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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>

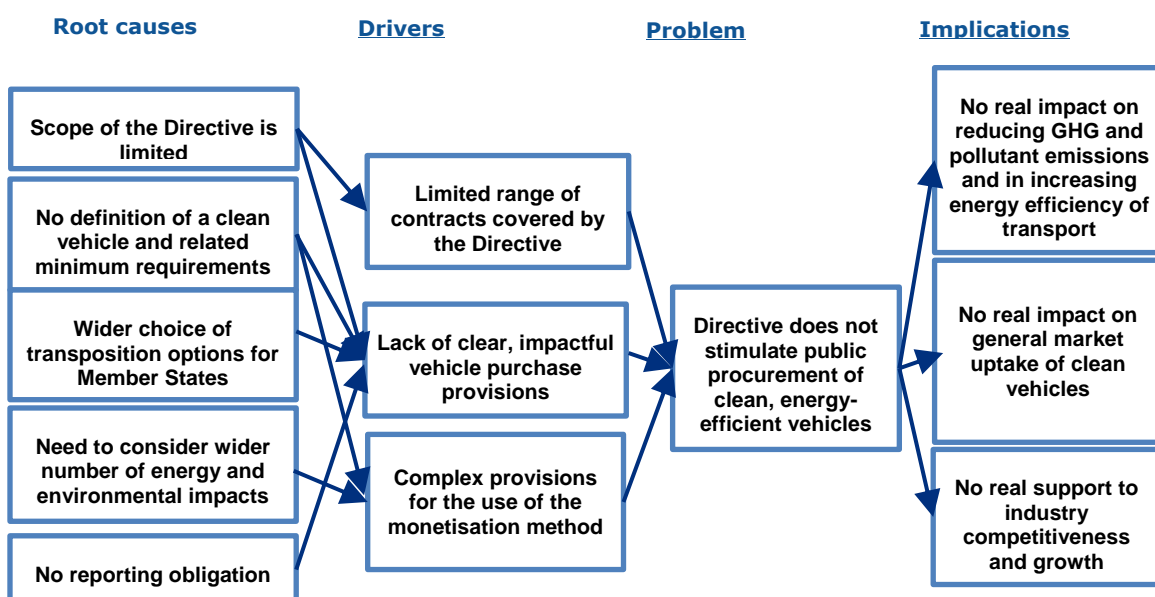
<i>SPR7</i> : Introduce a voluntary framework to facilitate Member State reporting	Section 2.1.1 and policy options 2,3, 4 and 5 tackle the issue of reporting (section 5).
<i>SPR8</i> : Explore potential for a Commission initiative on cross-border procurement	The Commission is facilitating action on 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*

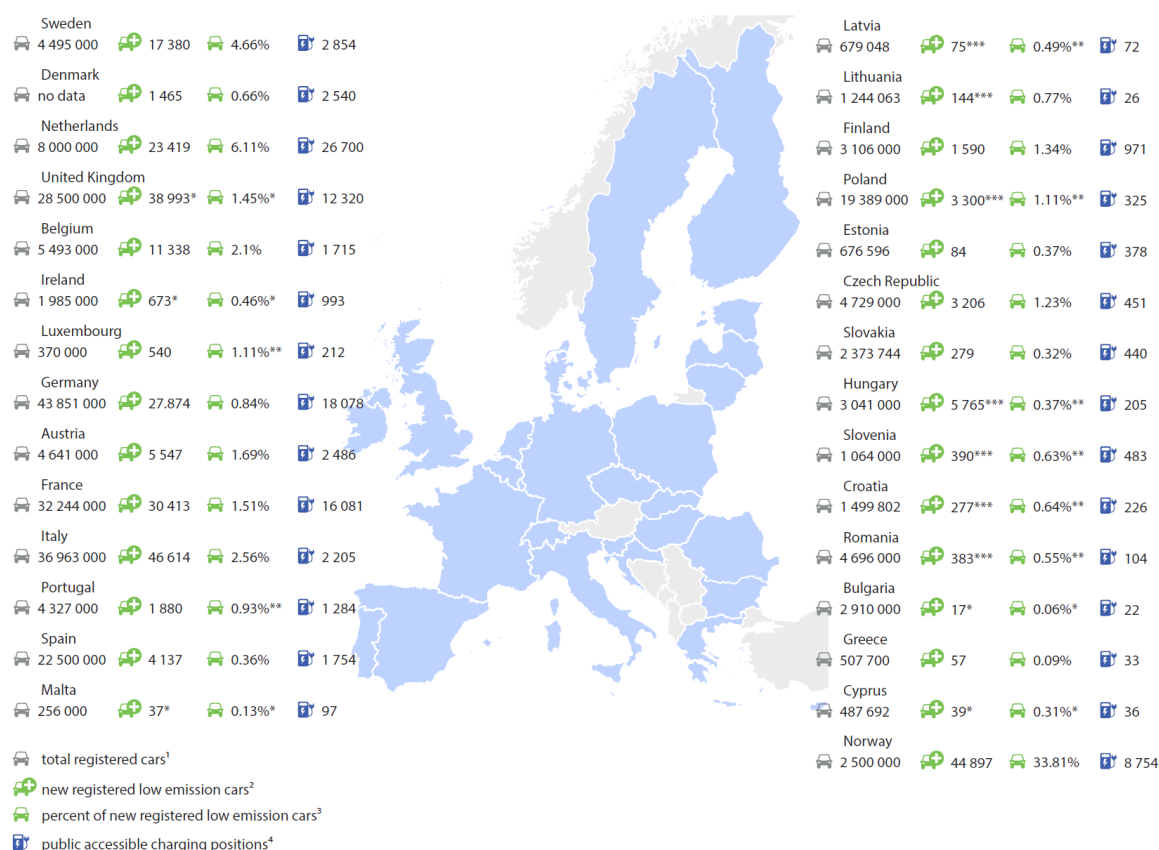
In many instances, public procurement has not effectively helped the general market uptake of those vehicles. As figure 2.2 shows, market shares of these vehicles, and particularly the market shares of zero-emission vehicles (battery-electric, fuel cell electric), are still low. For example, the EU market 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			
			Hybrid-electric	Electric chargeable	Other alternative fuels	Total 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.

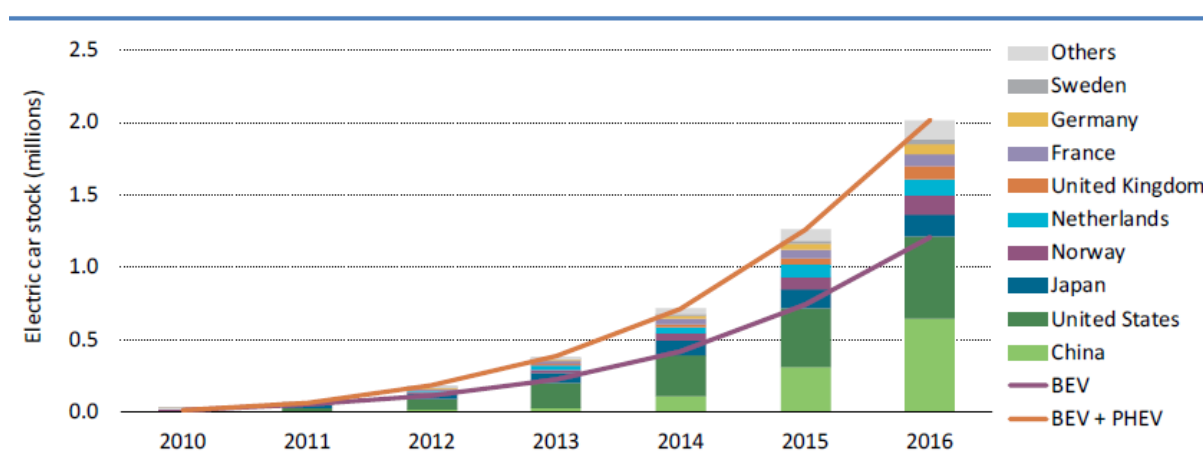
²⁴ Diesel vehicles have a higher energy efficiency compared to petrol vehicles. However, because of higher NO_x emissions diesel vehicles also have a higher negative impact on air pollution. 13% of procurers in the survey of the ex-post evaluation noted that they use the monetisation methodology. Comparing 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 fuelled 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 action 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 to 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 EUCO-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:
 - 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).
 - 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.
 - 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.
 - 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 considerate 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 is it 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.

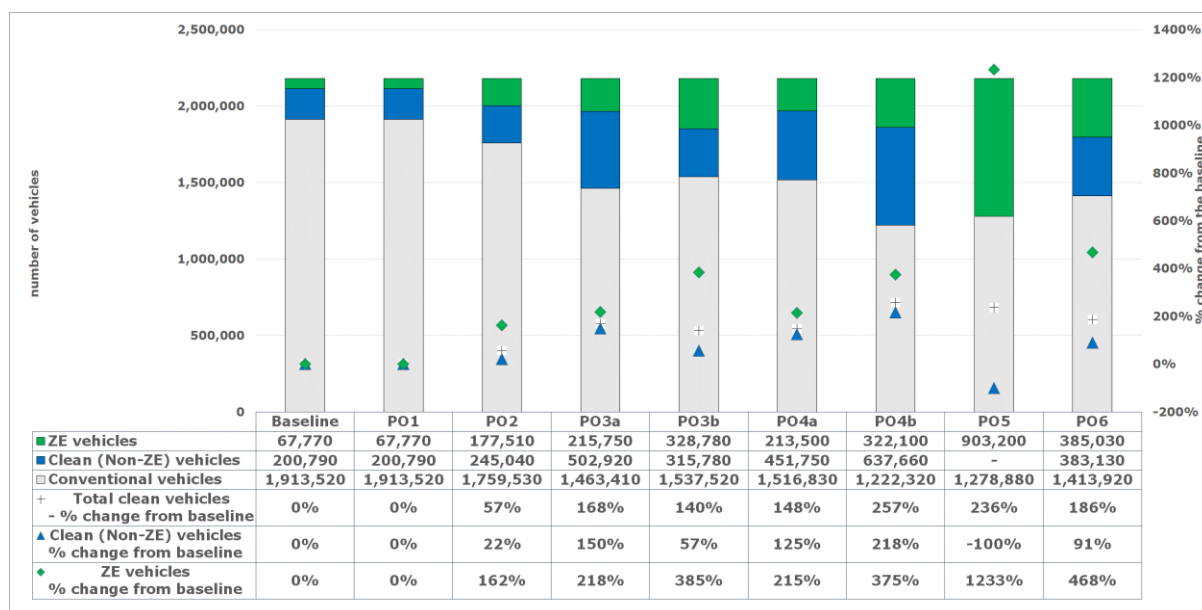
The policy options would not have a significant impact on the total number of vehicles procured during 2020-2035. But they would affect the composition of the fleet in terms of types of powertrains procured. Figure 6.1 presents the changes in the number of clean (low- and zero-emission vehicles) vehicles 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.

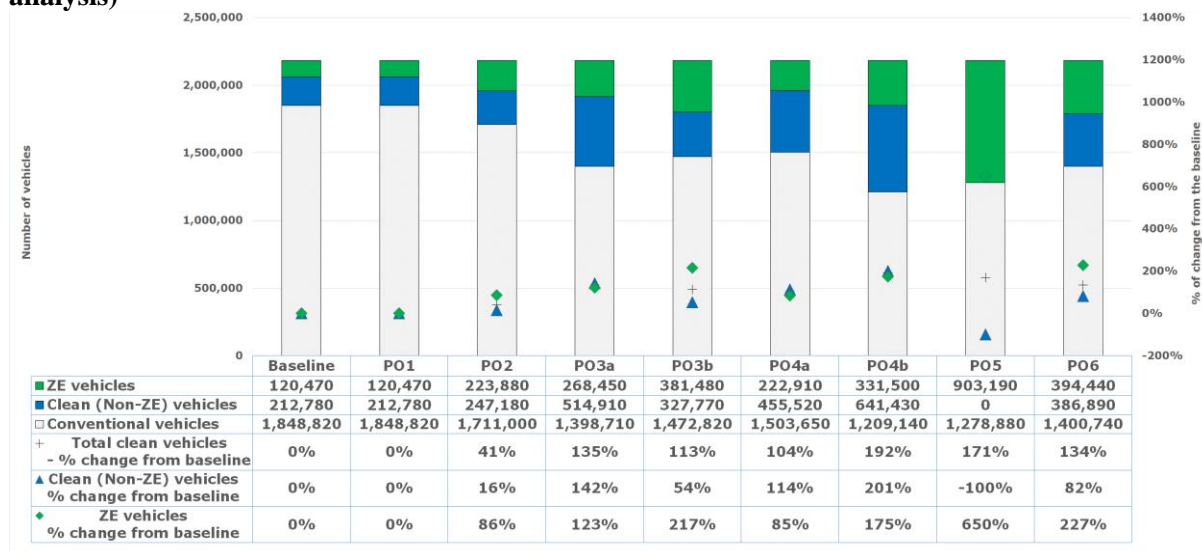
Figure 6.1 Impact of policy options on procurement of clean vehicles⁸¹ under purchase, lease and services contracts during 2020-2035 relative to the baseline scenario



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)

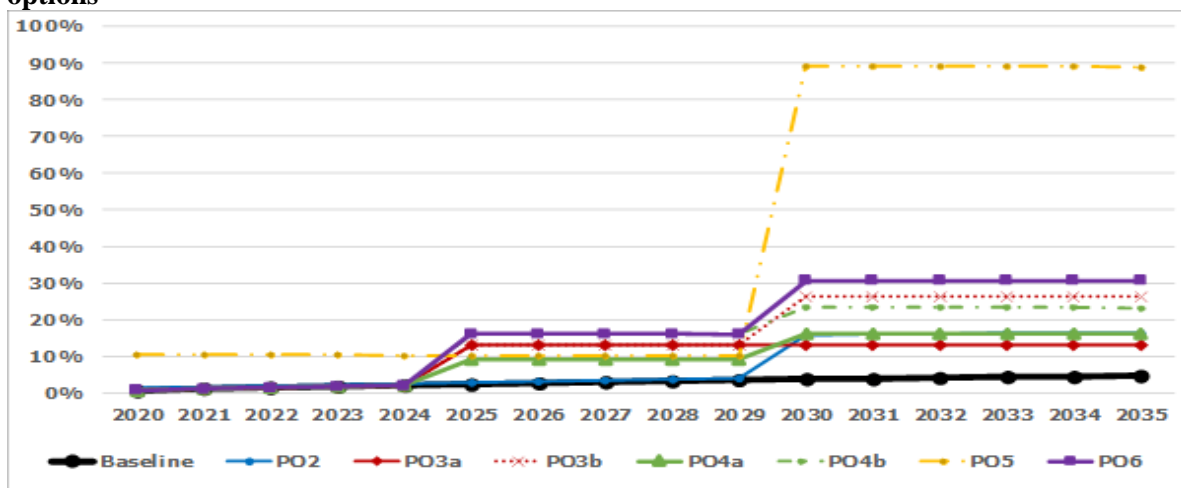


Source: Ricardo (2017) Support Study to the Impact Assessment of the Clean Vehicles Directive

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
CO ₂ emissions (thousand tonnes CO ₂)									
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
Support the market-uptake of low- and zero-emission vehicles	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
	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								
xx	x	O	✓	✓✓				
Strongly negative	Weakly negative	No or negligible impact	Weakly positive	Strongly positive		Unclear		
	PO1	PO2	PO3		PO4		PO5	PO6
			PO3a	PO3b	PO4a	PO4b		
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 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 No impact on trucks and buses	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 No impact on trucks and buses	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 691 thousand vehicles or 32 p.p. increase in the share of clean vehicles procured) driven by 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 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								
xx	x	O	✓	✓✓				
Strongly negative	Weakly negative	No or negligible impact	Weakly positive	Strongly positive			Unclear	
	PO1	PO2	PO3		PO4		PO5	PO6
			PO3a	PO3b	PO4a	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	Strong positive impact: common definition and action requirement	Strongest impact due to immediate effect of common procedure	Strong positive impact: common definition and action requirement

Key: Impacts expected								
xx	x	O	✓	✓✓				
Strongly negative	Weakly negative	No or negligible impact	Weakly positive	Strongly positive			Unclear	
	PO1	PO2	PO3		PO4		PO5	PO6
			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				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								
xx	x	O		✓	✓✓			
Strongly negative	Weakly negative	No or negligible impact		Weakly positive		Strongly positive		Unclear
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: €818 Procurement costs €1,790 Operational cost savings €970 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	Increase in revenues: €1,300 million Admin costs savings: €7.3	Increase in revenues: €1,960 Admin costs savings: €12.4	Increase in revenues: €1,790 Admin costs savings: €12.4	Increase in revenues: €2,550 Admin costs savings: €12.4	Increase in revenues: €4,090 Admin costs savings: €12.4	Increase in revenues: € 11,030 Admin costs: €6.7	Increase in revenues: €4,190 Admin costs savings: €12.4
c) Impact on total environmental costs over the lifetime of vehicles procured (2020-2035)	No impact	Cost savings: € 850	Cost savings: € 640	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	€168	€228	€38	-€8,139	-€53

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

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 develop 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