not possible to identify ex-ante how many Member States will choose the one or other approach.

Following the reasoning as explained under point 1b above, PO3 and PO4 include a definition of clean vehicles and a mandatory minimum procurement mandate. They also extend the scope of the Clean Vehicles Directive (see table A3.1). While PO2 moderately revised the overall governance approach of the Clean Vehicles Directive, PO3 and PO4 thoroughly revise it. The options increase the level of policy ambition, but also the degree of obligation for local and regional authorities. They lead a better directing of public procurement outcomes in the EU.

The monetisation approach and hence the ability to choose from different implementation mechanisms as in PO2 has been discarded for PO3 and PO4. This design follows the request of many interviewees for a simplification of the Clean Vehicles Directive, but also the outcome of the Open Public Consultation (see annex 2). Here, the option to base the Clean Vehicles Directive only on a definition of clean vehicles and related minimum procurement mandates found the strongest support among all respondents. It was also done to respond to the principal requirement of simplification of EU law. Moreover, a full coherent assessment of the impacts of minimum procurement mandates for all Member States following a clean vehicles definition would not be possible if there was a continued choice for Member States of main implementation mechanisms. Again, assumptions would need to be made for the preferences of Member States.

The principle distinction between PO3 and PO4 is the basis of their definition. It has implications for the policy ambition of the options. PO3 is based on an emission-based approach and applies to light-duty vehicles only. PO4 is based on an alternative fuels approach and applies to all categories of vehicles, including heavy-duty vehicles. The alternative fuels approach provides at this moment the only possibility to set up a minimum procurement mandate in the area of heavy-duty transport (see Impact Assessment Support Study). The emission-based approach at this moment works for light-duty vehicles only.²⁷ Accordingly, it was decided to differentiate the two policy options on this basis: the main increase in terms of policy ambition between PO3 and PO4 concerns the extension of the definition and the related minimum procurement mandates to heavy-duty transport.

The impact of lower- and a higher ambition minimum procurement mandates was tested in two sub-options in each policy option. The approach to defining and differentiating the level of policy ambition among Member States and among the light-duty and heavy-duty transport segments is described in greater detail in annex 4 of this Impact Assessment.

No distinction was made between PO3 and PO4 concerning the extension of the scope of the Clean Vehicles Directive. Principally, different degrees of ambition could be prescribed by extending the scope to either only vehicles rented, leased or hire-purchased or vehicles purchased for transport-service contracts other than public passenger transport. However, no suitable justification presented itself to excluding one of the two for the other in relation to the design of PO3 and PO4. Both the measures of extending to vehicles rented, leased and hire-purchased and of extending to specific transport service contracts had also received considerable positive support during the ex-post evaluation. It was hence regarded to be more important to test the differences of the emissions- and fuels-based approach on the basis of the same extended scope of the Clean Vehicles Directive.

13.2.3. Reasoning behind the design of PO5

PO5 represents the most ambitious of all policy options. It directly harmonises procurement procedures and related criteria at European level. Replacing the Directive with a Regulation stems from the logic of making the use of impacts as award criteria on the basis of a revised monetisation methodology the sole approach to clean vehicle procurement. In PO3 and PO4, there is a target that Member States must achieve. Accordingly, Member States are required to devise their own acts on how to reach this target and a Directive is the right legislative tool. In PO5, there is a procedure based

²⁷ Subject to progress with regulation of CO₂-emissions from heavy-duty vehicles in the area of trucks and buses, this situation will change in the future.

on a common methodology that should be applied in its entirety across the EU. The main objective is to ensure a uniform application of the methodology, not to what extent it conforms to reaching a certain target. A legal transposition into national law is not needed, as there is no need to make changes to the methodology to adjust it to domestic circumstances.

The increase of policy ambition compared to PO4 is considerable. PO5 obliges actions from all public bodies in the Union. It does not enable Member States to prioritise and adapt the provisions for clean vehicle procurement to their specific domestic circumstances. This corresponds to recital 15 of the current Clean Vehicles Directive that "procurement of vehicles for public transport services can make a significant impact on the market if harmonised criteria are applied at Community level". It also corresponds to recital 16 of the current Clean Vehicles Directive that "the biggest impact on the market, together with the best cost-benefit result, is obtained through mandatory inclusion of life cost for energy consumption, CO₂ emissions and pollutant emissions as award criteria in the procurement of vehicles for public transport services". It was also decided to include the same extension of scope to vehicles rented, leased and hire-purchased and to specific transport service contracts (waste collection, specific transport services other than public transport).

13.2.4. Reasoning behind the design of PO6

This option aims at combining the respective strengths of policy option 3 on light-duty vehicles and policy option 4 on heavy duty vehicles, which principal approach is also being followed by PO6. The intention is namely to preserve the positive impact on policy coherence with other legislative requirements on vehicle emission reduction, notably on CO₂ emission reduction, but also air pollutants reductions, and to ensure the principal ability to adapt heavy-duty clean vehicle procurement legislation to future emission-based legislative requirements in this sector (through a delegated act).

Understanding the potential time lags with fully putting the related legislative requirements into place at a European level, this option seeks to ensure a continued impact on the market through adopting a minimum target based on alternative fuels for heavy-duty vehicles, as developed in PO4b, in the meantime. PO6 hence ensures that public procurement can more effectively deliver its potential to support markets in their early stage of development.

14. ANNEX 6: APPROACHES TO SETTING THE LEVEL OF AMBITION FOR THE MINIMUM PROCUREMENT MANDATES

The remainder of this annex discusses approaches to setting minimum procurement mandates as included under policy option 3 and policy option 4 under this Impact Assessment. It also specifies which approaches have been used for the assessment of impacts. Further information on the context and the methodology can also be found in the Impact Assessment Support study.

14.1. Principal approaches to setting up a minimum procurement mandate based on a definition of a clean vehicle

Different elements need to be considered and brought together with respect to how to set up a minimum procurement mandate. These include the definition of the initial level of ambition, the possible differentiation of the mandate among Member States, but also among light- and heavy-duty vehicles applied. These are discussed in the following sub-sections. The annex complements the information provided through the pre-screening of measures.

14.1.1. Defining the initial level of ambition of the minimum procurement mandate

The initial level of the minimum procurement mandate can be established in two ways:

77. By establishing an EU average level of ambition, which is then modulated across Member States or
78. By establishing an individual level of ambition for each Member States, which is then aggregated to a EU average value.

In terms of the first principal option, there is no explicit legal EU policy target that can be used as a starting point for setting a European average level of ambition. The proposed GHG-emission reduction targets under the discussed Effort-Sharing Regulation explicitly do not foresee any sectoral target setting. However, such an approach can be informed by long-term goals and by established policy needs. Most notably, the 2011 Transport White Paper of the Commission establishes a number of aspirational long-term policy goals, including for urban mobility (box 1).²⁸ In addition, other international forecasts assess the deployment needs of low- and zero-emission and other alternatively fuelled vehicles in order to meet long-term environmental objectives of the EU (see box 1). Furthermore, some Member States have also installed minimum procurement targets, which can help orientate the discussion (see box 1, and annex 8). The modulation of the average ambition among the Member States can be informed through different relevant criteria (see section 6.2 ff.).

The second principal option is even more complex. Here, an individual level of policy ambition per Member State would need to be set up and then aggregated to a final EU average level of policy ambition. Under this approach, it is more difficult to ensure consistency and coherence in the exercise: the process of agreeing to the different levels of policy ambition can lead to outcomes that are informed by different reasons and rationales.

²⁸ European Commission, White Paper: Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system, COM/2011/0144 final

Box 14.1: Long-term goals and assessment of deployment needs of clean vehicles in the EU

The *Commission 2011 Transport White Paper* notes that the development and deployment of new and sustainable fuels and propulsion systems need to be pushed. To this end, it suggests a long-term goal to "halve the use of 'conventionally-fuelled' cars in urban transport by 2030; phase them out in cities by 2050; achieve essentially CO₂-free city logistics in major urban centres by 2030". The White Paper highlights the benefits of using smaller, lighter and more specialised road passenger vehicles. Large fleets of urban buses, taxis and delivery vans are particularly suitable for the introduction of alternative propulsion systems and fuels. These are expected to make a substantial contribution in reducing the carbon intensity of urban transport while providing a test bed for new technologies and opportunity for early market deployment.

The decarbonisation pathways/scenarios for light-duty vehicles underpinning the *Commission's Low-Emission Mobility Strategy* support the penetration of both new technologies related in internal combustion engines and to alternative fuels. In the more ambitious pathways/scenarios, the share of electric-rechargeable vehicles ranges in between 15-18% of the light-duty vehicle stock, whereas in the less ambitious scenarios shares are in the range of 11-13%.²⁹

At COP 21 in Paris 2015, the *Paris Declaration on Electric-Mobility and Climate Change and Call to Action* was launched. It calls for action to increase electro-mobility to levels compatible with a less-than-2-degree pathway. Partners to the declaration commit to broaden their action and call for joint efforts towards electrification of transport, including that at least 20% of all road vehicles (cars, 2 and 3 wheelers, trucks, buses and others) are to be electrically powered by 2020.³⁰ This corresponds to exceeding a global threshold of 100 million electric cars and 400 million electric two-wheelers by 2030.³¹

The *Electric Vehicles Initiative (EVI) of the Clean Energy Ministerial (CEM)* process has launched the EV30@30 campaign. It sets a collective aspirational goal for all EVI members of a 30% market share of electric vehicles in the total of passenger cars, light commercial vehicles, buses and trucks by 2030. It is currently supported by 10 Member States, including Canada, China, France, Germany, Japan, Netherlands, Norway, Sweden, the United Kingdom and the United States of America. As part of this process, EVI members have confirmed their commitment to use public procurement of low-emission vehicles, including electric vehicles, to foster this transition through the Governmental Fleet Declaration in line with the ambitions of the EV30@30 campaign, that was launched at COP 22 in Marrakech in November 2016.³²

The scenarios of the *International Energy Agency on energy technology perspectives* (2017) all suggest a substantive electrification of transport until 2030. In the reference technology scenario, this number increases to 56 million electric cars in circulation in 2030, compared to 2 million electric cars in circulation in early 2017. In the more ambitious 2DS scenario, this number increases to 160 million electric vehicles. The review of the IEA notes that recent trends have been positive, but that the overall trend is not on track to meet the 2°C scenario targets to 2025.³³

According to the *International Energy Agency*, 14 countries have adopted national targets for the deployment of electric vehicles, including Austria, China, Denmark, France, Germany, India, Ireland, Japan, the Netherlands, Portugal, Korea, Spain, the United Kingdom and the United States (where targets have been defined for 8 states).³⁴ From a perspective of public procurement, the following country examples are particularly interesting:

The *French government* has adopted the Energy Transition for the Green Growth Act in 2015³⁵. The act required public bodies to introduce minimum shares of vehicles with low emissions of CO₂ and air pollutants, when renewing their fleets. Central authorities are required to procure a minimum share of 50 percent of those vehicles, including primarily BEV and PHEVs, while local authorities have to procure a minimum share of 20%. There is no central definition, but a listing of (alternative fuels) technologies. In addition, only low-emission buses and coaches can be procured for public transport services from 2025 onwards. On top, the French

²⁹ SWD(2016) 244 final

³⁰ <http://newsroom.unfccc.int/lpaa/transport/the-paris-declaration-on-electro-mobility-and-climate-change-and-call-to-action/>

³¹ See <https://www.iea.org/publications/freepublications/publication/GlobalEVOutlook2017.pdf>

³² See https://www.iea.org/media/topics/transport/EVI_Government_Fleet_Declaration.pdf

³³ <http://www.iea.org/etp/tracking2017/>

³⁴ <https://www.iea.org/publications/freepublications/publication/GlobalEVOutlook2017.pdf>

³⁵ <http://www.gouvernement.fr/en/energy-transition>

Government has recently announced that sales of conventionally fuelled vehicles should stop in France as of 2040.

In the *Netherlands*, all the regions as the responsible actors for the organisation of public transport have set up an agreement to only buy zero-emission buses from 2025 onwards.

The *Swedish government* has adopted specific incentives for the procurement of clean vehicles by public bodies. Governmental agencies have to consider environmental aspects in the procurement following a central national definition of clean vehicles, particularly by either procuring electric vehicles or by using biofuels.

In *Belgium*, a procurement target is set for public authority fleets of more than 20 vehicles (including leased vehicles): setting of minimum technical specifications for tendering has to be informed by the Ecoscores tool which allows for the evaluation of the environmental performance of vehicles. Ecoscores is supposed to prioritise those vehicles with best environmental performance in terms of a well-to-wheel approach.

The *German federal government* has set up a quota that 20% of the federal fleet should be electric vehicles in 2019, which has been achieved already (around 29% in May 2017³⁶).

The *UK government* has put in place national buying standards that set mandatory criteria for central governmental departments and their related organisations; others are encouraged to follow. The UK government also announced its intention to stop the sales of conventionally fuelled vehicles as of 2040.

It was decided to use the first principal approach and test the impacts of different levels of ambition in comparison to the baseline of the Impact Assessment.

On the basis of the outcomes of the baseline and the review of policies, strategies and assessments (box 1), it was decided to set three different levels of ambition:

- 79. Low ambition: 20% of light-duty vehicle procurement by public authorities
- 80. Higher ambition: 35% of light-duty vehicle procurement by public authorities
- 81. High ambition: 50% of light-duty vehicle procurement by public authorities.

It needs to be recalled that in PO3 the scope of the mandate (number of vehicles to be procured) is combined with the ambition of the entry threshold (emissions of CO₂ and air pollutants) to define the overall ambition of the mandate. In PO3, the scope of the mandate remains the same in the two target years of 2025 and 2030, but the level of ambition is increased through changing the emission-based thresholds for eligible vehicles, to reflect the maturity of vehicle technologies (see section xx, and Impact Assessment Support Study). This means

- 82. In PO3a, a threshold of 50 gCO₂/km for cars and for vans is established.³⁷ The 50 gCO₂/km were chosen in coherence with the current low-emission threshold enshrined in the CO₂ emission performance standards regulation, which exerts a certain innovation push for low-emission technologies. It covers a relevant suite of low-emission technologies, including battery-electric and fuel-cell electric vehicles, natural gas blended with biogas and plug-in hybrids. In addition, it introduces a threshold for light duty vehicles with respect to RDE air pollutant emissions: vehicles should have a conformity factor of 1 (i.e. 0% meaning that they meet Euro 6 standards as originally defined). As the CO₂ threshold would not go much beyond the average CO₂ emission fleet standard in 2030, the CO₂ threshold is lowered in 2030 to 30 gCO₂/km for passenger cars and 46 gCO₂/km for vans. This threshold requires zero-emission

³⁶ Bundesministerium für Wirtschaft und Energie. Available from <https://www.bmwi.de/Redaktion/DE/Artikel/Industrie/rahmenbedingungen-und-anreize-fuer-elektrofahrzeuge.html> [19 May 2017]

³⁷ This follows the EU2030 scenario of the Low-Emission Mobility Strategy, which is built on the target of achieving 30% energy efficiency by 2030. 75 gCO₂/km is also used in other policy context, such as the Ultra-Low Emission support programme from the UK government.

capable vehicles and exerts an innovation push that is deemed feasible at the point of time, when these technologies have been established long in the market. The threshold with respect to RDE air pollutant emissions is lowered to a conformity factor of 0.8 (i.e. 20% below Euro 6 standards).

83. PO3b only allows low- and zero-emission vehicles to be counted towards the mandate. Hence, a threshold of 25 gCO₂/km for cars and 40 gCO₂/km for vans is set for 2025, coupled with a threshold with respect to RDE air pollutant emissions of having a conformity factor of 0.8 (i.e. 20% below Euro 6 standards). This threshold was chosen to deliver a considerable innovation push by 2025 to the market, incentivising battery-electric and fuel-cell electric vehicles, only very strong plug-in hybrids and biogas for natural gas vehicles. In 2030, the CO₂ threshold is lowered to zero gCO₂/km for cars and vans to reflect a continued high level of policy ambition after close to ten years of implementing the Directive and push for the full introduction of zero-emission vehicle technologies in light-duty transport sector.

Accordingly, the assessment of impacts of this policy option has been based on using the higher ambition average level of 35% of light duty vehicle procurement for setting the scope of the mandate, as it appeared to be best in line with the levels of ambition expressed in the different policies, strategies and market forecasts reviewed. The 35% were chosen by expert judgement and following analysis in the context of the IA support study as a mean to exert a considerable but feasible ambition impact relative to the baseline while ensuring that there is an overall flexibility of public bodies with regard to technical choice.

It needs to be recalled that in PO4 the overall ambition of the mandate can only be defined through the scope of the mandate (number of vehicles to be procured). The entry threshold remains the same, as it is defined by the alternative fuels. The range of vehicle technologies is also broader, as the mandate will always include other alternative fuels technologies such as natural gas vehicles. Accordingly, the policy options needs to increase the scope of the mandate over time to increase the level of the ambition. Hence the PO4 uses the different levels of ambition noted above differently in the two target years of 2025 and 2030:

84. PO4a starts with a low ambition mandate in 2025 and scales it to a higher ambition mandate in 2030
85. PO4b starts with a higher ambition mandate in 2025 and scales to a high ambition mandate in 2030

PO4 targets both light- and heavy-duty vehicles. Following comments received during the consultation process for this Impact Assessment, a differentiation of the basic level of ambition in comparison to the baseline was regarded necessary, also to account for the different levels of vehicle technologies maturity in the different subsectors. Following the analysis of relevant information, including from EU-funded projects on zero-emission technologies in buses and trucks³⁸ the following average levels of ambition were assumed for trucks and buses, reflecting expert judgement and analysis in the context of the Impact Assessment Support Study on suitable degrees of ambition levels relative to the baseline and taking into account recent forecasts of market developments, particularly in the area of urban buses:

86. Low: 5% of trucks and 30% of buses
87. Higher: 10% of trucks and 50% of buses
88. High: 15% of trucks and 75% of buses

PO 6 combines PO3b for light-duty vehicles and PO4b for heavy-duty vehicles and hence builds on the same policy option rationale as described for these options.

³⁸ See ZEEUS report, ACEA/UITP market forecasts, FREVUE project

14.1.2. Approaches to differentiating procurement mandates among Member States

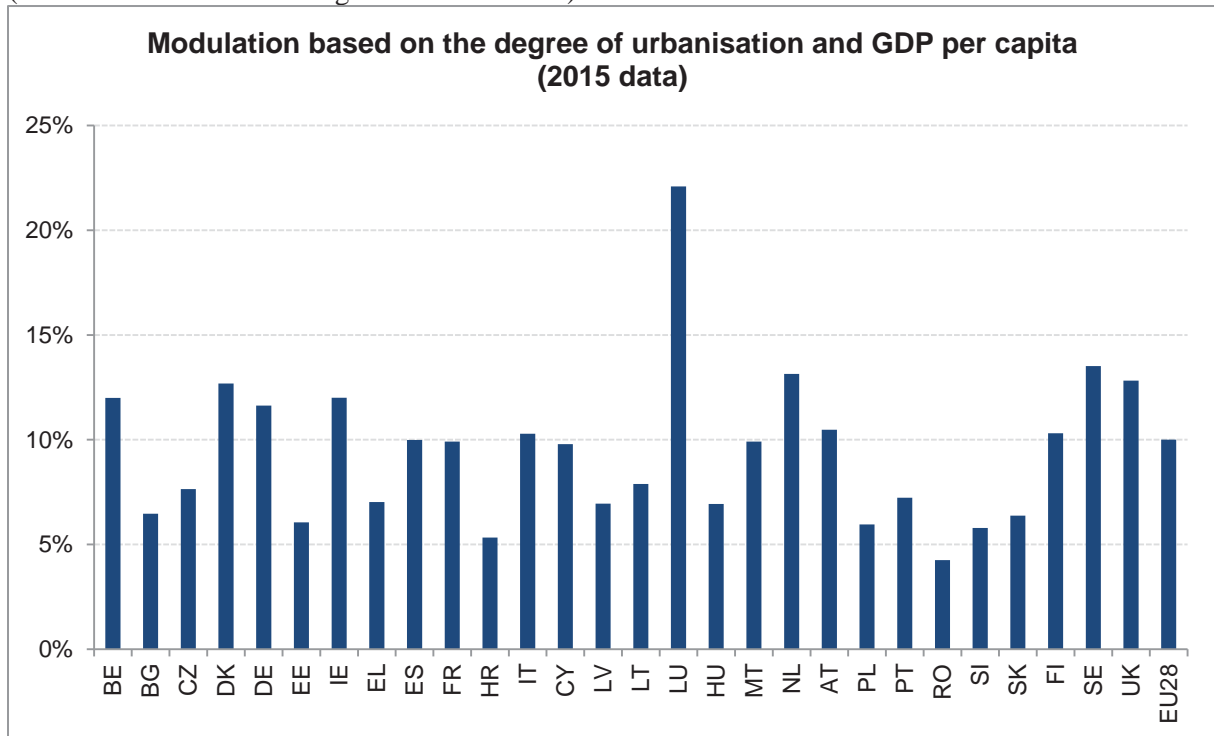
Section 5 of the Impact Assessment Report provides an overview of the pre-screened measures for differentiating an initial level of average policy ambition at European level among Member States. On this basis, four variants were initially tested, all based on data from Eurostat:

- 89. Variant 1: using the share of urban and intermediate regions population (50% weight) plus GDP per capita (50% weight) for modulation
- 90. Variant 2: using the share of urban and intermediate regions population;
- 91. Variant 3: using GDP per capita
- 92. Variant 4: using the share of GDP from predominantly urban and intermediate regions

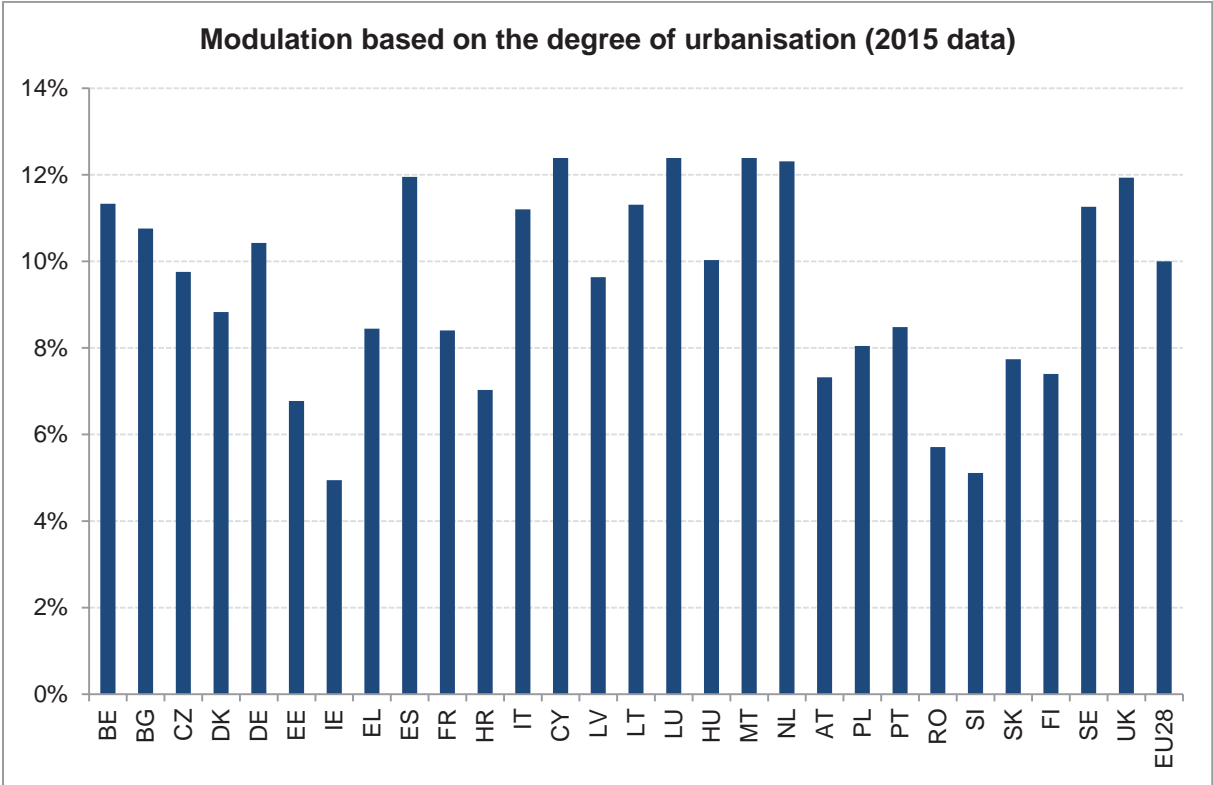
As discussed in the pre-screening of measures (section 5.1.2.2), a starting assumption was that the combination of GDP per capita and share of urban and intermediate regions population (variant 1) would provide a principle well-founded approach, as it helps accounting for both economic capacity of Member States (in order to deal with introduction of more innovative technologies), but also for urban problems such as air quality exposure (which is higher in more densely populated areas). To test the validity of the approach, other variants of only using the share of urban and intermediate regions population, only using GDP per capital or only using the share of GDP from predominantly urban and intermediate regions were tested as well.

Box 14.2 below shows the initial results of a testing of the different variants, on the basis of an initial average assumption of 10%.

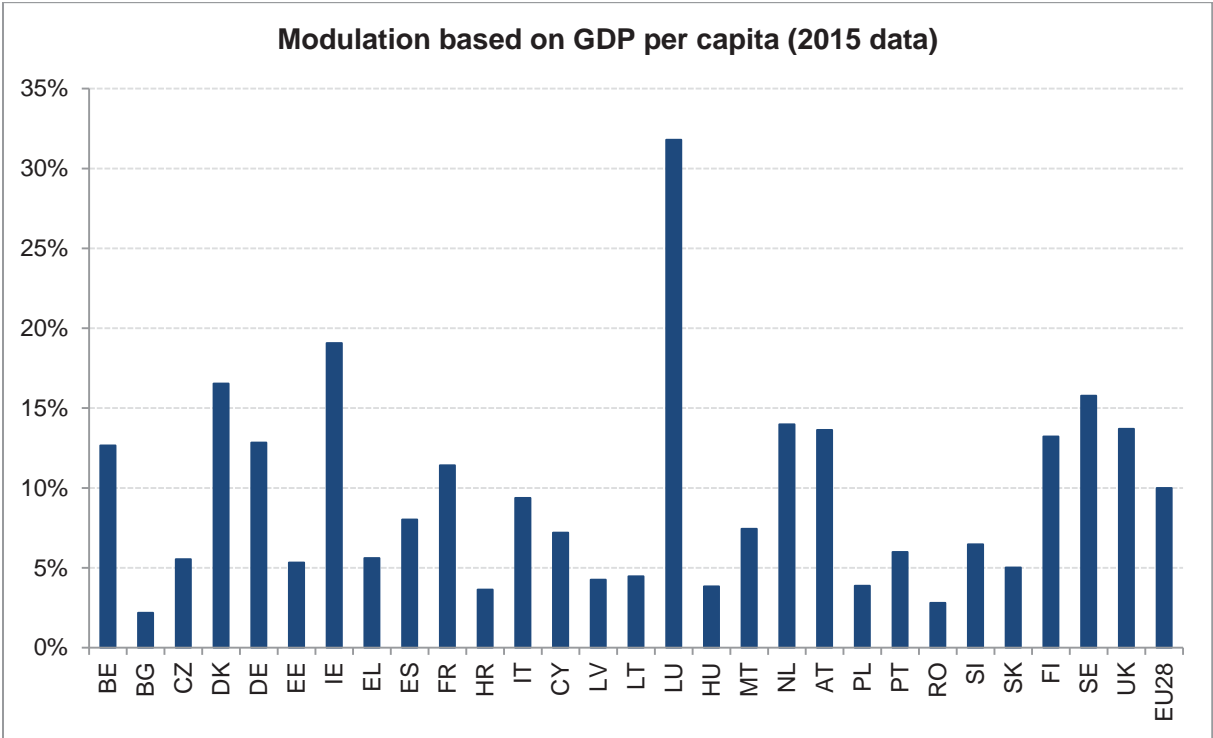
Box 14.2: Variants for the modulation of minimum procurement requirements by Member States (based on an assumed average ambition of 10%)



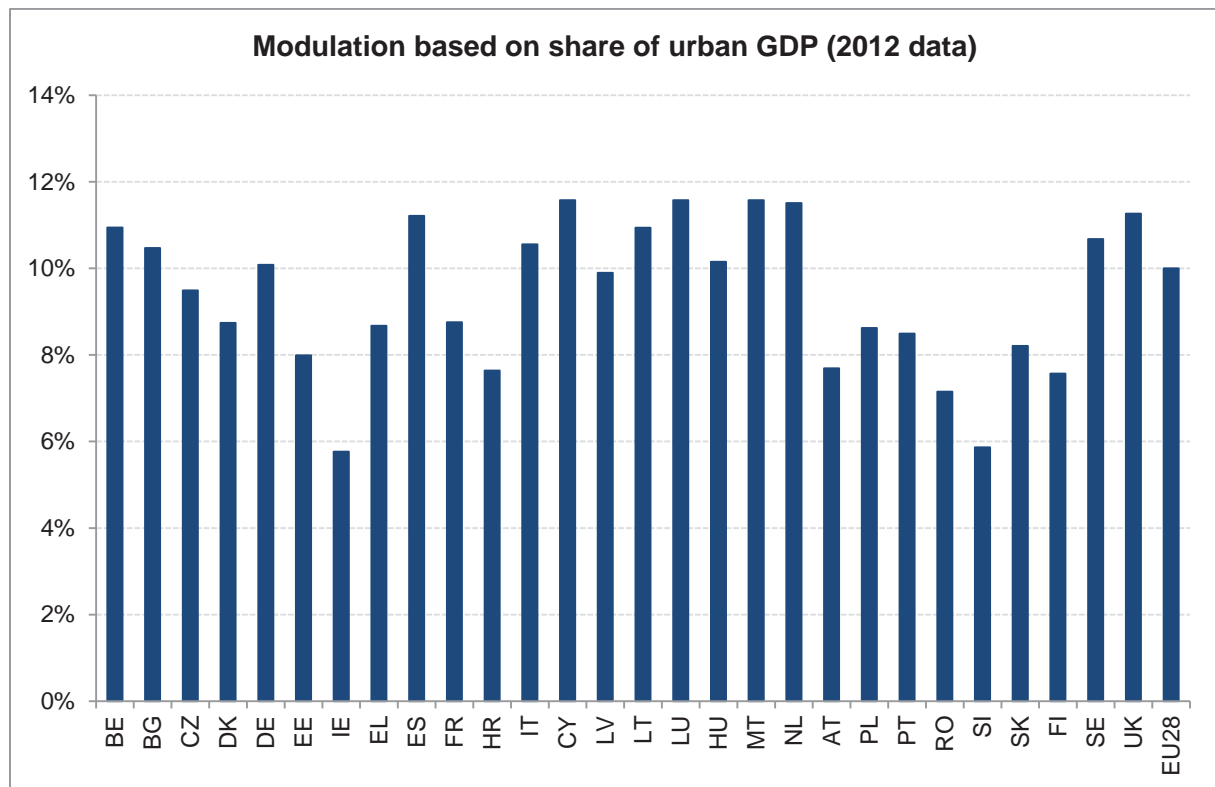
Variant 2: using the share of urban and intermediate regions population



Variant 3: using GDP per capita



Variant 4: using the share of GDP from predominantly urban and intermediate regions



From the initial analysis it appeared that variant 2 (based on urbanisation data only) would lead to cases, where Member States economic capacity (which is not reflected in this variant) would be overstretched. This could be, for example, particularly the case with Bulgaria that would be above the main European average. Even if all Member States above the European average would be capped to get the same full target, some of those would still be non-proportionally mandated. A similarly, though less pronounced outcome could be found for the use of the urban GDP approach (variant 4). Modulating solely on the basis of the GDP per capita (variant 3) leads to a very high mandate for Luxembourg, and also comparatively high mandates for e.g. Ireland or Denmark; with the additional drawback that this measure does not include a take on the actual problem pressure. Also the combination of GDP/capita and urbanisation data leads to a still high value for Luxembourg. In all cases, the modulations leads to mandates for some Member States above the European average level of ambition.

From the comparison of all four variants, it appears that none of the compared variants had significant advantages over variant 1. Accordingly, it was decided to use variant 1 as the basis for the differentiation of Member State mandates as it combines economic capacity and problem pressure in terms of urban population density (with a 50% weighting for each factor). The main rationale for using the modulation was to ensure that Member States with lower economic capacities are not burdened too much, which could result in further decreases of public transport services offer and overall public transport quality, but are still being incentivised to accelerate their transition to a low-emission mobility. Also, modulation leads in some cases to mandates for Member States which exceed the EU average considerably. It was hence concluded that the objectives of the policy initiative are best reflected if the modulation is used to differentiate all Member State mandates below the EU average level and if all Member States above the EU average level are capped at the average level (1.0) to have a full target.

14.2. Minimum mandates under PO3, PO4 and PO6

Tables 1 and 2 provide an overview of the differentiated minimum mandates under PO3, PO4 and PO6. Note that only the approach of using an average level of ambition of 35% of vehicle procurement was used to analyse the impacts of PO3 and subsequently in PO6.

Table 14.1: Minimum mandates differentiated by Member State under PO3 and PO6

		2025 & 2030		
		20% (all cars and vans)	35% (all cars and vans)*	50% All cars and vans
		Low	higher	
Luxembourg	1.00	20%	35%	50%
Sweden	1.00	20%	35%	50%
Denmark	1.00	20%	34%	50%
Finland	0.92	18%	35%	46%
Germany	1.00	20%	35%	50%
France	0.95	19%	34%	48%
United Kingdom	1.00	20%	35%	50%
Netherlands	1.00	20%	35%	50%
Austria	1.00	20%	35%	50%
Belgium	1.00	20%	35%	50%
Italy	1.00	20%	35%	50%
Ireland	1.00	20%	35%	50%
Spain	1.00	20%	33%	50%
Cyprus	1.00	20%	29%	50%
Malta	1.00	20%	35%	50%
Portugal	0.81	16%	27%	40%
Greece	0.76	15%	23%	38%
Slovenia	0.67	13%	20%	33%
Czech Republic	0.93	19%	27%	46%
Estonia	0.71	14%	21%	36%
Slovakia	0.77	15%	20%	39%

Lithuania	0.94	19%	19%	47%
Poland	0.74	15%	20%	37%
Croatia	0.64	13%	17%	32%
Hungary	0.84	17%	21%	42%
Latvia	0.80	16%	20%	40%
Romania	0.57	11%	17%	29%
Bulgaria	0.77	15%	16%	39%

* used for quantification of impacts in the final policy option

Belgium	1.00		20%	35%	35%		50%	5%	10%	10%	15%	30%	50%	50%	75%
Italy	1.00		20%	35%	35%		50%	5%	10%	10%	15%	30%	50%	50%	75%
Ireland	1.00		20%	35%	35%		50%	5%	10%	10%	15%	30%	50%	50%	75%
Spain	1.00		20%	35%	35%		50%	5%	10%	10%	14%	30%	50%	50%	75%
Cyprus	1.00		20%	35%	35%		50%	5%	10%	10%	13%	30%	50%	50%	75%
Malta	1.00		20%	35%	35%		50%	5%	10%	10%	15%	30%	50%	50%	75%
Portugal	0.81		16%	28%	28%		40%	4%	8%	8%	12%	24%	40%	40%	61%
Greece	0.76		15%	27%	27%		38%	4%	8%	8%	10%	23%	38%	38%	57%
Slovenia	0.67		13%	23%	23%		33%	3%	7%	7%	9%	20%	33%	33%	50%
Czech Republic	0.93		19%	32%	32%		46%	5%	9%	9%	11%	28%	46%	46%	70%
Estonia	0.71		14%	25%	25%		36%	4%	7%	7%	9%	21%	36%	36%	53%
Slovakia	0.77		15%	27%	27%		39%	4%	8%	8%	9%	23%	39%	39%	58%
Lithuania	0.94		19%	33%	33%		47%	5%	9%	9%	8%	28%	47%	47%	70%
Poland	0.74		15%	26%	26%		37%	4%	7%	7%	9%	22%	37%	37%	56%
Croatia	0.64		13%	23%	23%		32%	3%	6%	6%	7%	19%	32%	32%	48%
Hungary	0.84		17%	29%	29%		42%	4%	8%	8%	9%	25%	42%	42%	63%
Latvia	0.80		16%	28%	28%		40%	4%	8%	8%	9%	24%	40%	40%	60%

Romania	0.57		11%	20%	20%	29%	3%	6%	6%	7%	17%	29%	29%	43%
Bulgaria	0.77		15%	27%	27%	39%	4%	8%	8%	7%	23%	39%	39%	58%

EU weighted average			19%	34%	34%	48%	5%	10%	10%	14%	28%	48%	48%	72%
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15. GLOSSARY

Buses and coaches	Larger buses which are suited or intended to carry more than 16 passengers
CNG	Compressed natural gas
CO ₂	Carbon dioxide
COM	European Commission
COP 21	21 Convention of Parties to the United Nations Framework on Climate Change (UNFCCC)
CVD	Directive 2009/33.EC on the promotion of clean and energy-efficient road transport vehicles (Clean Vehicles Directive)
Euro VI/6	European Light-duty vehicle (EURO VI) and heavy-duty vehicle (Euro 6) emissions standards - have been adopted on grounds of environmental public health policy considerations and are not meant to address emissions with global warming effects.
GDP	Gross domestic product
GHG emissions	Greenhouse gases emission, which include CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, SF ₆ , NF ₃
HDV's	Heavy duty vehicles
LCV's	Light commercial vehicles
LDV's	Light duty vehicles
Life time cost	The total cost encountered over the lifetime operation of the vehicle, including for example the price, energy and emissions included in vehicle construction and operation, comprising costs for energy consumption, CO ₂ emissions, and pollutant emissions
LNG	Liquefied Natural Gas
NGO's	Non-governmental organisations
NMHC	Non-methane hydrocarbons
NO _x	Nitric oxide (NO) and nitrogen dioxide (NO ₂) are together referred to as nitrogen oxides (NO _x).
PM	Particulate matter
PO	Policy option

RDE	Real driving emissions
REFIT	Regulatory Fitness and Performance programme - program to ensure the effectivity of EU legislation which belong to the better regulation agenda of the European Commission.
RMB	Renminbi, currency of People's Republic of China
SME's	Small and medium-sized enterprises
SPO	Specific policy objectives
SPR	Specific evaluation recommendations
Tailpipe emissions	Exhaust gas emissions that occur due to fuel combustion during a vehicle's operation
TED	Tenders Electronic Daily database
TTW	Tank-to-wheels is part of the well-to-wheels analysis and measures emissions that arise during the vehicle operation (downstream stage).
WTT	Well-to-tank is part of the well-to-wheel analysis and measures emissions during the fuel production/feedstock and processing and fuel delivery or energy transmission (upstream phase)
WTW	Measuring emissions both upstream and downstream, including well-to-tank and tank-to-wheel.
ZEVs	Zero-emissions vehicles

16. OVERVIEW OF PUBLIC PROCUREMENT POLICY FRAMEWORKS IN THE EU

The table provides an overview of relevant legislation at national and subsequent regional and local level.

Legislation	Type of Policy	Importance	Jurisdiction
Passenger Car CO2 Regulations	Directive/Regulation	Core	EU
LCV CO2 Regulation	Directive/Regulation	Core	EU
((Heavy duty vehicle CO2 Regulation- Being developed))	Directive/Regulation	Additional	EU
EU Green Public Procurement criteria for Transport, 2012	Directive/Regulation	Additional	EU
Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (Renewable Energy Directive) 2009	Directive/Regulation	Additional	EU
Euro 6/RDE for cars and vans	Directive/Regulation	Core	EU
Euro VI for trucks and buses	Directive/Regulation	Core	EU
Directive 2009/30/EC amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC (Fuel Quality Directive) 2009	Directive/Regulation	Additional	EU
Directive 2014/94/EU on the deployment of alternative fuels Infrastructure (Alternative Fuels Infrastructure Directive) 2014	Directive/Regulation	Additional	EU

General Safety Regulation	Directive/Regulation	Additional	EU
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AT

Austrian Federal Public Procurement Law 2006 Bundesvergabegesetz 2006	National Legislation transposing Directive	Additional	AT
Guidelines for quality criteria of public procurement on transportation service, 2016 Leitfaden für Qualitätskriterien bei der Vergabe von Bundesverkehrsdienstleistungen, 2016	Member State procurement guidelines/ criteria	Additional	AT
Austria Action Plan for Sustainable Public Procurement Österreichischer Aktionsplan zur nachhaltigen öffentlichen Beschaffung, 2010	Member State procurement guidelines/ criteria	Additional	AT

BE

Royal Decree on the promotion of clean road transport vehicles and energy in the context of public procurement, No. 2010/21131 Arrêté royal relatif à la promotion de véhicules de transport routier propres et économes en énergie dans le cadre des marchés publics, 2010	National Legislation transposing Directive	Additional	BE
Decree of the Government of the Brussels-Capital Region on the introduction of vehicles more environmentally friendly fleets in the regional authorities, 2014 Arrêté du Gouvernement de la Région de Bruxelles-Capitale relatif à l'exemplarité des pouvoirs publics en matière de transport et modifiant l'arrêté du Gouvernement de la Région de Bruxelles-Capitale du 7 avril 2011 relatif aux plans de déplacement, actualisation 2014	National Legislation transposing Directive	Additional	BE

CY

Law providing for the award of public works contracts and services and related matters / Law providing for the award of public works contracts and services in the water, energy, transport and postal services and related matters (2011)	National Legislation transposing Directive	Additional	CY
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CZ				
Act on Public Procurement, 2006 Zákon ze dne 14. března 2006 o veřejných zakázkách	National Legislation transposing Directive	Additional		CZ
DE				
Public Procurement Law, 2016 Verordnung über die Vergabe öffentlicher Aufträge, 2016	National Legislation transposing Directive	Additional		DE
Act on public procurement on public transport, drink water and energy supply, 2016 Verordnung über die Vergabe von öffentlichen Aufträgen im Bereich des Verkehrs, der Trinkwasserversorgung und der Energieversorgung, 2016	National Legislation transposing Directive	Additional		DE
Act on procurement of diesel-electric hybrid buses in public transport, 2016 Richtlinien zur Förderung der Anschaffung von diesel-elektrischen Hybridbussen im öffentlichen Nachverkehr, 2016	National Legislation transposing Directive	Additional		DE
National guidelines for sustainable procurement, 2016 Umweltfreundliche Beschaffung, 2016	Procurement guidelines/ criteria	Additional		DE
German "Blue Angel" Scheme	Ecolabel/National tax	Additional		DE
DK				
Environmental Awareness surrounding purchase of vehicles, 2010 Bekendtgørelse nr. 1394 af 14. december 2010 om miljøbevidste indkøb af køretøjer til vejtransport	National Legislation transposing Directive	Additional		DK
ES				
Law 2/2011 of March 4, 2011, on Sustainable Economy Ley 2/2011, de 4 de marzo, de Economía Sostenible	National Legislation transposing Directive	Additional		ES

FI					FI
The Finnish Act on Consideration for the Energy and Environmental Impact of Vehicles in Public Procurement (1509/2011) Laki ajoneuvojen energia- ja ympäristövaikutusten huomioon ottamisesta julkisissa hankinnoissa, 2011		National Legislation transposing Directive	Additional		
FR					
Act on Energy Transition for Green Growth, 2015 LOI no 2015-992 du 17 août 2015 relative à la transition énergétique pour la croissance verte		National Legislation transposing Directive	Additional		FR
Act on procurement of low emission vehicles for fleet operators, rental and leasing companies, taxi operators and operators of private rental vehicles Décret no 2017-21 du 11 janvier 2017 relatif aux obligations d'achat ou d'utilisation de véhicules à faibles émissions par les gestionnaires de flottes de véhicules, les loueurs de véhicules automobiles, les exploitants de taxis et exploitants de voitures de transport avec chauffeur		National Legislation transposing Directive	Additional		FR
Décret no 2017-22 du 11 janvier 2017 pris pour l'application du premier alinéa de l'article L. 224-8 du code de l'environnement définissant les critères caractérisant les véhicules à faibles émissions dont le poids total autorisé en charge excède 3,5 tonnes		National Legislation transposing Directive	Additional		FR
Décret no 2017-23 du 11 janvier 2017 pris pour l'application de l'article L. 224-8 du code de l'environnement définissant les critères caractérisant les autobus et autocars à faibles émissions		National Legislation transposing Directive	Additional		FR
Décret no 2017-24 du 11 janvier 2017 pris pour l'application des articles L. 224-7 du code de l'environnement et L. 318-1 du code de la route définissant les critères caractérisant les véhicules à faibles et très faibles niveaux d'émissions de moins de 3,5 tonnes		National Legislation transposing Directive	Additional		FR
EL					
Law 3982/2011 Simplification of the licensing of technical professional and manufacturing activities and business parks and other provisions, 2011		National Legislation transposing Directive	Additional		EL

HU	48/2011 (III.30.) Government Regulation on the promotion of the purchase of environmentally friendly and energy-efficient road transport vehicles, 2011 48/2011. (III. 30.) Korm. rendelet a környezetkímélő és energiahatékony közúti járművek beszerzésének előmozdításáról	National Legislation transposing Directive	Additional	HU
IE	Statutory Instrument no. 339 of 2011. European Communities (clean and Energy-efficient Road Transport Vehicles (Regulations 2011.	National Legislation transposing Directive	Additional	IE
IT	Implementation of the directive 2009/33/CE on the promotion of clean and energy-efficient road transport vehicles, 2011 Attuazione della direttiva 2009/33/CE relativa alla promozione di veicoli a ridotto impatto ambientale e a basso consumo energetico nel trasporto su strada, 2011 Action Plan For The Environmental Sustainability of Consumption in the Public Administration Sector	National Legislation transposing Directive	Additional	IT
IT	n. 3553: Measure for the realization of infrastructure aimed at assisting the broad introduction of EVs Piano Nazionale Infrastrutturale per la Ricarica dei veicoli alimentati ad energia Elettrica, 2012	Member State procurement guidelines/criteria	Additional	IT
LT	Urgent measures for the growth of the country, 2012 Legge 7 agosto 2012, n. 134, Conversione in legge, con modificazioni, del decreto-legge 22 giugno 2012, n. 83, recante Misure urgenti per la crescita del Paese (Gazzetta Ufficiale n. 187 dell'11 agosto 2012 - Suppl. Ordinario n. 171), Art. 17 (Piano nazionale infrastrutturale per la ricarica dei veicoli alimentati ad energia elettrica)	National Legislation transposing Directive	Additional	IT

<p>Order of the Minister of Transport and Communications No. 3-100 on the list of requirements for energy efficiency and environmental protection when purchasing road vehicles and cases in which these requirements are to be applied, 2011</p> <p>Dėl energijos vartojimo efektyvumo ir aplinkos apsaugos reikalavimų, taikomų įsigyjant kelių transporto priemones, nustatymo ir atvejų, kada juos privaloma taikyti, tvarkos aprašo patvirtinimo, 2011 m. vasario 21 d. Nr. 3-100, 2011</p>	<p>National Legislation transposing Directive</p>	<p>Additional</p>	<p>LT</p>
<p>LU</p>			
<p>Grand Ducal Regulation of 17th June 2011 on the promotion of clean road transport vehicles and energy.</p>	<p>National Legislation transposing Directive</p>	<p>Additional</p>	<p>LU</p>
<p>MT</p>			
<p>Financial Administration and Audit Act. LN. 175 of 2011. Cleaner and more energy efficient road transport regulations 2011</p>	<p>National Legislation transposing Directive</p>	<p>Additional</p>	<p>MT</p>
<p>NL</p>			
<p>Promotion of the purchase of clean and energy efficient vehicles, 2011 Regeling van de Staatssecretaris van Infrastructuur en Milieu van 2011, houdende regels ter bevordering van de aanschaf van schone en energiezuinige wegvoertuigen (Regeling bevordering aankoop schone en energiezuinige wegvoertuigen)</p>	<p>National Legislation transposing Directive</p>	<p>Additional</p>	<p>NL</p>
<p>Netherlands PIANOo sustainable public procurement scheme</p>	<p>Member State procurement guidelines/criteria</p>	<p>Additional</p>	<p>NL</p>
<p>Voluntary agreement among Dutch Regions to only procure zero-emission buses as of 2025³⁹</p>	<p>Electric/ Low emission vehicle incentive scheme</p>	<p>Additional</p>	<p>NL</p>
<p>PL</p>			

³⁹ <https://www.government.nl/latest/news/2016/04/15/dutch-public-transport-switches-to-100-percent-emissions-free-buses>

Law on Public Transport, 2010 Ustawa o publicznym transporcie zbiorowym, 2010	National Legislation transposing Directive	Additional	PL
PT			
Ministry of Transport and Public Works, Transport and Communications Decree-Law no. 140/2010 promotion of clean and energy efficient road transport, 2010 Estabelece o regime jurídico relativo à promoção de veículos de transporte rodoviário não poluentes e energeticamente eficientes, no âmbito da Estratégia Nacional para a Energia 2020 e, transpõe a Directiva n.º 2009/33/CE (EUR-Lex), do Parlamento Europeu e do Conselho, de 23 de Abri, 2010	National Legislation transposing Directive	Additional	PT
RO			
Act on promotion of clean and energy-efficient road transport vehicles, 2011 Ordonanță de Urgență Nr. 40 din 20 aprilie 2011 privind promovarea vehiculelor de transport rutier nepoluante și eficiente din punct de vedere energetic, 2011	National Legislation transposing Directive	Additional	RO
Program Guide on Greenhouse Gas Emissions Reduction in Transport by Promoting Clean and Energy-Efficient Road Transport Vehicles ORDIN Nr. 955/2016 din 20 mai 2016 pentru aprobarea Ghidului de finanțare a Programului privind reducerea emisiilor de gaze cu efect de seră în transporturi, prin promovarea vehiculelor de transport rutier nepoluante și eficiente din punct de vedere energetic	National Legislation transposing Directive	Additional	RO
SE			
Legislation regarding the environmental requirements for the procurement of cars and certain public transport services (SFS 2011:846) Lag (2011:846) om miljökrav vid upphandling av bilar och vissa kollektivtrafikjänster	National Legislation transposing Directive	Additional	SE
Swedish Public Procurement Act, 2011	National Legislation transposing Directive	Additional	SE
Public procurement criteria's formalised by National Procurement Agency	National Legislation transposing Directive	Additional	SE

Ordinance concerning environmental and road safety requirements for administrative authorities cars and journeys by car, 2009 Förordning (2009:1) om miljö- och trafiksäkerhetskrav för myndigheters bilar och bilresor	National Legislation transposing Directive	Additional	SE
Swedish Government subsidy for clean buses	National Legislation transposing Directive	Additional	SE
SI			
Decree on Green Public Procurement, 2011 Uredba o zelenem javnem naročanju, 2011	National Legislation transposing Directive	Additional	SI
SK			
Act 158/2011 On the promotion of energy-saving and environmentally-friendly motor vehicles and on the amendment of other acts, 2011 Zákon z 19. mája 2011 o podpore energeticky a environmentálne úsporných motorových vozidiel a o zmene a doplnení niektorých zákonov, 2011	National Legislation transposing Directive	Additional	SK
UK			
The Cleaner Road Transport Vehicles Regulation 2011. Statutory Instrument (SI): 2011 No. 1631.	National Legislation transposing Directive	Additional	UK
Official Government Buying Standards (GBS) for cars, vans, buses, trucks: engine requirements and emissions standards	Member State procurement guidelines/criteria	Additional	UK
Low Carbon Vehicle Public Procurement Programme	Electric/ Low emission vehicle incentive scheme	Additional	UK

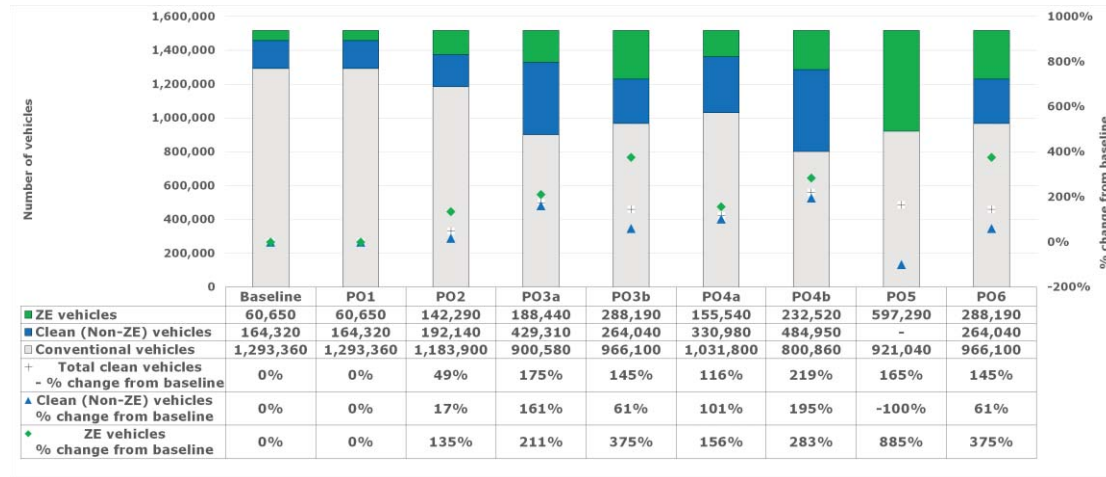
Example of city initiatives relevant for the CVD

	City procurement guidelines/ criteria	Additional	UK
<p>London municipal vehicles policy An Ultra Low Emission Vehicle Delivery Plan for London</p>	<p>City procurement guidelines/ criteria</p>	<p>Additional</p>	<p>NL</p>
<p>Amsterdam municipal vehicles policy Sustainable Amsterdam, Agenda for renewable energy, clean air, a circular economy and a climate-resilient city</p>	<p>City procurement guidelines/ criteria</p>	<p>Additional</p>	<p>DE</p>
<p>Hamburg "Hamburg Climate Plan"</p>	<p>City procurement guidelines/ criteria</p>	<p>Additional</p>	<p>DK</p>
<p>Copenhagen municipal vehicles policy</p>	<p>City procurement guidelines/ criteria</p>	<p>Additional</p>	<p>FR</p>
<p>Paris Bus2025 strategy Clean Vehicles in Stockholm programme</p>	<p>City procurement guidelines/ criteria</p>	<p>Additional</p>	<p>SE</p>

17. OVERVIEW OF RESULTS FOR VEHICLE CATEGORIES

17.1. Passenger cars

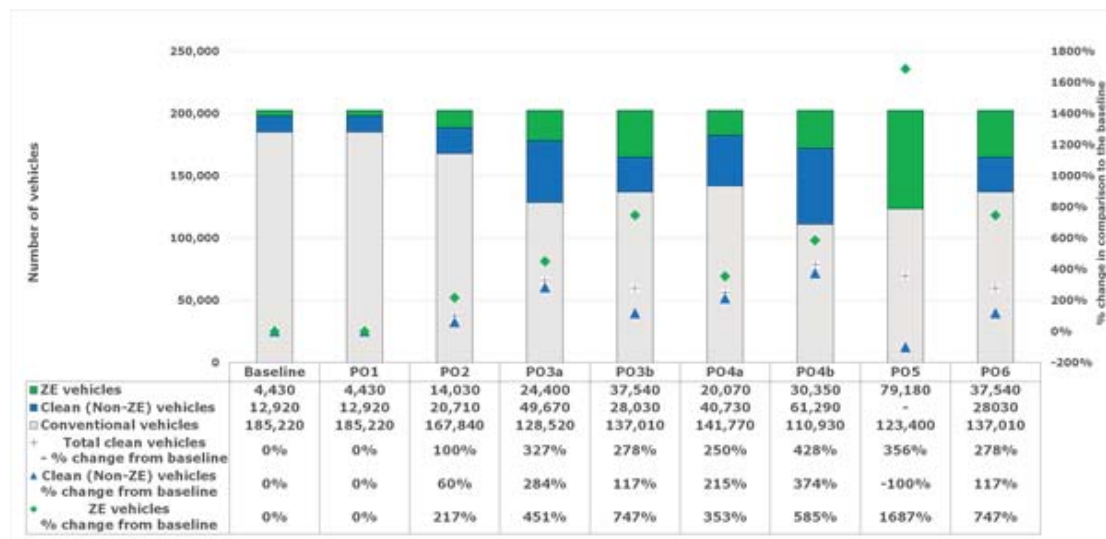
Table 17.1: Passenger cars procured by type (conventional, clean non-zero emissions and zero emissions) under the proposed policy options during the period 2020-2035 - number and % change from baseline



Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

17.2. Vans

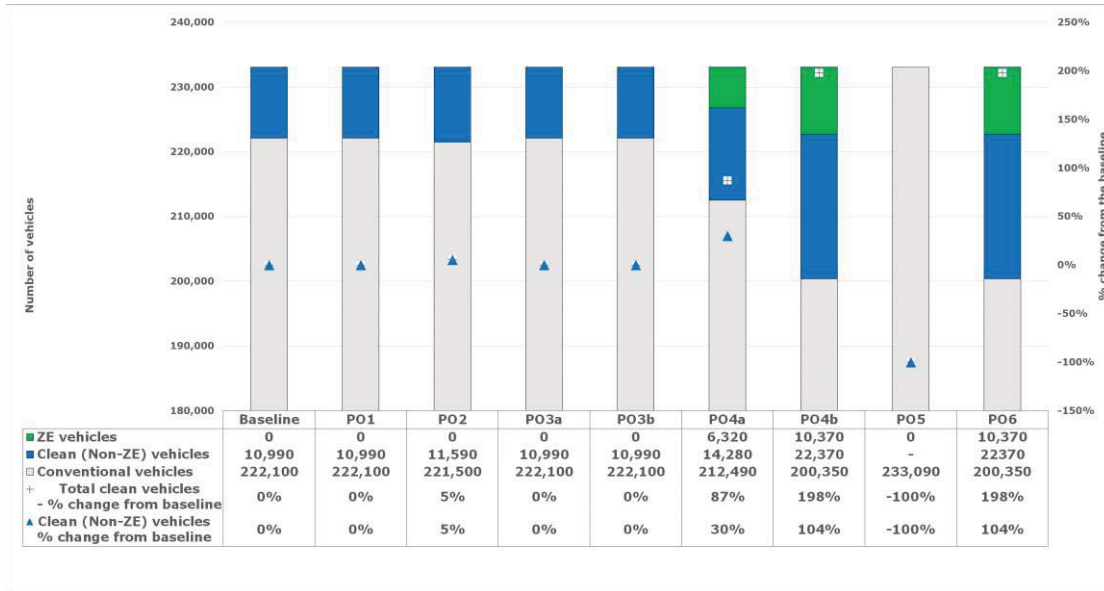
Figure 17.2: Vans procured by type (conventional, clean non-zero emissions and zero emissions) under the proposed policy options during the period 2020-2035 - number and % change from baseline



Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

17.3. Rigid trucks

Figure 9.3 Rigid trucks procured by type (conventional, clean non-zero emissions and zero emissions) under the proposed policy options during the period 2020-2035 - number and % change from baseline

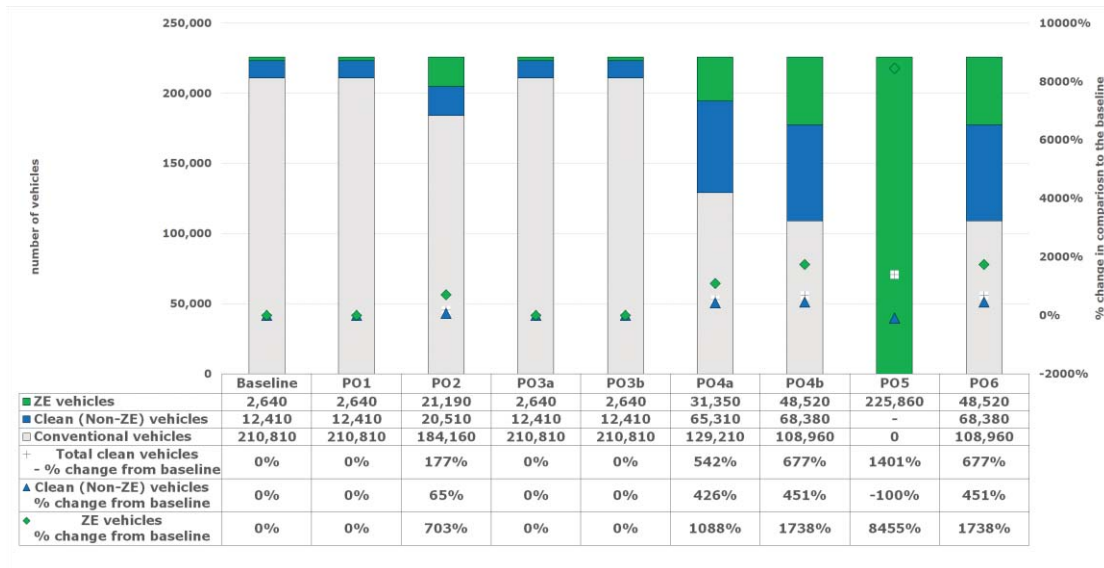


Note: No % change from baseline is calculated for ZE vehicles in the case of PO4a and PO4b, given that these were zero (0) under the baseline

Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

17.4. Buses

Figure 17.4: Buses procured by type (conventional, clean non-zero emissions and zero emissions) under the proposed policy options during the period 2020-2035 - number and % change from baseline – EU Reference scenario baseline



Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

18. TERRITORIAL IMPACT ASSESSMENT REPORT

This territorial impact assessment report is the outcome of an expert workshop organised by Directorate General of Regional and Urban Policy (DG REGIO) in collaboration with Directorate General for Mobility and Transport (DG MOVE) within the framework of the Better Regulation, applying tool No. 29 from the Better Regulation toolbox, in particular the TIA tool of the ESPON 2020 Cooperation Programme, partly financed by the European Regional Development Fund.⁴⁰

18.1. Introduction

18.1.1. *The Directive and options for its adaptation*⁴¹

The European Commission (DG MOVE) in the last quarter of 2017 plans to present a proposal for the revision of Directive 2009/33/EC on the promotion of clean and energy efficient road transport vehicles (known as the "Clean Vehicles Directive"). This is in line with the European Commission's Energy Union package presented on 25 February 2015, which foresees actions on further decarbonisation of road transport in line with the 2030 climate and energy goals.

The transport sector, and particularly road transport, still needs to substantially reduce its greenhouse gas emissions in view of long-term EU climate and energy policy objectives. The EU has set itself the ambitious objective that greenhouse gas emissions from transport will need to be at least 60% percent lower than in 1990 and on a firm path towards zero.

The Clean Vehicles Directive (CVD) aims at incentivising different contracting authorities, entities and operators (subject to the EU public procurement directives and the public service regulation) to consider life-time energy and environmental impacts when they purchase road transport vehicles. By including energy- and environmental impacts (based on an operational tank-to-wheel cost and the possible monetisation of external effects of vehicle use) the legislator intended to counter-weight the focus on sole purchase cost with a view to stimulate the market for cleaner (low- and zero-emission) vehicles and finally to support innovation and competitiveness of the transport sector and reduce CO₂ and air pollutant emissions.

The 2015 REFIT evaluation⁴² concluded that the Directive is relevant, but in its current format not effective and not efficient. Its impact on the market uptake of clean vehicles has been low, due to different shortcomings in the current format of the Directive, including limitations in scope, lack of clarity of purchase requirements and a complex methodology to be applied for the monetisation, which in some cases can also counteract the procurement of cleaner vehicles, as the methodology is giving more weight to fuel consumption and energy efficiency compared to pollutant emissions.

⁴⁰ The ESPON TIA Tool is designed to support the quantitative assessment of potential territorial impacts according to the Better Regulation guidelines. It is an interactive web application that can be used to support policy makers and practitioners with identifying, ex-ante, potential territorial impacts of new EU Legislations, Policies and Directives (LPDs). This report documents results of the territorial impact assessment expert workshop about the revision of the Directive 2009/33/EC on the promotion of clean and energy efficient road transport vehicles (known as the "Clean Vehicles Directive"). It serves for information purposes only. This report and the maps represent views and experiences of the participants of the workshop. It is for decision support only and does not necessarily reflect the opinion of the members of the ESPON 2020 Monitoring Committee as well as DG REGIO and DG MOVE. The ESPON EGTC is the Single Beneficiary of the ESPON 2020 Cooperation Programme. The Single Operation within the programme is implemented by the ESPON EGTC and co-financed by the European Regional Development Fund, the EU Member States and the Partner States, Iceland, Liechtenstein, Norway and Switzerland. The TIA report has been written by Erich Dallhammer and Bernd Schuh (ÖIR GmbH), Zintis Hermansons, ESPON EGTC and Eleftherios Stavropoulos, DG REGIO

⁴¹ The text of this chapter is based on the background paper for the TIA Workshop "Revision of Directive 2009/33/EC on Clean and Energy-efficient Road Transport Vehicles – Clean Vehicles Directive (CVD)" developed by the European Commission DG for Mobility and Transport and DG for Regional and Urban Policy.

⁴² European Commission, Regulatory Fitness and Performance Programme REFIT and the 10 Priorities of the Commission, Accompanying the Commission Work Programme 2017, SWD(2016)400

18.1.2. The approach of the ESPON TIA quick check

The concept of territorial impact assessment (TIA) aims at showing the regional differentiation of the impact of EU policies. The ESPON TIA Tool⁴³ is an interactive web application that can be used to support policy makers and practitioners with identifying, ex-ante, potential territorial impacts of new EU Legislations, Policies and Directives (LPDs). The “ESPON TIA quick check” approach combines a workshop setting for identifying systemic relations between a policy and its territorial consequences with a set of indicators describing the sensitivity of European regions. It helps to steer an expert discussion about the potential territorial effects of an EU policy proposal by checking all relevant indicators in a workshop setting. The results of the guided expert discussion are judgments about the potential territorial impact of an EU policy considering different thematic fields (economy, society, environment, governance) for a range of indicators. These results are fed into the ESPON TIA Quick Check web tool.

The web tool translates the combination of the expert judgments on exposure with the different sensitivity of regions into maps showing the potential territorial impact of EU policy on NUTS3 level. These maps serve as starting point for the further discussion of different impacts of a concrete EU policy on different regions. Consequently, the experts participating in the workshop provide an important input for this quick check on potential territorial effects of an EU policy proposal.

The workshop on the revision of Directive 2009/33/EC on clean and energy-efficient road transport vehicles – Clean Vehicles Directive (CVD) was held on 11 May 2017 in Brussels and brought together 20 experts representing different stakeholders, as e.g. the Automobile Manufacturers' Association, academic experts, NGOs and environmental institutions, local and regional authorities and European institutions such as SEC GEN, DG REGIO, DG ENV, DG MOVE, the CoR and ESPON EGTC.

Two moderators from the ÖIR, provided by ESPON, prepared and guided the workshop and handled the ESPON TIA tool.

Figure 18.1 Workshop Discussion



Source: Territorial impact assessment expert workshop, Brussels, 5 April 2017 © ÖIR

⁴³ https://www.espon.eu/main/Menu_ToolsandMaps/TIA/

18.2. The ESPON TIA Quick Check workshop – identifying potential effects on the territory

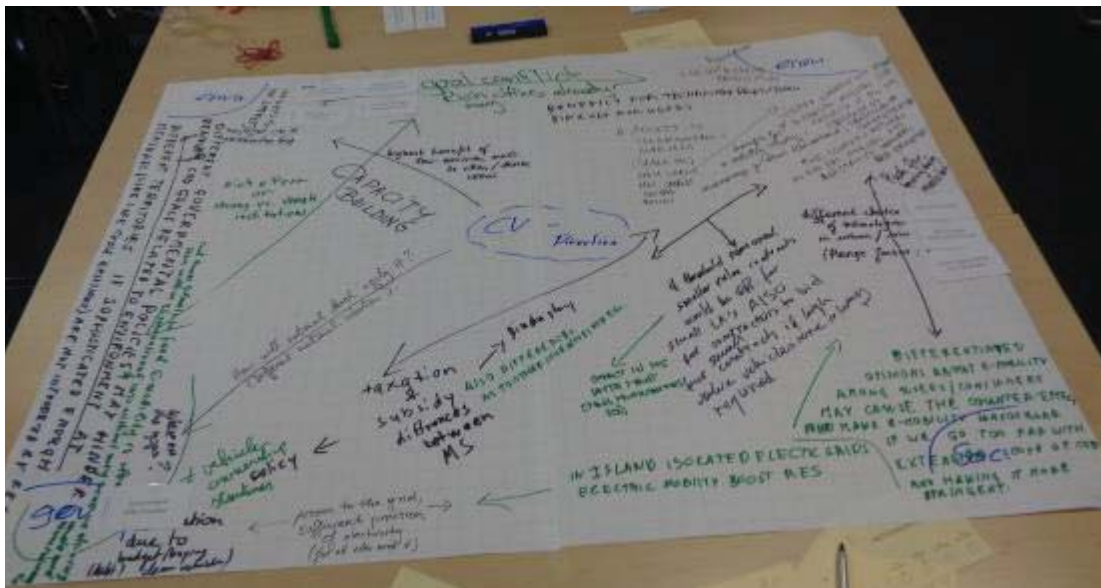
18.2.1. Identifying the potential territorial effects considering economy, society, environment and governance aspects – drafting a conceptual model

In the first step of the TIA workshop the participating experts discussed about the potential effects of the revision of the Clean Vehicles Directive on the development of regions. They agreed to focus their discussion about effects of the Clean Vehicles Directive on one core element the Directive is touching: Public authorities purchasing vehicles with certain technical standards to ensure that the vehicles purchased are “clean”. Compared to the existing Directive the following scenario was assessed:

- The procurement threshold will be removed, thus ensuring that all vehicles purchased by public authorities are covered.
- The scope of the Directive will be extended to vehicles which are rented, leased, hired or purchased by public authorities

This discussion revealed potential territorial impacts of the revision of the Clean Vehicles Directive considering economy, society, environment and governance related indicators. The participants identified potential linkages between the revisions of the Directive and the effect on territories including interdependencies and feed-back-loops between different effects (see figure below).

Figure 18.2 Workshop findings: Conceptual model of the potential territorial effects from the revision of Directive 2009/33/EC on clean and energy-efficient road transport vehicles – Clean Vehicles Directive (CVD)



Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

During the workshop session the following issues were discussed by the experts:

Environment

- A more effective implementation of the Clean Vehicles Directive will lead to a reduction of CO₂ emissions. However, if the standards still allow fossil fuelled vehicles being labelled as clean vehicles this could also contribute to an increase in CO₂ emissions.
- However, the higher purchase cost associated with clean vehicles could lead to social inequalities, if ambition was overstretched. A potential increase of costs for means of public transport due to higher prices of “clean” technology could lead to a gap between “richer” municipalities and regions, which could afford clean vehicles, and “poorer” municipalities and regions who could not. Consequently, the “poorer” municipalities and regions would invest in public transport run by conventional fossil fuel effecting higher pollution (PM10).

Economy

- In the automotive industry electric car providers will benefit, thus it will have a positive impact on economic growth and employment in this sector. However, there will be losses in conventional transport vehicles production.
- The requirement for having clean vehicles in public administrations can push innovation especially in heavy transport and busses.
- Regions producing conventional transport vehicles and/or depending on fossil energy production would face less demand and a reduced economic production.

Society

- When there is a higher share of clean vehicles in public transport, it is expected that more people will get used to clean vehicles e.g. when using public transport. This could generate a positive effect on the suitability for the daily use of clean vehicles.

Governance

- On the one hand the revision of the CVD will facilitate establishing a better guidance to regions on how to improve procurement. Especially regions with an existing high potential to manage such challenges is anticipated that will gain a positive effect on government effectiveness.
- On the other hand the procurement procedures following the requirements of the CVD could lead to an increase in complexity. Consequently, the procurement costs and administration costs would increase. Here, it will depend on the final design of the revised Directive to minimise the impacts on administrative burden.

18.2.2. Identifying the types of region affected

ESPON TIA tool provides several regional typologies⁴⁴ for analysis taking under consideration the types of territories mentioned in the Lisbon Treaty §174: urban/metropolitan regions; rural regions; sparsely populated regions; regions in industrial transition; cross-border regions; mountainous regions; islands and coastal regions. The experts agreed that in general all regions would be affected by the modification of the Clean Vehicles Directive.

18.2.3. Picturing the potential territorial effects through indicators

In order to assess the potential effects pictured in the conceptual model suitable indicators need to be selected related to the parameters that the experts discussed in the fields of economy, environment,

⁴⁴ https://www.espon.eu/main/Menu_ToolsandMaps/ESPONTypologies/index.html

society and governance. The availability of data for all NUTS 3 regions is posing certain limitations to indicators that can be used. From the available indicators that the ESPON TIA Quick Check web tool offers the experts chose the following indicators to describe the identified effects although in some cases these indicators were not their first choice. For that reason several experts chose not to vote for several indicators as they did not deem them as relevant:

18.2.4. Selecting indicators

Picturing potential territorial impacts considering environmental related indicators

- Greenhouse gas emissions CO₂ (tonnes per capita)
- Emissions of NO_x (tonnes per capita)
- Pollutants in air (PM10)

Picturing potential territorial impacts considering economic related Indicators

- R&D Climate (R&D expenditure)
- R&D Employment
- Patent applications/mio inhabitants

Picturing potential territorial impacts considering societal related indicators

93. Number of people exposed to noise

Picturing potential territorial impacts considering governance related indicators -

- Government effectiveness

18.2.5. Judging the intensity of the potential effects

The participants of the workshop were asked to estimate the potential effects deriving from the modification of the Clean Vehicles Directive. They judged the potential effect on the territorial welfare along the following scores:

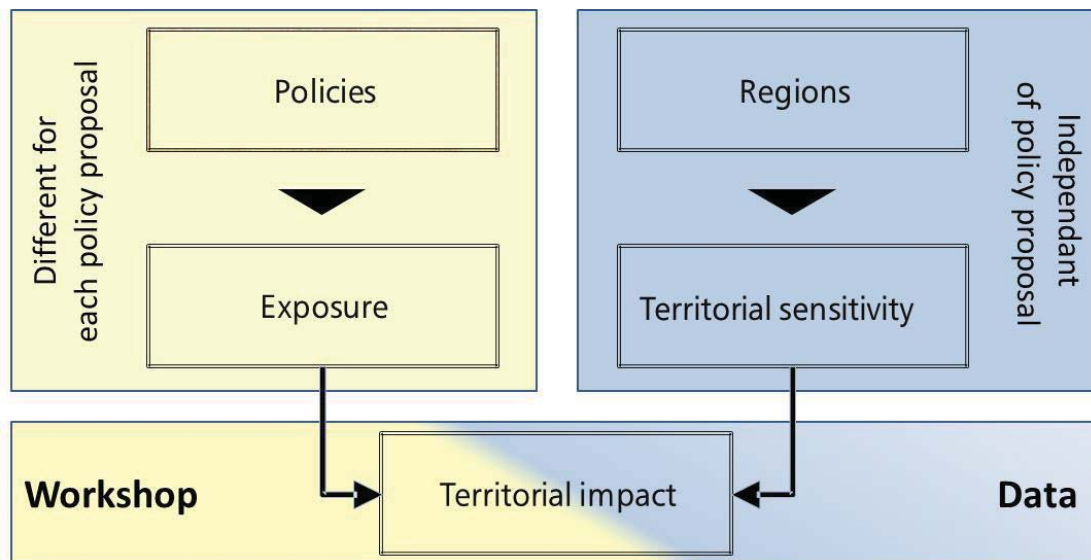
- ++ strong advantageous effect on territorial welfare (strong increase)
- + weak advantageous effect on territorial welfare (increase)
- o no effect/unknown effect/effect cannot be specified
- - weak disadvantageous effect on territorial welfare (decrease)
- -- strong disadvantageous effect on territorial welfare (strong decrease)

18.2.6. Calculating the potential “regional impact” – Combining the expert judgement with the regional sensitivity

The ESPON TIA Quick Check combines the expert judgement on the potential effect of the revised CVD (exposure) with indicators picturing the sensitivity of regions resulting in maps showing a territorial differentiated impact. This approach is based on the vulnerability concept developed by the

Intergovernmental Panel on Climate Change (IPCC). In this case, the effects deriving from a particular policy measure (exposure) are combined with the characteristics of a region (territorial sensitivity) to produce potential territorial impacts (cf. following figure).

Figure 18.3: Exposure x territorial sensitivity = territorial impact



Source: ÖIR, 2015.

- “Territorial Sensitivity” describes the baseline situation of the region according to its ability to cope with external effects. It is a characteristic of a region that can be described by different indicators independently of the topic analysed.
- “Exposure” describes the intensity of the potential effect caused by the revision of CVD on a specific indicator. Exposure illustrates the experts’ judgement, i.e. the main findings of the expert discussion at the TIA workshop.

18.2.7. Mapping the potential territorial impact

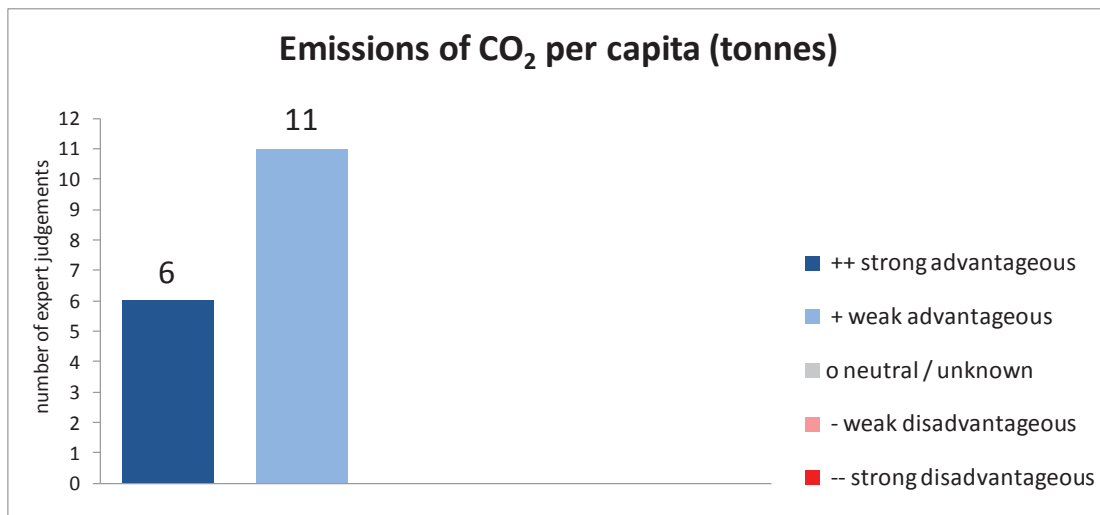
The result of the territorial impact assessment is presented in maps. The maps displayed below show potential territorial impacts based on a combination of the expert judgement on the exposure with the territorial sensitivity of a region, described by an indicator on NUTS3 level. Whereas expert judgement is a qualitative judgement (i.e strong advantageous effect on territorial welfare/weak advantageous effect/no effect/weak disadvantageous effect/strong disadvantageous effect), the sensitivity is a quantitative indicator. (The detailed description is provided in the annex.).

18.3. Results of the TIA quick check: Potential territorial impact considering environmental aspects

18.3.1. The potential territorial impact in relation on greenhouse gas emissions (CO₂) indicator

The experts estimated that the revision of the Clean Vehicles Directive will contribute to reducing CO₂ emissions. Eleven experts judged the effect weakly advantageous, six judged it as strongly advantageous⁴⁵.

Figure 18.4 Workshop findings: Expert judgement: Effect of the modification of the Clean Vehicles Directive



Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

The indicator picturing the sensitivity of a region according to greenhouse gas emissions is measured by the indicator “CO₂ emissions in tonnes/year per capita“. It is assumed that regions with higher Emissions of CO₂ per capita (tonnes) are more sensitive to directives aimed at its reduction.

The following map shows the potential territorial impact from the revision of the CVD based on CO₂ emissions. It combines the expert judgement of a weakly advantageous effect with the given sensitivity of regions. It shows that the effect of the revision of the CVD is quite equally distributed throughout all European regions. More than 99% could gain a minor positive impact.

⁴⁵ 5 out of the 22 experts did not consider this indicator as relevant



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ANNEXES

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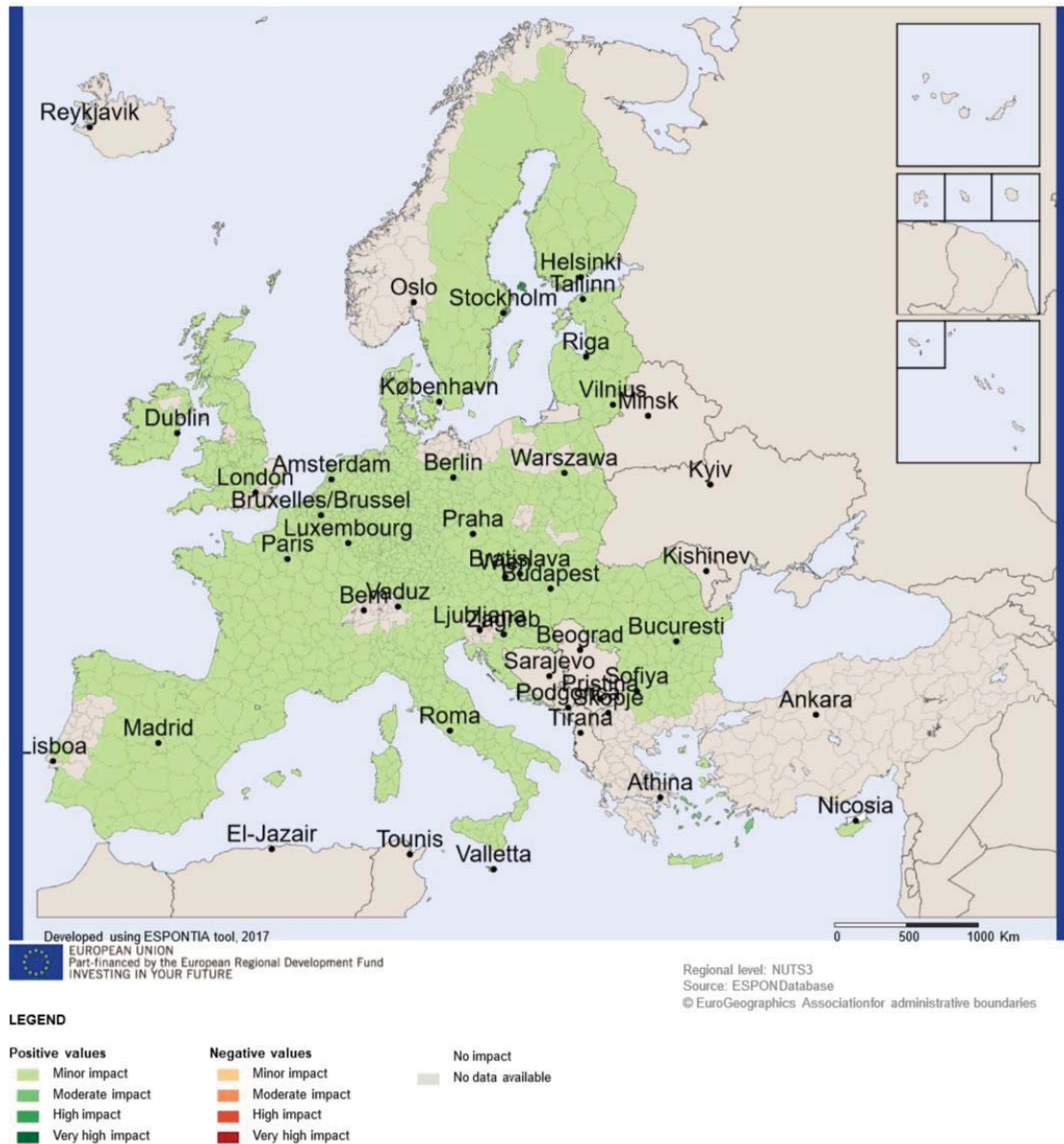
**Proposal for a Directive of the European Parliament and of the Council
amending Directive 2009/33/EC on the promotion of clean and energy-efficient road
transport vehicles**

{COM(2017) 653 final} - {SWD(2017) 367 final}

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Map 18.5: Result of the expert judgement: Emissions of CO₂ per capita (tonnes) affected by the revision of the Clean Vehicles Directive – expert judgement: weakly advantageous effect



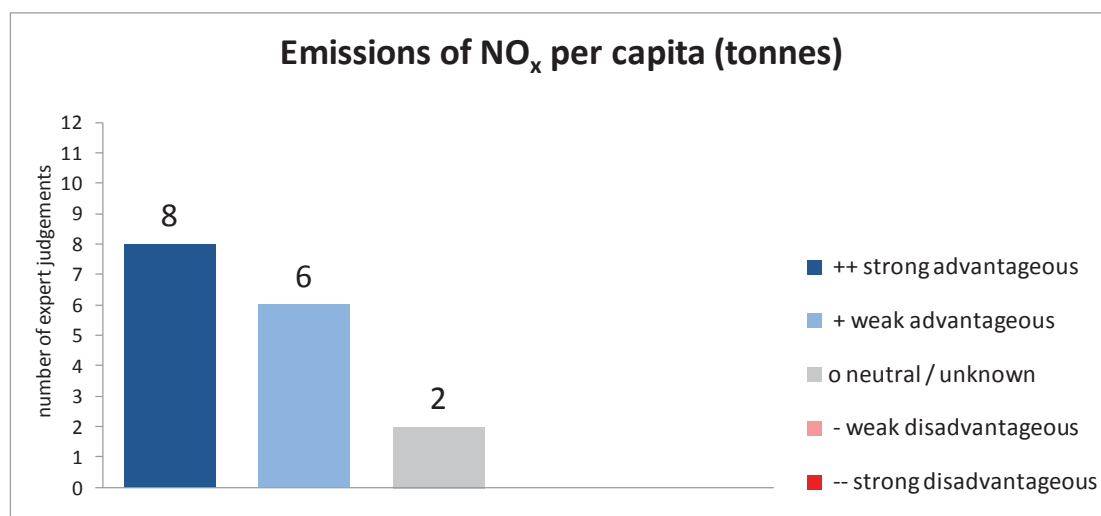
Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

18.3.1. The potential territorial impact in relation to the emissions of NO_x indicator

The experts saw a clearly positive effect of the revision of the Clean Vehicles Directive on the NO_x emissions. Eight experts judged the effect strongly advantageous, six judged it as weakly advantageous.¹

¹ 6 out of the 22 experts did not consider this indicator as relevant

Figure 18.1: Workshop findings: Expert judgement: Effect of the modification of the Clean Vehicles Directive



Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

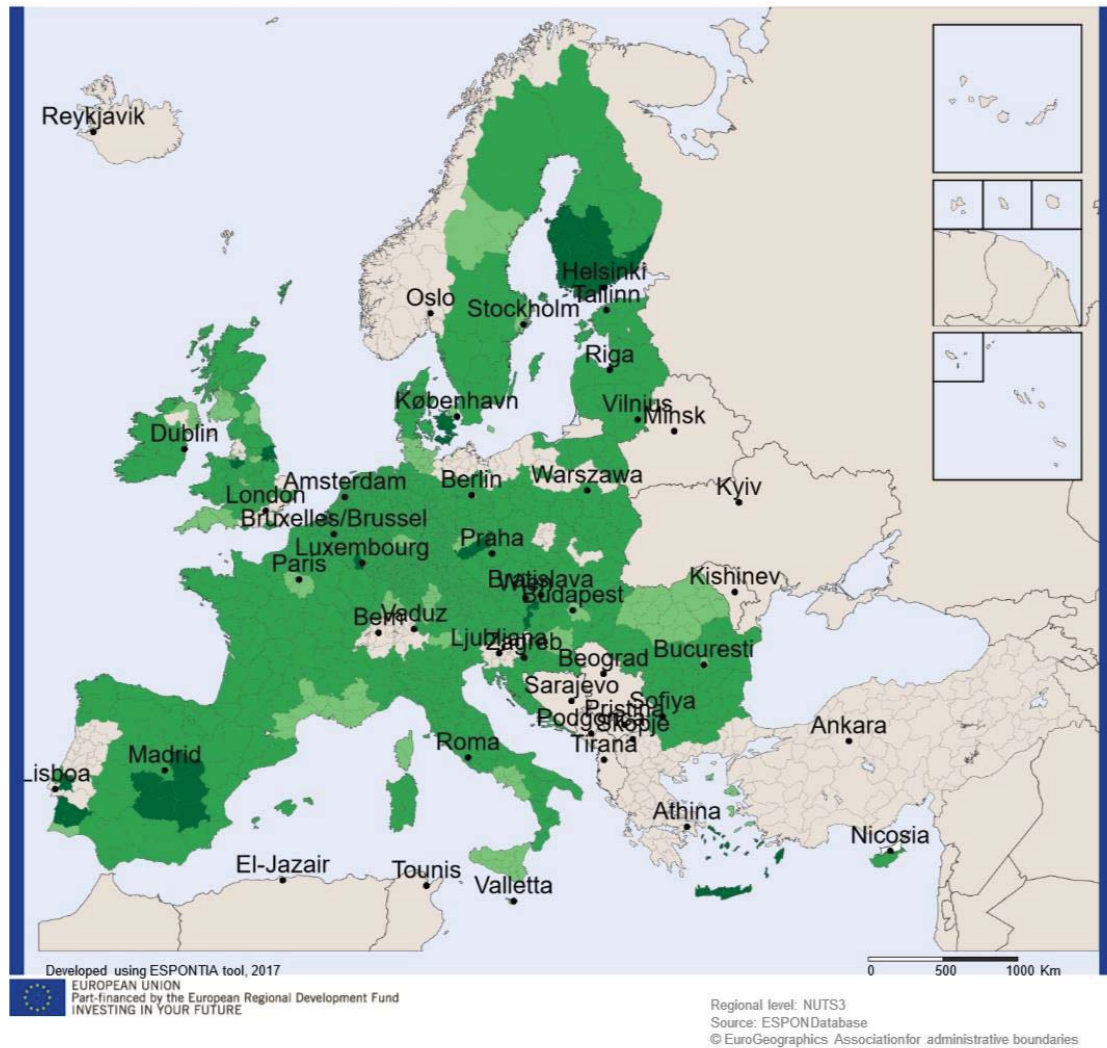
The indicator picturing the sensitivity of a region according to emissions of NO_x is measured the indicator “tons of NO_x per capita”. It is assumed that regions with higher Emissions of NO_x per capita (tonnes) are more sensitive to directives aimed at its reduction.

The following map shows the potential territorial impact of the revision of the CVD on NO_x emissions. It combines the expert judgement of a strongly advantageous effect with the given sensitivity of regions.

82% of the regions would gain a highly positive impact, 3 % even a very highly positive impact. Most of the regions are located in the environs of a great urban agglomeration as e.g. in the South of Finland, South of Copenhagen, South of Madrid, in the South of Portugal near Lisbon and North of Prague. Regions with just a moderate impact are located in more rural areas like in Romania, at the French Mediterranean coast, in the South of Italy and in the South-East of England.

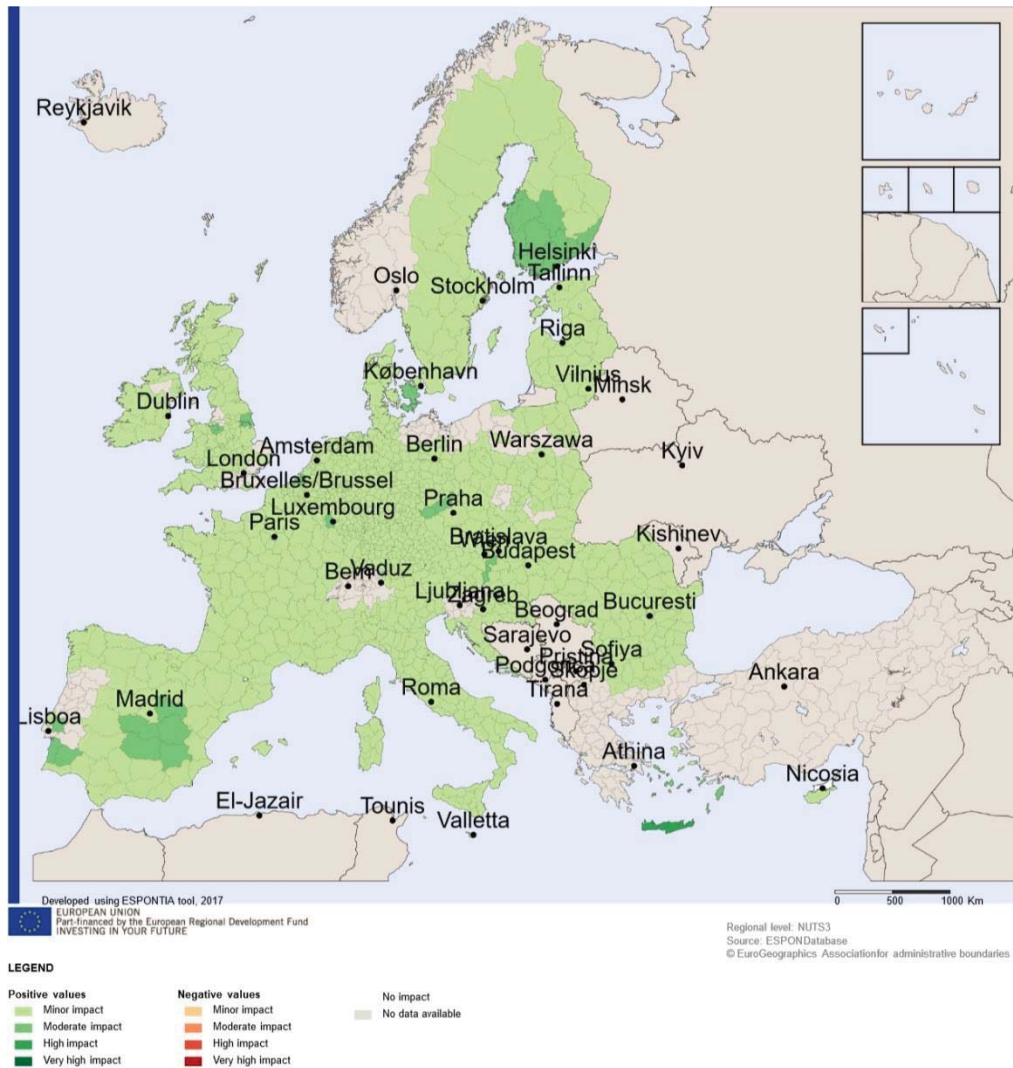
In case of the expert judgement of a weakly advantageous effect the impact on the regions would respectively be lower. In this case more than 96% of the regions would just face a minor positive impact. Regions located in the environs of a great urban agglomeration, as mentioned above, would gain higher impacts.

Map 18.6 Result of the expert judgement: Emissions of NO_x per capita (tonnes) affected by the revision of the Clean Vehicles Directive – expert judgement: strong advantageous effect



Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

Map 18.7: Result of the expert judgement: Emissions of NO_x per capita (tonnes) affected by the revision of the Clean Vehicles Directive – expert judgement: strong advantageous effect



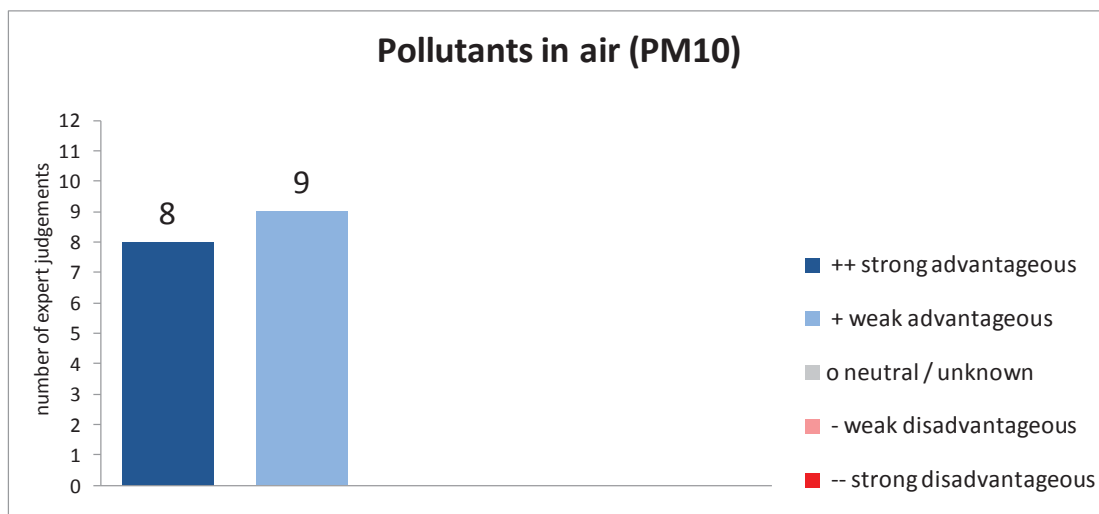
Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

18.3.2. The potential territorial impact in relation to the pollutants in air (PM10) indicator

The experts concluded that there is certainly a positive effect of the revision of the Clean Vehicles Directive on pollutants in air. Eight experts out of 17 judged the effect strongly advantageous, nine experts judged it as weakly advantageous.²

² 5 out of the 22 experts did not consider this indicator as relevant

Figure 18.2: Workshop findings: Expert judgement: Effect of the modification of the Clean Vehicles Directive



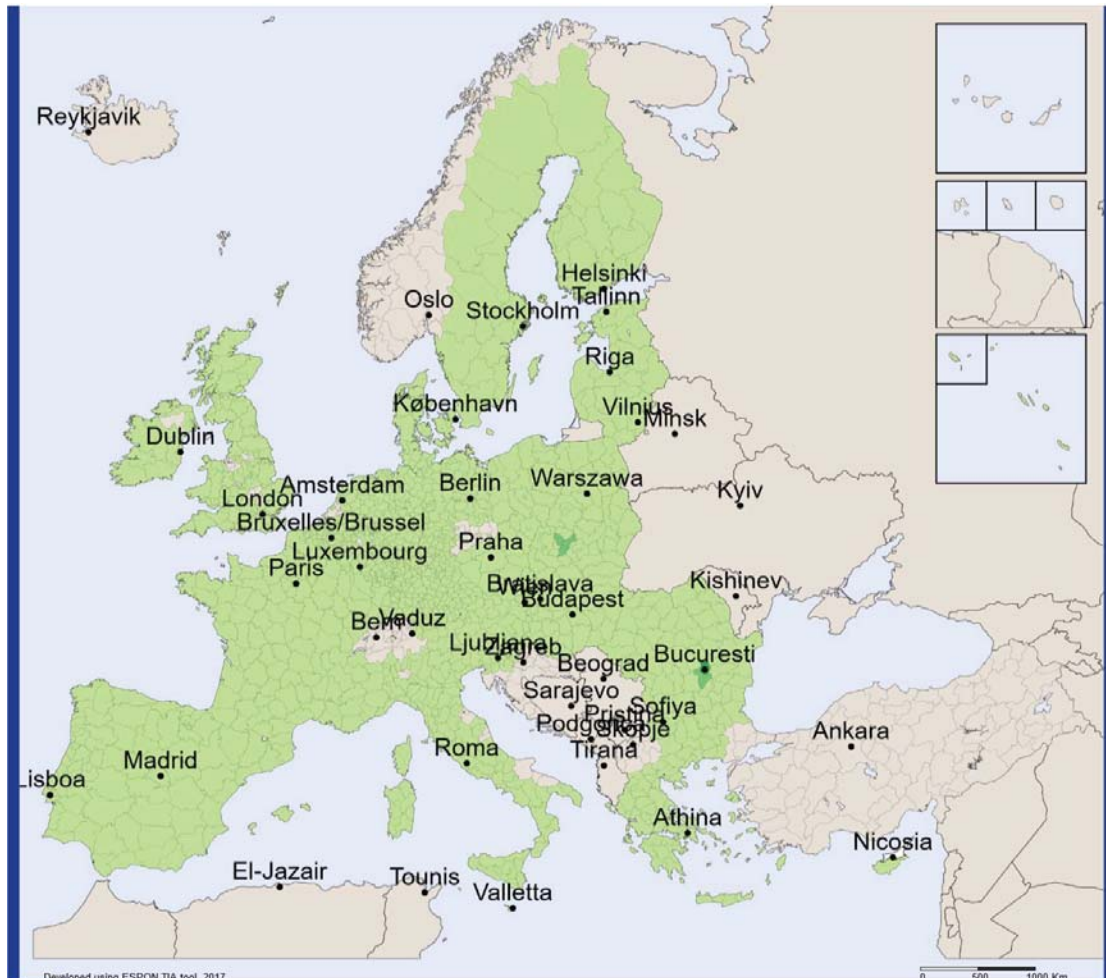
Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

The indicator picturing the sensitivity of a region according to pollutants in air is measured the indicator “concentration of air pollution PM10”. It is assumed that regions showing greater concentration of air pollution are expected to benefit more from directives aimed at its reduction.

The following map shows the potential territorial impact of the revision of the CVD when considering PM10 emissions. It combines the expert judgement of a weakly advantageous effect with the given sensitivity of regions. About 95 % of the regions would gain a minor positive impact. Several urban regions would get a moderate or even a high positive impact, as e.g. Rome, Helsinki, Lisboa, Stockholm, Budapest, Bucharest, Vienna, Copenhagen, Berlin, Hamburg, Bremen, Poznan, Warsaw etc.

In case of the expert judgement of a strongly advantageous effect the impact on the regions would be respectively higher. About 70 % of the regions would gain a moderately positive impact, 25 % a highly and 5 % a very highly positive impact. The focus on urban and metropolitan regions is even more pronounced.

Map 18.8: Result of the expert judgement: Pollutants in air (PM10) affected by the revision of the Clean Vehicles Directive – expert judgement: weak advantageous effect



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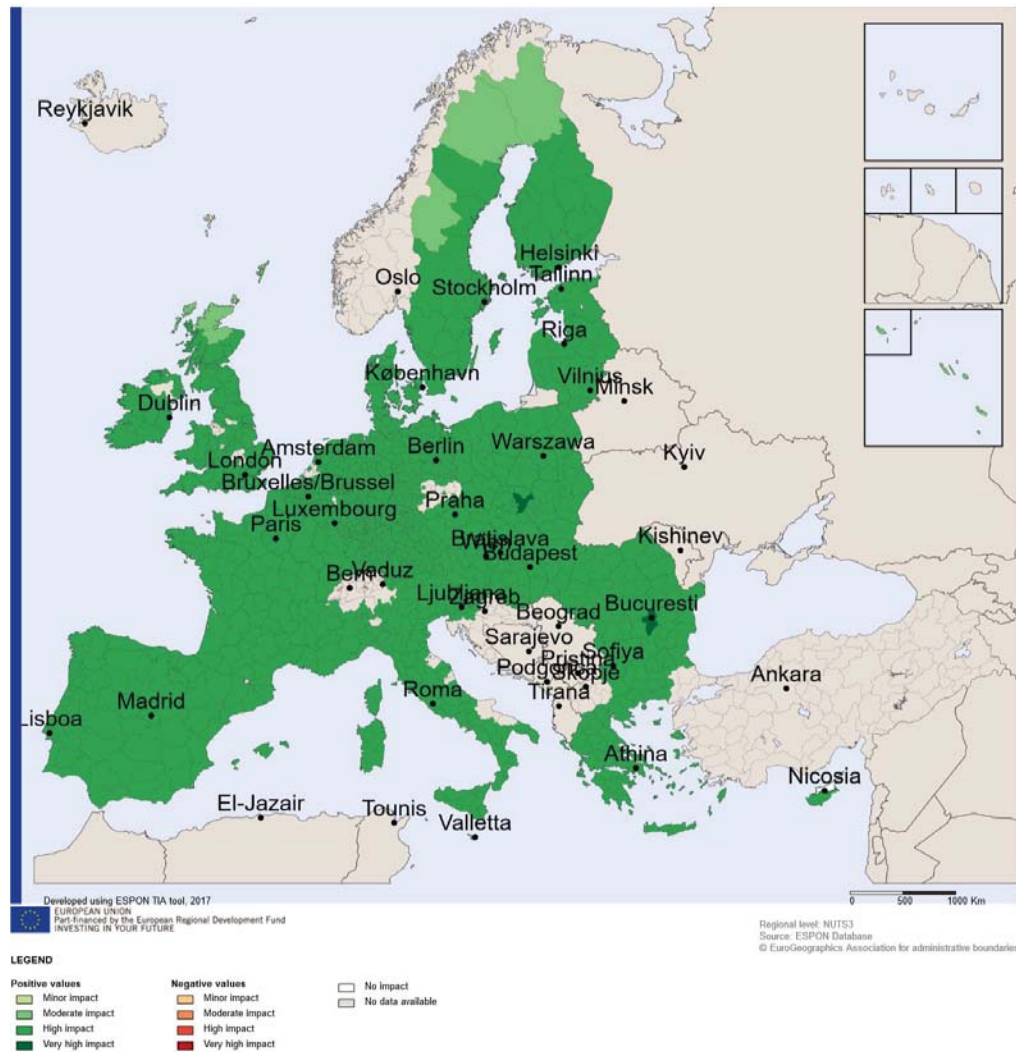
Regional level: NUTS3
 Source: ESPON Database
 © EuroGeographics Association for administrative boundaries

LEGEND

- | | | |
|------------------------|------------------------|---------------------|
| Positive values | Negative values | □ No impact |
| ■ Minor impact | ■ Minor impact | □ No data available |
| ■ Moderate impact | ■ Moderate impact | |
| ■ High impact | ■ High impact | |
| ■ Very high impact | ■ Very high impact | |

Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

Map 18.9: Result of the expert judgement: Pollutants in air (PM10) affected by the revision of the Clean Vehicles Directive – expert judgement: strong advantageous effect



Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

18.4. Results of the TIA quick check: Potential territorial impact considering economic aspects

18.4.1. The potential territorial impact in relation to the R&D climate indicator

The experts assumed that the modification of the CVD will cause a greater demand of clean vehicles by public authorities, which can push innovation especially in heavy transport and busses. Consequently, the R&D climate would be stimulated and R&D expenditures will increase: Four experts voted for a strongly advantageous effect, eleven for a weakly advantageous effect.³

³ 5 out of the 22 experts did not consider this indicator as relevant



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PART 4/4

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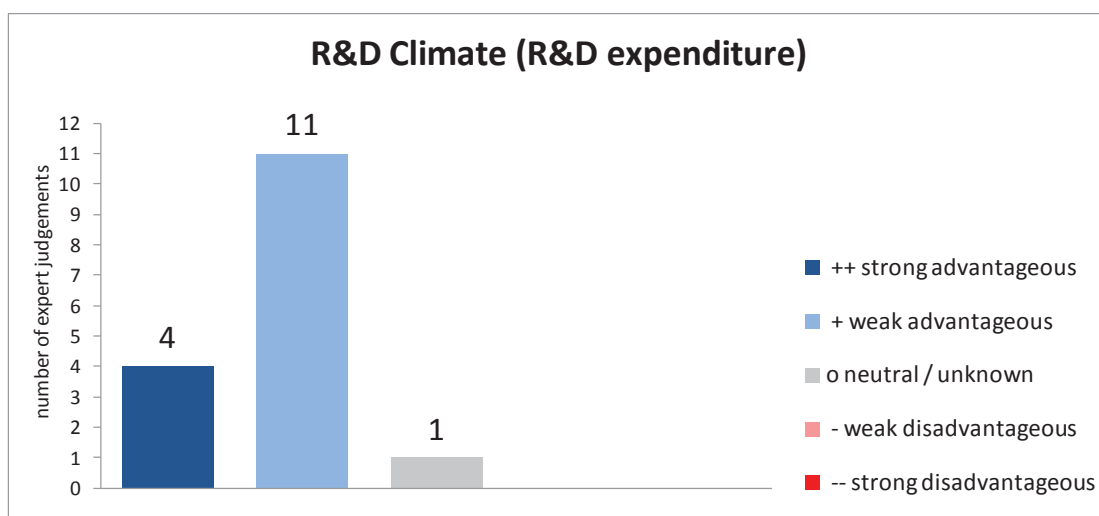
**Proposal for a Directive of the European Parliament and of the Council
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Figure 18.3: Workshop findings: Expert judgement: Effect of the modification of the Clean Vehicles Directive

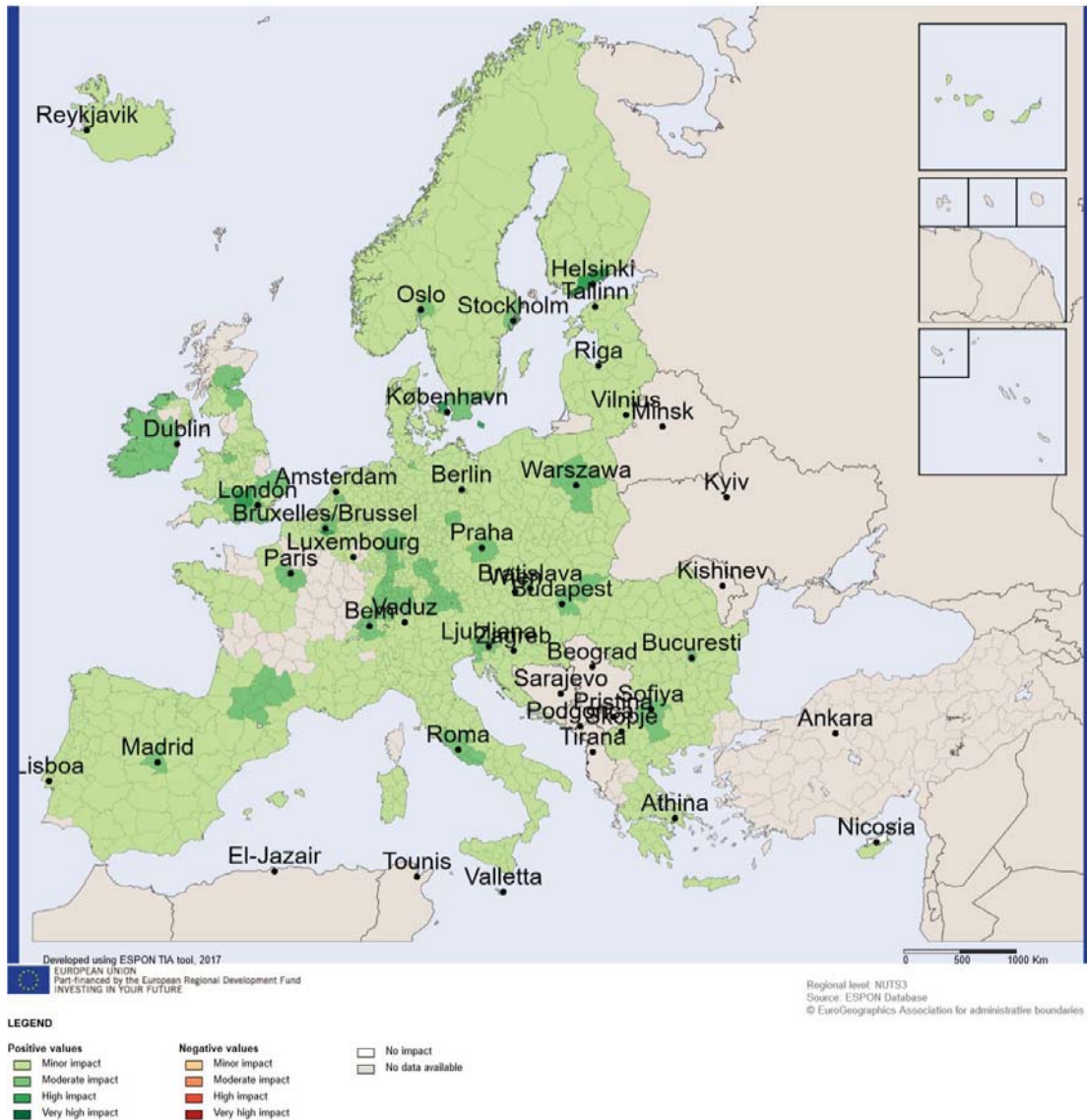


Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

The indicator picturing the sensitivity of a region according to the R&D climate is measured by the indicator “Total intramural R&D expenditure all sectors as a percentage of the GDP”. It is assumed that regions with a greater share of enterprises engaged in product and/or process innovation activities are considered to be more sensitive to directives influencing innovation.

The following map shows the potential territorial impact of the revision of the CVD based on the R&D climate indicator. It combines the expert judgement of a weakly advantageous effect with the given sensitivity of regions. The effect is distributed quite equally: most of the regions would gain a minor positive impact.

Map 18.10: Result of the expert judgement: R&D Climate (R&D expenditure) affected by the revision of the Clean Vehicles Directive – expert judgement: weak advantageous effect



Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

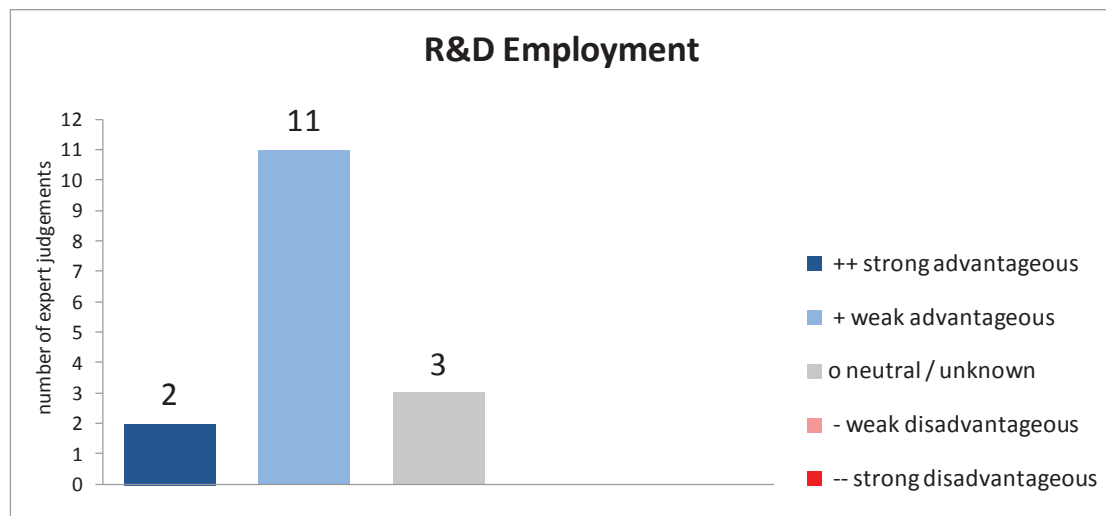
18.

18.4.2. The potential territorial impact in relation to the R&D employment indicator

Another indicator that the experts considered relevant in the analysis of the potential territorial impacts from the revision of CVD is the R&D employment. Eleven experts judged the effect of the modification of the CVD on R&D employment as weakly advantageous, 2 as strongly advantageous.¹

¹ 6 out of the 22 experts did not consider this indicator as relevant

Figure 18.4: Workshop findings: Expert judgement: Effect of the modification of the Clean Vehicles Directive



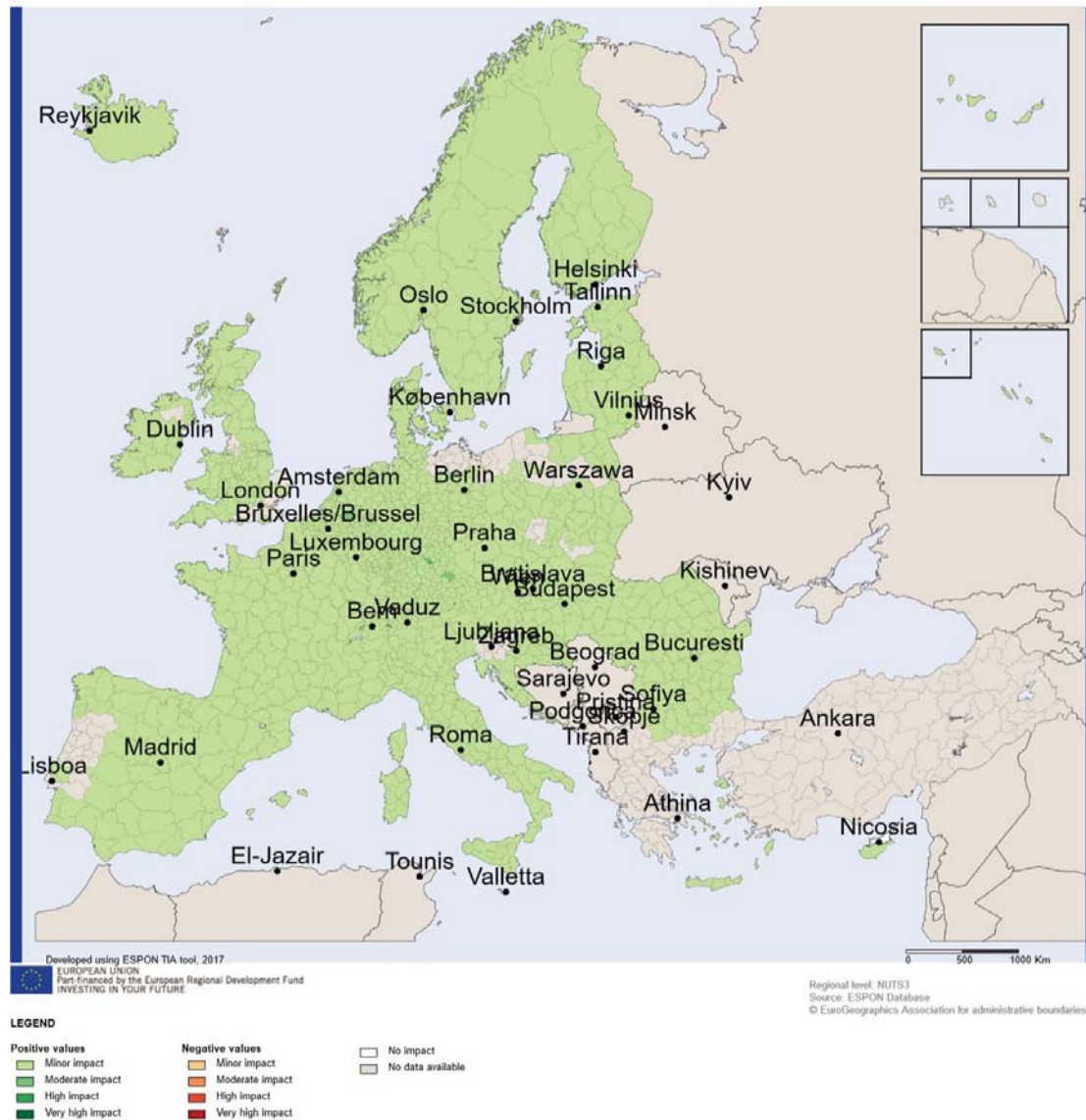
Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

The indicator picturing the sensitivity of a region according to R&D related employment is measuring “employment in technology and knowledge-intensive sectors”.

The following map shows the potential territorial impact of the revision of the CVD based on the R&D employment indicator. It combines the expert judgement of a weakly advantageous effect with the given sensitivity of regions.

The map shows the possibility of a “catching-up” effect of mainly Southern and Eastern European regions.

Map 18.11: Result of the expert judgement: R&D Employment affected by the revision of the Clean Vehicles Directive – expert judgement: weak advantageous effect



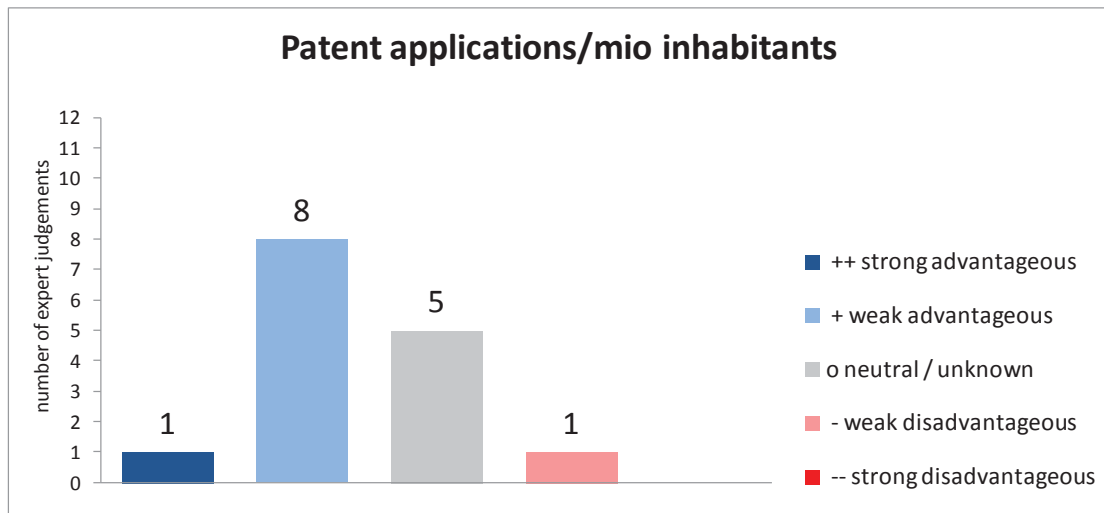
Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

18.4.3. The potential territorial impact in relation to the patent applications indicator

Another indicator that the experts considered relevant in the analysis of the potential territorial impacts from the revision of CVD is the number of patent applications. However the judgement of the experts was quite diverse. A majority of 8 experts judged the effect as weakly advantageous, 5 as neutral and 1 even as weakly disadvantageous.²

² Based on the fact that 7 out of the 22 experts did not vote for this indicator it was considered the least relevant

Figure 18.5: Workshop findings: Expert judgement: Effect of the modification of the Clean Vehicles Directive

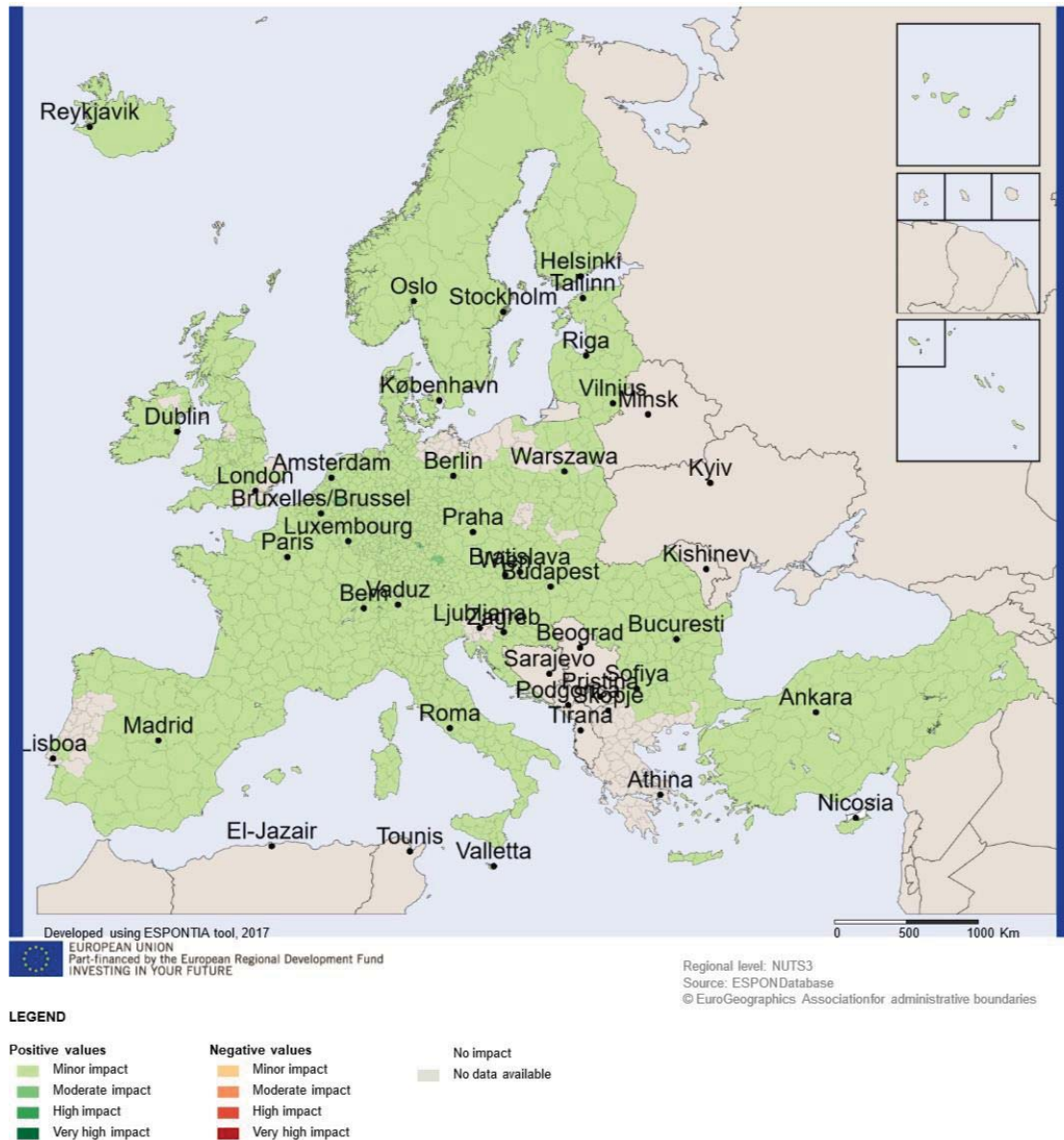


Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

The indicator picturing the sensitivity of a region according to patent applications is measuring “total patent applications to the EPO per million inhabitants”. It is assumed that regions with higher levels of patent applications are expected to have a higher capability of inventing new technology. Therefore they are considered to be more sensitive to directives influencing the levels of patent applications.

The following map shows the potential territorial impact of the revision of the CVD based on the R&D climate. It combines the expert judgement of a weakly advantageous effect with the given sensitivity of regions. The effect is distributed quite equally: More of 99% of the regions would gain a minor positive impact.

Map 18.12: Result of the expert judgement: Patent applications/mio inhabitants affected by the revision of the Clean Vehicles Directive – expert judgement: weak advantageous effect



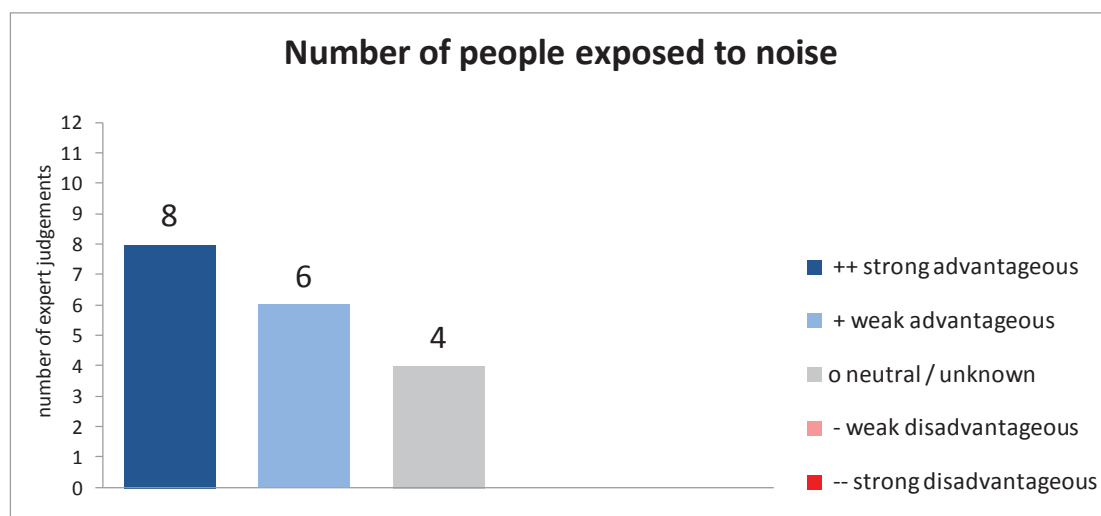
Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

18.5. Results of the TIA quick check: Potential territorial impact based on societal aspects

18.5.1. The potential territorial impact in relation to the number of people exposed to noise indicator

The experts assumed that the modification of the CVD will reduce noise caused by transport. Consequently eight experts voted for a strongly advantageous effect, six for a weakly advantageous effect. Four did not see a relevant effect of the CVD on people exposed to noise.

Figure 18.6: Workshop findings: Expert judgement: Effect of the modification of the Clean Vehicles Directive



Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

The indicator picturing the sensitivity of a region according to the exposure to noise is measured by a proxy-indicator referring to land use that is usually generating noise (area of Corine Landcover level 2 classes 12 (“Industrial, commercial and transport units”) and 13 (“Mine, dump and construction sites”). Based on the fact that only 4 out of the 22 experts did not vote this indicator was considered as very relevant a relevant As this indicator is covering different sources of noise and does not reflect on transport noise directly no further analysis and mapping seems to be useful. Results of the TIA quick check: Potential territorial impact based on governance aspects

18.6. Results of the TIA quick check: Potential territorial impact based on governance aspects

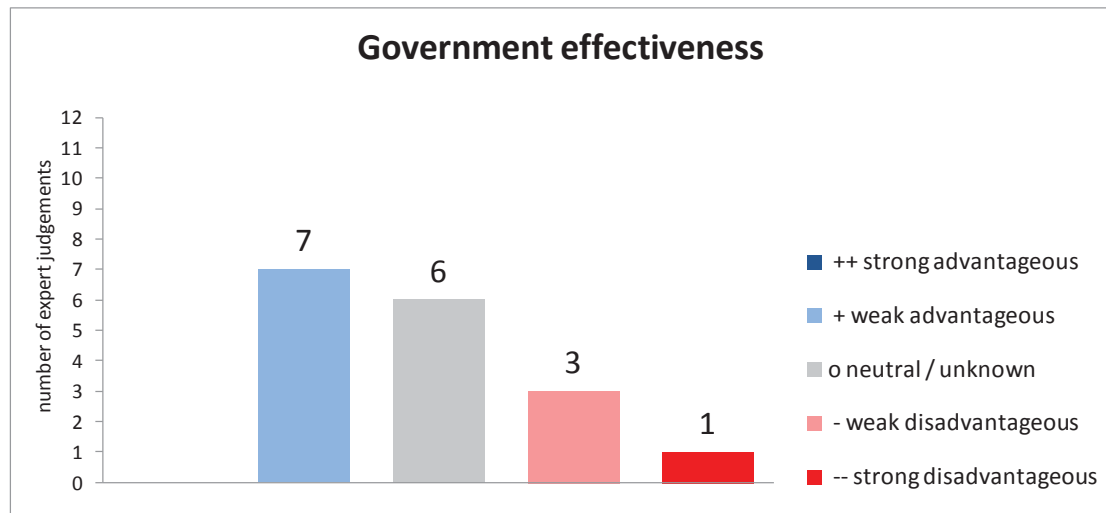
18.6.1. The potential territorial impact in relation to the government effectiveness indicator

The experts consider that an efficient and correct implementation of the revised Clean Vehicles Directive could contribute to establish better guidance to regions on how to improve procurement. Especially regions with an existing high potential to manage such challenges will gain a positive effect on government effectiveness. Nevertheless, there is the possibility that procurement procedures following the new requirements of the CVD could be more complicated and increase the procurement costs and administration. The question of governance design is of central relevance.

This ambiguous effect is mirrored in the expert judgement. 7 experts judged the effect of the modification of the CVD as weakly advantageous, whereas 3 judged them as weakly and 1 as strongly disadvantageous. Six experts judged the effects as unclear or neutral.³

³ 5 out of the 22 experts did not consider this indicator as relevant

Figure 18.7: Workshop findings: Expert judgement: Effect of the modification of the Clean Vehicles Directive

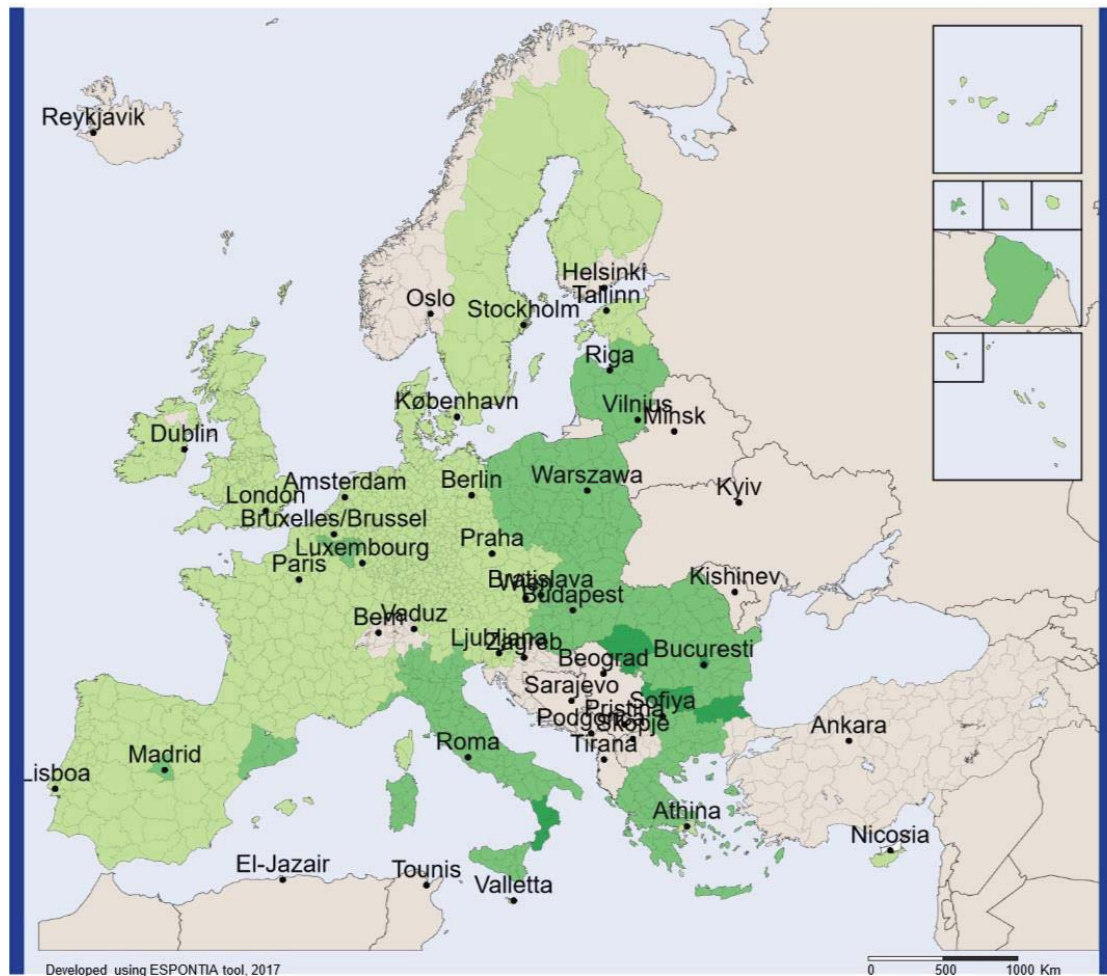


Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

The sensitivity of government effectiveness is measured by the indicator being part of the Regional Competitiveness Index. Regions with low government effectiveness will benefit more from the implementation of new standards of administration than regions that already have high standards of their administration.

The following map shows the potential territorial impact of the modification of the CVD on government effectiveness combining the expert judgement of the weakly advantageous effect with the corresponding sensitivity. Eastern European regions in Latvia, Lithuania, Poland, Romania and Bulgaria as well as Italian and Greek regions and some Spanish regions could gain a moderately to highly positive impact on government effectiveness. Most of the other regions would gain a minor positive impact.

Map 18.13: Result of the expert judgement: Government effectiveness affected by the revision of the Clean Vehicles Directive – expert judgement: weak advantageous effect



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 Regional level: NUTS3
 Source: ESPON Database
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LEGEND

Positive values	Negative values	No impact
Minor impact	Minor impact	No data available
Moderate impact	Moderate impact	
High impact	High impact	
Very high impact	Very high impact	

Source: Territorial impact assessment expert workshop, Brussels, 11 May 2017

18.7. Conclusions and policy implications

18.7.1. Findings based on the results of the TIA Quick check

The experts judged the effects of the revision of Directive 2009/33/EC on Clean and Energy-efficient Road Transport Vehicles – Clean Vehicles Directive predominantly positively. Three main observations can be made:

- Several effects are distributed quite equally throughout the European regions, when considering the impact on CO₂ emissions, PM10 emissions or R&D climate. Concerning these aspects no strong regional distinction would be expected.

- However, there is a clear sign that for some environmental effects especially urban regions will benefit more than the other regions. This can be observed by the effects on the air pollutants NO_x and – to a slighter extent – PM10.
- A correct and efficient implementation of the revised Clean Vehicles Directive is expected that could contribute to establish better procurement procedures. This could support especially Eastern European regions in Latvia, Lithuania, Poland, Romania and Bulgaria as well as Italian and Greek regions and some Spanish regions to catch up in government effectiveness.

Based on the results of the TIA-tool no special effect could be detected for outermost regions.

18.7.2. Findings and recommendations from the expert discussion

Based on the impact maps showing the potential territorial impact from the revision of the Clean Vehicles Directive by linking the results of the expert judgements on the effects with the sensitivity of the regions towards these effects the experts discussed on conclusions and policy implications.

Discussion about the scope of the CVD

In order to find the optimal scope of the revision of the CVD the experts deem important that following aspects should be considered:

- A clear and simple definition helps to understand the CVD better and supports its acceptance and implementation
- Very ambitious goals run the risk of non-implementation, whereas unambitious goals would cause no effects.
- A very strict regulation could also lead to a counter effect: E-mobility could get the touch of forcing and forbidding which could lead to a negative image of e-mobility in the population.
- When leasing is not covered by the revised CVD there is the danger that public authorities opt for leasing instead of buying vehicles in order to avoid the application of the CVD

Flexibility

Experts consider that wealthy regions with efficient administrations could better deal with a more strict regulation than poorer regions with less efficient administration. In addition experts expressed concerns that the poorer regions could not afford to pay more for clean vehicles. Therefore flexibility would be required. This flexibility could include e.g.:

- A minimum framework for all and a guidance for those who would like to go a step further
- A differentiation along the current status of the vehicle fleet. For an older fleet even a lower standard would be a great step forward. Here, however, impacts on complexity of the final approach would need to be considered as well.
- Transition time to public authorities to replace old fleet to meet new standards

- Transition time for producers of busses and other heavy vehicles to adjust their production
- Consider the starting point of each region. Regions in Eastern and South Europe will probably need more time, effort and money to implement reviewed CVD. Support from European Structural and Investment Funds could play a key role here.
- Consider that in remote and sparsely populated areas where the distances are longer electric vehicles will not be adequate since they will need more often recharge
- Flexibility when setting the national goals

However, great flexibility of the directive in technical terms would be a barrier for developing a European wide market for clean vehicles.

Implementation of the Clean Vehicles Directive

Experts consider that in order to implement a good practice in public procurement, a directive setting up rules should be accompanied by supporting measures. An enabling framework would be useful. The Commission faces some limitations here, as procurement legislation and practise have national and regional specifications. Support points established by the MS to integrate national, regional and local administrations could help.

Adequate financing would be also required via the EU Structural Funds to provide the necessary infrastructure such as recharging stations etc. Special consideration should be given to islands since the uptake of electric vehicles by local authorities is more difficult since in many cases there is no connection to the mainland Europe grid.

The idea that the Public Procurement Partnership under the Urban Agenda of the EU should follow the Directive as one of the Actions was also considered

18.8. Territorial impact assessment workshop agenda

Territorial impact assessment expert workshop

Revision of Directive 2009/33/EC on Clean and Energy-efficient Road Transport Vehicles – Clean Vehicles Directive (CVD)

Brussels, 11 May 2017

09:30 – 10:00	Registration and Welcome Coffee
10:00 – 10:10	Welcome and introduction into the Territorial Impact Assessment Eleftherios Stavropoulos Unit Inclusive Growth, Urban and Territorial Development, DG REGIO
10:10-10:20	Tour de table – Getting to know the experts
10:20 – 10:45	Presentation of the Revision of Directive 2009/33/EC on Clean and Energy-efficient Road Transport Vehicles – Clean Vehicles Directive (CVD) Main issues – Policy Options Axel Volkery, DG MOVE

10:45 – 11:00	ESPON TIA Quick Scan tool Erich Dallhammer, Austrian Institute for Regional Studies and Spatial Planning
11.00 – 12:30	Interactive discussion on potential benefits of Revision of CVD with respect to the development of different territories of the EU § Discussing cause/effect chains § Defining the types of regions affected and estimating the intensity of the regional exposure
12:30 – 13:30	Lunch Break
13:30 – 14:30	Interactive discussion on potential benefits of Revision of CVD with respect to the development to the development of different territories of the EU § Discussion on the findings, results and hypothesis
14:30 – 15:30	Policy recommendations
15:30 – 15:45	Summing up the results, feedback, discussion on options for further improvements

18.9. Description of the indicators used and regional sensitivity

Following the interactive discussion among experts, the following indicators were selected and introduced into the ESPON TIA Quick Check model:

Emissions of CO₂ per capita (tonnes)

Definition of sensitivity	Regions with higher Emissions of CO₂ per capita (tonnes) are considered to be more sensitive to directives aimed at its reduction.
Description	Spatial distribution of CO ₂ (Carbon dioxide) emissions in tonnes/year per capita
Source	JRC, GAINS model
Reference year	2020
Original Indicator Spatial Reference	NUTS2, 2013

Emissions of NO_x per capita (tonnes)

Definition of sensitivity	Regions with higher Emissions of NO_x per capita (tonnes) are considered to be more sensitive to directives aimed at its reduction.
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Description	Spatial distribution of NO _x (Nitrogen oxides) emissions in kilotonnes/year per capita
Source	JRC, GAINS model
Reference year	2020
Original Indicator Spatial Reference	NUTS2, 2013

Air pollutants (PM10)

Definition of sensitivity	Regions showing greater concentration of air pollution are expected to benefit more from directives aimed at its reduction.
Description	particular matter (PM10)
Source	5 th Cohesion Report
Reference year	2009
Original Indicator Spatial Reference	NUTS3, 2010

R&D Climate (R&D expenditure)

Definition of sensitivity	Regions with greater share of enterprises engaged in product and/or process innovation activities are considered to be more sensitive to directives influencing innovation.
Description	Total intramural R&D expenditure (GERD), all sectors as a percentage of the GDP
Source	EUROSTAT
Reference year	2011
Original Indicator Spatial Reference	NUTS3, 2013

R&D Employment

Definition of sensitivity	Regions with a greater share of employment in technology and knowledge intensive sectors are considered to be more sensitive to directives influencing innovation.
Description	Employment in technology and knowledge-intensive sectors
Source	EUROSTAT, LFS
Reference year	2012
Original Indicator Spatial Reference	NUTS3, 2010

Patent applications/mio inhabitants

Definition of sensitivity	Regions with higher levels of patent applications are expected to have a higher capability of inventing new technology. Therefore they are considered to be more sensitive to directives influencing the levels of patent application.
Description	Total patent applications to the EPO per million inhabitants
Source	EUROSTAT
Reference year	2012
Original Indicator Spatial Reference	NUTS3, 2013

Number of people exposed to noise

Definition of sensitivity	Exposure to noise is largely dependent on the proximity to transport units. Regions with a higher share of these areas are likely to be more hit by the impacts changing the levels of noise. Therefore they are expected to benefit more from directives.
Description	Area of Corine Landcover level 2 classes 12 (“Industrial, commercial and transport units”) and 13 (“Mine, dump and construction sites”) per inhabitant
Source	ESPON on CLC; OIR calculation
Reference year	2006
Original Indicator Spatial Reference	NUTS3, 2010

Government effectiveness

Definition of sensitivity	Regions with a low Regional Competiveness Index will benefit more from an improvement of the government effectiveness by implementing new standards of administration than regions that have already high standards of their administration.
Description	EU Regional Competiveness Index 2013
Source	DG Regio project on QoG
Reference year	2009
Original Indicator Spatial Reference	NUTS3, 2010

Definition of additional indicators

During the TIA quick check it is possible to identify additional fields of exposure, which are affected by the policy proposal and which are not provided by the tool as standard. Whereas the exposure caused by the policy proposal could be judged by the experts during the workshop, a valid indicator for describing the sensitivity of regions needs to be defined in advance. The TIA quick check offers the possibility to upload new indicators. It provides a template, where for each NUTS 3 regions the values of the indicator can be to be filled in.

For the new indicator it has to be defined, whether the exposure field needs to be evaluated as being either harmful (“cost”) or favourable (“benefit”) for the regions welfare. Then the tool will automatically transform the experts rating into numbers for further calculation (= normalisation).

Normalisation of indicators

The normalisation follows a linear procedure. Normalised values range from 0.75 up to 1.25. Basically, normalized sensitivity indicators represent coefficients that can increase (if greater than 1) or decrease (if lower than 1) each policy proposal’s impact on a specific field.

Methodology for normalisation of regional sensitivity values

For this step the following definitions are needed:

X_{norm_i} the normalized value of the sensitivity indicator for impact field i

X_i the original value of the sensitivity indicator for impact field i

X_{min_i} the minimum original value of the sensitivity indicator for impact field i

X_{max_i} the maximum original value of the sensitivity indicator for impact field i

Then, normalization follows this formula:

$$X_{norm_i} = 0,75 + ((1,25 - 0,75) * ((X_i - X_{min_i}) / (X_{max_i} - X_{min_i})))$$

Source: ESPON TIA Quick Check Moderator’s Guide and Methodological Backgro