Impact Assessment study for the review of Directive 2009/33 on the Promotion of Clean and Energy-Efficient Road Transport Vehicles

Final report

Study contract no. MOVE/C1/2016-476/SI2.740207

Transport and Environmental Policy Research

Authors: Sarah Winne, Achilleas Tsamis, Marius Biedka, Charlotte Brannigan, Fiona Twisse, Samuel Levin, Gena Gibson (Ricardo), Ian Skinner (TEPR)

November – 2017

EUROPEAN COMMISSION

Directorate-General for Mobility and Transport
Directorate B – Investment, Innovative & Sustainable Transport
Unit B4 — Sustainable & Intelligent Transport

Contact: Axel Volkery

E-mail: Axel.Volkery@ec.europa.eu

European Commission
B-1049 Brussels

Impact Assessment study for the review of Directive 2009/33 on the Promotion of Clean and Energy-Efficient Road Transport Vehicles

Final report

Study contract no. MOVE/C1/2016-476/SI2.740207

Europe Direct is a service to help you find answers to your questions about the European Union.

Freephone number (*)**:**

00 800 6 7 8 9 10 11

(*) The information given is free, as are most calls (though some operators, phone boxes or hotels may charge you).

Luxembourg: Publications Office of the European Union, 2020

ISBN 978-92-76-20750-4
doi: 10.2832/118535

Table of Contents

EXECUTIVE SUMMARY

A. Purpose and scope of the study

The Clean Vehicles Directive (CVD) aims to stimulate the market for clean and energy-efficient vehicles by requiring various public bodies to take account of lifetime environmental and energy impacts when purchasing road transport vehicles. These requirements oblige contracting authorities, contracting entities and transport operators charged with public service obligations (Article 5(1)) to take into account at least: energy consumption and lifetime emissions of carbon dioxide (CO_2), nitrogen oxides (NO_X), non-methane hydrocarbons (NMHCs), particulate matter (PM) and energy consumption in purchases of road transport vehicles (Article 5(2)).

The Ex-Post Evaluation of the CVD[1] pointed out that the Directive has had limited impact and should be revised. The present study was commissioned to support the Impact Assessment of the proposal to amend the Clean Vehicles Directive.[2]

B. Problem analysis

The study presents findings from an extensive analysis of public procurement of clean vehicles in the EU. It shows that public procurement has had a very limited impact on the market uptake of clean vehicles. Through an extensive stakeholder consultation process it further corroborated the shortcomings in the design of the CVD that contribute to this marginal impact. These relate particularly to the provisions on the scope and the provisions on vehicle purchase.

C. Policy options analysed

Following the general objective for the amendment of the CVD, namely to accelerate the procurement of clean vehicles in the EU, key specific objectives are that an amended CVD should cover all relevant procurement practices, that it should support clear long-term market signals, and that that it should ensure that provisions are simplified and effective to use.

Following a wider screening of potential measures to address the identified problems, the remaining list of suitable measures was combined to form six different policy options. They gradually increase the level of policy ambition and changes to the governance approach of the CVD.

Policy Option 1 – Repeal of the CVD: This policy option assumes the repeal of the CVD. Member States would be free to apply any approach to public procurement of vehicles (unless constrained by EU horizontal procurement or relevant national legislation).

Policy Option 2 analyses a set of incremental changes. It retains the current scope of the CVD, updates the values of the monetisation methodology, and provides a definition of a clean vehicle. Member States have to make a mandatory choice: either they choose to use environmental impacts as award criteria, including their monetisation, or they adopt the definition and develop national plans on this basis, including target-setting. The national plans should be developed within a year of the entry into force of the CVD and targets should be set for 2030.

[1] Ricardo & TEPR, 2015. Ex-post Evaluation of Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles, online: https://ec.europa.eu/transport/sites/transport/files/facts-fundings/evaluations/doc/2015-09-21-ex-post-evaluation-directive-2009-33-ec.pdf.

[2] Available from: https://ec.europa.eu/transport/modes/road/news/2017-11-08-driving-clean-mobility_en

Policy Option 3 increases the ambition compared to Option 2 and eliminates the monetisation methodology. PO3 expands the scope of the CVD to include vehicles leased, rented or hire-purchased by public authorities and selected transport services (bus, waste collection and postal/courier services) procured by public authorities. It focuses on the introduction of a definition of a clean vehicle based on a vehicle's tailpipe CO_2 emissions and, for light duty vehicles, its RDE air pollutant emissions. Two sub-options reflect different forms of stringency of the requirements to be set in 2025 and 2030, following an approach of a combined threshold of gCO_2/km and RDE air pollutant emissions conformity factors for tailpipe emissions of light duty vehicles. Building on the definition, minimum procurement targets are set for light-duty vehicles for 2025 and 2030, differentiated by Member States. Vehicles with zero tailpipe emissions are counted preferentially towards the fulfilment of the target. No requirements based on tailpipe emissions are set for HDVs (trucks and buses). Such requirements would be introduced when related regulatory requirements have been adopted at the EU level in the future.

Policy Option 4 applies the same structural changes to the governance of the CVD as PO3, but is based on a definition of a clean vehicle as one that uses alternative fuels (including electricity, hydrogen and natural gas). It adopts the same approach to broadening the scope of the CVD to include vehicles leased, rented or hire-purchased by public authorities and selected transport services (bus, waste collection and postal/courier services) procured by public authorities. Again, two alternative sub-options consider different levels of stringency for minimum procurement targets, differentiated by Member State and differentiated by light-duty (passenger cars, vans) and heavy-duty (buses, trucks) vehicles.

Policy Option 5 is different from the previous options because it significantly changes the main governance approach to public procurement of clean vehicle at the EU level. The current Directive would be replaced by a Regulation that prescribes the mandatory use of the amended monetisation methodology with direct effect to all public bodies in the EU. The scope and reporting obligation will be the same as in PO3 and PO4.

Policy Option 6 combines elements of PO3 and PO4. Building on the same extension of the scope of the CVD to include vehicles leased, rented or hire-purchased by public authorities and selected transport services (bus, waste collection and postal/courier services) procured by public authorities, it covers the requirements of PO3b for light-duty vehicles. It further assumes that the same combined emission-based approach would be adopted through a delegated act under the CVD once the regulatory measures for CO_2 emissions for trucks and buses have been adopted at the EU level. Until that point in time, the requirements of PO4b for heavy-duty vehicles apply.

D. Analysis of impacts

The analysis of the policy options followed the Commission's Impact Assessment methodology and assessed impacts in terms of effectiveness, efficiency, coherence with EU policy objectives, proportionality and subsidiarity.

The analysis used a specific assessment tool that had been used previously for the ex-post evaluation of the CVD. It was further refined for the purposes of this Impact Assessment Support Study.

A baseline scenario was developed as a reference for the analysis of impacts under the different policy options. The baseline scenario builds on an update of the EU Reference scenario 2016, developed with the PRIMES-TREMOVE model by ICCS-E3MLab, to the extent possible. An alternative baseline has also been constructed, as part of the sensitivity analysis, assuming a faster increase in the share of clean buses. This alternative baseline builds on information obtained from key stakeholders. The timeframe for the analysis of future procurement action is 2020-2035, with further impacts of procured vehicles up until 2050 being analysed.

A large array of evidence was used for this study. A key source of information was information provided by public and private partners through an open public consultation and targeted consultation activities, as well as information gathered through different public meetings, a specific territorial impact assessment workshop and interviews, and desk research (as described in Annex 2 of this study). Overall, the sources used for the drafting of this study are numerous, exhaustive and representative of the different stakeholder groups.

D.1 Effectiveness and efficiency of policy options

The analysis of effectiveness and efficiency needed to factor in the high level of uncertainty for PO5, relative to the impacts of solely using an updated monetisation methodology, to underpin public procurement of road transport vehicles. Against this backdrop, the analysis resulted in the following findings for the different policy options:

- PO1: a repeal of the CVD is only expected to lead to some very limited administrative cost savings with no other impacts. A repeal would not contribute to achieving the general and specific objectives of the policy initiative. It would not contribute to a more coherent and consistent approach for procurement across the Member States, nor have any potential to influence the market.
- PO2 is expected to lead to a more sizeable increase in the share of clean vehicles until 2035 and result in greater environmental benefits, which rest, however, on certain assumptions of using the monetisation methodology, as well as on assumptions on how Member States will set targets for following up on the setting of a common definition of clean vehicles at the EU level. Compared to PO3, PO4, and PO6, PO2 shows less advantages for modernising public procurement of clean vehicles: it does not stipulate a clear framework for extending the scope of the CVD and it provides no real long-term market clarity, as market signals depend on Member State willingness to act.
- PO3 and PO4 (with the respective less and more demanding options "a" and "b") deliver on all specific policy objectives of this initiative: they cover all relevant procurement practices and they considerably reduce market uncertainty through introducing an absolute definition of clean vehicles and minimum procurement targets. They also simplify the provisions compared to the current Directive. Relative to PO2 they have a more sizable positive impact, particularly when looking at PO4b. They provide knock-on effects for private vehicle purchases, despite being difficult to measure, as they ensure a more consistent and coherent utilisation of public procurement to accelerate vehicle take up across the EU. Moreover, they leave a considerable level of flexibility of implementation, as Member States can decide how to implement the procurement targets taking into account specific local conditions. By eliminating the use of the monetisation methodology, these policy options contribute to the simplification of the Directive. Both options also provide for a staged adoption of more demanding targets to allow authorities to run existing contracts and to make adjustments in terms of necessary support infrastructure. However, PO3 does not address heavy-duty vehicles due to the lack of existing regulatory requirements for CO_2 emissions of heavy-duty transport vehicles. PO4 is not fully coherent with the emissions-based approach of other policies tackling emissions from road transport vehicles.
- PO5 shows the strongest impacts on uptake of clean vehicles in the EU. Building on the assumption that electric buses are the most cost-effective option and will be procured from 2020 onwards, this PO will not lead to the selection of clean, low- and zero-emission vehicles in the other market segments, where conventional vehicles are expected to remain cost-effective under the updated methodology. Prescribing to all public bodies this approach to vehicle procurement also calls into question efficiency principles.

- PO6 bridges PO3b and PO4b. It enables a policy approach to clean vehicle procurement at the EU level that is coherent with other relevant policies, addressing emissions from the transport sector. At the same time, it enables public procurement to foster market uptake of clean heavy-duty vehicles until regulatory measures for CO_2 emissions for trucks and buses have been adopted at the EU level.

D.2 Coherence of policy options

PO4 covers all market segments and types of procurement on the basis of one common approach. PO6 relies on different criteria for different vehicle types. PO3 does not cover all vehicles; PO2 covers vehicle purchases and leaves other forms of procurement practice to the discretion of the Member States. PO5 is not internally coherent, since it leads to the selection of vehicles of different powertrains depending on the vehicle type, leaves little predictability, and provides no real flexibility for different technology solutions in the heavy-duty vehicles sector.

All policy options except PO1 are in line with the overall EU policy objectives on reducing road transport emissions. PO2 and PO3 are consistent with the policy framework regulating CO_2 emissions from passenger cars and vans, as they use an emission-based threshold approach. PO4 not full consistent here, but is consistent with Directive 2014/94/EU on alternative fuels infrastructure. PO5 is in line with the objective of internalising external costs of transport as set out in the 2011 White Paper. PO6 combines elements of PO3 (for cars and vans) and PO4 (for buses and trucks) enabling a full consistency with emission-based policy approaches in the future.

In terms of coherence with other EU policy objectives (internal market, competitiveness of industry, impact on SMEs and on transport accessibility), PO3-PO6 are expected to contribute – to varying degrees – to better alignment of procurement procedures across all Member States. PO3, PO4 and PO6 allow for a certain level of differentiation among Member States in terms of the thresholds set, but ensure that common criteria are being used. PO5 sets a far-reaching binding harmonisation of procurement procedures and criteria. PO2 does not help to better align procurement procedures, whereas PO1 will remove any obligation for a common approach in the procurement of vehicles.

D.3 Proportionality and subsidiarity

None of the policy options go beyond what is necessary to achieve the objectives. All policy options – except PO5 – leave scope for public authorities to define a trajectory of low- and zero-emission mobility with measures to upgrade the remainder of the fleet with efficient conventionally-fuelled vehicles.

At the same time, the application of the mandate at the national level in PO3, PO4 and PO6 gives national, regional and local authorities the flexibility to adjust the implementation of the mandate to their particular circumstances. These policy options do not principally intervene in the competence of Member States to organise public transport. They also leave full technology choice within the overall framework of the EU approach to achieving low-emission mobility.

In terms of the legislative instrument, the analysis clearly outlines that an amended CVD provides the flexibility needed to combine directional steer with adjustment to domestic circumstances.

E. Preferred policy option

PO6 has been identified as the preferred option from an effectiveness and efficiency point of view. It includes a sizeable impact on the share of zero emission vehicles (227%-468%) and significant environmental benefits (€800-2,100 million cost savings associated with

CO_2 emissions reduction and €40-100 million associated with air pollutant reduction) relative to the baseline.[3] Procurement costs (€4,100 million) are only partly counterbalanced (45%) by operational costs savings over the time period of the assessment, but are not considered unbalanced, particularly not in an annualised cost perspective over the time horizon of the impact assessment.

[3] The ranges illustrate the sensitivity analysis performed with regard to the alternative baseline scenario.

SYNTHÈSE

A. But et portée de l'étude

La Directive des Véhicules Propres (CVD) a pour objectif de stimuler le marché des véhicules de transport routier propres et économes en énergie en demandant aux divers organismes publics de prendre en compte, lors de l'achat, les impacts environnementaux et énergétiques sur le cycle de vie complet du véhicule. Ses exigences obligent les pouvoirs adjudicateurs, les entités adjudicatrices et les opérateurs de transport de service public (Article 5(1)) à prendre en compte au minimum lors de l'achat de véhicules de transport routier (Article 5(2)): la consommation d'énergie et les émissions sur la durée du cycle de vie des dioxyde de carbone (CO_2), oxydes d'azote (NO_X), hydrocarbures non méthaniques (NMHC), et matières particulaires (PM).

L'évaluation ex-post de la CVD[4] a montré que la directive a eu un impact limité et devrait être revue. L'étude actuelle a été commandée pour soutenir l'étude d'impact de la proposition d'amendement de la Directive des Véhicules Propres.

B. Analyse de problème

L'étude présente les découvertes résultant d'une analyse approfondie des marchés publiques d'acquisition de véhicules propres au sein de l'UE. Elle montre que l'acquisition publique a eu un impact très limité sur l'adoption par le marché des véhicules propres. Au travers une large consultation des parties prenantes, l'étude a aussi corroboré les lacunes dans la conception de la CVD qui contribuent à cet impact marginal. Celles-ci se rapportent en particulier aux dispositions relatives au champ d'application et aux dispositions concernant l'achat des véhicules.

C. Options politiques analysées

Après l'objectif général pour l'amendement de la CVD, à savoir l'accélération des acquisitions de véhicules propres au sein de l'UE, les objectifs spécifiques clés sont qu'une CVD amendée doit : couvrir toutes les pratiques d'acquisition concernées, supporter par la fourniture de signaux clairs le marché à long terme, et s'assurer que les dispositions soient simplifiées et efficaces à l'usage.

Suite à une analyse plus large de mesures potentielles pour répondre aux problèmes identifiés, la liste des mesures appropriées restantes a été combinée pour former six options de politiques différentes, qui présentent un accroissement graduel du niveau d'ambition politique et de changements requis dans l'approche de la gestion de la CVD.

Option de politique 1 (OP1) – Abrogation de la CVD : Cette option suppose l'abrogation de la CVD. Les États membres seraient libres d'appliquer n'importe quelle approche lors de l'acquisition publique de véhicules (à moins d'être contraints par les objectifs d'achat horizontaux de l'UE ou la législation nationale concernée).

L'option de politique 2 (OP2) analyse un ensemble de changements graduels. Elle retient le champ d'application actuel de la CVD, met à jour les valeurs pour la méthodologie de monétisation et fournit une définition de «véhicule propre». Les États membres doivent impérativement faire un choix : soit ils choisissent d'utiliser les impacts environnementaux comme critères de sélection, y compris leur monétisation; soit ils adoptent la définition de la CDV et élaborent des plans nationaux sur cette base, y compris la fixation d'objectifs. Les plans nationaux doivent être élaborés dans l'année qui suit l'entrée en vigueur de la CVD et les objectifs doivent être fixés pour 2030.

[4] Ricardo & TEPR, 2015. L'évaluation ex-post de la Directive 2009/33/CE sur la promotion de véhicules de transport routier propres et économes en énergie, en ligne : https://ec.europa.eu/transport/sites/transport/files/facts-fundings/evaluations/doc/2015-09-21-ex-post-evaluation-directive-2009-33-ec.pdf.

L'option de politique 3 (OP3) accroit l'ambition par rapport à l'option 2 et élimine la méthodologie de monétisation. L'OP3 étend le champ d'application de la CVD pour inclure les véhicules loués, à bail ou non, ou avec option d'achat par les autorités publiques et les services de transport sélectionnés (bus, services de ramassage des ordures et services postaux/de courrier) procurés par les autorités publiques. Il se concentre sur l'introduction d'une définition de « véhicule propre » basée sur les émissions de CO_2 par le tuyau d'échappement du véhicule et, pour les véhicules utilitaires légers, leurs émissions de polluants atmosphériques en conditions de conduites réelles (RDE). Les deux sous-options reflètent différentes formes de rigueur des exigences à mettre en place en 2025 et 2030, suivant une approche de seuil combiné de gCO_2/km et de facteurs de conformité d'émissions de polluants atmosphérique RDE pour les émissions des tuyaux d'échappement des véhicules utilitaires légers. En se basant sur cette définition, des objectifs minimums pour l'acquisition sont fixés pour les véhicules utilitaires légers pour 2025 et 2030, différenciés par État membre. Les véhicules n'émettant aucune émission sont comptés préférentiellement vers l'accomplissement de l'objectif. Aucune exigence sur les émissions de tuyaux d'échappement n'est fixée concernant les véhicules utilitaires lourds (camions et bus). Ces exigences seraient introduites dans le futur une fois les prescriptions réglementaires seront adoptées au niveau de l'UE.

L'option de politique 4 (OP4) applique les mêmes changements structuraux à la gestion de la CVD que l'OP3, mais est basée sur une définition de « véhicule propre » comme « utilisant des carburants de remplacement (comprenant électricité, hydrogène et gaz naturel) ». Elle adopte la même approche de l'élargissement du champ d'application de la CVD pour inclure les véhicules loués, à bail ou non, ou avec option d'achat par les autorités publiques et les services de transport sélectionnés (bus, services de ramassage des ordures et services postaux/de courrier) procurés par les autorités publiques. De nouveau, deux sous-options alternatives considèrent les différents niveaux de rigueur pour les objectifs minimums pour l'acquisition, différenciés par État-membre et différenciés par véhicules utilitaires légers (voitures particulières, fourgonnettes) et utilitaires lourds (bus, camions).

L'option de politique 5 (OP5) est différente des options précédentes en ce qu'elle change considérablement l'approche principale de l'acquisition publique de véhicules propres au niveau de l'UE. La directive actuelle serait remplacée par une réglementation qui prescrit l'usage impératif de la méthodologie de monétisation amendée, avec effet direct sur tous les organismes publics au sein de l'UE. L'obligation liée au champ d'application et aux rapports sera le même que dans l'OP3 et l'OP4.

L'option de politique 6 (OP6) combine des éléments de l'OP3 et de l'OP4. En se basant sur la même extension du champ d'application de la CVD pour inclure les véhicules loués, à bail ou non, ou avec option d'achat par les autorités publiques et les services de transport sélectionnés (bus, services de ramassage des ordures et services postaux/de courrier) procurés par les autorités publiques, elle respecte les exigences de l'OP3b pour les véhicules utilitaires légers. Elle estime par ailleurs que la même approche basée sur l'émission combinée serait adoptée à travers un acte délégué conformément à la CVD, une fois que les mesures réglementaires pour les émissions de CO_2 des camions ont été adoptées au niveau de l'UE. Jusqu'à cette date, les exigences de l'OP4b pour les véhicules utilitaires lourds s'appliqueront.

D. Analyse des impacts

L'analyse des options de politique a suivi la méthodologie d'étude d'impact de la Commission et a évalué les impacts en termes d'effectivité, d'efficience, de cohérence avec les objectifs de la politique de l'UE, de proportionnalité et de subsidiarité.

L'analyse a utilisé un outil d'évaluation spécifique dont il avait été fait usage auparavant pour l'évaluation ex-post de la CVD, affiné pour les besoins de cette Étude de soutien d'évaluation d'impact.

Un scénario de base a été élaboré comme référence pour l'analyse des impacts dans le cadre des différentes options politiques. Le scenario de point de départ se base sur une mise à jour, dans la mesure du possible, du scenario de Référence UE 2016 élaboré avec le modèle PRIMES-TREMOVE par ICCS-E3MLab. Un point de départ alternatif a également été constitué, dans le cadre de l'analyse de sensibilité, en supposant une augmentation plus rapide de la proportion des bus propres. Ce point de départ alternatif se base sur les informations obtenues des principaux intervenants. L'échéance pour l'analyse des actions d'acquisition futures est 2020-2035, les impacts supplémentaires sur les véhicules acquis jusqu'en 2050 étant en cours d'analyse.

Un large éventail d'information a été utilisé dans cette étude. La principale source d'informations fut celle fournie par les partenaires publics et privés au travers d'une consultation publique ouverte et des activités de consultation ciblées ; ainsi que des informations collectées à travers différentes réunions publiques, un atelier d'évaluation d'impact géographique spécifique et des entretiens, ainsi qu'une recherche documentaire (décrite dans l'Annexe 2 de cette étude). En tout, les sources utilisées pour la rédaction de cette étude sont nombreuses, exhaustives et représentatives des différents groupes d'intervenants.

D.1 Efficacité et efficience des options de politique

L'analyse de l'efficacité et de l'efficience a eu besoin de prendre en considération le haut niveau d'incertitude de l'OP5 par rapport aux impacts de l'usage seul de la méthodologie de monétisation mise à jour, pour soutenir l'acquisition publique des véhicules de transport routier. Dans ce contexte, l'analyse a fait ressortir les constatations suivantes pour les différentes options de politique :

- OP1 : une abrogation de la CVD ne devrait seulement conduire qu'à certaines économies de frais administratifs très limitées, sans autres impacts. Une abrogation ne contribuerait pas à atteindre les objectifs généraux et spécifiques de l'initiative politique. Elle ne constituerait pas une approche plus cohérente et logique pour l'acquisition dans les États membres, ni n'aurait le potentiel d'influer sur le marché.
- L'OP2 devrait conduire à une augmentation plus conséquente de la proportion de véhicules propres jusqu'en 2035 et à des gains environnementaux plus importants, mais cela repose cependant sur des hypothèses d'utilisation de la méthodologie de monétisation, de même que des hypothèses sur la manière dont les États membres établiront des objectifs pour effectuer le suivi de la mise en place d'une définition commune des véhicules propres au niveau de l'UE. Comparée à l'OP3, l'OP4, et l'OP6, l'OP2 présente moins d'avantages pour moderniser l'acquisition publique de véhicules propres : elle ne stipule pas d'échéance claire pour étendre le champ d'application de la CVD et elle ne fournit aucune clarté sur le marché à long terme, car les signaux du marché dépendent de la volonté des États membres à agir.
- L'OP3 et l'OP4 (avec leurs options respectives plus ou moins exigeantes "a" et "b") répondent à tous les objectifs spécifiques de cette initiative politique : elles respectent toutes les pratiques d'acquisition concernées et elles réduisent considérablement l'incertitude du marché en introduisant une définition absolue des véhicules propres et des objectifs minimums pour l'acquisition. Elles simplifient également les dispositions par rapport à la Directive actuelle. Comparé à l'OP2 elles ont un impact positif plus important, en particulier lorsqu'on examine l'OP4b. Elles ont un effet indirect positif sur les achats de véhicules privés, en dépit de la difficulté à les mesurer, car elles assurent une utilisation plus logique et cohérente de l'acquisition publique pour accélérer la prise en charge des véhicules propres à travers l'UE. De plus, elles laissent un niveau de flexibilité considérable lors de la mise en œuvre, car les États membres peuvent décider comment définir les objectifs d'acquisition en prenant en compte des conditions locales spécifiques. En éliminant l'usage de la méthodologie de monétisation, ces options de politique

contribuent à la simplification de la Directive. Les deux options prévoient également une adoption par étapes d'objectifs plus exigeants pour permettre aux autorités d'exécuter les contrats existants et de faire les ajustements nécessaires en ce qui concerne l'infrastructure de soutien. Cependant, L'OP3 ne concerne pas les véhicules utilitaires lourds en raison du manque d'exigences réglementaires existant sur les émissions de CO_2 de véhicules de transport lourds. L'OP4 n'est pas totalement cohérente avec l'approche basée sur les émissions des autres politiques qui luttent contre les émissions des véhicules de transport routier.

- L'OP5 présente les impacts ayant le plus d'effets en ce qui concerne l'adoption de véhicules propres au sein de l'UE. En se basant sur l'hypothèse que les bus électriques constituent l'option la plus rentable et qu'ils seront achetés à partir de 2020 et au-delà, cette OP ne conduira pas à la sélection de véhicules propres à faible ou à zéro émission dans les autres segments du marché car les véhicules conventionnels devraient rester rentables si l'on utilise la méthodologie mise à jour. Prescrire à tous les organismes publics cette approche pour l'acquisition de véhicules remet également en question les principes d'efficience.
- L'OP6 rapproche l'OP3b et l'OP4b. Elle permet une approche de la politique relative à l'acquisition de véhicules propres au niveau de l'UE qui est cohérente avec les autres politiques qui adressent les émissions du secteur du transport. En même temps, elle permet aux achats publiques de favoriser l'adoption des véhicules propres sur le marché de véhicules utilitaires lourds jusqu'à ce que les mesures réglementaires concernant les émissions de CO_2 des camions et des bus aient été adoptées au niveau de l'UE.

D.2 Cohérence des options de politique

L'OP4 couvre tous les segments du marché et les types d'acquisition sur la base d'une approche commune. L'OP6 s'appuie sur des critères différents pour des types de véhicules différents. L'OP3 ne couvre pas tous les véhicules ; L'OP2 couvre les achats de véhicules et laisse les autres formes de pratique d'acquisition à la discrétion des États membres. L'OP5 n'est pas non plus cohérente sur le plan interne, puisqu'elle conduit à la sélection de véhicules avec différents modes de propulsion selon le type de véhicule, fournit peu de prévisibilité et aucune vraie flexibilité pour des solutions à technologie différente au sein du secteur des véhicules utilitaires lourds.

Toutes les options de politique, à l'exception de l'OP1, sont conformes avec les objectifs de politique généraux de l'UE sur la réduction des émissions du transport routier. L'OP2 et l'OP3 sont cohérentes avec le cadre de la politique régulant les émissions de CO_2 des voitures de tourisme et des fourgonnettes, car elles utilisent une approche de seuil basée sur les émissions. L'OP4 n'est pas totalement cohérente avec celui-ci, mais est cohérente avec la Directive 2014/94/UE sur l'infrastructure des carburants alternatifs. L'OP5 est conforme à l'objectif d'internalisation des frais externes de transport détaillés dans le White Paper 2011[5]. L'OP6 combine des éléments de l'OP3 (pour les voitures et fourgonnettes) et de l'OP4 (pour les bus et les camions) permettant une pleine cohésion avec les approches de politiques basées sur les émissions dans le futur.

En termes de cohérence avec d'autres objectifs politiques de l'UE (marché interne, compétitivité de l'industrie, impact sur les petites et moyennes entreprises et sur l'accessibilité au transport), OP3 et OP6 devraient contribuer – à des degrés divers – á améliorer l'alignement des procédures d'acquisition à travers tous les États membres. L'OP3, l'OP4 et l'OP6 permettent un certain niveau de différentiation parmi les États membres en termes de seuils fixés, mais s'assurent que des critères communs soient utilisés. L'OP5 fixe une harmonisation contraignante ambitieuse des procédures et critères d'acquisition. L'OP2 n'aide pas à améliorer l'alignement des procédures d'acquisition,

[5] https://ec.europa.eu/transport/themes/strategies/2011_white_paper_en

tandis que l'OP1 retire toute obligation d'approche commune dans l'acquisition de véhicules.

D.3 Proportionnalité et subsidiarité

Aucune des options de politique ne va au-delà de ce qui est nécessaire pour parvenir aux objectifs. Toutes les options de politique – sauf l'OP5 – laissent de la marge aux autorités publiques pour définir une trajectoire vers une mobilité à faible et zéro émission avec des mesures pour moderniser le reste du parc avec des véhicules à carburant conventionnel performants.

Dans le même temps, l'application d'un mandat au niveau national dans l'OP3, OP4 et l'OP6 offre aux autorités nationales, régionales and locales la flexibilité d'ajuster la mise en œuvre du mandat en fonction de leurs circonstances particulières. Ces options de politique n'interviennent pas dans la compétence de l'État membre d'organiser le transport public. Elles laissent aussi un choix complet de technologies dans le cadre général de l'approche de l'UE pour parvenir à la mobilité à faible émission.

En ce qui concerne l'instrument législatif, l'analyse souligne clairement qu'une CVD amendée fournit la flexibilité nécessaire pour combiner l'orientation directionnelle vers l'objectif de la CDV avec un ajustement aux circonstances intérieures.

E. Option de politique préférée

L'OP6 a été identifiée comme l'option préférée du point de vue de l'efficacité et de l'efficience. Elle inclut un impact conséquent sur la proportion de véhicules à zéro émission (227 %-468 %) et des bénéfices environnementaux importants (de €800 à €100millions d'économies sur les coûts associés avec la réduction des émissions de CO_2 et de €40 à €100 millions associés à la réduction des polluants atmosphériques) par rapport à la base de référence.[6] Les frais d'acquisition (€4100 millions) sont seulement contrebalancés en partie (45 %) par les économies de frais de fonctionnement sur la durée de la période d'évaluation, mais ne sont pas considérés comme mal équilibrés, surtout dans une perspective de frais annualisés à l'horizon prévisionnel de l'étude d'impact.

[6] Les fourchettes illustrent l'analyse de sensibilité réalisée concernant le scénario de base de référence alternatif.

ZUSAMMENFASSUNG

A. Zweck und Umfang der Studie

Die Richtlinie über die Förderung sauberer und energieeffizienter Straßenfahrzeuge (die Richtlinie) zielt darauf ab, den Markt für saubere und energieeffiziente Straßenfahrzeuge anzuregen, indem verschiedene öffentliche Stellen verpflichtet werden, beim Kauf von Straßenfahrzeugen die über die gesamte Lebensdauer anfallenden Energie- und Umweltauswirkungen zu berücksichtigen. Diese Anforderungen verlangen von öffentlichen Auftraggebern, anderen Auftraggebern und Betreibern, die mit gemeinwirtschaftlichen Verpflichtungen betraut sind (Artikel 5 (1)), beim Kauf von Straßenfahrzeugen zumindest die folgenden Faktoren zu berücksichtigen: Energieverbrauch, Kohlendioxid-Emissionen über die gesamte Lebensdauer (CO_2), sowie Emissionen von Stickstoffoxid (NO_X), Nichtmethan-Kohlenwasserstoffen (NMHCs), und Partikeln (Artikel 5 (2)).

Die Ex-Post-Evaluierung der Richtlinie[7] hat darauf hingewiesen, dass die Richtlinie eine begrenzte Wirkung gezeigt hat und überarbeitet werden sollte. Der Auftrag der vorliegenden Studie ist die Folgenabschätzung des Vorschlags zur Änderung der Richtlinie über die Förderung sauberer und energieeffizienter Straßenfahrzeuge, zu unterstützen.

B. Problemanalyse

Die Studie präsentiert Ergebnisse einer umfangreichen Analyse der öffentlichen Beschaffung von sauberen Fahrzeugen in der EU. Sie zeigt, dass die Vergabe öffentlicher Aufträge einen sehr begrenzten Einfluss auf die Marktakzeptanz von sauberen Fahrzeugen gehabt hat. Durch eine umfassende Konsultation mit den beteiligten Akteuren hat sie die Mängel bei der Gestaltung der Richtlinie, die zu diesen geringen Auswirkungen beitragen, weiter bestätigt. Diese betreffen insbesondere die Bestimmungen in Bezug auf den Geltungsbereich der Richtlinie sowie Bestimmungen zum Fahrzeugkauf.

C. Die analysierten Optionen

Dem allgemeinen Ziel der Änderung der Richtlinie folgend, d. h. die Beschleunigung der Anschaffung von sauberen Fahrzeugen in der EU, bestehen die wichtigsten konkreten Ziele darin, dass eine geänderte Richtlinie alle relevanten Praktiken der Beschaffung abdecken sollte, dass klare langfristige Signale für den Markt gestützt werden sollten und dass sie gewährleisten sollte, dass Bestimmungen vereinfacht werden und effektiver anzuwenden sind.

Nach einer umfassenden Überprüfung möglicher Maßnahmen zur Behandlung der festgestellten Probleme wurde die verbleibende Liste geeigneter Maßnahmen in sechs verschiedene Optionen unterteilt. Sie verstärken schrittweise die politischen Ambitionen und Änderungen des Governance-Ansatzes der Richtlinie.

Option 1 - Aufhebung der Richtlinie: Diese Option geht von der Aufhebung der Richtlinie aus. Mitgliedstaaten stünde es frei, jedweden Ansatz für die öffentliche Beschaffung von Fahrzeugen anzuwenden (es sei denn, dies wäre durch ein horizontales EU-Beschaffungswesen oder eine einschlägige nationale Gesetzgebung eingeschränkt).

Option 2 analysiert eine Reihe schrittweiser Änderungen. Sie behält den aktuellen Geltungsbereich der Richtlinie bei, aktualisiert die Werte der Monetarisierungsmethodik und definiert den Begriff des sauberen Fahrzeugs. Mitgliedstaaten müssen eine verbindliche Wahl treffen: entweder sie wählen als Kriterium für die Auftragsvergabe die Umweltauswirkungen, einschließlich ihrer Monetarisierung oder sie nehmen die Definition

[7] Ricardo & TEPR, 2015. Ex-post Ex-Post-Evaluierung der Richtlinie 2009/33/EC über die Förderung sauberer und energieeffizienter Straßenfahrzeuge, online: https://ec.europa.eu/transport/sites/transport/files/facts-fundings/evaluations/doc/2015-09-21-ex-post-evaluation-directive-2009-33-ec.pdf.

an und entwickeln auf deren Basis nationale Pläne mit Zielsetzungen. Diese nationalen Pläne sollten innerhalb eines Jahres nach dem Inkrafttreten der Richtlinie entwickelt und die Ziele für 2030 gesetzt werden.

Option 3 setzt im Vergleich zu Option 2 ein ehrgeizigeres Ziel und beseitigt die Monetarisierungsmethodik. Option 3 erweitert den Geltungsbereich der Richtlinie auf durch öffentliche Behörden geleaste, gemietete Fahrzeuge bzw. Mietkauffahrzeuge und ausgewählte Transportdienstleistungen (Bus, Abfallentsorgung und Post/Kurierdienste) die von öffentlichen Stellen beschafft werden. Sie konzentriert sich auf die Einführung einer Definition eines sauberen Fahrzeugs basierend auf den CO_2-Emissionen am Auspuff und, für leichte Nutzfahrzeuge, auf deren Luftschadstoffemissionen unter realen Fahrbedingungen. Zwei Unteroptionen reflektieren Anforderungen verschiedener Strenge, die für 2025 und 2030 gesetzt werden, welche einen Ansatz eines kombinierten Grenzwerts aus Konformitätsfaktoren für gCO_2/km und Luftschadstoffemissionen unter realen Fahrbedingungen für Auspuffemissionen von leichten Nutzfahrzeugen verfolgen. Aufbauend auf der Definition, werden, differenziert nach Mitgliedstaaten, Mindestziele für die Beschaffung leichter Nutzfahrzeuge für 2025 und 2030 festgelegt. Fahrzeuge, mit null Auspuffemissionen, zählen verstärkt für das Erreichen des Ziels. Für schwere Nutzfahrzeuge (LKW und Busse) werden keine Anforderungen in Bezug auf Auspuffemissionen gesetzt. Solche Anforderungen würden eingeführt, wenn in der Zukunft auf EU-Ebene entsprechende regulatorische Anforderungen angenommen wurden.

Option 4 wendet die gleichen strukturellen Veränderungen an wie Option 3 in Bezug auf die Governance der Richtline, basiert jedoch auf einer Definition eines sauberen Fahrzeugs, als eines, welches alternative Kraftstoffe (einschließlich Strom, Wasserstoff und Erdgas) benutzt. Sie nutzt den gleichen Ansatz für die Ausweitung des Geltungsbereichs der Richtlinie auf durch öffentliche Behörden geleaste, gemietete Fahrzeuge bzw. Mietkauffahrzeuge und ausgewählte Transportdienstleistungen (Bus, Abfallentsorgung und Post/Kurierdienste) die von öffentlichen Stellen beschafft werden.. Es werden erneut, differenziert nach Mitgliedstaaten, zwei alternative Untergruppen unterschiedlicher Strenge für Mindestziele in der Beschaffung berücksichtigt und es wird nach leichten Nutzfahrzeugen (PKW, Kleintransporter) und schweren Nutzfahrzeugen (Busse, LKW) unterschieden.

Option 5 unterscheidet sich von den vorhergehenden Optionen, weil sie den Haupt-Governance-Ansatz für das öffentliche Auftragswesen für saubere Fahrzeuge auf EU-Ebene wesentlich ändert. Die derzeitige Richtlinie würde durch eine Verordnung ersetzt werden, die die zwingende Anwendung der geänderten Monetarisierungsmethodik mit unmittelbarer Auswirkung für alle öffentlichen Stellen in der EU vorschreibt. Der Geltungsbereich und die Meldepflichten wären die gleichen wie in Option 3 und 4.

Option 6 kombiniert Elemente von Option 3 und 4. Auf der gleichen Ausweitung des Geltungsbereichs aufbauend, wonach die Richtlinie sich auch auf durch öffentliche Behörden geleaste, gemietete Fahrzeuge bzw. Mietkauffahrzeuge und ausgewählte Transportdienstleistungen (Bus, Abfallentsorgung und Post/Kurierdienste) die von öffentlichen Stellen beschafft werden. erstreckt, erfassen die Anforderungen von Option 3b auch leichte Nutzfahrzeuge. Sie geht zudem davon aus, dass der gleiche kombinierte Emissiones-basierte Ansatz durch einen delegierten Rechtsakt im Rahmen der Richtlinie angenommen würde, sobald die regulatorischen Maßnahmen in Bezug auf den CO_2-Ausstoß für LKW und Busse auf EU-Ebene angenommen worden sind. Bis zu diesem Zeitpunkt gelten für schwere Nutzfahrzeuge die Anforderungen von Option 4b.

D. Folgenabschätzung

Die Analyse der Optionen folgte der Methodik zur Folgenabschätzung der Kommission und untersuchte die Auswirkungen in Bezug auf Effektivität, Effizienz, Übereinstimmung mit den politischen Zielen der EU, Verhältnismäßigkeit und Subsidiarität.

Die Analyse nutzte eine besonderes Bewertungsinstrument, welches zuvor bei der Ex-Post-Evaluierung der Richtlinie zum Einsatz gekommen war. Es wurde für die Zwecke dieser Studie zur Unterstützung der Folgenabschätzung weiterentwickelt.

Für die Folgenabschätzung der verschiedenen Optionen wurde als Referenz ein Basis-Szenario entwickelt. Das Basis-Szenario baut soweit wie möglich auf einer Aktualisierung des Referenz-Szenarios der EU von 2016 auf, welches mit dem PRIMES-TREMOVE-Modell von ICCS-E3MLab entwickelt wurde. Im Rahmen der Sensitivitätsanalyse wurde zudem ein alternatives Basis-Szenario entwickelt, welches von einem schnelleren Anstieg des Anteils sauberer Busse ausgeht. Dieses alternative Basis-Szenario basiert auf Informationen von wichtigen Akteuren. Der zeitliche Rahmen für die Analyse zukünftiger Beschaffungstätigkeiten ist 2020-2035, wobei die weiteren Auswirkungen beschaffener Fahrzeuge bis 2050 analysiert wurden.

Für die Studie wurde eine große Anzahl von Belegen verwendet. Eine wesentliche Informationsquelle waren von öffentlichen und privaten Partnern im Rahmen einer öffentlichen Konsultation und gezielten Konsultationsaktivitäten bereitgestellte Informationen sowie Informationen, die im Zuge verschiedener öffentlicher Versammlungen, eines besonderen territorialen Workshops zur Folgenabschätzung und von Interviews und Schreibtischstudien (wie in Anhang 2 dieser Studie beschrieben) gesammelt wurden. Insgesamt gab es eine Vielzahl von erschöpfenden und repräsentativen Quellen der verschiedenen Interessengruppen, die für die Erstellung dieser Studie verwendet wurden.

D.1 Effektivität und Effizienz der Optionen

Für die Analyse der Effektivität und Effizienz musste die hohe Unsicherheit für Option 5, bezogen auf die Auswirkungen der ausschließlichen Verwendung einer aktualisierten Monetarisierungsmethodik einkalkuliert werden, um die öffentliche Beschaffung von Straßenfahrzeugen zu untermauern. Vor diesem Hintergrund führte die Analyse für die verschiedenen Optionen zu den folgenden Ergebnissen:

- Option 1: Es wird erwartet, dass die Aufhebung der Richtlinie nur zu einigen sehr begrenzten Kosteneinsparungen in der Verwaltung ohne weitere Auswirkungen führen wird. Eine Aufhebung würde nicht zum Erreichen der allgemeinen und spezifischen Ziele der politischen Initiative beitragen. Sie würde zu keinem kohärenteren und einheitlicheren Ansatz für die Beschaffung in den Mitgliedsstaaten führen, noch hätte sie Potential den Markt zu beeinflussen.
- Es wird erwartet, das Option 2 bis 2035 zu einem größeren Anteil an sauberen Fahrzeugen und zu besseren Umweltvorteilen führen wird, was jedoch auf der Annahme basiert, dass die Monetarisierungsmethodik angewendet wird und auf Annahmen zur Art und Weise, wie die Mitgliedstaaten Ziele setzen werden, um die Einigung auf eine gemeinsame Definition eines sauberen Fahrzeugs auf EU-Ebene zu verfolgen. Im Vergleich zu Optionen 3, 4 und 6 zeigt Option 2 einen geringeren Vorteil für die Modernisierung der öffentlichen Beschaffung von sauberen Fahrzeugen: sie legt keine klaren Rahmenbedingungen für die Ausweitung des Geltungsbereichs der Richtlinie vor und bietet keine wirkliche langfristige Marktsicherheit, da die Signale für den Markt von der Handlungsbereitschaft der Mitgliedstaaten abhängen.
- Optionen 3 und 4 (mit den jeweiligen mehr oder weniger fordernden Varianten „a" und „b") decken alle spezifischen politischen Ziele der Initiative ab: Sie berücksichtigen alle relevanten Beschaffungspraktiken und durch die Einführung einer absoluten Definition sauberer Fahrzeuge und Mindestbeschaffungszielen wird die Marktunsicherheit wesentlich reduziert. Im Vergleich zur derzeitigen Richtlinie werden auch die Bestimmungen vereinfacht. Relativ zu Option 2 zeigen sie beträchtlichere Auswirkungen, insbesondere Option 4b. Sie bieten eine Vorbildwirkung für den Kauf von Privatfahrzeugen, auch wenn dies schwer

gemessen werden kann, da sie eine einheitlichere und kohärentere Nutzung des öffentlichen Auftragswesen gewährleisten welches den Absatz für saubere Fahrzeuge in der EU beschleunigt. Darüber hinaus gestatten sie ein beträchtliches Ausmaß an Flexibilität bei der Umsetzung, da Mitgliedstaaten entscheiden können, wie sie die Beschaffungsziele unter Berücksichtigung der besonderen örtlichen Gegebenheiten umsetzen möchten. Durch die Aufhebung der Monetarisierungsmethodik tragen diese Optionen zur Vereinfachung der Richtlinie bei. Beide Optionen sehen ebenfalls eine stufenweise Annahme von anspruchsvolleren Zielen vor, um Behörden die Nutzung bestehender Verträge und die Vornahme von Anpassungen in Bezug auf die notwendige unterstützende Infrastruktur zu ermöglichen. Allerdings befasst sich Option 3 mangels bestehender Vorschriften für CO_2-Emissionen von schweren Nutzfahrzeugen nicht mit schweren Nutzfahrzeugen. Option 4 ist in Bezug auf den emissionsbasierten Ansatz anderer Richtlinen für die Reduzierung von Emissionen von Straßenfahrzeugen nicht kohärent.

- Option 5 zeigt die stärksten Auswirkungen in Bezug auf die Abnahme von sauberen Fahrzeugen in der EU. Aufbauend auf der Annahme, dass Elektrobusse die kostengünstigste Option sind und ab 2020 beschafft werden, wird diese Option nicht zur Wahl von sauberen, emissionsarmen und emissionsfreien Fahrzeugen in den anderen Marktsegmenten führen, wo erwartet wird, dass konventionelle Fahrzeuge unter der aktualisierten Methodik weiterhin kosteneffizient bleiben. Allen öffentlichen Stellen diesen Ansatz der Fahrzeugbeschaffung vorzuschreiben, kann auch die Prinzipien der Effizienz in Frage stellen.
- Option 6 schlägt die Brücke zwischen Option 3b und Option 4b. Sie ermöglicht einen politischen Ansatz für die Beschaffung von sauberen Fahrzeugen auf EU-Ebene, der mit anderen relevanten Richtlinen , die sich mit den Emissionen im Verkehrsbereich befassen, übereinstimmt. Gleichzeitig ermöglicht sie dem öffentlichen Beschaffungswesen die Marktakzeptanz sauberer schwerer Nutzfahrzeuge zu fördern, bis auf EU-Ebene regulatorische Maßnahmen für CO_2-Emissionen für Lkw und Busse verabschiedet worden sind.

D.2 Kohärenz der Optionen

Option 4 erstreckt sich auf alle Marktsegmente und Arten der Beschaffung basierend auf einem gemeinsamen Ansatz. Option 6 baut auf verschiedene Kriterien für verschiedene Fahrzeugtypen. Option 3 deckt nicht alle Fahrzeuge ab; Option 2 gilt für Fahrzeugkäufe und überlässt andere Formen der Beschaffungspraxis dem Ermessen der Mitgliedstaaten. Option 5 ist nicht kohärent, da es je nach Fahrzeugtyp zur Auswahl von Fahrzeugen mit verschiedenen Antriebssystemen führt, wenig Raum für Vorhersehbarkeit lässt und im Bereich der schweren Nutzfahrzeuge keine wirkliche Flexibilität für verschiedene Technologien bietet.

Mit Ausnahme der Option 1 sind alle Optionen im Einklang mit den allgemeinen politischen Zielen der EU zur Verringerung der Emissionen im Straßenverkehr. Optionen 2 und 3 entsprechen den politischen Rahmenbedingungen, welche die CO_2-Emissionen von PKW und Kleintransportern regeln, da sie einen Ansatz eines emissionsbasierten Grenzwerts anwenden. Option 4 ist hier nicht vollständig konsequent, stimmt jedoch mit Richtlinie 2014/94/EU über den Aufbau der Infrastruktur für alternative Kraftstoffe überein. Option 5 entspricht dem Ziel des 2011 White Paper[8] zur Internalisierung externer Verkehrskosten. Option 6 kombiniert Elemente von Option 3 (für PKW und Kleintransporter) und Option 4 (für Busse und LKW) und ermöglicht eine vollständige Übereinstimmung mit emissionsbasierten Politikansätzen in der Zukunft.

[8] https://ec.europa.eu/transport/themes/strategies/2011_white_paper_en

In Bezug auf die Übereinstimmung mit anderen Zielen der EU (Binnenmarkt, Wettbewerbsfähigkeit der Industrie, Auswirkungen auf kleine und mittelständische Unternehmen und Verkehrszugänglichkeit) wird erwartet, dass Optionen 3-6 - in unterschiedlichem Maße - zu einer besseren Angleichung von Beschaffungspraktiken in allen Mitgliedstaaten beitragen werden. Optionen 3, 4 und 6 gestatten einen gewissen Differenzierungsgrad zwischen Mitgliedstaaten in Bezug auf die eingeführten Grenzwerte, gewährleisten jedoch die Verwendung von gemeinsamen Kriterien. Option 5 führt eine weitreichende, verbindliche Vereinheitlichung von Beschaffungsmethoden und -kriterien ein. Option 2 hilft nicht bei der stärkeren Vereinheitlichung von Beschaffungspraktiken, wohingegen Option 1 jedwede Verpflichtung für einen gemeinsamen Ansatz bei der Beschaffung von Fahrzeugen abschafft.

D.3 Verhältnismäßigkeit und Subsidiarität

Keine der Optionen geht über das zur Erreichung der Ziele Erforderliche hinaus. Alle Optionen - mit Ausnahme von Option 5 - geben den öffentlichen Stellen Raum Niedrig- und Null-Emissions-Mobilität durch Maßnahmen zur Aufrüstung der verbleibenden Flotte durch effiziente konventionell betriebene Fahrzeuge zu definieren.

Gleichzeitig gibt die Anwendung des Mandats auf nationaler Ebene in Optionen 3, 4 und 6 nationalen, regionalen und lokalen Behörden die Flexibilität, die Umsetzung des Mandats ihren besonderen Umständen anzupassen. Diese Optionen greifen im Prinzip nicht in die Kompetenz der Mitgliedstaaten, den öffentlichen Verkehr zu regeln, ein. Sie gewähren auch innerhalb der allgemeinen Rahmenbedinungen des EU-Ansatzes zur Erreichung einer emissionsarmen Mobilität die freie Wahl in Bezug auf die Technologie.

Hinsichtlich des Rechtsinstruments macht die Analyse deutlich, dass eine überarbeitete Richtlinie die notwendige Flexibilität bietet um Richtungssteuerung und Anpassung an innerstaatlichen Umstände zu kombinieren.

E. Bevorzugte Option

Option 6 wurde in Bezug auf Effektivität und Effizienz als die bevorzugte Option identifiziert. Sie umfasst im Vergleich zum Basis-Szenario erhebliche Auswirkungen auf den Anteil emissionsfreier Fahrzeuge (227 % - 468 %) und wesentliche Umweltvorteile (Kosteneinsparungen verbunden mit der Verringerung der CO_2-Emissionen in Höhe von 800 - 2.100 Millionen € und 40 - 100 Millionen € verbunden mit der Verringerung der Luftschadstoffe).[9] Beschaffungskosten (4.100 Millionen €) werden im Bewertungszeitraum nur teilweise (45 %) durch Einsparungen bei den Betriebskosten ausgeglichen, werden jedoch nicht als unausgewogen angesehen, insbesondere nicht in einer annualisierten Kostenperspektive über den Zeitraum der Folgenabschätzung.

[9]Das Spektrum veranschaulicht die Sensitivitätsanalyse, die im Hinblick auf das alternative Basisszenario durchgeführt wurde.

1 PROBLEM DEFINITION

1.1 Purpose of the study

This study aims to provide support to the Impact Assessment for the review of Directive 2009/33 on the promotion of clean and energy-efficient road transport vehicles (commonly referred to as the ”Clean Vehicles Directive” (CVD)).

The Ex-Post Evaluation of the CVD (Ricardo & TEPR, 2015) pointed out that the CVD has had limited impact. It is not effective or efficient. The present study sets out to further analyse the problem and to explore different options for amending the CVD in order to address the identified problems.

1.2 Policy Context

The promotion of sustainable transport is a key element of the EU’s common transport policy. The Commission's European Strategy for Low-Emission Mobility, published in July 2016, indicates that greenhouse gas emissions (GHGs) from transport will need to be at least 60% lower by 2050 compared to 1990. The transport sector should also be firmly on the path towards zero-emission, concerning both GHG and pollutant emissions.

The Commission's Communication "Europe on the Move: an agenda for a socially fair transition towards clean, competitive and connected mobility for all" emphasises that increased production and uptake of vehicles, infrastructure and system services for low-emission mobility in the Union offers multiple benefits to Europe's citizens and industries.

The CVD aims to stimulate the market for clean and energy-efficient vehicles by requiring various public bodies to take account of lifetime environmental and energy impacts when purchasing road transport vehicles. These requirements oblige contracting authorities, contracting entities and transport operators charged with public service obligations (Article 5(1)) to take into account at least: energy consumption and lifetime emissions of carbon dioxide (CO_2), nitrogen oxides (NO_X), non-methane hydrocarbons (NMHCs), particulate matter (PM) and energy consumption in purchases of road transport vehicles (Article 5(2)).

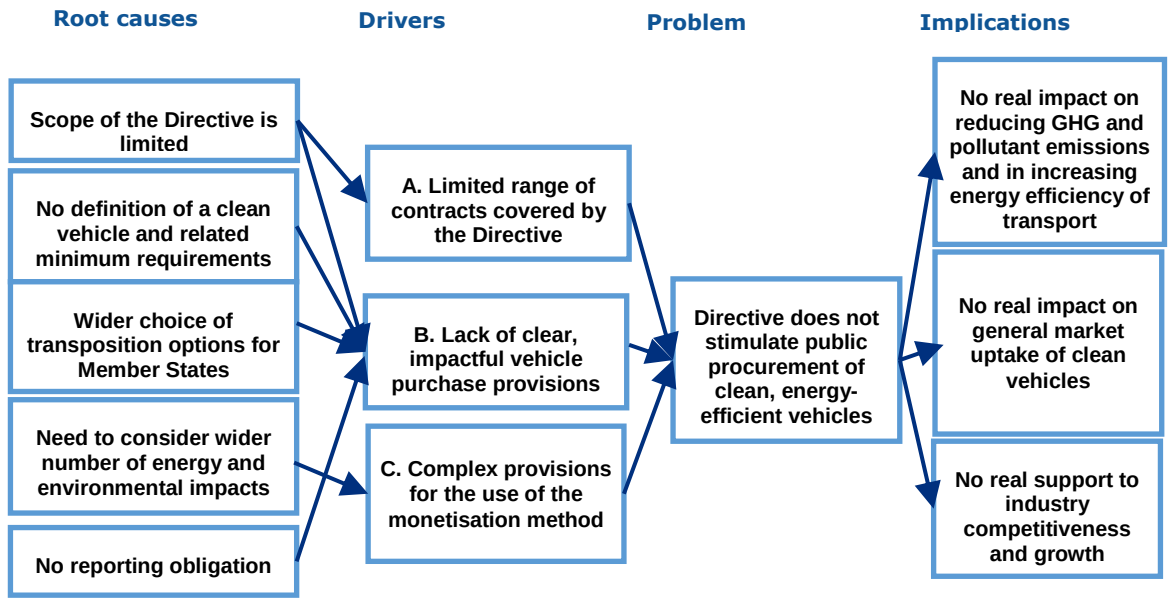
The CVD works alongside several other pieces of EU legislation that contribute to improving the environmental performance of transport. These include the EU’s 2030 policy framework for climate and energy and the policies in place to support air quality. The CVD is a demand-side measure that focuses on increasing the market for clean vehicles. It complements various supply-side measures, including:

- those that require manufacturers to improve the fuel efficiency/CO_2 emissions of new cars and vans, and
- those that regulate emissions of vehicles as part of the overall type approval process, and therefore including the real driving emission (RDE) tests for light duty vehicles.

1.3 Problem definition

This section presents the problem definition, identifying the drivers and the underlying root causes, as shown in Figure 1-1.

Figure 1-1: Problem Tree



The original intention of the CVD was to use public procurement as a catalyst for the adoption of clean vehicles. The ex-post evaluation study showed that stakeholders agreed that public procurement can play such a role; however, in practice the CVD has resulted in little change in procurement practices (Ricardo & TEPR, 2015).

The results from the public consultation for this Impact Assessment echo the results from the ex-post evaluation. 87 of the 130 respondents (67%) felt that it is very important that public procurement is effectively used to stimulate the market for clean vehicles in the EU. A further 25 (19% of the total 130 respondents) felt that it is important.

Despite a general agreement over the relevance of the CVD, the ex-post evaluation concluded that it does not stimulate public procurement of clean, energy-efficient vehicles in its current form. The outcome of this is that public procurement in the Union continues to have very little effect on market uptake of clean vehicles and therefore also a very limited impact in reducing GHGs and air pollutant emissions from publicly procured vehicles. Since the CVD appears to be ineffective in providing market pull, it is clearly not meeting its objective of promoting industry competitiveness and growth through the promotion of clean vehicles.

The estimated impacts of the CVD were a reduction in CO_2 emissions compared to the baseline of *up to* 5.5% for passenger cars and 2.3% for vans. However, these calculations represented a best-case scenario, which, most probably, does not take full account of the impact of other relevant policies in place (such as the passenger car CO_2 Regulation) (Ricardo & TEPR, 2015). Moreover, the reductions apply only to the vehicles that were affected by the CVD, so the overall market impacts are minor. Indeed, except for buses, the total number of procured vehicles that fall within the scope of the CVD represents only a small fraction of the total number of new vehicles registered (<1% or about 60k of 15 million vehicles procured in the EU fall within the current scope of the CVD, Table 1-2).

There are a range of underlying root causes and drivers to the identified problems. The underlying drivers are:

A. The limited range of contracts covered by the CVD
B. The lack of clear, impactful vehicle purchase provisions
C. Complex provisions for the use of the monetisation method

The problem drivers and underlying root causes are presented in the following sections.

1.3.1 A. The limited range of contracts covered by the CVD

Driver A is that a limited range of contracts are covered by the CVD. The root causes of this are a set of factors that limit the scope of the CVD and mean that many publicly procured vehicles are not covered by its provisions. The three factors that limit the scope are defined in Article 3, namely:

The presence of contract value thresholds. There is a threshold for service and supply contracts[10], below which the CVD does not need to be applied. The analysis of available data from the EU's public tender platform (Tenders Electronic Daily – TED)[11] and the ex-post evaluation suggest that, 64-84% of publicly purchased vehicles currently fall within the scope of contract values defined in the CVD, depending on vehicle type (

- **Table 1-1**).
- The CVD covers only vehicles that are purchased and not vehicles that are rented or leased, nor the provision of transport services, all of which are alternative means of acquiring the use of a vehicle. According to available data for the period 2009-2015, an estimated 26% of the vehicles publicly procured are leased (20%) or contracted as services (6%) – see
-
- Table **1-1**. Furthermore, some feedback from stakeholders, for example, two EU-level organisations interviewed during this study, indicates that in some countries and cities the proportion of leased vehicles is increasing and the proportion of purchased vehicles is decreasing. Thus, if this trend continues the impact of CVD could reduce even further in the future.

The CVD covers only 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 goods (e.g. waste collection).

- **Table 1-1** provides estimated numbers of vehicles which are used for public services.

[10] When setting out its scope, Article 3 of the CVD refers to Directive 2014/25/EU, which relates to the public procurement of *inter alia* bus and postal services, and Directive 2014/25/EU that covers other public procurement. Hence, the relevant thresholds within these two Directives apply for the purpose of the CVD. Article 15(a) of Directive 2014/25 sets a threshold of €414,000 for supply and services contracts relating to bus and postal services, while Article 4 of Directive 2014/24 (amended by Commission Delegated Regulation (EU) 2015/2170) applies thresholds of €135,000 to contracts concerning products listed in its Annex III, which includes vehicles, and a threshold of €209,000 to contracts concerning products not listed in this annex.

[11] TED is a database that publishes public procurement notices from across the EU. 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. Typically, these are procurements that exceed the corresponding thresholds (see footnote 10).

The table below illustrates the number of vehicles which are currently included within the scope of the CVD in comparison to the total number of vehicles procured by the public sector.

Table 1-1: Number of vehicles publicly procured by vehicle type and type of contract (Average for 2009-2015 period)

Type of vehicle	Type of contract	Number of vehicles procured (Average 2009-2015)	% share
Passenger Car	Lease	16,320	23%
	Purchase	53,840	76%
	Services	770	1%
	Total	70,920	**100%**
Van	Lease	1,050	11%
	Purchase	7,350	77%
	Services	1,090	12%
	Total	9,490	100%
Truck	Lease	3,140	**25%**
	Purchase	9,200	72%
	Services	450	4%
	Total	12,790	**100%**
Bus	Lease	840	7%
	Purchase	8,310	65%
	Services	3,600	28%
	Total	12,740	**100%**
Total	Lease	21,350	20%
	Purchase	78,700	74%
	Services	5,910	6%
	Total	105,940	**100%**

Sources: Ricardo analysis based on TED database contract award notices published between 2009 and 2015

1.3.2 B. The lack of clear, impactful vehicle purchase provisions

Driver B is the lack of clear vehicle purchase provisions. The main root causes of this driver are 1) the scope of the CVD is limited, 2) the CVD does not provide a definition of a clean vehicle, 3) there are a wide choice of transposition options for MS, and 4) there is no reporting obligation.

The first root cause that the **scope of the CVD is limited**, means that many publicly procured vehicles, including vehicles leased or hire-purchased or vehicles used under public service contracts other than for public passenger transport, are excluded from the requirements of the CVD. Thus, the CVD has no effect on the choice of such vehicles.

The **absence of a clear definition of a clean vehicle** within the CVD is the second root cause and has an impact on the transposition options: namely setting technical specifications or using environmental impacts as award criteria. In the most common cases (where the monetisation option is not used), the CVD does not alter the choice of vehicles towards clean vehicles. This is because the requirements as set out specify that public bodies following Art 5 (3) CVD can be meet the requirements by procuring almost any vehicle on the market, therefore requiring little change to existing practices and resulting in the CVD having little effect on the purchase of clean vehicles. At the same time, the absence of a common and clear definition means that authorities can adopt their own definitions, contributing to a fragmentation of procurement rules. A large majority of respondents (84%; 109 of 130) to the public consultation agreed with this assessment (75 of the 130 strongly agreed; 34 somewhat agreed). This was similar for each of the

stakeholder groups except for contracting authorities (100%, 6 respondents) and 'other' (96%, 23 respondents), who expressed a higher level of agreement.

The **range of options available for transposing the CVD** is another root cause of the problem. There are several options to transpose the CVD, namely by setting technical specifications, by establishing relevant award criteria, by monetising the operational costs as an award criterion or any combination of the above. In the last instance, the choice is left to the actual procurers on a case-by-case basis. Since most Member States (25 out of 28)[12] have chosen to allow for all three options when transposing the CVD to national legislation, the CVD has not reduced the procurement practice diversity that existed before the CVD came into play. A majority of respondents to the public consultation agreed that this represents an important problem (29% (38 out of 130) strongly agreed, 30% (39 out of 130) somewhat agreed).

A final root cause is the **absence of reporting obligations.** Reporting obligations would allow the implementation of the CVD to be monitored on a continuous basis by Member States. They would also provide the basis for possible interventions to improve the implementation and address shortcomings that contribute to the fragmentation of procurement rules and lack of clear market signals. The majority of respondents to the public consultation indicated that it was important to require regular reporting by Member States on minimum procurement targets (30% (39 out of 130) felt it very important and 29% (38 out of 130) important). However, opinions vary greatly depending on stakeholder type: 52% (14 out of 27 respondents) from NGOs strongly agreed that member states should undertake regular reporting on minimum procurement targets, followed by 47% (7 out of 15 respondents) of Individuals, 38% (9 out of 24 respondents) from 'other', 21% (7 out of 33 respondents) of companies, and 12% (2 out of 17 respondents) from public authorities. No contracting authorities strongly agreed or agreed.

1.3.3 C. Complex provisions for the use of the monetisation methodology

The fourth root cause is the need to consider a greater number of energy and environmental impacts. The monetisation method is rarely used (according to the survey of authorities conducted for the ex-post evaluation, only 13% of procurers had used the monetisation methodology for their last procurement contract), which means that there has been a minimal contribution to the internalisation of external costs in the purchase decision. Regarding the perceived complexity of the monetisation methodology, as part of the public consultation, 62% (81 of the 130 respondents) felt it was either very important or important for the monetisation methodology to be simplified. There were also concerns about the suitability of the methodology, which gives greater weight to energy efficiency compared to environmental impacts and hence confers higher scores to conventionally-powered, particularly diesel, vehicles.

Regarding a requirement to use the monetisation methodology, the results of the public consultation indicated some support, if the methodology was to be retained. Overall, there was support for the requirement to follow the methodology for calculating operational life-time costs when using energy and environmental impacts as award criteria, with 41% (53 out of 130) strongly agreeing.

1.3.4 Summary

Each of the above root causes and resulting drivers leads to the main problem that the CVD has little impact on the public procurement of clean vehicles. The

[12] Only three Member States have restricted the options: The Estonian legislation only allows for the use of technical standard, the Slovenian legislation only allows for the use of the monetisation methodology and the Czech legislation allows for setting technical specifications or to use award criteria.

resulting outcome is the very limited overall impact on the uptake of clean vehicles, reduction of and pollutant emissions from road transport vehicles. This is illustrated in Table 1-2**Error! Reference source not found.** which shows the small number of clean vehicles which are purchased by the public sector. The resulting outcome is the very limited overall impact on the uptake of clean vehicles, reduction of GHGs and pollutant emissions from road transport vehicles.

Table 1-2: Comparison of total annual new vehicle registrations, estimates of the total number of publicly procured vehicles from the CVD ex-post evaluation and the new estimate of public vehicle purchases falling under the CVD

Vehicle / service	EU total new registrations [1]	Estimated total number of vehicles purchased by the public sector [2]	Total vehicles procured (purchases/leases/services) reported in TED [3]	Current CVD scope: Vehicles purchased by the public sector [3]	Proportion of vehicles purchased by the public sector that are clean vehicles[13] [4]
Passenger cars	13.7 million	405k vehicles 3.4% of EU new car registrations	70.9k vehicles 0.5% of EU new car registrations	53.8k vehicles 13.3% of public purchases 0.4% of EU new car registrations	2680 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	9.5k vehicles 0.6% 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	12.7k vehicles 10.6% of EU new rigid truck registrations	9.2k vehicles 76.7% of public purchases 7.7% of EU new rigid truck registrations	6 vehicles 0.1% of public purchases 0.005% of total registrations
Buses	29k	18k vehicles 75% of EU new bus registrations	12.7k vehicles 43.1% of EU new bus registrations	8.3k vehicles 46.1% of public purchases 28.6% of EU new bus registrations	133 vehicles 1.7% of public purchases 0.45% of total registrations[14]

Sources: [1]: Eurostat; [2] Ex-post evaluation study (Ricardo & TEPR, 2015)*; [3] Ricardo Energy & Environment analysis based on TED database contract award notices published between 2009 and 2015[15]; [4]: Analysis of TED data and EU Reference scenario*

[13] Defines a clean vehicle as one that uses alternative fuels, as defined in Article 2(1) of Directive 2014/94

[14] Excludes contracts that fall below the procurement reporting threshold– actual clean vehicle purchasing figures may be higher but unreported.

[15] TED database procurement figures do not include contracts below the procurement reporting threshold which may skew figures.

2 POLICY OBJECTIVES

The **general objective** of this initiative is to accelerate the public procurement of clean (i.e. low- and zero-emission) vehicles in the Union and thus to support the modernisation of the European mobility and transport sector.

This should help stimulate the market uptake of these vehicles, particularly in the heavy-duty transport sector. It should further improve the contribution from the transport sector to the reduction of CO_2 and air pollutant emissions and contribute to competitiveness and growth. 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** for the revision of Directive 2009/33/EC are as follows:

1. Ensure that the Directive covers all relevant procurement practices
2. Ensure that the Directive supports clear, long-term market signals
3. Ensure that the Directive provisions are simplified and effective to use.

3 POLICY MEASURES

The list of policy measures considered has evolved based on those indicated in the terms of reference of the study and other suggestions from:

- The ex-post evaluation
- Input from public and private partners through the consultation process
- Discussions with the Commission.

An initial list of policy measures was developed that was then screened in terms of feasibility, proportionality and in response to stakeholder feedback. This led to a final list of policy measures which have been linked into policy options ensuring that all options include measures addressing the root cause, drivers and issues identified in the problem definition presented in Section A.

These sections present the key issues considered in the selection of policy measures and the screening process followed. Further details are provided in Annex 4.

3.1 Initial list of policy measures considered

An initial list of policy measures was considered, based on the findings of the evaluation report. These have been formulated to address the root causes and drivers identified in the problem tree as follows:

- Expanding the scope of the CVD;
- Introduction of an absolute definition of clean vehicles;
- Revision of the monetisation methodology;
- Combination of both measures with a mandatory choice for Member States;
- Repeal of the CVD.

The initial list has subsequently been developed based on further analysis and suggestions from stakeholders.

The first set of policy measures aim to address the first root cause that was identified in the problem tree, i.e. that the scope of the CVD is limited. Options for ***expanding the scope of the CVD*** focus on increasing the number of procurement decisions that involve transport vehicles, services or other contracts to which the CVD might apply. Expanding the scope of the CVD would therefore ensure that it applies to a wider range of procurement options. Options for doing this are set out below (see Annex 4 for further details):

a) Remove or lower the procurement threshold, thus ensuring that all vehicles purchased by public authorities are covered by the CVD
b) Extend the scope of the CVD to vehicles rented, leased and hire-purchased by public authorities[16]
c) Extend the scope of the CVD to selected transport services, such as bus and waste collection services, procured by public authorities[17]
d) Extend the scope of the CVD to all contracts that have a major transport element. These contracts are not for the procurement of transport vehicles, or even of transport services, but for contracts that have a separate activity as their main purpose, but which involve a significant transport element. An example of such a contract might be significant construction contracts.

[16] Note that in the context of the public procurement Directives (Directives 2014/24 and 2014/25) a supply contract refers to contracts involving the purchase, lease, rental or hire-purchase of products.

[17] This option has been reworded since that initially considered, as the former was not clear to some stakeholders.

Potential policy measures to address the lack of clear purchase provisions focused on ***including a definition of a clean vehicle*** in the CVD. Reflecting the key environmental impacts of vehicles, including emissions of greenhouse gas emissions and air pollutants, different criteria for defining a clean vehicle could include the following:

a) **Tailpipe** CO_2 emissions below a specified threshold
b) **Lifecycle** GHG emissions below a specified threshold
c) **Real world air pollutant emissions** below a specified threshold;
d) Meeting **broader environmental criteria**, such as those defined in the EU Green Public Procurement (GPP) criteria for transport (up for revision)
e) Using an **alternative fuel**, as defined by Article 2(1) of the Alternative Fuels Infrastructure Directive[18]
f) **Zero tailpipe emissions**.

In most cases, a decision would have to be made as to the appropriate threshold to apply to define a clean vehicle. Another consideration is whether it would be appropriate to have a two-tiered definition; this would mean two thresholds are set and vehicles that meet the more stringent threshold would count more for the purpose of compliance with the minimum requirement than vehicles that only meet the less stringent threshold. Additionally, simply defining a clean vehicle would not be sufficient: it needs to be decided how the definition would be applied in practice, particularly in the context of defining a minimum requirement.

Options considered regarding how a ***minimum requirement might be applied in practice*** include:

a) Define a clean vehicle with a **relatively low threshold** and then **require** this to be applied
b) Require public authorities to ensure that at least a specified percentage of vehicles procured **under each contract** are clean vehicles
c) Require public authorities to ensure that at least a specified percentage of vehicles procured **over a fixed time period** are clean vehicles
d) Set a **target for a future year** to indicate the specified percentage of clean vehicles that should be procured in that year
e) Set a **minimum requirement per Member State**, but leave it to Member States how to deliver this, or
f) **Require public authorities** to use the definition of a clean vehicle when procuring vehicles, but do not state how.

The threshold and level of the minimum requirement are linked. Consequently, for those options that set a threshold, it might be possible to vary this along with the level of the mandate in order to provide further options.

In terms of applying the minimum requirement, there are several other elements that need to be considered:

- Whether the same minimum requirement should be applied in all Member States, or
- Whether the minimum requirement should be differentiated between Member States. In this instance, the basis of the differentiation and how the differentiation should work in practice also need to be considered.

[18] Directive 2014/94, which defines the following as alternative fuels: electricity, hydrogen, biofuels (as defined in Directive 2009/28), synthetic and paraffinic fuels, natural gas in compressed and liquefied forms and including biomethane, and LPG.

The second set of policy measures aim to address issues identified with the use of the **monetisation methodology** to determine 'operational lifetime costs' as an award criterion. The ex-post evaluation of the CVD identified that the methodology was perceived to be overly complex in its current form and that it had a high emphasis on fuel consumption, reducing the incentives to purchase low-emission vehicles.

Options for ***revising the monetisation methodology*** include:

a) Simplifying the current methodology
b) Putting greater emphasis on reducing emissions of CO_2
c) Putting more emphasis on reducing emissions of air pollutants
d) Enlarge the scope of environmental impacts covered (e.g. noise)
e) Create more effective mechanisms for updates of the methodology.

In addition, the mandatory use of the methodology when using environmental impacts as award criteria should be considered. Further details on the calculations included in the monetisation methodology are presented in Annex 8.

Another root cause is the wide range of transposition options that the CVD currently allows Member States. In order to address this, several options for putting into ***practice the changes to the implementation mechanisms*** of the CVD can be considered. Currently, there are two options with respect to the implementation mechanisms, i.e. setting technical specifications relating to the energy and environmental performance or including energy and environmental concerns in the purchase decision through either award criteria or monetisation. Options for changing the implementation mechanisms include:

a) Keep the existing implementation mechanisms (Article 5(3)(a) and (b)), but improve the monetisation methodology
b) Remove the possibility to include energy and environmental considerations as a technical specification (Article 5(3)(a)), and improve the monetisation methodology
c) Replace the current technical specification mechanism (Article 5(3)(a)) with a mandate requiring authorities to use the specified definition of a clean vehicle and include a minimum target, but also retain an amended monetisation methodology
d) Introduce a mandate requiring authorities to use the specified definition of a clean vehicle with a related minimum target, and remove all other implementation mechanisms including the monetisation methodology
e) Make the application of an improved monetisation methodology mandatory, but do not include a clean vehicle definition or an associated target
f) Include an improved monetisation methodology and a definition of a clean vehicle, but leave the details of the implementation to Member States
g) Require the application of an improved monetisation methodology or require authorities to use the specified definition of a clean vehicle. In this case, which option to apply could be left to:
    i. Member States
    ii. Contracting authorities, contracting entities and operators proving public services under the realm of the CVD.

Most of the options listed above have been included in the public consultation and have been covered in the exploratory interviews.

An additional option to consider is the option to **repeal the CVD**. Repealing the CVD would mean the CVD would not apply to any vehicle procured by authorities for the period under examination. Any requirements set at national level would not be a result of EU legislation. Although this option was not strongly supported by the ex-post evaluation or the responses

to the Public Consultation, it has been considered to provide an understanding of the consequences of a complete repeal of the CVD.

3.2 Screening the options

The long-list of measures was screened to identify a short-list.

3.2.1 Expanding the scope of the CVD

The measure to remove the current minimum procurement threshold was rejected on the basis that these have been defined with reference to the thresholds set in the overarching public procurement Directives 2014/24 and 2014/15. The thresholds in these Directives are aligned with the thresholds set out in the WTO's Agreement on Government Procurement (GPA) and are set to avoid the unnecessary development of a multitude of different thresholds[19]. A proliferation of different thresholds would increase the administrative burden on potential suppliers, as would applying WTO and EU public procurement requirements to the smallest contracts. The responses to the public consultation showed some support (44% or 57 of the 130 respondents felt it very relevant) for removing the current procurement threshold. Support for removing the threshold was higher amongst individuals (65%, 11 out of 17 respondents) and non-government organisations (67%, 18 out of 27 respondents), with lowest support coming from contracting authorities (17%, 1 out of 6 respondents) and public authorities (18%, 3 out of 17 respondents). Those respondents, such as those representing operators and cities, opposing the full removal of the threshold, cited increased administrative costs as one of the main reasons for retaining a threshold for procurement contracts.

The measure to expand the scope of the CVD to vehicles leased, hire-purchased and rented by public authorities was less controversial. The responses to the public consultation indicated that 54% of respondents felt that expanding the scope in this way was very relevant; a further 24% felt that it was relevant. As public authorities increasingly procure vehicles in these ways instead of buying vehicles, an extension of the scope of the CVD to cover these means of procurement was generally supported. The measure was retained for further consideration.

The measure to expand the scope to selected transport services procured by public authorities, was also retained for further consideration. Again, expanding the CVD in this way reflects the fact that fewer public authorities purchase and operate their own vehicles; choosing instead to contract operators to provide the services using the contractor's own vehicles. A challenge with extending the scope of the CVD to a lot of the services procured by public authorities is that in many cases the suppliers of such services, e.g. road cleaning services, provide the same services using the same vehicles to other purchasers, including businesses. Furthermore, some potential services are often provided by SMEs, including school transport services, which may find it more challenging to meet the requirements of the CVD. However, including services that are provided predominantly to public authorities, such as bus services or waste collection services, could still be appropriate. The results of the public consultation agree with this, as 44% of respondents indicated that expanding the scope to selected transport services was very relevant. A further 27% indicated that it was relevant. Consequently, the measure to expand the scope of the CVD to include relevant transport service contracts such as for bus services, waste collection services and postal and courier services, as defined by their respective CPV codes, was retained. It would be consistent with the proposed coverage of the revised EU GPP criteria for transport, and it would reflect some of the more significant services that involve transport that are procured by public authorities.

The option for extending the scope of the CVD to all contracts with a 'major transport element' was not taken forward for further consideration. This option would present

[19] Recital 28 of the preamble of Directive 2014/25

several challenges, not least in identifying how it might be applied in practice. The responses to the public consultation demonstrated some support for this option (26% or 34 out of 130 respondents felt it relevant; 30% or 39 out of 130 respondents felt it very relevant); however, there was a relatively high percentage of respondents that answered, "I do not know" (19% or 25 out of 130) demonstrating that what this option means in practice was not as clear. One option might be to define what is meant by 'major transport element', e.g. in terms of proportion of contract value, but this would probably vary by type of contract and would anyway be difficult to define. Stakeholders interviewed during this study agreed that defining what is meant by 'major transport element' would be challenging. In particular, EU level organisations interviewed for this study responded that coming up with such a definition would be difficult, and applying the CVD to such contracts could not be compulsory unless the criteria were very low, in which case it would have little impact. Accordingly, the measure was not taken forward.

Finally, to be consistent with the rejection of the first option for extending the scope of the CVD, **the thresholds to be used in any expansion of the scope**, e.g. to vehicles rented, leased or hire-purchased or to selected transport services procured by public authorities, should also be set with reference to Directives 2014/24 and 2014/25.

3.2.2 Revising the monetisation methodology

Based on the long-list of possible amendment options to the monetisation methodology, different approaches for revising the monetisation methodology were discussed with the Commission, including:

- Update the external cost figures in light of scientific progress and index costs to inflation to avoid erroneously undermining true emission costs, for example by drawing on the 2014 DG MOVE external cost handbook (Ricardo-AEA et al., 2014) see Table 3-1;
- Use actual fuel costs (with the implication of shifting the emphasis towards the operator's financial perspective);
- Use real-world data for air pollutant and CO_2 emissions, as well as energy consumption;
- Adjust air pollutant damage costs to the geography of vehicle use; take population density into account within the monetisation when calculating damage costs;
- Add damage costs from noise emissions to the assessment.

The public consultation revealed that 56% of respondents thought that it was very important or important to simplify the methodology, if it was to be retained. Following discussions with the Commission, an amendment should include revisions to the monetisation methodology by drawing on the 2014 DG MOVE external cost handbook. This would imply an overall increase in the assessment of the external costs from air pollution and CO_2 emissions, increasing the cost-effectiveness of low and zero-emission vehicles.

Table 3-1: Pollutant costs, CVD versus EU handbook, adjusted to inflation

	NO_x (€/g)	Particulate matter (€/g)	NMHC (€/g)	CO_2 (€/kg)	
				Low	*High*
CVD	0.004	0.087	0.001	0.030	0.040
EU handbook, all areas (2015 prices)	0.011	0.042	0.002	0.051	0.178
Ratio EU handbook: CVD	*2.6*	*0.5*	*1.7*	*1.7*	*4.4*

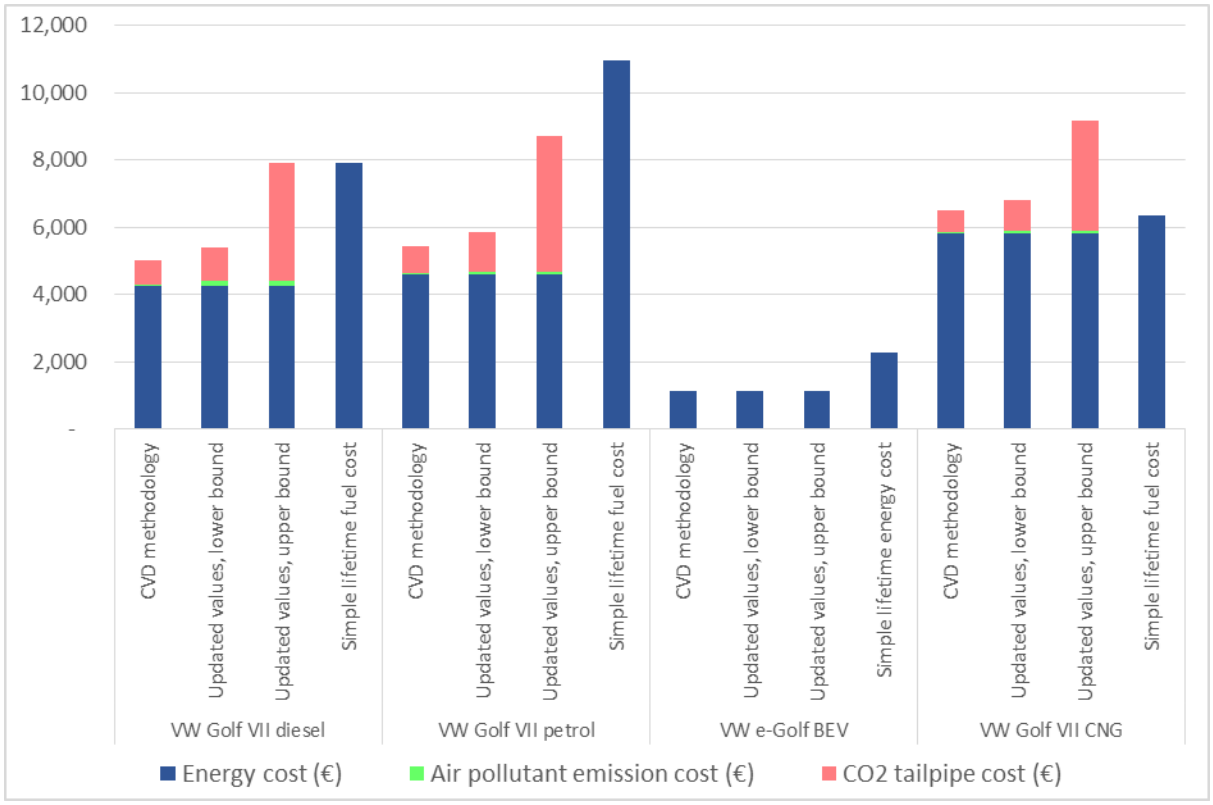
In addition to using updated cost figures, the handbook's upper-bound values for CO_2 costs will be used. This is because, typically, the calculated 'operational lifetime costs' following the current methodology are lower than a simple lifetime financial analysis of fuel costs (since the latter includes fuel duties). This makes any upfront 'investments' in clean vehicle technology less likely to be evaluated as cost-effective according to the monetisation methodology compared to a standard financial perspective. Therefore, applying the CVD's monetisation methodology with current external cost values may in some cases provide a disincentive for the procurement of clean vehicles over purely financial considerations, counteracting the aims of the CVD. However, using the upper bound CO_2 costs will align the monetisation calculation more closely with the operator's financial perspective under current EU average fuel duty levels (

The other approaches to the revision of the methodology were rejected for the following reasons (see also section 3.3 of this study). The use of actual fuel cost was regarded to provide an insufficient alternative to the current status quo. While the use of real-world data was considered principally relevant, the lack of overall consistent and high-quality data makes constrains this measure. The adjustment to geography of use again would render a high degree of complexity, above all, and hence impact negatively on the objective of simplifying the methodology. For the same reason, adding noise to the methodology was regarded to be an insufficient measure, as it is both constrained by data availability and increase of complexity.

Figure 3-1).

The other approaches to the revision of the methodology were rejected for the following reasons (see also section 3.3 of this study). The use of actual fuel cost was regarded to provide an insufficient alternative to the current status quo. While the use of real-world data was considered principally relevant, the lack of overall consistent and high-quality data makes constrains this measure. The adjustment to geography of use again would render a high degree of complexity, above all, and hence impact negatively on the objective of simplifying the methodology. For the same reason, adding noise to the methodology was regarded to be an insufficient measure, as it is both constrained by data availability and increase of complexity.

Figure 3-1: Example comparison of 'operational lifetime costs' using current CVD methodology versus updated values versus simple lifetime fuel cost (including fuel duties, excluding VAT) for the Volkswagen Golf VII under different fuel/powertrain variants



Notes: costs in Euros over assumed lifetime mileage of 200,000 km. No discount rate applied.

Sources: CVD monetisation parameters: European Union (2009)*, Energy cost data: year 2015 EU28 average costs from European Commission* (2016f; 2016e)*, data on vehicle energy consumption and emissions: Volkswagen* (2016; 2016a)*, updated external cost values from Ricardo-AEA* (2014)

A further revision to the external cost handbook is currently planned. It remains to be determined if, and how, the monetisation methodology can be set up to ensure the latest assessments on the costs of different pollutants are included, and adjusted to inflation.

3.2.3 Defining a clean vehicle, and using this as the basis of a minimum requirement

Many issues were considered while screening the options for defining a clean vehicle and using this definition as the basis of a minimum target. These include the following:

- The criterion to be used to define a clean vehicle;
- The thresholds, if any, to be applied to define the point at which a vehicle can be considered to be clean.
- Whether to set two thresholds for defining clean (low-emission) and 'ultra-clean' (zero-emission) vehicles, and how to differentiate between these vehicles if this approach is taken forward;
- How to set the level and apply a minimum target in practice;

- Whether the same minimum target should be applied in all Member States or whether there should be a differentiation;

These are covered in turn below; a more detailed assessment of the options can be found in Annex 4. Following consideration of the potential criterion on which a definition of a clean vehicle might be based, the following options were retained for further consideration, i.e. defining a clean vehicle on the basis of:

1. For cars and LCVs only their tailpipe CO_2 emissions, or
2. For cars and LCVs only, their real-world air pollutant emissions, or
3. Whether it is uses an alternative fuel, or
4. If it has zero tailpipe emissions.

For these criteria, it is, or soon will be, straightforward to identify the relevant values on the basis of existing legislation. For cars and light commercial vehicles (LCVs), each vehicle's ***tailpipe CO_2 emissions*** is measured for the purpose of compliance with relevant EU emission performance standards. It is currently not possible to apply the same approach for heavy duty vehicles (HDVs), although it is expected it will be possible in the future. ***Air pollutant emission*** standards based on real world emissions are particularly relevant for LDVs. The respective standards for HDVs, i.e. the Euro VI standards, are delivering the anticipated emissions reductions in the real world, whereas the Euro 6 standards applied to LDVs are not yet delivering these reductions. ***Alternative fuels*** are defined in Article 2 of Directive 2014/94/EU on Alternative Fuels Infrastructure. Whether a vehicle has ***zero tailpipe emissions*** is also evident explicitly with reference to its tailpipe CO_2 emissions, but is also clear from the propulsion technology that it uses.

The following two options were not taken forward for further consideration, i.e. defining a clean vehicle on the basis of:

- ***Lifecycle*** GHG emissions below a specified threshold; or
- ***Broader environmental criteria***, such as those defined in the revised EU GPP criteria for transport.

With both, one of the main challenges is how to define and apply these criteria in a concrete legislative context. There are factors to determine the lifecycle emissions of some fuels, which are well established in the literature. Yet some gaps remain and there is currently no political maturity to include such factors in legislation, including open questions of how to account for energy and transport emissions. The GPP criteria have been developed for public authorities that want to be ambitious in terms of improving the environmental performance of their vehicle fleets, rather than to act as the basis of a standard. In this respect, the requirements of the CVD provide the minimum requirement, whereas the GPP criteria serve as a point of orientation for public bodies that want to go beyond the basic requirements. If another set of wider environmental criteria were to be used, these would need to be agreed and defined in legislation, which would be more complex than simply referring to existing legislation, as is possible for the options that are taken forward.

Of the options to be taken forward for further considerations, it seems most logical to combine tailpipe CO_2 emissions and tailpipe air pollutant emissions, as both are measures of tailpipe emissions of different pollutants.

It was not considered appropriate to use only the zero-emission vehicle (ZEV) approach as the sole criterion, as it would be challenging and expensive to meet with respect to some vehicle types in some parts of the Union in the shorter-term. A combination of low- and zero-emission technologies is needed to stimulate the transition to low-emission mobility However it was considered appropriate to also incentivise the use of zero-emission technologies. Moreover, in the longer-term (e.g. 2030) it could also make sense to focus on zero-emission technologies in an attempt to keep the function of an innovative market trigger by public procurement. The simplest way of differentiating between ZEVs and non-ZEVs would be to use 'double-counting', i.e. for the purpose of assessing compliance with

the requirements of the revised Directive, a ZEV could count more as another type of clean vehicle. Consequently, the following approach (referred to as **double counting**) was taken forward for further consideration:

- Count each ZEV (i.e. BEV and FCEV, as well as HDV natural gas vehicles running on biomethane, if certified) as one clean vehicle, and
- Count all other vehicles that comply with the clean vehicle definition as 0.5 clean vehicles.

These values would effectively be 'credits' in the context of delivering a minimum requirement (see next section), with a ZEV counting as one credit and any other clean vehicle counting only as half a credit[20].

Of the various options for defining how to apply **a minimum target in practice**, the following were retained:

- Set a minimum target per Member State, but leave it to Member States how to deliver this, and
- Require public authorities to use the definition of a clean vehicle when procuring vehicles, but do not state how.

Other options were rejected for various reasons. Setting a ***low threshold and requiring this to be applied in all procurement*** was rejected as it would be challenging for all the criteria selected above, and it would also allow Member States no flexibility in delivering the aims of the CVD. Applying ***a minimum target to each procurement contract*** is impractical, as public authorities tend not to procure vehicles that use different fuels and energy sources within a single procurement contract, choosing instead to buy only electric vehicles in a specific contract, for example. Applying a ***minimum target over a fixed period of time*** could, for the smaller public authorities that do not procure vehicles regularly, amount to the same thing as applying a minimum requirement to each contract. Setting a longer time period would prove challenging from the perspective of monitoring. Setting an ***EU level target for a specified year*** would also have similar issues.

The first step was to decide on **the appropriate thresholds to apply** to define the point at which a vehicle can be considered to be clean. For cars, of those currently on the market, the lowest CO_2 emissions of a conventional non-hybrid diesel car is 79 gCO_2/km.[21] It is considered that ultimately the CO_2 emissions per kilometre of such vehicles are unlikely to go much below is 70 gCO_2/km (ICCT, 2016).[22] [23] On the other hand, emissions of many plug-in hybrids on the EU market are already less than 40 gCO_2/km, while the best performing model has CO_2 emissions of 22 g/km, while a range extended car has emissions of only 12 gCO_2/km[24].

[20] It should be noted that such a rule is only possible to apply when the minimum requirement is set above the 50% threshold of total vehicles procured. In this case, separate targets were for ZEV and non-ZEV.

[21] http://carfueldata.direct.gov.uk/search-by-fuel-economy.aspx

[22] ICCT (2016) *2020-2030 CO2 standards for new cars and light-commercial vehicles in the European Union*, International Council on clean Transportation, Berlin

[23] Note that these thresholds are defined using the current NEDC test cycle. However, this will have been replaced by the new WLTP test cycle by the time a revised CVD has been transposed by Member States. Hence, these NEDC values would need to be converted to equivalent WLTP test cycle values.

[24] Ricardo Energy & Environment, E3M Lab and TEPR (forthcoming) *Assessing the impacts of selected options for regulating CO2 emissions from new passenger cars and vans after 2020*, report for DG CLIMA

For **air pollutant emissions** from cars and LCVs, thresholds would need to go beyond the RDE requirements, i.e. the conformity factor with which a clean vehicle must comply should be less than 1.5 (the limits are defined in the Commission Regulation 646/2016 (RDE legislation) as 1.0 + *margin* parameter = 1.5), which is the figure applied in the RDE legislation from 2021.[25] Given that the Euro 6Cla standards should have been complied with in the mid-2010s, defining a clean vehicle as one that delivers Euro 6 standards on the road by 2025, i.e. it should have a conformity factor of 1.0 (including the applicable uncertainty margin), does not seem too ambitious. For 2030, given that EU air quality standards are still above those recommended by the World Health Organisation (WHO), a clean vehicle could be defined as having air pollutant emissions lower than those required by Euro 6, e.g. these vehicles should have emissions only 80% of the value of Euro 6 standards, which could be interpreted as applying a 'conformity factor' of 0.8 (including the applicable uncertainty margin). It should be noted that there is considerable uncertainty here, as this goes beyond the current legislative state of play and it is not clear how this discussion will evolve.

The thresholds below were therefore chosen based on the following factors:

- **The emission performance of different vehicle technologies**. As discussed above, current data on vehicle tailpipe emissions were examined to select reasonable thresholds that would encourage the uptake of vehicles with the lowest emissions within the different vehicle categories.
- **The need to encourage the uptake of clean vehicles throughout the assessment period**. The assessment period for this study is 2020 – 2035. The thresholds were set separately for the two mid-points of the study, namely 2025 and 2030, so that procurers are encouraged to choose clean vehicle both in the immediate future and in the longer-term. Setting thresholds for 2025 and 2030 also allows the thresholds to become more stringent over time, considering the development of new, cleaner technologies.
- **The need to consider air pollutant emissions as well as CO_2 emissions**. A clean vehicle could be defined as having lower air pollutant emissions and lower CO_2 emissions. For this reason, each threshold should be set with respect to tailpipe CO_2 emissions AND with respect to RDE air pollutant emissions conformity factor.

Hence, alternative thresholds were set for 2025 and 2030, with increasing levels of stringency:

- **By 2025**: Tailpipe CO_2 emissions with a threshold of 50 gCO_2/km for cars; 50gCO_2/km for vans AND with respect to RDE air pollutant emissions having a conformity factor of 1.
- **By 2030**: Tailpipe CO_2 emissions with a threshold of 25 gCO_2/km for cars; 40 gCO_2/km for vans AND with respect to RDE air pollutant emissions having a conformity factor of 0.8.

A more ambitious set of thresholds was also set as follows:

- **By 2025**: Tailpipe CO_2 emissions with a threshold of 25 gCO_2/km for cars; 40 gCO_2/km for vans AND with respect to RDE air pollutant emissions having a conformity factor of 0.8.
- **By 2030**: Tailpipe CO_2 emissions with a threshold of 0 gCO_2/km for cars and vans.

[25] RDE3 option will be published in the OJ 07.07.2017. From the regulation: 'margin' is a parameter taking into account the additional measurement uncertainties introduced by the PEMS equipment, which are subject to an annual review and shall be revised as a result of the improved quality of the PEMS procedure or technical progress.

For buses and trucks, there is more uncertainty regarding setting an appropriate tailpipe CO_2 threshold because there is currently no standard approach to measuring CO_2 emissions from buses and trucks. Thus, CO_2 requirements for buses and trucks have been excluded from the current definition of a clean vehicle and the analysis of the relevant policy options on the basis that it is not possible to set such requirements at this stage. However, such a requirement will be introduced once the regulatory approach to measuring CO_2 emissions from buses and trucks has been adopted at EU level.

Minimum targets

Besides, the approach and the threshold set to define clean vehicles, the proposed policy measures should set minimum actions in terms of the share of such clean vehicles in the total number of vehicles procured. These action requirements could be best expressed in form of target setting. Given that data on share of clean vehicles are only available at EU level, it was considered appropriate that such targets should be determined at EU level. At the same time, it was considered appropriate that national targets should differ to take account of the differences between Member States in terms of their public bodies' financial capacities for purchasing clean vehicles. To the extent possible, environmental criteria (such as the level of air pollution) should be considered. Setting the same minimum requirement throughout the EU would risk being meaningless for some and too challenging for other Member States.

In terms of the EU targets, three potential thresholds were identified of increasing level of stringency (Low, Medium, and High) and varying depending on the type of vehicle as summarised in the table below. These thresholds were set so that they represent increasing levels of improvement in comparison to the current level of uptake of clean vehicles, as described in more detail in the Annex 4.

Table 3-2: Thresholds on the share of clean vehicles at EU level

Vehicle type	Low	Medium	High
Cars and vans	20%	35%	50%
Trucks	5%	10%	15%
Buses	30%	50%	75%

The final step was to determine the criterion to be used to set the minimum target for each Member State. The following options were considered in this respect:

- One option to base each Member State's minimum requirements on the percentages set out under the **Effort Sharing Regulation** (ESR)[26], once this has been agreed. However, basing each Member States' minimum requirement solely on their ESR reduction target would put the clear majority of the requirements on the Member States with greater capacity to act, while those Member States at the bottom end of the distribution would have very low requirement with respect to the procurement of clean vehicles. Thus, while this would satisfy the need to take into account the financial capacities of Member States, it was not considered an acceptable approach. Moreover, Member States enjoy flexibility with regard to allocating sectoral emission reductions in the agriculture, buildings or transport sector.
- An alternative option was to link the CVD requirements to the extent to which the cities in each Member State failed to meet **EU air quality limits** in combination with a measure of financial capacity However, such an option also would be

[26] Available from: https://ec.europa.eu/clima/policies/effort/framework_en

administratively complex and it was not clear how it might be applied in practice. Thus, this option was rejected.

- The third option examined, which was also selected, was to use the **Member States GDP per capita** as a measure of financial capacity in combination with the **level of urban population density,** as a proxy for urban air pollution issues. This approach would meet both requirements and require all Member States to take some action, but still putting most of the effort on those with the largest financial capacities.

Taking the last option forward, data from Eurostat on GDP per capita (2015 values) and of the population share of predominantly urban and intermediate regions in the total population[27] (2015 values) were used to develop an index for each Member State. Values for each Member State for each parameter were compared to the EU average and the resulting indexes were used to develop a weighted aggregate index (applying equal weights). As the last step, it was determined that for those Member States with an index value higher than the EU average, the threshold set at the EU level would apply. For the remaining Member States, the national target would be set below the EU target at a level equal to that of the value index for any given Member State in comparison to the EU average.

Table 3-3 below presents the scaling factors used (further details of the calculation are provided in Annex 4)

Table 3-3: Scaling factors used to set national targets

Member State	Scaling factor	Member State	Scaling factor
Luxembourg	1	Lithuania	0.94
Sweden	1	Czech Republic	0.93
Denmark	1	Finland	0.92
Germany	1	Hungary	0.84
United Kingdom	1	Portugal	0.81
Netherlands	1	Latvia	0.8
Austria	1	Slovakia	0.77
Belgium	1	Bulgaria	0.77
Italy	1	Greece	0.76
Ireland	1	Poland	0.74
Spain	1	Estonia	0.71
Cyprus	1	Slovenia	0.67
Malta	1	Croatia	0.64
France	0.95	Romania	0.57

Scope of the CVD

If the scope of the CVD is **expanded to rented, leased or hire-purchased vehicles**, the same minimum target should be applied to these vehicles, as will be applied to the purchase of vehicles, with the further specification that the implementation of the mandate is in the flexible responsibility of the Member State This is appropriate for leased and hire-

[27] Eurostat, Demographic balance and crude rates by urban-rural typology [urt_gind3]

purchased vehicles, as these will largely be new. While rental fleets will be made up of new and older cars, thus making it potentially more challenging to meet these minimum requirements, these requirements are being set for 2030, which will give rental companies plenty of time to ensure that their fleets are compatible with public authorities' requirements concerning the environmental performance of the vehicles that they rent.

If the scope of the CVD is **expanded to include 'selected transport services' in the minimum requirement,** the fleets of the relevant operators running services for public authorities should be included as part of the Member State minimum requirement. In other words, the '40% target' applied to purchases would be extended to include, for example, the buses sold to operators providing services to public authorities. This avoids the need to set additional, separate, minimum requirements for transport services.

A final consideration was the **timing of the introduction of the requirements**. Following the input from the open consultation, it was considered appropriate to provide for a significant transition period before any requirements would be introduced. On the basis that public procurement contracts – often in the form of framework contracts - may last for multiple years – it was considered that introducing the first requirements by 2025 would provide sufficient time for most- if not all – existing contracts to be completed and sufficient period for authorities and suppliers to prepare for the proposed changes. Furthermore, it was also considered appropriate to adopt a staged approach in the introduction of more requirements. Thus, the first moderately demanding set of requirements should be set in 2025 while more demanding requirements – in terms of the thresholds set or the minimum share of vehicles to meet these thresholds – by 2030.

3.2.4 Selected policy options

Based on the above process a set of alternative policy options were developed.

Policy Option 1– Repeal of the CVD: This policy option considers the possibility of repealing the CVD without replacing it with any other legislation at EU level. Member States can still set national targets while procurement authorities will also be free to set requirements concerning the procurement of vehicles and the share of clean vehicles (unless constrained by national legislation). Any voluntary action at EU level, such as the GPP criteria for transport and the European Clean Bus Deployment Initiative, will continue but there will not be procurement requirements based on EU legislation.

Policy Option 2 is a lower ambition/maximum flexibility option, which limits the changes to the current Directive and provides flexibility to Member States with respect to its implementation. Consequently, Option 2:

- Retains the same scope as the current Directive;
- Updates the values of the monetisation methodology;
- Provides a definition of a clean vehicle and mandates Member States to develop national plans and to set targets for increasing the uptake of clean vehicles. The national plans should be developed within a year of the entry into force of the CVD and targets should be set for 2030. As this Option is the least stringent, it uses the least demanding of the measures described earlier. This therefore specifies a definition of a clean vehicle on the basis of tailpipe CO_2 and air pollutant emissions as follows: Tailpipe CO_2 emissions of less than 50 gCO_2/km for cars and 50 gCO_2/km for vans. For light duty vehicles, a threshold with respect to RDE air pollutant emissions of having a conformity factor of '1'.
- Concerning the level of use of the monetisation methodology, it is assumed that the share of vehicles procured based on the monetisation methodology will be at the level indicated by respondents to the procurers' survey from the ex-post evaluation (11%). For the remaining 89% of vehicles procured, we assume that the clean vehicle definition will be used.

- Contains a reporting obligation. This should be every three years and full reporting should begin in 2026, with interim reporting in 2023.
- Retains the choice of using definition or methodology, but makes it mandatory for national authorities to select one.

Policy Option 3 increases the ambition compared to Option 2. PO3 expands the scope of the CVD to also include vehicles leased, rented or hire-purchased by public authorities and selected transport services (bus, waste collection and postal/courier services) procured by public authorities. It eliminates the monetisation methodology. It focuses on the introduction of a definition of a clean vehicle based on a vehicle's tailpipe CO_2 emissions and its RDE air pollutant emissions, for light duty vehicles. Two scenarios were adopted concerning the stringency of the requirements to be set in 2025 and 2030.

- PO3a is based on the introduction of the lower threshold of 50 gCO_2/km for cars and 50 gCO_2/km for vans by 2025 and the more demanding threshold of 25 gCO_2/km for passenger cars and 40 gCO_2/km for vans by 2030. A threshold with respect to RDE air pollutant emissions is introduced with a conformity factor of 1 in 2025 and 0.8 in 2030.
- PO3b is based on the introduction of the more demanding threshold 25 gCO_2/km for cars and 40 gCO_2/km for vans by 2025 and an even more demanding level of 0 gCO_2/km for both passenger cars and vans by 2030. A threshold with respect to RDE air pollutant emissions is introduced with a conformity factor of 0.8 in 2025. No conformity factor is necessary for 2030 due to the 0 gCO_2/km threshold.
- Vehicles that meet the threshold would count as 0.5 clean vehicles for the purpose of complying with the 'minimum requirement', while those with zero tailpipe CO_2 emissions would count as one clean vehicle for the purpose of complying with the minimum requirement. This aims to give a higher weighting to ZEVs, without weakening the overall minimum requirement.
- For PO3a and PO3b, a minimum requirement at EU level was set in accordance to the medium level defined in Table 3-2 (section 3.2.2) (35% for cars and vans) and using the scaling factor presented in Table 3-3 to set the threshold at national level.;
- No requirements based on tailpipe emissions are set for HDVs (trucks and buses), although it noted that such requirements may be introduced in the future.

It also includes the same requirements as PO2 in terms of the reporting obligation (every three years, starting with full reporting in 2026 and intermediate reporting in 2023).

Policy Option 4 is based on a definition of a clean vehicle as one that uses alternative fuels, as defined in Article 2(1) of Directive 2014/94[28] and differentiates between zero emission and other clean vehicles. Again, two alternative sub-options were considered in terms of the stringency by varying the minimum requirement of clean vehicles procured. These thresholds – set at EU level - are different depending on the vehicle type as indicated in Table 3-24 below. Furthermore, they vary among Member States based on the approach described previously.

[28] With a differentiation that it only focuses on electricity, hydrogen and natural gas, including bio-methane.

Table 3-4: Thresholds on the share of clean vehicles at EU level

	PO4a		PO4b	
Vehicle type	**2025**	**2030**	**2025**	**2030**
Cars and vans	20%	35%	35%	50%
Trucks	5%	10%	10%	15%
Buses	30%	50%	50%	75%[29]

As in PO3, PO4 also expands the scope of the CVD to also include vehicles leased, rented or hire-purchased by public authorities and selected transport services procured by public authorities. It also includes the same requirements as PO2 in terms of the reporting obligation (every three years, starting with full reporting in 2026 and intermediate reporting in 2023).

Policy Option 5 is different from the previous options since:

- The use of the amended monetisation methodology is mandatory. In this case, there is no requirement for the use the definition of a clean vehicle or the determination of a minimum requirement;
- The CVD is expected to be replaced by a Regulation that will not need to be transposed by Member State authorities.

Otherwise, the scope and reporting obligation will be the same as in PO3 and PO4. This option has been included to test a more extreme option for revising the CVD which tests the effectiveness and feasibility of an option which only includes the monetisation methodology.

Finally, since Option 3 does not cover buses and trucks**, a combined option of sub-options 3b and 4b (Policy Option 6)** was also considered as follows:

- PO3b applies in the case of passengers' cars and vans. It is based on the introduction of the low threshold of the demanding 25 gCO_2/km for cars and 40 gCO_2/km for vans by 2025 and an even more demanding level of 0 gCO_2/km for both passenger cars and vans by 2030. A threshold with respect to RDE air pollutant emissions is introduced with a conformity factor of 0.8 in 2025. No conformity factor is necessary for 2030 due to the 0 gCO_2/km threshold.
- PO4b applies in the case of trucks and buses. It is based on a definition of a clean vehicle as one that uses alternative fuels (not diesel or petrol) [30]; it includes a requirement for a 10% share of clean trucks in 2025 and 15% in 2030 (at EU level) and 50% and 75% respectively for buses (see Table 3-4). It also differentiates between zero emission and other clean vehicles.

Table 3-5 provides an overview of the retained policy measures under each policy option.

[29] In this case a double counting rule cannot be applied as it would result in total distribution greater than 100%. E.g. with a 75% clean bus mandate, 35% would be ZEV (counted as 1) and 75% Clean Non-ZEV (counted as 0.5) resulting in 35% + 75% = 110%. Thus, in this case, we have applied an equal share of ZEV (37.5%) and non-ZEV (37.5%).

[30] With a differentiation that it only focuses on electricity, hydrogen and natural gas, including bio-methane.

Table 3-5: Summary of the policy options considered

Policy Option	Scope	Monetisation methodology (MM)	Clean Vehicle definition	Requirement for clean vehicles (i.e. Minimum share of vehicles that should be clean vehicles)	Reporting obligation	Entry into force
1 – Repeal	N/A	N/A	N/A	N/A	N/A	N/A
2 – Light review	As with current CVD	Amended with updated values from handbook	**Light duty vehicles** Based on Tailpipe CO_2 and RDE air pollutant emissions: 50 gCO_2/km for cars; 50 gCO_2/km for vans **Buses and trucks**: Alternative fuelled vehicles[31] ***AND*** for light duty vehicles a threshold with respect to RDE air pollutant emissions of having a conformity factor of 1	**To be set at national level** **Anticipated values of national targets for 2030:** **All vehicles** of 35% for Luxembourg and Sweden, 17% for Romania, with the requirements for other Member States scaled in between.	Every 3 years starting 2025	2020
3a – Tailpipe – Low ambition	As PO2, but extended to vehicles leased, hire-purchased and rented AND to bus, waste collection and postal/ courier services	Eliminated	Tailpipe CO_2 and RDE air pollutant emissions AND double-counting for zero emission vehicles with the following timetable: 2025: Tailpipe CO_2 emissions with a threshold of 50 gCO_2/km for cars, 50 gCO_2/km for vans ***AND*** for light duty vehicles a threshold with respect to RDE air pollutant emissions of having a conformity factor of 1 (i.e. 0% meaning that they meet Euro 6 standards as originally defined) 2030: Tailpipe CO_2 emissions with a threshold of 25 gCO_2/km for cars and 40 for vans ***AND*** a threshold with respect to RDE air pollutant emissions of having a conformity factor of 0.8 (i.e. 20% below Euro 6 standards). Vehicles that meet the threshold would count as 0.5 clean vehicles; those with zero tailpipe CO_2 emissions would count as one clean vehicle for the purpose of complying with the minimum requirement. **No thresholds for heavy duty vehicles**	**2025 and 2030** 35% for Luxembourg and Sweden, 17% for Romania, with the requirements for other Member States scaled in between.	Every 3 years starting 2025	2020

[31] Specific thresholds to be set for HDVs once emission standards for HDV have been adopted

Policy Option	Scope	Monetisation methodology (MM)	Clean Vehicle definition	Requirement for clean vehicles (i.e. Minimum share of vehicles that should be clean vehicles)	Reporting obligation	Entry into force
3b Tailpipe – High ambition	As PO2, but extended to vehicles leased, hire-purchased and rented AND to bus, waste collection and postal/ courier services	Eliminated	**Tailpipe CO_2 and RDE air pollutant emissions AND double-counting for zero emission vehicles –** **2025**: Tailpipe CO_2 emissions with a threshold of 25 gCO_2/km for cars and 40 gCO_2/km for vans ***AND*** a threshold with respect to RDE air pollutant emissions of having a conformity factor of 0.8 (i.e. 20% below Euro 6 standards). **2030**: Tailpipe CO_2 emissions with a threshold of 0 gCO_2/km for cars and vans. Vehicles that meet the threshold would count as 0.5 clean vehicles; those with zero tailpipe CO_2 emissions would count as one clean vehicle for the purpose of complying with the minimum requirement. **No thresholds for heavy duty vehicles**	**2025 and 2030** 35% for Luxembourg and Sweden, 17% for Romania, with the requirements for other Member States scaled in between.	Every 3 years starting 2025	2020
4a- Alternative fuel definition – Low ambition	As PO3	Eliminated	Use of alternative fuels, as defined in Article 2(1) of Directive 2014/94, AND double-counting for zero emission vehicles. Vehicles capable of using natural gas should only be able to be fully counted towards the minimum requirement if it can be demonstrated that there is a contract to procure biomethane, or other means of accessing biomethane, e.g. from a municipally-owned facility, in sufficient capacity to ensure full operation of the vehicle.	**2025:** - **Light duty vehicles:** 20% for Luxembourg and Sweden, 11% for Romania, with the requirements for other Member States scaled in between. - **Trucks:** 5% for Luxembourg and Sweden, 3% for Romania the requirements for other Member States scaled in between. - **Buses:** 30% for Luxembourg and Sweden, 17% for Romania, with the requirements for other Member States scaled in between. **2030:** - **Light duty vehicles:** 35% for Luxembourg and Sweden, 20% for Romania, with the requirements for other Member States scaled in between. - **Trucks:** 10% for Luxembourg and Sweden, 6% for Romania, with the requirements for other Member States scaled in between.	Every 3 years starting 2025	2020

Policy Option	Scope	Monetisation methodology (MM)	Clean Vehicle definition	Requirement for clean vehicles (i.e. Minimum share of vehicles that should be clean vehicles)	Reporting obligation	Entry into force
				- **Buses:** 50 % for Luxembourg and Sweden, 29% for Romania, with the requirements for other Member States scaled in between.		
4b- Alternative fuel definition – High ambition			Use of alternative fuels AND double-counting for zero emission vehicles	**2025:** - **Light duty vehicles:** 35% for Luxembourg and Sweden, 20% for Romania, with the requirements for other Member States scaled in between. - **Trucks:** 10% for Luxembourg and Sweden, 6% for Romania, with the requirements for other Member States scaled in between. - **Buses:** 50 % for Luxembourg and Sweden, 29% for Romania, with the requirements for other Member States scaled in between. **2030:** - **Light duty vehicles:** 50% for Luxembourg and Sweden, 29% for Romania, with the requirements for other Member States scaled in between. - **Trucks:** 15 % for Luxembourg and Sweden, 7% for Romania with the requirements for other Member States scaled in between. - **Buses:** 75% for Luxembourg and Sweden, 43% for Bulgaria, with the requirements for other Member States scaled in between.	Every 3 years starting 2025	2020
5 – Full scale monetisation – Regulation	As PO4	As PO2	None	None	Every 3 years starting 2025	2020
6 – Combined option 3b and 4b	As PO3	Eliminated	**Tailpipe CO_2 and RDE air pollutant emissions AND double-counting for zero emission vehicles – Cars and Vans** **2025**: Tailpipe CO_2 emissions with a threshold of 25 gCO_2/km for cars and 40 gCO_2/km for vans ***AND*** a threshold with respect to RDE air pollutant emissions of having a conformity	**Cars and vans** **2025 and 2030** 35% for Luxembourg and Sweden, 17% for Romania, with the requirements for other Member States scaled in between. **Trucks and buses** **2025:**	Every 3 years starting 2025	2020

Policy Option	Scope	Monetisation methodology (MM)	Clean Vehicle definition	Requirement for clean vehicles (i.e. Minimum share of vehicles that should be clean vehicles)	Reporting obligation	Entry into force
			factor of 0.8 (i.e. 20% below Euro 6 standards). **2030**: Tailpipe CO_2 emissions with a threshold of 0 gCO_2/km for cars and vans. Vehicles that meet the threshold would count as 0.5 clean vehicles; those with zero tailpipe CO_2 emissions would count as one clean vehicle for the purpose of complying with the minimum requirement. **Trucks and buses** Use of alternative fuels AND double-counting for zero emission vehicles	- **Trucks:** 5% for Luxembourg and Sweden, 3% for Romania the requirements for other Member States scaled in between. - **Buses:** 30% for Luxembourg and Sweden, 17% for Romania, with the requirements for other Member States scaled in between. **2030:** - **Trucks:** 10% for Luxembourg and Sweden, 6% for Romania, with the requirements for other Member States scaled in between. - **Buses:** 50 % for Luxembourg and Sweden, 29% for Romania, with the requirements for other Member States scaled in between.		

3.3 Discarded measures

Most of the proposed measures in the long list described in Section 3.1 were taken forward in some form within the policy options described in Section 3.2.4. Options that were discarded are listed below.

- **Options regarding expanding the scope of the CVD:**
    - **Removing the procurement threshold**. Removing the procurement threshold would ensure that all vehicles purchased by public authorities would be covered by the CVD. However, this option was rejected because the procurement threshold has been defined with reference to the thresholds set in the overarching public procurement Directives 2014/24 and 2015/15. A proliferation of different thresholds would increase the administrative burden on potential suppliers.
    - **Extending the scope of the CVD to all contracts that have a major transport element**. These contracts are not for the procurement of transport vehicles or transport services, but instead are for activities which involve a significant transport element. This option was discarded due to difficulties in how it would be applied in practice and how 'a major transport element' would be defined.
- **Options for revising the monetisation methodology:**
    - **'Giving more weight' to environmental factors**. The philosophy underlying monetisation is to minimise the one-and-only 'true' cost of a vehicle, all things considered. For this reason, this option of arbitrarily 'giving more weight' to certain elements was discarded.
    - **Enlarging the scope of environmental impacts covered (e.g. noise).** This option was discarded due to the lack of any standardised data on noise impacts. Also, noise damages are so extremely context-dependent.
    - **Adjusting damage costs to the geography of vehicle use**. In urban areas, NOx damage costs can be around 10 times higher than average because 10 times more people are subjected to the emissions. However, the option of taking population density into account in the monetisation methodology was discarded because it would make applying the methodology even more complicated. Stakeholders were consistently in favour of simplifying the methodology, not making it more complicated.
    - **Using real world vehicle emissions in the monetisation methodology**. These tend to be around 40% higher for CO_2 and around 5 times higher for NOx in diesel cars. This option was discarded because there is no standardised real-world emissions data.
- **Options for defining a clean vehicle**:
    - **Define a clean vehicle on the basis of lifecycle GHG emissions below a specified threshold.** This option was discarded on the basis of the challenges it would present in terms of defining and applying it in legislation. The complexity of this option would put an administrative burden on MS.
    - **Define a clean vehicle on the basis of broader environmental criteria, such as those defined in the revised EU GPP criteria for transport**. This option was discarded because the EU GPP criteria have been developed for public authorities that want to be ambitious in terms of improving the environmental performance of their vehicle fleets, rather than to act as the basis of a standard. In this respect, the requirements of the

CVD could be seen as the minimum requirement, whereas the GPP criteria are a higher aspiration for public authorities that want to go beyond the basic requirement. Hence, the two are complementary, so basing the CVD on the GPP criteria would undermine this.

- **Options regarding how a minimum target might be applied in practice:**
  - **Define a clean vehicle with a relatively low threshold and then require this to be applied**. This option was discarded because it would allow MS no flexibility in delivering the aims of the CVD.
  - **Apply a minimum target to each procurement contract**. This option was impractical as public authorities tend not to procure vehicles that use different fuels and energy sources within a single procurement contract, choosing instead to buy only electric vehicles in a specific contract, for example.
  - **Applying a minimum target over a fixed period over time**. This option would be impractical for smaller public authorities that do not procure vehicles regularly.

4 BASELINE

In order to assess the impacts of the policy options, a baseline scenario of no change to the existing provisions of the CVD has been developed. In the following sections, we present:

- The expected evolution of the main drivers and root causes of the problem identified in Section 1
- A detailed analysis of the expected number and type of vehicles procured over the period 2020-2035 under the baseline scenario based on available data. The necessary assumptions made are also discussed.

4.1 Assumed evolution of main drivers and root causes

This section describes how the internal and external drivers identified in the problem definition are expected to evolve in the absence of any changes to the CVD.

Driver A (limited range of contracts covered by the CVD) is related to the scope of the CVD as defined in the legal text; hence, without intervention this will remain the same. It is also assumed that the total numbers of vehicles purchased by the public sector will increase in line with the average vehicle procurement from the TED database over the period 2009 –2015.

For **Driver B** (lack of clear vehicle purchase provisions), it can be assumed that Member States will retain their current approaches to procurement of clean vehicles in the baseline, since there is no indication that Member States intend to make changes. The absence of a common and clear definition of a clean vehicle means that authorities can adopt their own definitions, resulting in the continued lack of clear market signals.

Regarding the related **root cause 3** (wide choice of transposition options) and **root cause 5** (no reporting obligation), it can be assumed that Member States will retain their current approaches to procurement of clean vehicles in the baseline, since there is no indication that Member States intend to make changes to their current approach.

In relation to **Driver C** (complexity of the monetisation methodology), it should be expected that use of the methodology in practice will remain limited (only 11% of procurers currently make use of the methodology). Furthermore, the inherent limitations of the calculation that tend to favour diesel vehicles and give lower weight to air pollutants will continue. Thus, the methodology is expected to influence purchase decision towards less environmentally advantageous vehicles, counter to the actual objectives of the CVD.

Because of the above, the associated problems will also continue. The CVD will continue to exercise a very limited or no impact on the market uptake of clean (low- and zero-emission vehicles). Accordingly, the potential of public procurement to contribute to climate, environmental and energy policies of the EU will continue to remain under-used.

Alignment of public procurement at European level and related scale effects with the opportunity of cost reduction will not be realised at a much greater scale compared to today. Thus, possible opportunities for cost reduction of technologies, particularly for urban buses, where public demand matters most, will also continue to happen on an incremental basis.

From an industry perspective, market uncertainty, and higher cost of information and risk to decision-making for manufactures, will continue to persist - particularly in the area of heavy-duty transport. Overall, given the long lead times for fleet renewal, the transition to low-emission mobility will not be strongly encouraged by the CVD in its current format.

4.1.1 CVD Implementation by Member States

The baseline has been developed under the assumption that the CVD will continue to exercise a very limited impact on the market uptake of clean (low- and zero-emission) vehicles. Multiple implementation options, including a lack of detailed 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.

In the absence of any changes to the CVD, the baseline assumes that Member States will retain their current approaches to procurement of clean vehicles. Although a few Member States have implemented ambitious measures to stimulate the public procurement of clean and energy efficient road vehicles, the majority have retained all options presented in Article 5(3) when transposing the CVD into national legislation. A few of the currently ambitious approaches to transposing the CVD and encouraging additional policy momentum to stimulate the public procurement of clean vehicles are described below to demonstrate the variety of approaches adopted.

Belgium's legal framework

On 20th December 2010, Belgium issued a Royal Decree to transpose the CVD. There was a subsequent Federal "Circulaire 307 quinquies" adopted on 20th March 2017 covering only light vehicles.

The Federal Circular sets a procurement target for fleets of more than 20 vehicles (if an authority's fleet is bigger than 20 vehicles, the procurement target applies). Under this approach, leased vehicles are included and each vehicle is assigned an Ecoscore. The Ecoscore allows the evaluation of the environmental performance of a vehicle by taking into account the most important environmental impact factors caused by the vehicle using a well-to-wheel approach. The Ecoscore takes into account global warming (mainly through CO_2 emissions), air pollution, and noise in order to calculate a value between 0 and 100. The closer to 100 the Ecoscore is, the more environmentally-friendly the vehicle.

There is no central reporting in Belgium which means there are no available numbers for how many vehicles are procured on a national level.

France's policy for the public procurement of clean vehicles

Initially, three different texts were used to implement the CVD in France:

- Article 12 - Law 2011/12 of 5 January 2011.
- Decree -011-493, dated 5 May 2011 which specifies taking into account the energy and environmental impacts of motor vehicles in public procurement procedures.
- Order of 5 May 2011 which specifies the ways in which the energy and environmental impacts of motor vehicles are taken into account in public procurement procedures (Ricardo & TEPR, 2012).

France's current policy for the public procurement of clean vehicles aims to promote sustainable consumption, climate protection, and reduce air pollution which goes beyond the CVD requirements.

More recently, an Ordinance on public procurement was introduced (23 July 2015), including Article 30, which specifies that public procurers must take into account sustainable development in the definition of their needs and in the preparation of new tenders. Since 2006, the Public Procurement Code required that sustainable development objectives be taken into account during the determination of the need (Article 5 of the 2006 Code). However, the provisions of Article 5 did not provide for sanctions in the event of failure to take these objectives into account. The Ordinance of 23 July 2015 'codifies' the case-law, since Article 30 of that Ordinance always requires public purchasers to define their needs before launching their consultations by taking into account sustainable

development objectives in their economic, social and environmental dimensions. (Holterbach, 2016)

Additionally, on 11 January 2017, Decree No. 2017-21 came into effect regarding the purchase of low emission vehicles. This decree specifies the obligation to purchase or use low-emission vehicles by fleet managers of motor vehicles, operators of taxis and transport operators. It specifies that when new vehicles are purchased, there is a requirement to buy 50% (20% for local authorities) low emission vehicles. However, there is no definition of a low emission vehicle; a list of suggested vehicles is provided so the procurers can choose between the vehicles below:

- High level officials must use electric vehicles
- Hydrogen, natural gas, biofuels
- Buses: electric, hybrid (electric or biogas)

This approach is therefore not about a definition based on emission thresholds but rather about types of vehicles.

France has an observatory of public procurement that manages public procurement in many respects. Data from the observatory has found that when the CVD is transposed into French legislation it does not have much impact. However, it has raised awareness among public procurers of the importance of CO_2 and pollution emissions. Furthermore, it does not seem that anyone uses the current CVD methodology; however, it did inspire the development of a methodology which is used in French procurement.

UK's approach to public procurement of clean vehicles

The main piece of CVD transposing legislation in the UK is The Cleaner Road Transport Vehicles Regulation, 2011 - Statutory Instrument (SI): 2011 No. 1631. This was a new piece of legislation introduced to transpose the CVD. It was also transposed in Scotland through The Cleaner Road Transport Vehicles (Scotland) Regulations 2010, Scottish Statutory Instrument 2010 No. 390, which entered into force on the 4th December 2010 (Ricardo & TEPR, 2012).

Additionally, the UK goes beyond the requirements of the CVD by basing its Government Buying Standards for transport on the EU GPP criteria. These are mandatory criteria that central government departments and related organisations must adhere to; other public-sector organisations are encouraged to use these criteria. In addition, there are best practice standards that are more comprehensive or stricter for organisations that want to go further (Rocío Rodríguez Quintero, 2016)

Although the distribution of criteria between mandatory and 'best practice' do not always reflect the EU criteria's split between core and comprehensive, the criteria draw heavily on the coverage and formulation of the EU criteria.

An example is provided below of the UK's GPP criteria for cars and LGV:

<u>CO_2 emissions:</u>

Minimum mandatory: Fleet average CO_2 emissions for new cars should not exceed 130 gCO_2/km; the equivalent figure for LCVs is 175 gCO_2/km.

Additional 'best practice' criteria: Fleet average CO_2 emissions lower than the minimum required.

Minimum award criteria: Capability to use fuel from renewable resources.

Best practice award criteria: Vehicle capable of using renewable energy, equipped with GSI and TPMS, have air conditioning systems with a GWP of less than 150, commitment to use low rolling resistance tyres.

<u>Pollutant emissions:</u>

Best practice: Vehicles comply with Euro 5 standard.

Noise emissions:

Minimum award criteria: Noise emissions lower than required by national law.

Best practice award criteria: Vehicle equipped with tyres with noise emissions below those required by national law.

Other environmental criteria:

Minimum award criteria: Use of recycled content, inclusion of bio-content/materials, design to maximise opportunities to recycle or recover parts at the end of the vehicle's life, design to enhance reparability and availability of more frequently used spares

Best practice contract performance criteria: Contractor must selectively collect used lubricants and tyres and have a contract with a relevant waste management organisation.

Best practice award criteria: Low viscosity lubricants, commitment to use tyres that do not contain oils subject to labelling in accordance with Directive 67/548 in tread rubber.

4.2 Baseline scenario

The development of the baseline scenario followed the following steps:

- Development of projections on the number of publicly procured vehicles
- Development of projections on the type of vehicles procured and the share of clean and zero emission vehicles
- Development of projections concerning the impacts (economic, environmental) associated with the baseline scenario

4.2.1 Projections of publicly procured vehicles

The baseline for this study provides the projections for the numbers and types of vehicles that would be procured over the period 2020 – 2035 if no changes are made to current provisions of the CVD. In other words, the CVD continues to apply only to vehicles purchased over the procurement threshold and has minimal impact on the procurement of clean vehicles as discussed previously.

A first parameter to be defined in developing the baseline is the **number of vehicles publicly procured in the EU** per year.

The baseline includes all types of procurement. Even though only vehicle purchases are currently within the remit of the CVD, assessment of the policy options also requires a baseline for other types of procurement, i.e. leasing, renting or hire-purchases and selected transport services (bus, waste collection and postal/courier services). It is assumed that vehicles procured on the basis of leasing/hiring of services contracts will have the same characteristics as that of the baseline.

In order to project the total number of publicly procured vehicles falling under the CVD, we have used data from the EU's public tender platform (Tenders Electronic Daily – TED). TED is a database that notices from all procurements that fall under the procurement procedures set out in Directives 2014/24/EU and 2014/25/EU. Typically, these are procurements that exceed a threshold value of just over €200,000 (€135,000 in the case of central government authorities). These same criteria make the application of the CVD mandatory for vehicle procurement contracts. Therefore, it can generally be assumed that procurement contracts published in the TED database should include all procurements to which authorities are required to apply the clean vehicle criteria, as set out in the CVD. A baseline estimate on the number of publicly procured vehicles in Europe that fall under the scope of the CVD has thus been developed by extracting relevant information from the TED database.

We extracted data on tenders from 2009 - 2015 to give an estimate of the average number of vehicles publicly procured by year that would fall under the scope of the CVD, as well as vehicles leased, rented, and procured by transport services which are not covered by the CVD as presented in

Table 1-1. We then used data on the expected growth of vehicle registrations from the EU Reference scenario to project the number of vehicles procured by type of contract.

According to available data for the period 2009-2015, overall an estimated 26% of the vehicles publicly procured are leased (20%) or contracted as services (6%). Although some feedback from stakeholders (for example, two EU-level organisations interviewed during this study) indicates that in some countries and cities the proportion of leased vehicles is increasing and the proportion of purchased vehicles is decreasing, no specific data on the magnitude of this shift is available. In the absence of specific input on the expected evolution in the share of vehicles by contract type, a constant share has been assumed. The Table 4-1 below summarises the expected number of vehicles procured by vehicle type and type of contract for the period 2020- 2035.

Table 4-1: Baseline numbers of publicly procured vehicles (over the current CVD procurement threshold)[32]

Vehicle type	Contract type	2020	2025	2030	2035
Passenger cars	Purchases	64,478 (76%)	71,247 (76%)	74,760 (76%)	76,379 (76%)
	Leases	19,542 (23%)	21,594 (23%)	22,659 (23%)	23,149 (23%)
	Services	917 (1%)	1,013 (1%)	1,063 (1%)	1,086 (1%)
Vans	Purchases	8,937 (77%)	9,858 (77%)	10,217 (77%)	10,431 (77%)
	Leases	1,281 (11%)	1,414 (11%)	1,465 (11%)	1,496 (11%)
	Services	1,330 (12%)	1,467 (12%)	1,521 (12%)	1,553 (12%)
Rigid trucks	Purchases	9,113 (72%)	10,064 (72%)	11,097 (72%)	11,500 (72%)
	Leases	3,109 (25%)	3,434 (25%)	3,786 (25%)	3,924 (25%)
	Services	448 (4%)	495 (4%)	546 (4%)	566 (4%)
Buses	Purchases	8,335 (65%)	9,138 (65%)	9,558 (65%)	9,592 (65%)
	Leases	838 (7%)	919 (7%)	961 (7%)	964 (7%)
	Services	3,610 (28%)	3,958 (28%)	4,140 (28%)	4,155 (28%)

[32] Projections based on TED procurement figures

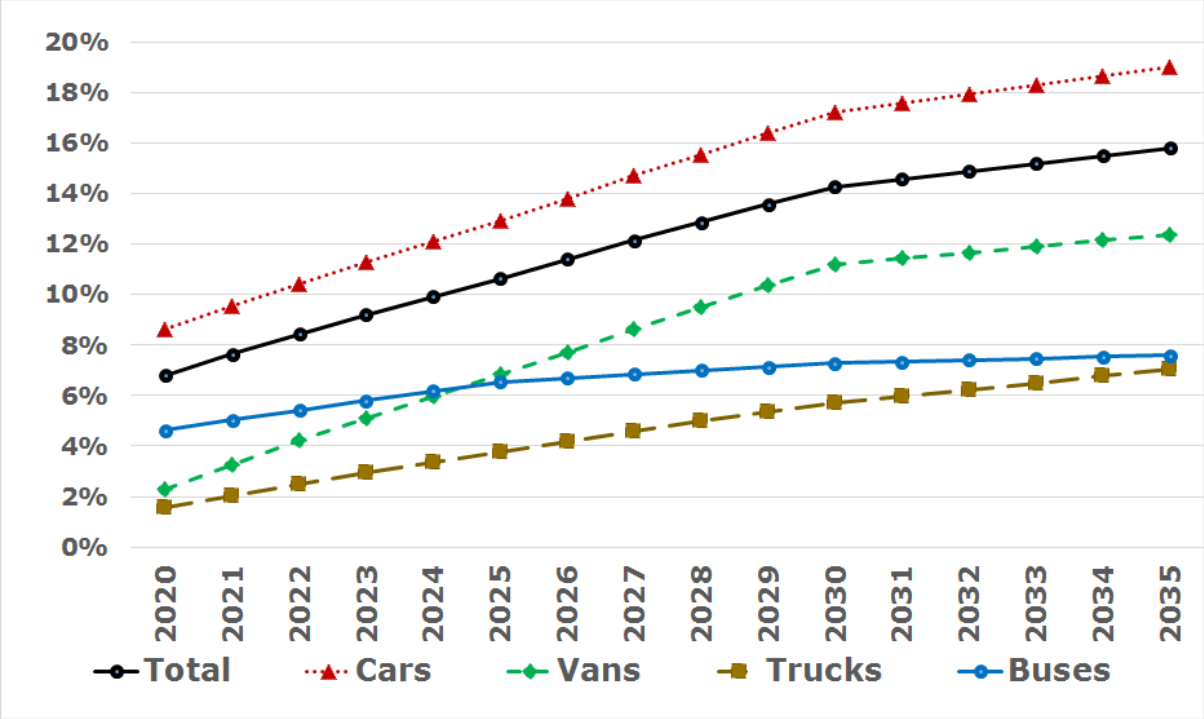
4.2.2 Projections on the share of clean vehicles procured

The final step is the development of projections of the expected share of clean (low[33] and zero emission[34] vehicles) procured each year up to 2035.

In the absence of specific data on the share of vehicles by powertrain among the vehicles procured, it has been assumed that these should follow the more general developments in the update of the EU Reference scenario 2016. Inputs from the EU Reference scenario 2016 have been used to develop a profile of the vehicles procured and assess the expected share of clean and zero emissions vehicles for the period 2020-2035[35].

Figure 4-1 and Figure 4-2 present the expected evolution in the share of low and zero emissions vehicles for the baseline.

Figure 4-1: Share of clean vehicles (non-zero and zero emissions vehicles) in total vehicles procured

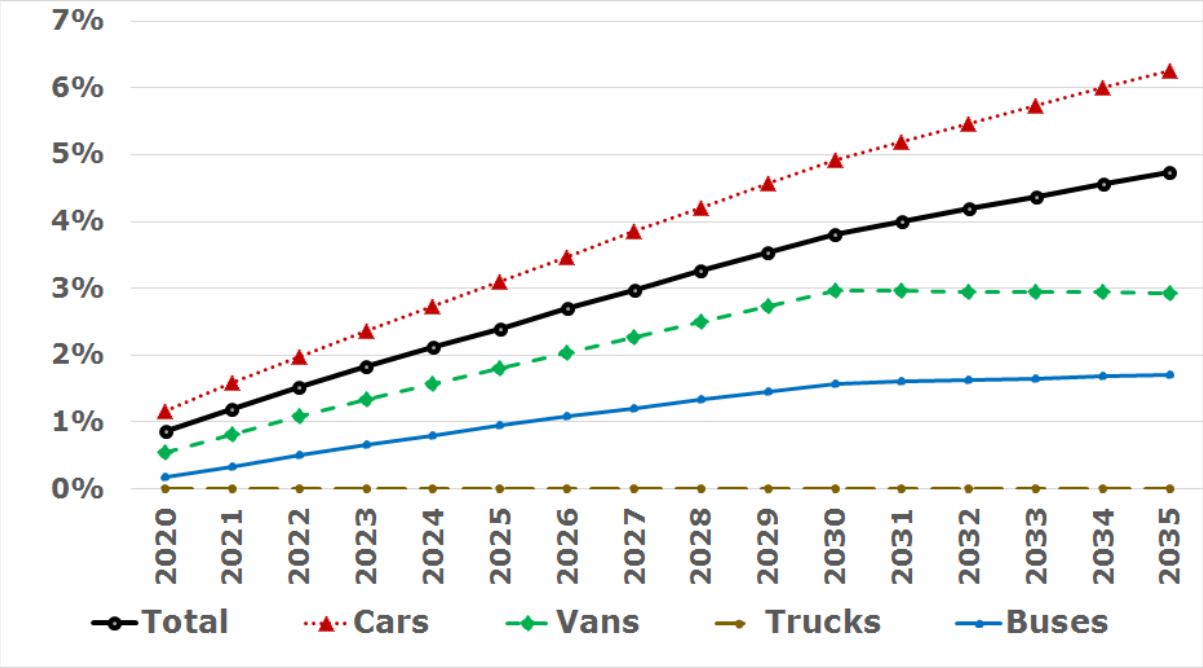


[33] Includes: Plug-in hybrid petrol and diesel, LPG and CNG.

[34] Includes: Fuel cell and battery electric vehicles.

[35] 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 CVD 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 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.

Figure 4-2: Share of zero emissions vehicles in total vehicles procured



Alterative baseline for buses

Projected numbers of clean buses from the updated EU Reference scenario suggest a very slow uptake of clean vehicles. This contrasts with input from a recent survey conducted by UITP and ACEA (ZeEUS, n.a.), which suggested that electric buses may represent up to 50% of the market by 2030 (see Table 4-2). Such projections would also suggest a very different picture in terms of the future uptake of buses and the impact of any targets set in the context of the CVD – though it needs to be noted that this projection likely includes some policy impacts of a revised CVD.

Table 4-2: Projected share of buses procured by powertrain on the basis of UITP data – selected years

Powertrain/fuel	2020	2025	2030	2035
Diesel	54.2%	31.2%	9.4%	9.4%
Diesel Hybrid	9.4%	11.8%	13.5%	13.5%
LPG	0.0%	0.0%	0.0%	0.0%
LNG	15.6%	17.2%	15.6%	15.6%
Electric	18.8%	34.4%	52.1%	52.1%
Fuel Cell	2.1%	5.4%	9.4%	9.4%
Share of clean buses	***36.5%***	***56.7%***	***77.1%***	***77.1%***

Source: UITP; Note: Data provided for 2020, 2025 and 2030. For the period 2030-2035, a zero-growth rate has been assumed, given the high share of clean vehicles already reached by 2030.

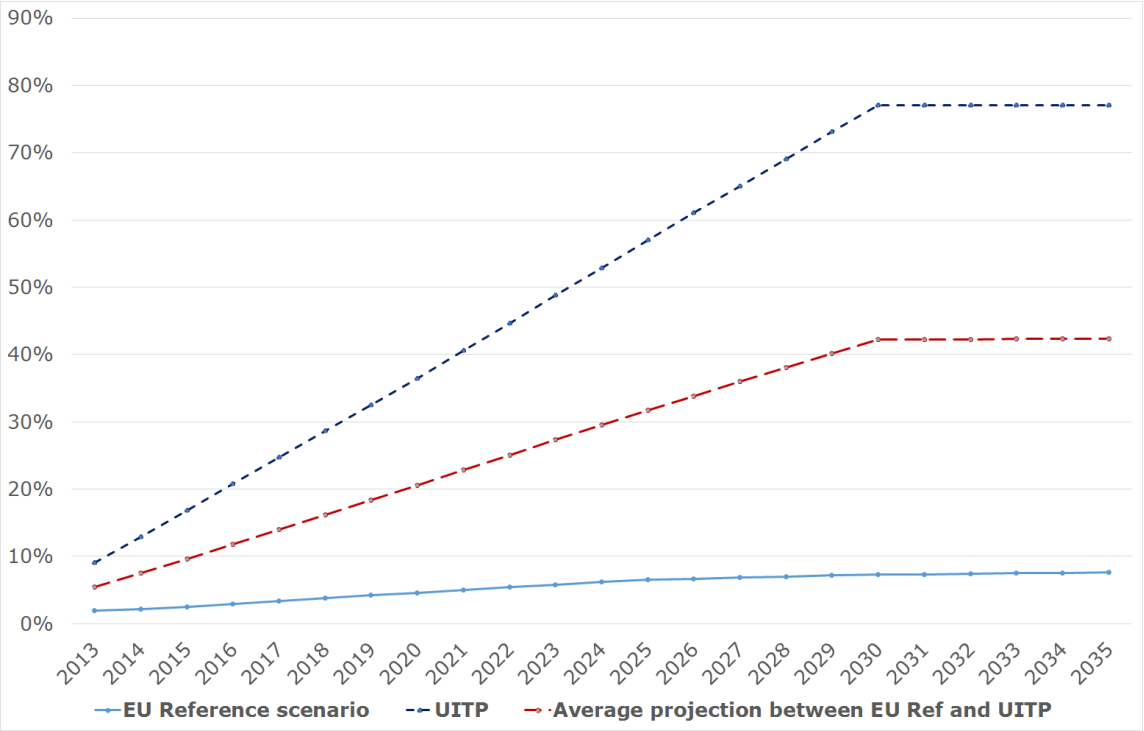
Given the uncertainty of the projections and the absence of alternative sources, we have selected the following approach in developing the baseline scenario for buses:

- The updated EU Reference scenario 2016 projections are used as the main baseline;

- An average of the projected numbers of clean buses from the updated EU Reference scenario 2016 and projections from the UITP study is used as a sensitivity.

The figure below presents the projected share of clean buses used for the alternative scenario (red line).

Figure 4-3: Project share of clean buses in total share of procurement according to different scenarios.



4.2.3 Projection of economic and environmental impacts

Based on estimates of the numbers of and types of vehicles procured during the period 2020-2035, estimates of the expected economic, environmental and social impacts under the baseline were also developed. These were estimated for the period up to 2050 covering the whole lifecycle of vehicles purchased up to 2035. The details of the impacts are presented in Section 5 and compared for the different policy options.

Most data inputs have been obtained directly from an update of the EU Reference Scenario[36] (the so-called "Reference scenario 2016+" or "REF2016+" developed by the ICCS-E3MLab using the PRIMES-TREMOVE model). In cases where the required data is not available from PRIMES-TREMOVE, data from Ricardo Energy & Environment's SULTAN transport policy analysis tool has been used.[37] A full list of model inputs and the key

[36] The update provides projections under current trends and adopted policies. It 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 CVD on Weights and Dimensions, the 4th Railways Package, the NAIADES II Package, the Ports Package and the replacement of the New European Driving Cycle (NEDC) test cycle by the new Worldwide harmonised Light-vehicles Test Procedure (WLTP).

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

sources of data are presented in Annex 3. A description of the model is provided in Annex 9.

Table 4-3: Data inputs and sources used for the baseline scenario

Input	Description	Sources
Vehicle capital cost and fixed annual cost projections	Projection of one-off purchase cost (excluding tax) of new vehicles over time for each vehicle type and powertrain analysed. Annual fixed costs account for aspects such as maintenance.	REF2016+ scenario, capital costs of efficient diesel and petrol types determined using cost curves developed by Ricardo E&E
Annual vehicle mileage	Average lifetime mileage for vehicles considered in the analysis.	SULTAN, calibrated to REF2016+ scenario
Vehicle survival rates	In the form of a distribution over time since the vehicle was purchased.	SULTAN tool
Average energy consumption of new vehicles	New vehicles' average energy consumption over time. This is one element used to calculate the fuel costs.	REF2016+ scenario
Passenger cars and vans: CO_2 emissions	New vehicles' average CO_2 emissions over time, by fuel type. Real-world emissions are used in the model.	REF2016+ scenario
Passenger cars and vans: air pollutant emissions	Real-world NOx, PM and NMHC emissions performance by fuel type, from empirical studies up to 2019. From 2019 onwards following Commission legislation on real-driving emissions (RDE). Post-2019; no subsequent change in emission factors assumed.	Studies from the International Council on Clean Transportation (ICCT), in addition to RDE legislation
HDV CO_2 emissions	Real-world average CO_2 emissions for trucks and buses. These has been calculated based on the energy consumption of HDVs and by applying emissions factors from combustion for each fuel type.	REF2016+ scenario, IEA for emissions factors
HDV pollutant emissions	Real-world NOx, PM and NMHC emissions by fuel type from empirical studies, in line with Euro VI standard.	Studies from the ICCT, own estimates based on Euro VI limit values
GDP projections	Projected GDP growth over time.	REF2016+ scenario, based on the 2015 Ageing report (ECFIN/EPC)
Fuel price projections	Estimates for pre-tax petrol and diesel prices for each year of the assessment period.	REF2016+ scenario
CO_2 external cost projections	Climate change costs from CO_2 emissions	2014 Handbook on external costs of transport.
Pollutant emission cost projections	Social costs from NOx, PM and NMHC emissions	2014 DG MOVE External Cost Handbook

5 ASSESSMENT OF IMPACTS

5.1 Impact on number of clean vehicles procured

This section presents the impacts of each policy option in terms of the impact on the number and share of clean vehicles procured by vehicle type for the reference period 2020-2035. Further background information is presented in Annexes 7 (detailed explanation of the approach followed for each option) and 8 (information on the approach followed for Policy options 2 and 5 that are based on the monetisation methodology).

5.1.1 Passenger cars

A repeal of the CVD (PO1) will mean that passenger cars will not need to follow the specific provisions of the CVD, although individual authorities may continue using environmental criteria in the vehicle procurement process. On the basis that the CVD has been found to have no impact (Ricardo & TEPR, 2015), the repeal option means that that the baseline situation – determined by other relevant EU legislation, any national requirements and other voluntary action at EU or national level - will continue. There will be no change in the share of clean passenger cars procured. However, it is still possible that the removal of any legal requirement at EU level may lead some authorities to remove any environmental criteria from the procurement process, leading to an even smaller share of clean cars, thus a possible negative effect.

The impact of Policy option 2 is smaller (see Table 5-2), although a 55% increase in the number of zero emissions vehicles procured is expected (see Figure 5-1). According to the monetisation methodology, petrol vehicles have the lowest total (internal and external) costs up to 2030, and hence procurement authorities will select petrol cars (see Table 5-1). After 2030, electric vehicles are expected to be the least costly (see detailed calculations in Annex 8). At the same time, for the remaining share of cars procured based on the clean car definition proposed and the national targets set, the expected impact is small. The tailpipe emissions level (50 g CO_2/km) that will apply from 2030 onwards mean that the impact until that point is limited. Thus, there is no impact on the selection of clean cars from the proposed requirements under PO2.

Table 5-1: Ranking of passenger cars by powertrain type on the basis of total cost (internal and external) costs estimated using the monetisation methodology

2020	2025	2030	2035
1-Petrol	1-Petrol	1-Electric	1-Electric
2-LPG	2-Electric	2-Petrol	2-Petrol
3-CNG	3-PHEV Petrol	3-PHEV Petrol	3-PHEV Petrol
4-Diesel	4-LPG	4-LPG	4-LPG
5-PHEV Petrol	5-CNG	5-CNG	5-PHEV Diesel
6-Electric	6-Diesel	6-PHEV Diesel	6-CNG
7-PHEV Diesel	7-PHEV Diesel	7-Diesel	7-Diesel

The impact is even greater in the case of PO5 where the monetisation methodology will be the only approach used for the procurement of all cars. In this case, there will be an almost nine times (885%) increase in the share of zero emissions vehicles, while no non-zero emissions clean vehicles will be procured. The overall impact in terms of the total share of clean vehicles is still high (166% increase in comparison to the baseline).

By comparison, both PO3 and PO4 are expected to lead to a higher uptake of clean vehicles after 2025, once the initial targets for minimum share of clean cars are in place. The more demanding PO3b, PO4b and PO6 (combined option) have higher impact in terms of total clean cars and in relation to zero emissions (ZE) and non-zero emissions (non-ZE) cars. PO3a is expected to lead to a total of around 393,000 additional clean cars during the total period, while PO3b a bit more than 327,000. However, while in the case of PO3a, the

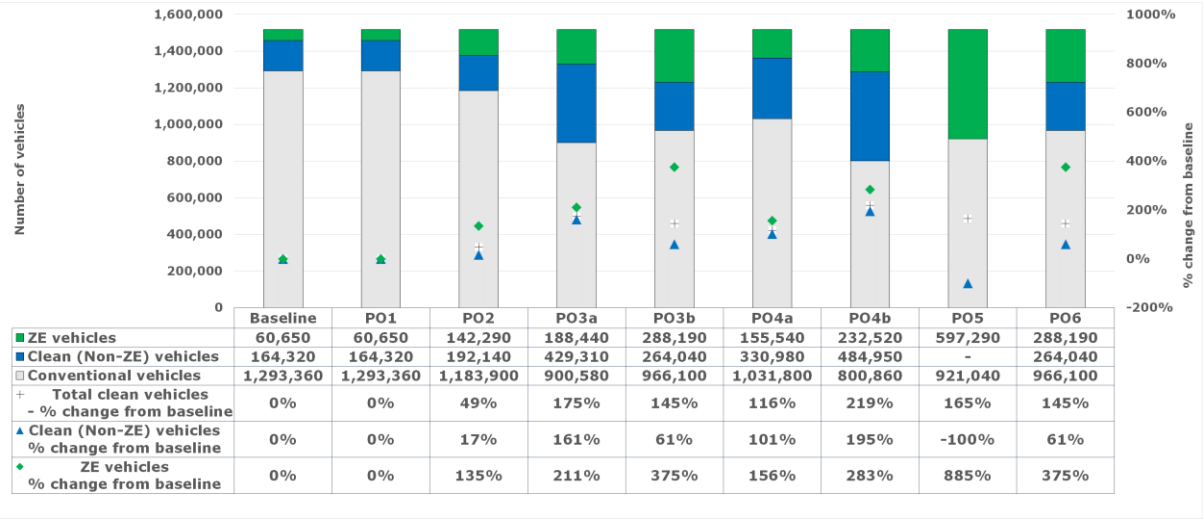
majority of clean cars (69%) will be non-zero emissions cars, in the case of PO3b and the combined option PO6 the requirement for zero emissions cars after 2030, leads to a higher (52%) share of zero emissions vehicles.

The impacts of the less demanding PO4a (with lower national targets set for both 2025 and 2030) are still significant. A total of around 262,000 additional clean cars (116% increase compared to the baseline) is expected, with an increase of over 100% for both ZE and non-ZE cars. In the case of PO4b, the impacts are even more sizeable. A total increase by 492,500 clean cars over the period 2020-2035 is expected (219% increase), with a total increase in zero emissions vehicles of 283% and a twofold increase of non-ZE cars.

Table 5-2: Number and share of clean passenger cars procured under each policy option (selected periods and cumulative over the reference period)

	2020-2024	2025-2029	2030-2035	2020-2035
Total vehicles procured				
Baseline	442,520	478,520	597,290	1,518,330
Number of clean vehicles procured (% of total vehicles procured)				
Baseline	46,240 (10%)	70,340 (15%)	108,390 (18%)	224,970 (15%)
PO1	46,240 (10%)	70,340 (15%)	108,390 (18%)	224,970 (15%)
PO2	42,380 (10%)	64,470 (13%)	227,580 (38%)	334,430 (22%)
PO3a	46,240 (10%)	253,620 (53%)	317,890 (53%)	617,750 (41%)
PO3b	46,240 (10%)	253,620 (53%)	252,370 (42%)	552,230 (36%)
PO4a	46,240 (10%)	139,250 (29%)	301,030 (50%)	486,530 (32%)
PO4b	46,240 (10%)	241,180 (50%)	430,050 (72%)	717,470 (47%)
PO5	0 (0%)	0 (0%)	597,290 (100%)	597,290 (39%)
PO6	46,240 (10%)	253,620 (53%)	252,370 (42%)	552,230 (36%)
Change in comparison to the baseline (change in percentage points from baseline)				
PO1	0 (0pp.)	0 (0pp.)	0 (0pp.)	0 (0pp.)
PO2	-3,860 (-1pp.)	-5,870 (-1pp.)	119,190 (20pp.)	109,460 (7pp.)
PO3a	0 (0pp.)	183,280 (38pp.)	209,500 (35pp.)	392,780 (26pp.)
PO3b	0 (0pp.)	183,280 (38pp.)	143,980 (24pp.)	327,260 (22pp.)
PO4a	0 (0pp.)	68,910 (14pp.)	192,640 (32pp.)	261,560 (17pp.)
PO4b	0 (0pp.)	170,840 (36pp.)	321,660 (54pp.)	492,500 (32pp.)
PO5	-46,240 (-10pp.)	-70,340 (-15pp.)	488,900 (82pp.)	372,320 (25pp.)
PO6	0 (0pp.)	183,280 (38pp.)	143,980 (24pp.)	327,260 (22pp.)

Figure 5-1: Passenger cars procured by type (conventional, clean non-zero emissions and zero emissions) under the proposed policy options during the period 2020-2035 - number and % change from baseline



	Baseline	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
ZE vehicles	60,650	60,650	142,290	188,440	288,190	155,540	232,520	597,290	288,190
Clean (Non-ZE) vehicles	164,320	164,320	192,140	429,310	264,040	330,980	484,950	-	264,040
Conventional vehicles	1,293,360	1,293,360	1,183,900	900,580	966,100	1,031,800	800,860	921,040	966,100
Total clean vehicles - % change from baseline	0%	0%	49%	175%	145%	116%	219%	165%	145%
Clean (Non-ZE) vehicles % change from baseline	0%	0%	17%	161%	61%	101%	195%	-100%	61%
ZE vehicles % change from baseline	0%	0%	135%	211%	375%	156%	283%	885%	375%

Source: Model calculations

Summarising, Policy option 4b is expected to have the highest overall impact among all options with a total increase of 492,500 additional clean vehicles, including both ZE emissions and non-ZE cars. PO5, PO3b and PO6 have also considerable overall impacts in terms of clean vehicles procured but, in the case of PO5, these are expected to come only after 2030 and on the assumption that a 100% change from conventional to electric vehicles is possible. It should also be noted that under all options of PO3 and PO4 and option PO6 a sizeable positive impact (>100% increase) in terms of the share of clean vehicles should be expected.

5.1.2 Vans

As in the case of passenger cars, the CVD repeal option means that that the baseline situation will continue and there will be no real change in the share of clean vehicles procured. As in the case of passenger cars, the removal of any legal requirement at EU level may lead some authorities to remove any environmental criteria from the procurement process, thus having a possible negative effect.

Considering the remaining policy options, the impact of Policy option 2 (PO2) is around 20% more clean vehicles over the whole reference period (2020-2035), with a 122% increase in the number of zero emissions vehicles procured (see Figure 5-2). Petrol vans are expected to be vehicles procured by those procurement authorities that use the methodology on the basis of their total (internal and external) costs up to 2030, while electric vans will be selected after that year (see Table 5-3 and detailed calculations in Annex 8). For the remaining share of vans procured on the basis of the clean vehicle definition proposed and the national targets set, the expected impact is small. The definition of clean vans on the basis of tailpipe emissions set at 50 g CO_2/km will only apply from 2030 onwards.

Table 5-3: Ranking of vans by powertrain type on the basis of total cost (internal and external) costs estimated using the monetisation methodology

2020	2025	2030	2035
1-Petrol 2-Electric 3-Diesel 4-PHEV Diesel	1-Petrol 2-Electric 3-PHEV Diesel 4-Diesel	1-Electric 2-Petrol 3-PHEV Diesel 4-Diesel	1-Electric 2-PHEV Diesel 3-Petrol 4-Diesel

The impact is bigger in the case of PO5 where the monetisation methodology will be used for the procurement of all vans although this only comes after 2030. A total increase in the number of zero emission vans by seventeen times (1687%) is expected with an overall increase in the number of clean vans of 356% (a total of 62,500 additional clean vehicles in comparison to the baseline).

PO3 and PO4 are expected to lead to a higher uptake of both ZE and non-ZE vans after 2025, with PO3b and PO4b and the combined option PO6 having a higher impact. PO3a is expected to lead to a total of 57,320 additional clean vans during the total period, while in the case of PO3b, 48,470. However, in the case of PO3a, the majority of clean vans will be non-ZE vans (67% of all clean cars), while in the case of PO3b (as in the case of PO6) the requirement for ZE vans after 2030, leads to a higher (56%) overall share of ZE vans.

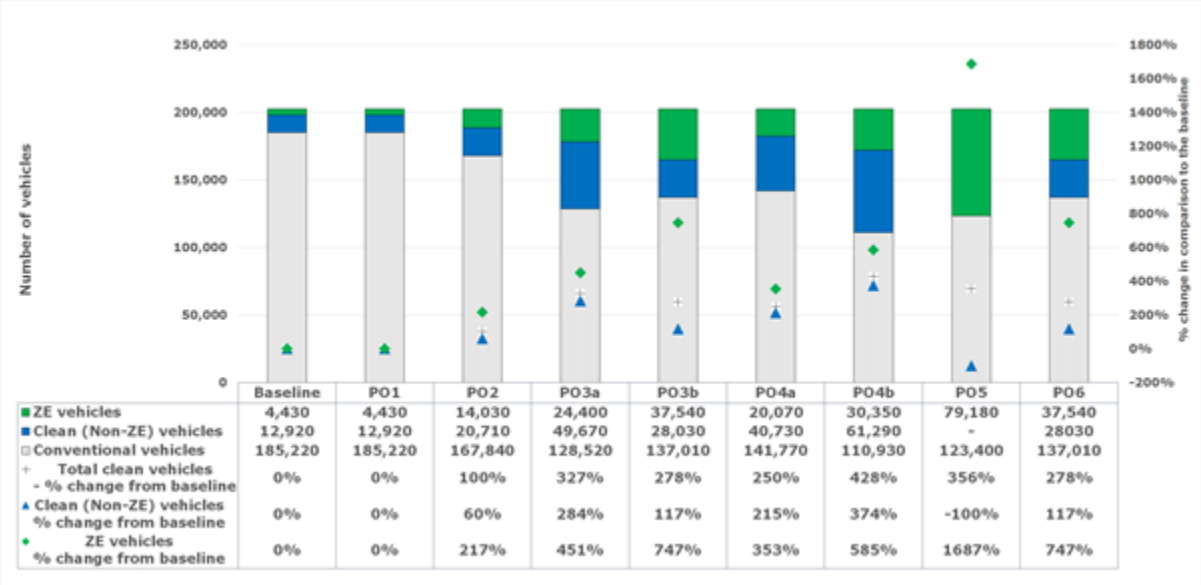
In the case of PO4, the impacts of the less demanding PO4a (with lower national targets set for both 2025 and 2030) are still significant. 43,920 additional clean vans (250% increase in comparison to the baseline) are expected, with a high level of increase (over 200%) for both ZE and non-ZE vans. In the case of PO4b, a total increase by 75,100clean vans over the period 2020-2035 is estimated (428% increase), with a total increase in of 585% for zero emissions vans and of 374% for non-ZE vans (see Table 5-4).

Table 5-4: Number and share of clean vans procured under each policy option (selected periods and cumulative over the reference period)

	2020-2024	2025-2029	2030-2035	2020-2035
Total vehicles procured				
Baseline	60,120	64,620	80,050	204,800
Number of clean vehicles procured (% of total vehicles procured)				
Baseline	2,540 (4%)	5,570 (9%)	9,440 (12%)	17,550 (9%)
PO1	2,540 (4%)	5,570 (9%)	9,440 (12%)	17,550 (9%)
PO2	2,320 (4%)	5,090 (8%)	27,410 (34%)	34,830 (17%)
PO3a	2,540 (4%)	32,300 (50%)	40,040 (50%)	74,870 (37%)
PO3b	2,540 (4%)	32,300 (50%)	31,450 (39%)	66,290 (32%)
PO4a	2,540 (4%)	18,710 (29%)	40,230 (50%)	61,470 (30%)
PO4b	2,540 (4%)	32,470 (50%)	57,640 (72%)	92,650 (45%)
PO5	0 (0%)	0 (0%)	80,050 (100%)	80,050 (39%)
PO6	2,540 (4%)	32,300 (50%)	31,450 (39%)	66,290 (32%)
Change in comparison to the baseline (change in percentage points from baseline)				
PO1	0 (0pp.)	0 (0pp.)	0 (0pp.)	0 (0pp.)
PO2	-220 (0pp.)	-480 (-1pp.)	17,970 (22pp.)	17,280 (8pp.)
PO3a	0 (0pp.)	26,730 (41pp.)	30,600 (38pp.)	57,320 (28pp.)

	2020-2024	2025-2029	2030-2035	2020-2035
PO3b	0 (0pp.)	26,730 (41pp.)	22,010 (27pp.)	48,740 (24pp.)
PO4a	0 (0pp.)	13,140 (20pp.)	30,790 (38pp.)	43,920 (21pp.)
PO4b	0 (0pp.)	26,900 (42pp.)	48,200 (60pp.)	75,100 (37pp.)
PO5	-2,540 (-4pp.)	-5,570 (-9pp.)	70,610 (88pp.)	62,500 (31pp.)
PO6	0 (0pp.)	26,730 (41pp.)	22,010 (27pp.)	48,740 (24pp.)

Figure 5-2: Vans procured by type (conventional, clean non-zero emissions and zero emissions) under the proposed policy options during the period 2020-2035 - number and % change from baseline



	Baseline	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
ZE vehicles	4,430	4,430	14,030	24,400	37,540	20,070	30,350	79,180	37,540
Clean (Non-ZE) vehicles	12,920	12,920	20,710	49,670	28,030	40,730	61,290	-	28030
Conventional vehicles	185,220	185,220	167,840	128,520	137,010	141,770	110,930	123,400	137,010
Total clean vehicles - % change from baseline	0%	0%	100%	327%	278%	250%	428%	356%	278%
Clean (Non-ZE) vehicles % change from baseline	0%	0%	60%	284%	117%	215%	374%	-100%	117%
ZE vehicles % change from baseline	0%	0%	217%	451%	747%	353%	585%	1687%	747%

Source: Model calculations

Overall, as in the case of passenger cars, option 4b is expected to have the highest overall impact in the overall procurement of clean vans. It is expected to lead to more than 4 times higher share of clean vans procured, with a total increase in the number of clean vans by 75,100 over the 2020-2035 period. It will also lead to a sizeable increase in the share of both ZE and non-ZE vans. PO5 also has sizeable overall impacts (356% increase) but coming only after 2030 and on the basis of a 100% change from conventional to electric vans procured. Similar to cars, all options of PO3, PO4 and PO6 are expected to have a sizeable positive impact (>200% increase) in terms of the share of clean vans with significant increase in the number of zero and non-zero emissions vehicles. PO2 has more limited although still not insignificant impacts.

5.1.3 Rigid Trucks

A repeal of the CVD (PO1) will mean that the procurement of trucks will not need to follow any specific requirements set at EU level. The repeal option means that the baseline situation will continue and no change should be expected.

In the case of Policy option 2, a small increase in the total number of clean trucks of 5% (around 580 above the baseline) over the whole reference period (2020-2035) is expected under PO2(see Table 5-6 and Figure 5-3). This is because the use of the monetisation methodology has a negative impact since it is expected to lead to the procurement of non-

clean vehicles (diesel hybrid and diesel) (see Table 5-5) on the basis of their total (internal and external) costs (see detailed calculations in Annex 8). For the remaining share of trucks expected to be procured on the basis of the clean vehicle definition, the proposed national targets are only expected to be in place from 2030 and, thus, have limited positive impact.

The negative impact is even greater in the case of PO5 where the mandatory use of the monetisation methodology should lead procurers to selected diesel hybrid or diesel vehicles, and as result towards a 100% decrease in the number of clean trucks procured.

Table 5-5: Ranking of trucks by powertrain type on the basis of total cost (internal and external) costs estimated using the monetisation methodology

2020	2025	2030	2035
1-Diesel Hybrid 2-CNG 3-Diesel	**1-Diesel Hybrid** 2-Diesel 3-CNG	**1-Diesel** 2-Diesel Hybrid 3-CNG	**1-Diesel** 2-CNG 3-Diesel Hybrid

PO3 is not expected to have an impact on the procurement of trucks under the current definition of the option that does not include a definition of clean trucks based on tailpipe emissions.

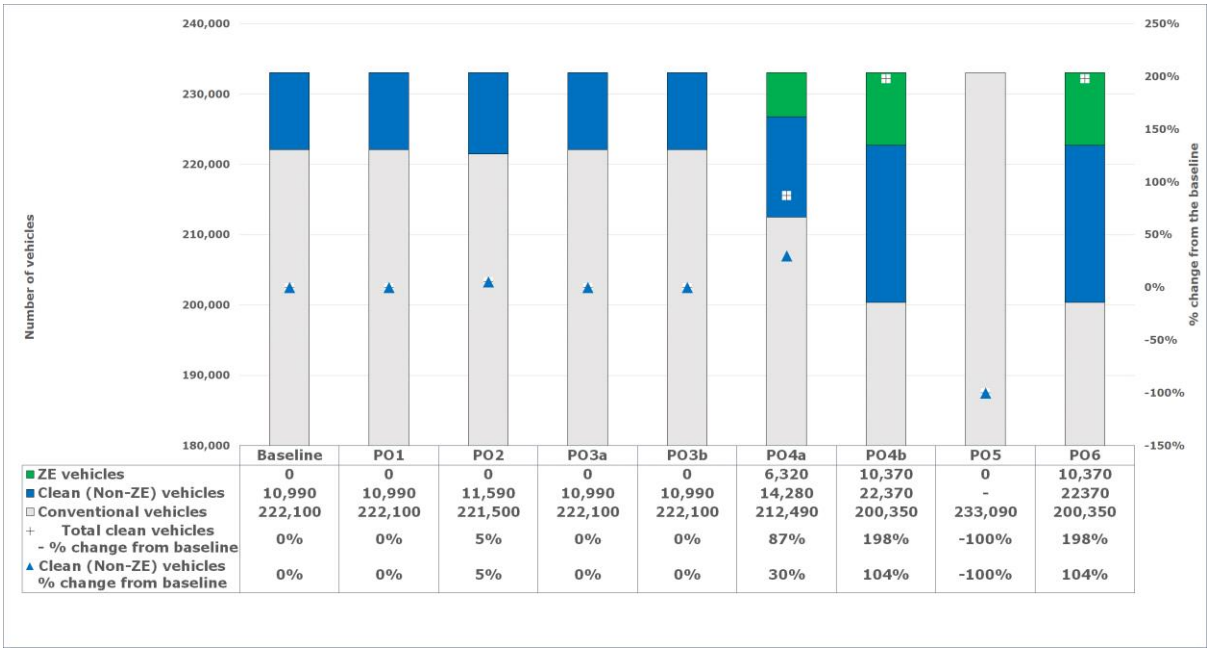
In contrast, under PO4, a positive impact is expected. In the case of PO4a, a net increase in the number of clean trucks of 9,610 is expected (87% increase in comparison to the baseline), of which 3,290 being non-ZE trucks and the remaining 6,320 expected to be ZE trucks. Even greater are the expected impacts of PO4b and following also the combined option PO6, with a total net increase of 21,750 (198% increase), 11,380 being non-ZE and the remaining 10,370 being ZE.

Table 5-6: Number and share of clean rigid trucks procured under each policy option (selected periods and cumulative over the reference period)

	2020-2024	2025-2029	2030-2035	2020-2035
Total vehicles procured				
Baseline	66,000	72,840	94,260	233,090
Number of clean vehicles procured (% of total vehicles procured)				
Baseline	1,640 (2%)	3,340 (5%)	6,010 (6%)	10,990 (5%)
PO1	1,640 (2%)	3,340 (5%)	6,010 (6%)	10,990 (5%)
PO2	1,510 (2%)	3,080 (4%)	7,000 (7%)	11,590 (5%)
PO3a	1,640 (2%)	3,340 (5%)	6,010 (6%)	10,990 (5%)
PO3b	1,640 (2%)	3,340 (5%)	6,010 (6%)	10,990 (5%)
PO4a	1,640 (2%)	5,240 (7%)	13,710 (15%)	20,600 (9%)
PO4b	1,640 (2%)	10,600 (15%)	20,500 (22%)	32,740 (14%)
PO5	0 (0%)	0 (0%)	0 (0%)	0 (0%)
PO6	1,640 (2%)	10,600 (15%)	20,500 (22%)	32,740 (14%)
Change in comparison to the baseline (change in percentage points from baseline)				
PO1	0 (0pp.)	0 (0pp.)	0 (0pp.)	0 (0pp.)
PO2	-130 (0pp.)	-260 (0pp.)	990 (1pp.)	600 (0pp.)
PO3a	0 (0pp.)	0 (0pp.)	0 (0pp.)	0 (0pp.)

	2020-2024	2025-2029	2030-2035	2020-2035
PO3b	0 (0pp.)	0 (0pp.)	0 (0pp.)	0 (0pp.)
PO4a	0 (0pp.)	1,900 (3pp.)	7,700 (8pp.)	9,610 (4pp.)
PO4b	0 (0pp.)	7,260 (10pp.)	14,490 (15pp.)	21,750 (9pp.)
PO5	-1,640 (-2pp.)	-3,340 (-5pp.)	-6,010 (-6pp.)	-10,990 (-5pp.)
PO6	0 (0pp.)	7,260 (10pp.)	14,490 (15pp.)	21,750 (9pp.)

Figure 5-3: Rigid trucks procured by type (conventional, clean non-zero emissions and zero emissions) under the proposed policy options during the period 2020-2035 - number and % change from baseline



	Baseline	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
ZE vehicles	0	0	0	0	0	6,320	10,370	0	10,370
Clean (Non-ZE) vehicles	10,990	10,990	11,590	10,990	10,990	14,280	22,370	-	22370
Conventional vehicles	222,100	222,100	221,500	222,100	222,100	212,490	200,350	233,090	200,350
Total clean vehicles - % change from baseline	0%	0%	5%	0%	0%	87%	198%	-100%	198%
Clean (Non-ZE) vehicles % change from baseline	0%	0%	5%	0%	0%	30%	104%	-100%	104%

Source: Model calculations; Note: No % change from baseline is calculated for ZE vehicles in the case of PO4a and PO4b, given that these were zero (0) under the baseline

Overall, options PO4b and PO6 are expected to have the highest overall impact in the procurement of clean trucks with a net increase of 21,750 over the 2020-2035 reference period, including both zero and non-zero emissions trucks, a 198% increase in comparison to the baseline. The impact of PO4a is also positive (87% increase; 9,610 additional clean trucks). PO3 does not have an impact since it does not cover trucks, while is expected to lead a reduced number of clean vehicles since the use of monetisation methodology and the use of clean definition will only apply after 2030.

5.1.4 Buses

A repeal of the CVD (PO1) will mean that the procurement of the approximately 140,000 buses procured over the period 2020-2025 buses will not be affected by any specific requirements set at EU level. Thus, the repeal option means that the baseline situation – determined by other relevant EU legislation, any national requirements and other voluntary actions – will continue. However, it is also possible that certain authorities will

remove and energy consumption or environmental criteria currently in place, thus further reducing the overall share of clean procured.

In the case of PO2, a significant increase in the number of clean buses by 25,000 is expected under PO2 when compared against the Baseline scenario (167% increase), although this is much less when compared against the alternative higher baseline, based on the average of the EU Reference scenario and the UITP data (net increase of 9,840; 12% change from the baseline), (see Table 5-8 and

Figure 5-4). In addition, there is a tenfold increase in the share of zero emission buses under this policy option which is driven by the fact that electric buses are expected to be procured immediately following the implementation of the option (see Table 5-7).

Table 5-7: Ranking of buses by powertrain type on the basis of total cost (internal and external) costs estimated using the monetisation methodology

2020	2025	2030	2035
1-Electric 3-Diesel Hybrid 4-Diesel 5-LPG 6-LNG	**1-Electric** 3-Diesel Hybrid 4-Diesel 5-LPG 6-LNG	**1-Electric** 3-Diesel Hybrid 4-Diesel 5-LPG 6-LNG	**1-Electric** 3-Diesel Hybrid 4-Diesel 5-LPG 6-LNG

The positive impact is even greater in the case of PO5. The mandatory use of the monetisation methodology should lead all procurers to select electric buses according to the description of the policy option. Thus, a net increase of 210,810 clean vehicles - all electric zero emission buses – is expected (1400% change) compared to the Baseline scenario, and around 146,000 relative to the alternative baseline scenario (a 63% increase).

As in the case of trucks, PO3 is not expected to have an impact on the procurement of buses under the current definition of the option that does not include a definition of clean buses based on tailpipe emissions.

In the case of PO4a, the total net impact in terms of clean buses is 81,600 compared to the baseline scenario, although much reduced (30,080) in the case of using the alternative baseline scenario as a starting point, representing 542% and 38% change from the respective baselines. Under the more demanding option PO4b and the combined option PO6, the total net impact in terms of clean buses is 101,850 under the Baseline and 50,170 in the case of the alternative baseline scenario (677% and 63% change from the respective baselines) (see Table 5-8,

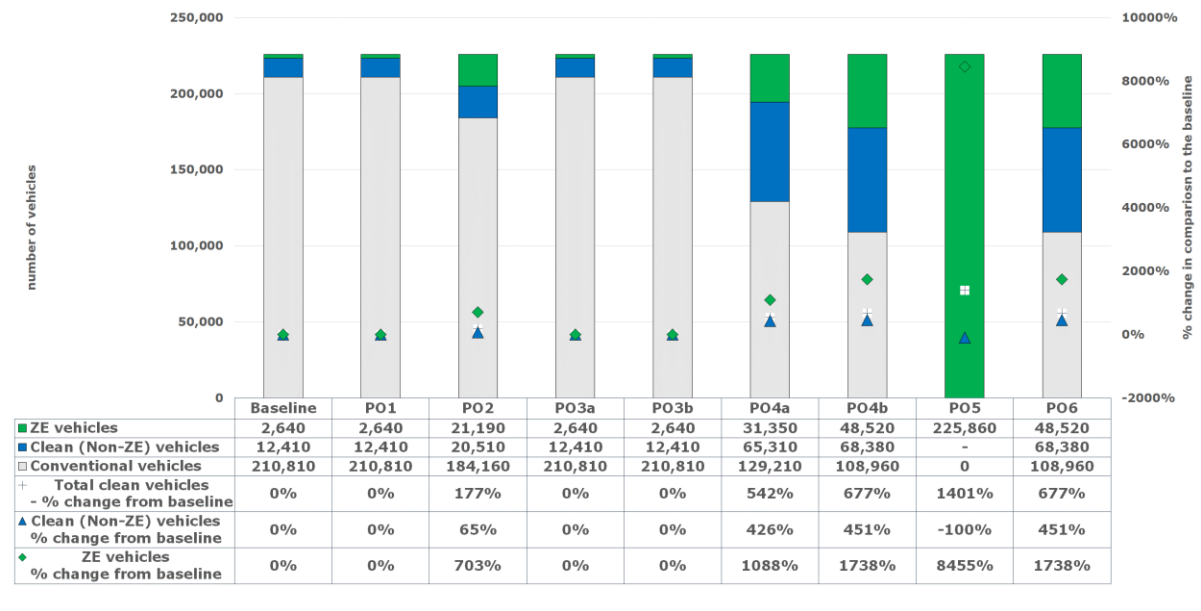
Figure 5-4 and Figure 5-5). All three options – which include the first set of national targets in 2025 followed by more demanding targets in 2030 - lead to a sizeable increase in the share of zero emissions vehicles in the case of the Baseline scenario, which assumes a limited uptake of clean non-ZE and ZE buses (1088% increase for PO4a and 1739% increase in the case of PO4b and PO6). In the case of the alternative baseline scenario, which assumes a much higher level of uptake of clean buses, the percentage increase of ZE buses is only 5% for PO4b and PO6 and even negative for PO4a (-26%).

Table 5-8: Number and share of clean buses procured under each policy option (selected periods and cumulative over the reference period)

	2020-2024	2025-2029	2030-2035	2020-2035
Total vehicles procured				
Baseline	66,380	71,360	88,110	225,860
Number of clean vehicles procured (% of total vehicles procured)				
Baseline	3,600 (5%) *16,780 (25%)*	4,880 (7%) *25,720 (36%)*	6,560 (7%) *37,240 (42%)*	15,050 (7%) *79,740 (35%)*
PO1	3,600 (5%) *16,780 (25%)*	4,880 (7%) *25,720 (36%)*	6,560 (7%) *37,240 (42%)*	15,050 (7%) *79,740 (35%)*
PO2	8,110 (12%) *20,340 (31%)*	9,650 (14%) *28,990 (41%)*	23,940 (27%) *40,890 (46%)*	41,700 (18%) *90,220 (40%)*
PO3a	3,600 (5%) *16,780 (25%)*	4,880 (7%) *25,720 (36%)*	6,560 (7%) *37,240 (42%)*	15,050 (7%) *79,740 (35%)*
PO3b	3,600 (5%) *16,780 (25%)*	4,880 (7%) *25,720 (36%)*	6,560 (7%) *37,240 (42%)*	15,050 (7%) *79,740 (35%)*
PO4a	3,600 (5%) *16,780 (25%)*	30,400 (43%) *30,400 (43%)*	62,650 (71%) *62,650 (71%)*	96,650 (43%) *109,820 (49%)*
PO4b	3,600 (5%) *16,780 (25%)*	50,740 (71%) *50,740 (71%)*	62,560 (71%) *62,560 (71%)*	116,900 (52%) *130,070 (58%)*
PO5	66,380 (100%) *66,380 (100%)*	71,360 (100%) *71,360 (100%)*	88,110 (100%) *88,110 (100%)*	225,860 (100%) *225,850 (100%)*
PO6	3,600 (5%) *16,780 (25%)*	50,740 (71%) 50,740 (71%)	62,560 (71%) *62,560 (71%)*	116,900 (52%) *130,070 (58%)*
Change in comparison to the baseline (change in percentage points from baseline)				
Baseline Scenario				
PO1	4,510 (7pp.)	4,770 (7pp.)	17,380 (20pp.)	26,650 (12pp.)
PO2	0 (0pp.)	0 (0pp.)	0 (0pp.)	0 (0pp.)
PO3a	0 (0pp.)	0 (0pp.)	0 (0pp.)	0 (0pp.)
PO3b	0 (0pp.)	25,520 (36pp.)	56,090 (64pp.)	81,600 (36pp.)
PO4a	0 (0pp.)	45,860 (64pp.)	56,000 (64pp.)	101,850 (45pp.)
PO4b	62,780 (95pp.)	66,480 (93pp.)	81,550 (93pp.)	210,810 (93pp.)
PO5	0 (0pp.)	45,860 (64pp.)	56,000 (64pp.)	101,850 (45pp.)
PO6	4,510 (7pp.)	4,770 (7pp.)	17,380 (20pp.)	26,650 (12pp.)
Alternative Baseline Scenario				
PO1	0 (0pp.)	0 (0pp.)	0 (0pp.)	0 (0pp.)
PO2	3,560 (5pp.)	3,270 (5pp.)	3,650 (4pp.)	10,480 (5pp.)

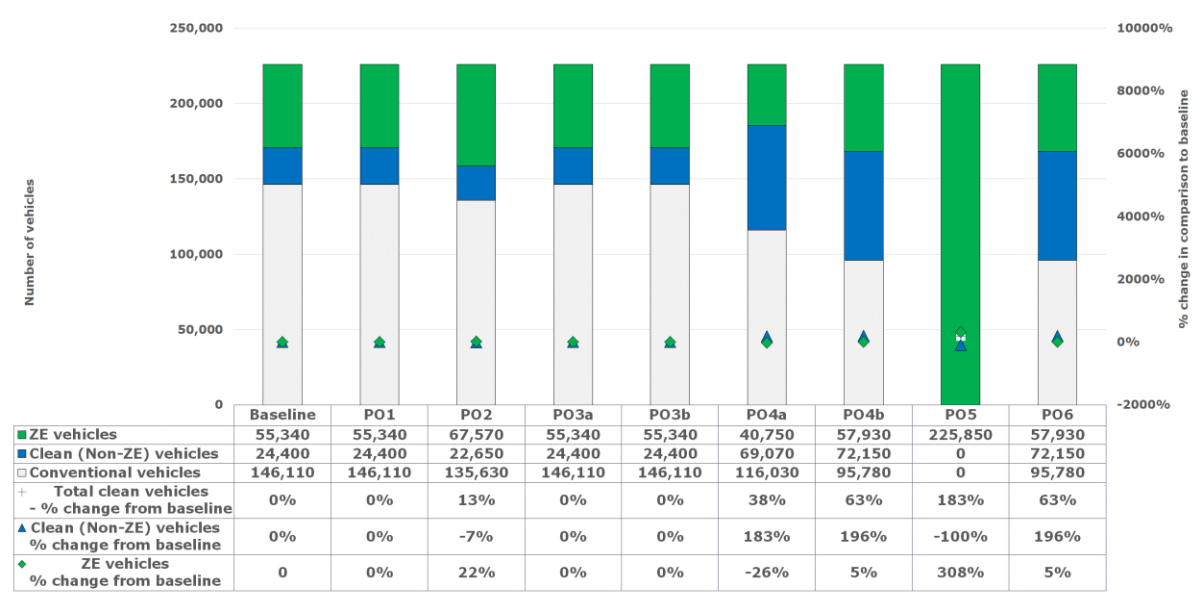
	2020-2024	2025-2029	2030-2035	2020-2035
PO3a	0 (0pp.)	0 (0pp.)	0 (0pp.)	0 (0pp.)
PO3b	0 (0pp.)	0 (0pp.)	0 (0pp.)	0 (0pp.)
PO4a	0 (0pp.)	4,680 (7pp.)	25,410 (29pp.)	30,080 (13pp.)
PO4b	0 (0pp.)	25,020 (35pp.)	25,320 (29pp.)	50,330 (22pp.)
PO5	49,600 (75pp.)	45,640 (64pp.)	50,870 (58pp.)	146,110 (65pp.)
PO6	0 (0pp.)	25,020 (35pp.)	25,320 (29pp.)	50,330 (22pp.)

Figure 5-4: Buses procured by type (conventional, clean non-zero emissions and zero emissions) under the proposed policy options during the period 2020-2035 - number and % change from baseline scenario



	Baseline	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
ZE vehicles	2,640	2,640	21,190	2,640	2,640	31,350	48,520	225,860	48,520
Clean (Non-ZE) vehicles	12,410	12,410	20,510	12,410	12,410	65,310	68,380	-	68,380
Conventional vehicles	210,810	210,810	184,160	210,810	210,810	129,210	108,960	0	108,960
Total clean vehicles - % change from baseline	0%	0%	177%	0%	0%	542%	677%	1401%	677%
Clean (Non-ZE) vehicles % change from baseline	0%	0%	65%	0%	0%	426%	451%	-100%	451%
ZE vehicles % change from baseline	0%	0%	703%	0%	0%	1088%	1738%	8455%	1738%

Figure 5-5: Buses procured (conventional, clean non-zero emissions and zero emissions) under the proposed policy options during the period 2020-2035 - number and % change from alternative baseline scenario



	Baseline	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
ZE vehicles	55,340	55,340	67,570	55,340	55,340	40,750	57,930	225,850	57,930
Clean (Non-ZE) vehicles	24,400	24,400	22,650	24,400	24,400	69,070	72,150	0	72,150
Conventional vehicles	146,110	146,110	135,630	146,110	146,110	116,030	95,780	0	95,780
Total clean vehicles - % change from baseline	0%	0%	13%	0%	0%	38%	63%	183%	63%
Clean (Non-ZE) vehicles % change from baseline	0%	0%	-7%	0%	0%	183%	196%	-100%	196%
ZE vehicles % change from baseline	0	0%	22%	0%	0%	-26%	5%	308%	5%

Sources: Model calculations

Overall, the analysis suggests that option PO5 is expected to have a very high overall impact in the procurement of clean buses – with an overall 14 times increase in comparison the baseline scenario and a bit less than 2 times under the alternative baseline scenario that assumes higher level of uptake of clean buses. The use of monetisation methodology means that all this net increase is only based on ZE buses. Furthermore, under PO5 the

change in the vehicles procured from the current mix is expected to take place from the date that the new legislation (in the form of an EU Regulation) enters into force. Besides PO5 – which provides a politically challenging implementation scenario – PO4b and PO6 are expected to have a sizeable positive impact in terms of both total clean buses procured (677% increase relative to the baseline; 63% compared to the alternative baseline) and particularly in terms of ZE buses. Sizeable positive impacts (in terms of percentage change from the baseline) can be expected in the case of PO2 although the net impact in terms of clean vehicles over the 2020-2035 period will be smaller in comparison to PO3b since this option will only cover purchased vehicles and will not affect vehicles procured under leasing or services contracts.

5.1.5 Total vehicles

Table 5-9, Figure 5-6 and Figure 5-7 present the results of the analysis of the impacts of the policy options for all vehicles procured for both the EU Reference scenario and the alternative baselines.

In total, PO4b has the greatest net impact in terms of clean vehicles procured over the whole 2020-2035 period (in the range of 640,000 to 691,000 depending on the baseline) and the higher percentage change from the baseline (191% to 253%). PO5 has similar level of net impacts (in the range of 570,000-636,000) but the main difference is that these come at a later stage – after 2030. Any positive impacts on the purchase of clean buses during the initial period are counterbalanced by a negative impact in the case of cars or vans. Another difference is that in the case of PO5, the increase in the number and share of clean vehicles concerns only zero emission electric vehicles (cars, vans or buses), as a result of the use of the monetisation methodology.

The net impacts in terms of clean vehicles procured of both PO3a and PO3b are greater than PO4a given the much higher impact on cars and vans and despite the fact that it does not affect buses and trucks. PO3b has a reduced impact in terms of on the number of additional clean vehicles although a higher impact in terms of the zero emissions vehicles. As a combination of options PO3b and PO4b, PO6 sits somewhere in the middle of the two options in terms of the total share of clean vehicles, although it leads to a higher share of zero emissions vehicles and overall a sizable market impact.

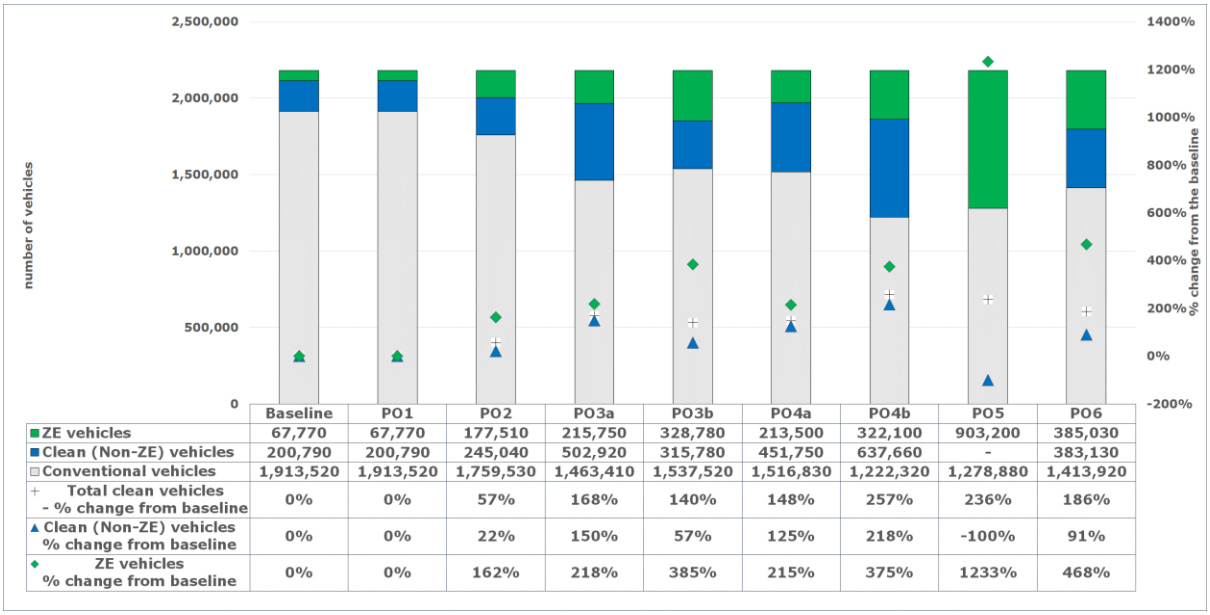
Finally, the total net impacts from the light revision option (PO2) are more limited (in the range of 137,000-154,000 depending on the baseline). In this case there is also significant uncertainty as to the extent that national targets set by Member States will reflect the EU average target of 35% share of clean vehicles that has been the basis of the analysis.

Table 5-9: Impact of policy options on total number of vehicles procured and share of clean vehicles procured (selected periods and cumulative over the reference period)

	2020-2024	2025-2029	2030-2035	2020-2035
Total vehicles procured				
Baseline /Alternative baseline	635,020	687,350	859,710	2,182,070
Number of clean vehicles procured relative to the baseline and alternative baseline (% of total vehicles procured)				
Baseline /Alternative baseline	54,030 (9%) *67,200 (11%)*	84,140 (12%) *104,980 (15%)*	130,400 (15%) *161,080 (19%)*	268,560 (12%) *333,250 (15%)*
PO1	54,030 (9%) *67,200 (11%)*	84,140 (12%) *104,980 (15%)*	130,400 (15%) *161,080 (19%)*	268,560 (12%) *333,250 (15%)*

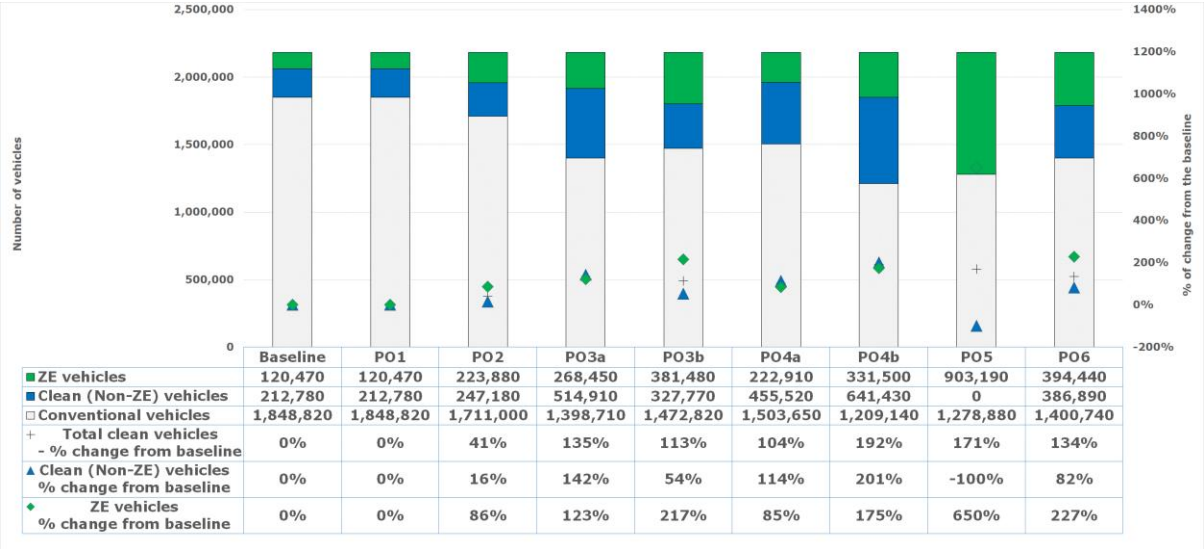
	2020-2024	2025-2029	2030-2035	2020-2035
PO2	54,320 (9%) *66,550 (10%)*	82,300 (12%) *101,640 (15%)*	285,930 (33%) *302,880 (35%)*	422,550 (19%) *471,070 (22%)*
PO3a	54,030 (9%) *67,200 (11%)*	294,150 (43%) *314,980 (46%)*	370,500 (43%) *401,180 (47%)*	718,670 (33%) *783,360 (36%)*
PO3b	54,030 (9%) *67,200 (11%)*	294,150 (43%) *314,980 (46%)*	296,390 (34%) *327,070 (38%)*	644,560 (30%) *709,250 (33%)*
PO4a	54,030 (9%) *67,200 (11%)*	193,600 (28%) *193,600 (28%)*	417,620 (49%) *417,620 (49%)*	665,250 (30%) *678,420 (31%)*
PO4b	54,030 (9%) *67,200 (11%)*	334,990 (49%) *334,990 (49%)*	570,750 (66%) *570,750 (66%)*	959,760 (44%) *972,930 (45%)*
PO5	66,380 (10%) *66,380 (10%)*	71,360 (10%) *71,360 (10%)*	765,450 (89%) *765,450 (89%)*	903,200 (41%) *903,190 (41%)*
PO6	54,030 (9%) *67,200 (11%)*	347,250 (51%) *347,250 (51%)*	366,880 (43%) *366,880 (43%)*	768,160 (35%) *781,330 (36%)*
Change in comparison to the baseline (change in percentage points from baseline)				
Baseline Scenario				
PO1	0 (0pp.)	0 (0pp.)	0 (0pp.)	0 (0pp.)
PO2	290 (0pp.)	-1,840 (0pp.)	155,530 (18pp.)	153,990 (7pp.)
PO3a	0 (0pp.)	210,010 (31pp.)	240,100 (28pp.)	450,110 (21pp.)
PO3b	0 (0pp.)	210,010 (31pp.)	165,990 (19pp.)	376,000 (17pp.)
PO4a	0 (0pp.)	109,460 (16pp.)	287,220 (33pp.)	396,690 (18pp.)
PO4b	0 (0pp.)	250,850 (36pp.)	440,350 (51pp.)	691,200 (32pp.)
PO5	12,350 (2pp.)	-12,780 (-2pp.)	635,050 (74pp.)	634,640 (29pp.)
PO6	0 (0pp.)	263,110 (38pp.)	236,480 (28pp.)	499,600 (23pp.)
Alternative Baseline Scenario				
PO1	0 (0pp.)	0 (0pp.)	0 (0pp.)	0 (0pp.)
PO2	-650 (0pp.)	-3,340 (0pp.)	141,800 (16pp.)	137,820 (6pp.)
PO3a	0 (0pp.)	210,000 (31pp.)	240,100 (28pp.)	450,110 (21pp.)
PO3b	0 (0pp.)	210,000 (31pp.)	165,990 (19pp.)	376,000 (17pp.)
PO4a	0 (0pp.)	88,620 (13pp.)	256,540 (30pp.)	345,170 (16pp.)
PO4b	0 (0pp.)	230,010 (33pp.)	409,670 (48pp.)	639,680 (29pp.)
PO5	-820 (0pp.)	-33,620 (-5pp.)	604,370 (70pp.)	569,940 (26pp.)
PO6	0 (0pp.)	242,270 (35pp.)	205,800 (24pp.)	448,080 (21pp.)

Figure 5-6: Vehicles procured by type (conventional, clean non-zero emissions and zero emissions) under the proposed policy options during the period 2020-2035 - number and % change from baseline scenario



	Baseline	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
ZE vehicles	67,770	67,770	177,510	215,750	328,780	213,500	322,100	903,200	385,030
Clean (Non-ZE) vehicles	200,790	200,790	245,040	502,920	315,780	451,750	637,660	-	383,130
Conventional vehicles	1,913,520	1,913,520	1,759,530	1,463,410	1,537,520	1,516,830	1,222,320	1,278,880	1,413,920
Total clean vehicles - % change from baseline	0%	0%	57%	168%	140%	148%	257%	236%	186%
Clean (Non-ZE) vehicles % change from baseline	0%	0%	22%	150%	57%	125%	218%	-100%	91%
ZE vehicles % change from baseline	0%	0%	162%	218%	385%	215%	375%	1233%	468%

Figure 5-7: Vehicles procured (conventional, clean non-zero emissions and zero emissions) under the proposed policy options during the period 2020-2035 - number and % change from alternative baseline scenario



	Baseline	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
ZE vehicles	120,470	120,470	223,880	268,450	381,480	222,910	331,500	903,190	394,440
Clean (Non-ZE) vehicles	212,780	212,780	247,180	514,910	327,770	455,520	641,430	0	386,890
Conventional vehicles	1,848,820	1,848,820	1,711,000	1,398,710	1,472,820	1,503,650	1,209,140	1,278,880	1,400,740
Total clean vehicles - % change from baseline	0%	0%	41%	135%	113%	104%	192%	171%	134%
Clean (Non-ZE) vehicles % change from baseline	0%	0%	16%	142%	54%	114%	201%	-100%	82%
ZE vehicles % change from baseline	0%	0%	86%	123%	217%	85%	175%	650%	227%

Sources: Model calculations

5.2 Analysis of economic impacts

The main type of economic impacts includes costs to authorities and business (to vehicle suppliers).

1. Possible impact on authorities include:
    - Procurement costs arising as a result of possible increase in prices for the procurement of new vehicles during the reference period (2020-2035) (see Section 5.2.1.1);
    - Operational cost savings due to reduced fuel consumption, reductions in emissions and improvements to air quality from vehicles purchased during the reference period. These costs have been calculated for the period 2020-2050 to take into account the lifecycle of vehicles purchased during the reference period (see Section 5.2.1.2);
    - Administrative costs for the contracting authorities for the procurement of vehicles during the reference period that need to take into account the requirements of the CVD in their procurement procedures and ensure compliance with its provisions (see Section 5.2.1.3);
    - Other costs, including the costs for reporting and costs for national or local authorities arising from the policy options (e.g. costs for the development of national plans) (see Section 5.2.1.4);
2. Impacts on suppliers of vehicles may include:
    - Benefits from increased sales of clean vehicles as a result of the increased level of public sector demand (see Section 5.2.2.1);
    - Administrative costs as a result of the need to adapt to the new procurement procedures, provide the additional information requested and, possibly, perform tests to demonstrate that the vehicles meet the set requirements (see Section 5.2.2.2); and
    - Compliance costs for suppliers of vehicles that may need to invest in new technologies in order to be able to meet the new procurement criteria set by the contracting authorities (see Section 5.2.2.3);

In addition to the above costs, we also considered in the following economic impacts for the proposed options:

- Stimulation of innovation in the field of clean vehicle technologies and increased competitiveness of the European industry through economies of scale/learning
- Specific impacts of the proposed measures on SMEs, and
- Impact on energy import dependency.

In the following section, we present the results of the analysis for all policy options.

5.2.1 Impacts on authorities

5.2.1.1 Impact on procurement costs

The adoption of more demanding requirements is expected to lead to higher procurement costs due to the higher prices of alternative fuelled or low emission vehicles that will meet the requirements.

To assess these additional costs, we have used data on average vehicle prices for each powertrain type on the basis of the REF2016+ Scenario.

We have also assumed that prices will be the same for vehicles procured through leasing/hiring and services contracts.

In our analysis, we have also assumed that procurement authorities will maintain the same level of procurement activity (i.e. number of vehicles procured) adjusted for GDP growth rates, rather than scaling down their activities as a result of higher costs/vehicle. This is considered reasonable since they will still need to provide similar level of services to their citizens.

On the basis of these figures, we have calculated the additional procurement costs for authorities. Table 5-10 presents the calculated total costs for the period 2020-2035.

In the case of the repeal option (PO1) there will still be procurement costs, but these will not be as a result of the CVD requirements. Given that the ex-post evaluation concluded that there is no impact on the type of vehicles procured, a repeal option will lead to no change from the baseline.

Among the remaining policy options PO5 is expected to lead to highest up-front additional procurement costs (around €11 billion for the total 2020-2035 period; a 12% increase from the baseline), although €8.6 billion (9% increase) if we consider the alternative baseline. This is almost exclusively driven by the fact that the more expensive electric buses will be selected from 2020 onwards on the basis of the total internal and external costs estimated using the monetisation methodology.

Among the remaining options, PO6 and PO4b are the most costly, a bit less than €4.2 billion for PO6 and a bit less than €4.1 billion for PO4b over a time period of 2020-2035 (around €2.7 billion in the case of alternative baseline for PO6 and €2.6 billion for PO4b), both cases no more than 5% change from the baseline and tolerable, particularly if seen from an annualised cost perspective. The change is driven by higher costs from the procurement of more expensive clean – mainly zero emission – vehicles (all types) from 2025 onwards. The impacts of PO3a and PO3b are more limited (2% change from the baseline) due to the fact that they only affect the procurement of passenger cars and vans. It should also be noted that the costs under option PO4b – as well as PO3a, PO3b, PO4a and PO6 – are expected to come at a later stage than in the case of PO5.

Table 5-10: Estimated impact on procurement costs of proposed policy options – Net present value of additional cost of vehicles procured during the period 2020-2035 (€ million) and % change in comparison to the baseline

	Baseline/Alt. baseline	Net change from baseline (% change)							
		PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Total – Baseline	**88,850**	**0 (0%)**	**1,300 (1%)**	**1,960 (2%)**	**1,790 (2%)**	**2,550 (3%)**	**4,090 (5%)**	**11,030 (12%)**	**4,190 (5%)**
Total – Alt. baseline	***91,240***	***0 (0%)***	***960 (1%)***	***1,960 (2%)***	***1,790 (2%)***	***1,080 (1%)***	***2,640 (3%)***	***8,630 (9%)***	***2,740 (3%)***
Cars	25,250	0 (0%)	290 (1%)	1,680 (7%)	1,520 (6%)	710 (3%)	1,350 (5%)	90 (0%)	1,520 (6%)
Vans	3,460	0 (0%)	40 (1%)	280 (8%)	270 (8%)	190 (5%)	340 (10%)	-110 (-3%)	270 (8%)
Rigid trucks	12,550	0 (0%)	150 (1%)	0 (0%)	0 (0%)	150 (1%)	260 (2%)	1,860 (15%)	260 (2%)
Buses - baseline	47,590	0 (0%)	820 (2%)	0 (0%)	0 (0%)	1,500 (3%)	2,140 (4%)	9,190 (19%)	2,140 (4%)
Buses – Alt. baseline	*49,980*	*0 (0%)*	*490 (1%)*	*0 (0%)*	*0 (0%)*	*20 (0%)*	*690 (1%)*	*6,790 (14%)*	*690 (1%)*

5.2.1.2 Impacts on operational costs

Besides the impact on procurements costs, any change to the type of vehicles procured should also have an impact on energy consumption (i.e. reduced fuel costs) as well as other fixed costs including vehicle insurance, maintenance, and repair and, where relevant, battery replacement costs. On the basis of the expected impact on the vehicles procured presented in Section 5.1 we have estimated the impacts on authorities. A key assumption made was that all vehicles are expected to do the same number of miles per year irrespective of powertrain. While this is generally not the case, it is considered a reasonable scenario on the basis that publicly procured vehicles serve certain functions and all vehicles selected should be able to provide the same functionality. A different assumption would mean that, depending on the powertrain, a different number of vehicles would need to be procured to serve the same needs of authorities.

Table 5-11 summarises the costs for each of the policy options and scenarios considered. As in the case of procurement costs, PO1 should have no impact in comparison to the baseline, assuming that authorities will continue to procure vehicles according to the baseline projections.

Among the remaining policy options, PO5 has the higher additional fixed costs (€3.8 billion; €2.5 under the alternative baseline for buses) over the whole period (2020-2050) of the expected life of vehicles procured during the 2020-2035 period. They are mainly driven by the higher fixed costs of electric buses when battery replacement costs are also taken into account. At the same time though, there are higher fuel/energy cost savings[38] (€14.1 billion; 31% decrease) from the exclusive use of electric buses from 2020 onwards. When the alternative baseline is considered, fuel savings are reduced to €11.5 billion (26% decrease) which leads to total operational cost savings of €9.0-10.3 billion, around 10-11% less than the baseline.

Besides PO5, PO6 is expected to lead to overall operational cost savings of around €2 billion savings, followed by PO4b (€1.9 billion) and PO4a (1 billion savings. In both cases, they are driven by sizeable fuel costs savings from the procurement of zero emissions buses that counterbalance any additional fixed costs. However, in the case of the alternative baseline with higher level of uptake of clean buses, the impacts of both PO6 and PO4b are much reduced (€520 million and €370million savings respectively) and in the case of PO4a a small increase in total operational costs is expected (€380 million; less than 1%).

Savings from PO3 and PO2 are also around €1 billion suggesting small overall difference among a number of options. However, in contrast to all other options, both PO3a and PO3b are expected to lead to a reduction of fixed costs, albeit very small (less than 1% change in comparison to the baseline). It is driven by the expected reduced fixed costs of electric cars and vans[39].

[38] Fuel and energy prices are taken from the EU Ref 2016+ scenario and do not include taxes.

[39] In contrast to the buses and trucks, battery replacement costs have not been included in the fixed costs due to the overall reduced annual mileage of vans and trucks.

Table 5-11: Impact on operational costs (fixed and fuel/energy costs) for procurement authorities– Net present values for the period 2020-2050 (€ million) and % change from the baseline

	Baseline	Net change from baseline (% change)							
		PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Fixed costs									
Total – Baseline	**47,170**	**0 (0%)**	**290 (1%)**	**-220 (0%)**	**-280 (-1%)**	**720 (2%)**	**1,070 (2%)**	**3,800 (8%)**	**1,040 (2%)**
Total – Alt. baseline	***48,430***	***0 (0%)***	***120 (0%)***	***-220 (0%)***	***-280 (-1%)***	***-180 (0%)***	***180 (0%)***	***2,540 (5%)***	***140 (0%)***
Cars	19,400	0 (0%)	-140 (-1%)	-170 (-1%)	-220 (-1%)	-100 (-1%)	-180 (-1%)	-1,250 (-6%)	-220 (-1%)
Vans	3,770	0 (0%)	-30 (-1%)	-50 (-1%)	-60 (-2%)	-40 (-1%)	-70 (-2%)	-210 (-6%)	-60 (-2%)
Rigid trucks	7,610	0 (0%)	0 (0%)	0 (0%)	0 (0%)	80 (1%)	150 (2%)	-40 (-1%)	150 (2%)
Buses - baseline	16,380	0 (0%)	460 (3%)	0 (0%)	0 (0%)	780 (5%)	1,170 (7%)	5,310 (32%)	1,170 (7%)
Buses – Alt. baseline	*17,640*	*0 (0%)*	*290 (2%)*	*0 (0%)*	*0 (0%)*	*-120 (-1%)*	*280 (2%)*	*4,050 (23%)*	*280 (2%)*
Fuel/energy costs									
Total – Baseline	**46,220**	**0 (0%)**	**-1,280 (-3%)**	**-800 (-2%)**	**-690 (-1%)**	**-1,730 (-4%)**	**-2,930 (-6%)**	**-14,100 (-31%)**	**-3,040 (-7%)**
Total – Alt. baseline	***43,610***	***0 (0%)***	***-990 (-2%)***	***-800 (-2%)***	***-690 (-2%)***	***560 (1%)***	***-550 (-1%)***	***-11,480 (-26%)***	***-660 (-2%)***
Cars	9,430	0 (0%)	-190 (-2%)	-650 (-7%)	-560 (-6%)	-210 (-2%)	-380 (-4%)	-840 (-9%)	-560 (-6%)
Vans	1,480	0 (0%)	-30 (-2%)	-150 (-10%)	-120 (-8%)	-110 (-7%)	-190 (-13%)	-20 (-1%)	-120 (-8%)
Rigid trucks	10,980	0 (0%)	-50 (0%)	0 (0%)	0 (0%)	-70 (-1%)	-120 (-1%)	-620 (-6%)	-120 (-1%)
Buses - Baseline	24,330	0 (0%)	-1,010 (-4%)	0 (0%)	0 (0%)	-1,350 (-6%)	-2,240 (-9%)	-12,620 (-52%)	-2,240 (-9%)
Buses – Alt. baseline	*21,640*	*0 (0%)*	*-670 (-3%)*	*0 (0%)*	*0 (0%)*	*940 (4%)*	*140 (1%)*	*-9,970 (-46%)*	*140 (1%)*
Total operational costs									
Total – Baseline	**93,390**	**0 (0%)**	**-990 (-1%)**	**-1,020 (-1%)**	**-970 (-1%)**	**-1,010 (-1%)**	**-1,860 (-2%)**	**-10,300 (-11%)**	**-2,000 (-2%)**
Total – Alt. baseline	***92,040***	***0 (0%)***	***-870 (-1%)***	***-1,030 (-1%)***	***-970 (-1%)***	***380 (0%)***	***-370 (0%)***	***-8,950 (-10%)***	***-520 (-1%)***
Cars	28,840	0 (0%)	-330 (-1%)	-820 (-3%)	-780 (-3%)	-300 (-1%)	-570 (-2%)	-2,100 (-7%)	-780 (-3%)
Vans	5,260	0 (0%)	-60 (-1%)	-200 (-4%)	-190 (-4%)	-150 (-3%)	-260 (-5%)	-240 (-5%)	-190 (-4%)
Rigid trucks	18,590	0 (0%)	-50 (0%)	0 (0%)	0 (0%)	10 (0%)	30 (0%)	-660 (-4%)	30 (0%)
Buses – EU Ref.	40,710	0 (0%)	-550 (-1%)	0 (0%)	0 (0%)	-560 (-1%)	-1,070 (-3%)	-7,300 (-18%)	-1,070 (-3%)

5.2.1.3 Impact on administrative costs

Turning to the administrative costs for all entities affected by the CVD in their procurement of vehicles, these will be determined by the additional time and resources that may be required depending on the procurement option adopted. Changes to the proposed methodology may lead to:

- One-off costs for changes to the existing procedures and/or establishing new procedures;
- Additional ongoing costs (or savings) from the proposed changes to the procurement procedures.

In the case of PO2, the impact on costs will depend on the extent that national authorities will select the use of the monetisation methodology or the clean vehicle definition. While we do not have specific input from Member States, it should be expected that, when forced to choose, most national authorities will not select the more demanding monetisation approach which is currently used by only a small number of contracting authorities and is considered cumbersome. Thus, the option of a clean vehicle definition should contribute to a reduction of on-going costs for most procurement authorities, although some of them may face one-off switching costs.

There will also be some initial costs for developing national plans and setting national targets under PO2. Setting such targets at national level will require consultation with procurement authorities and other stakeholders affected, a procedure which will incur certain costs and last for a certain period (most probably one-off). These costs may vary among Member States although they should still be rather minor (at no more than a few hundred thousand per Member State), much smaller than the assessed impacts on procurement and operational costs (see Section **Error! Reference source not found.**). Similar type costs are expected be much smaller in the case of PO3 and PO4, where national targets will be agreed at EU level, and close to zero for PO5, where an EU Regulation referring to the use of monetisation will uniformly apply across the EU.

One-off costs may also apply in the case of POs 3 and 4, since authorities will need to make changes to the current practices However, given that both options introduce a standard clean vehicle definition and minimum targets, such switching costs should be rather limited. More importantly, the use of the standard clean vehicle definition should be expected to bring on-going savings. Particularly in the case of PO4, the use of a clean vehicle definition based on powertrain type should be expected to simplify the whole procedure and reduce the time/effort needed per contract (in terms of time/cost savings). This is also the input from representatives of local authorities (European Association of Regional and Local Authorities and the Swedish association of local authorities). The use of tailpipe emissions to define clean vehicles under PO3 may still require some time to process and verify the information provided by suppliers, and thus greater effort in comparison to PO4. Still, the presence of a standard clean vehicle definition should bring savings to costs per procurement for most authorities.

In the case of PO5, higher one-off costs are expected. A mandatory introduction of the monetisation method should lead to additional costs for the majority that have been using alternative methods. According to the ex-post evaluation, less than 13% of authorities reported using the monetisation method in a procurement contract since the start of 2012. They will need to familiarise themselves with the new approach and establish the relevant procedures, and train the staff involved in the process. Among the smaller share of authorities that have already been using the monetisation methodology, the level of additional effort should be limited to updating the relevant values according to the 2015 Handbook. Furthermore, the mandatory use of monetisation methodology under PO5 should probably lead to higher ongoing costs for most authorities. As indicated, the monetisation methodology is generally considered as the more complex and time

consuming, including the collection of relevant data and was also indicated by stakeholders interviewed in the context of this study.

We should also note that in the case of PO3, PO4 and PO5, the proposed extension of the scope should lead to certain additional costs for making use of the same procedures in the case of hiring, leasing and services contracts. Our analysis in section 4.2 suggests that an extension of the scope will lead to a 26% increase in the number of vehicles procured covered by the CVD rules.

Table 5-12 summarises in qualitative terms the expected impact from the adoption of the different policy options in comparison to the baseline. Overall, PO5 is expected to be the most costly in terms of the one-off costs for familiarising with the monetisation methodology for most procurers that have no experience of using it.

Table 5-12: Expected impact of policy options to administrative costs for authorities

Policy option	Expected impact on one-off costs	Impact on ongoing costs
1 - Repeal	Eliminate any costs	Eliminate any costs
2 – Light revision	Limited cost to familiarise with new approach for a few authorities Costs to develop national plans and set national targets	Time savings per contract due to use of clean vehicle definition in most contracts
3 – Clean vehicle definition on the basis of tailpipe emissions	Limited cost to familiarise with new approach	Time savings due to use of clean vehicle definition but some information collection needed to ensure that vehicles meet the tailpipe emissions thresholds Increase in ongoing costs from extension of the scope (more contracts covered)
4 - Clean vehicle definition based on alternative fuels AND double-counting for zero emission vehicles	Limited cost to familiarise with new approach	Time savings per contract due to use of clean vehicle definition Increase in ongoing costs from extension of the scope (more contracts covered)
5 - Mandatory application of MM	Cost to familiarise with approach for most (87%) authorities not currently using monetisation	Additional time per contract from use of monetisation Increase in ongoing costs from extension of the scope (more contracts covered)

On the basis of the information from the ex-post evaluation on the resources/time needed per contract we have quantified the additional costs arising from some of the proposed changes. The calculations are based on an average of 27 vehicles per procurement contract[40] which, in the case of PO1 and PO2, means a total of 59.6 thousand contracts during the 2020-2035 period. In the case of PO3, PO4, PO5 and PO6 which have an extended scope, the same average leads to 80.7 thousand contracts over the same period.

[40] This is the average procurement contract size for all types of contracts on the basis of the responses to the survey of procurement authorities conducted by Ricardo in the context of the ex-post evaluation.

In the case of PO 1 (repeal), it is expected that there will be administrative costs savings equivalent to the current costs under the baseline.

In the case of PO3, PO4 and PO6 – and for the share of contracts where a clean vehicle definition is used under PO2 – there may be some savings from the current average of 3 hours/contract – according to the analysis of the data from the ex-post evaluation – as a result of the adoption of clean vehicle definition. In the absence of additional input we have estimated the savings from a 50% reduction to the time needed (1.5 hour/contract) for PO3, PO4 and PO6, which is line with the time needed for contracts using technical standards according to the ex-post evaluation study. However, it is possible that cost savings are even greater as a result of the use of a standard clean vehicle definition, especially in the case of PO4.

In the case of PO5, we have used the estimated 3.8 hours/contract (0.8 hours/contract more than the average) needed for the monetisation methodology[41] to estimate the total additional costs for all contracts from the use of the monetisation methodology.

For PO2, the time per contract used is the weighted average of the time based on the clean vehicle definition and monetisation. Small cost savings are expected but less that those under PO3, PO4 or PO6.

Table 5-13 summarises the estimations of the additional costs in terms of net present values for all procurement contracts during the period 2020-2035. Under PO5 we expect total increase in costs at around €1.3 million while in all other cases a net cost reduction is expected, which is around €2.5 million for PO3, PO4 and PO6. In the case of PO2 (11% of vehicles procured using the monetisation methodology), the estimated net costs are a result of the expected increase in the time for vehicles procured on the basis of the monetisation and the decrease of the time for those based on a clean vehicle definition.

Table 5-13: Impact on administrative costs from the proposed policy options – Net present value for the period 2020-2035

	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Number of vehicles procured over reference period (million) [1]	1.6	1.6	2.2	2.2	2.2	2.2	2.2	2.2
Average number of vehicles per contract [2]	27							
Number of contracts affected (thousands)	59.6	59.6	80.7	80.7	80.7	80.7	80.7	80.7
Time per contract in baseline [2]	3							
Expected time per contract in package (hrs) [3]	0	1.8	1.5	1.5	1.5	1.5	3.8	1.5
Net change from baseline (hrs/contract)	-3	-1.2	-1.5	-1.5	-1.5	-1.5	+0.8	-1.5
Cost per hour (€/hr) [4]	20.5							
Net costs (million €s)	-3.7	-1.5	-2.5	-2.5	-2.5	-2.5	1.3	-2.5

Sources: [1] Estimated on the based data from TED and reference scenario; [2] and [3] Based on analysis of procurers' survey in ex-post evaluation, [4] Eurostat labour force survey (Eurostat, 2016c)

[41] Based on the median of responses to the survey of procurement authorities that used the monetisation method in the ex-post evaluation.

We should highlight that that the figures indicated have a high level of uncertainty given the absence of specific data on the time required for each procedure and the number of contracts affected. Furthermore, these figures mainly refer to the ongoing costs and do not cover the possible switching or other training costs mentioned earlier. However, ongoing costs that will affect procurement contracts for the whole period are expected to be the most significant cost element. Thus, given the small size of the estimates costs and the fact that none of the proposed changes is particularly radical, the overall size of the impacts on administrative costs should still be expected to be rather limited when compared to the impact on the costs of procurement, operation and maintenance.

5.2.1.4 Other costs

In addition to the procurement and operational costs for authorities, all options introduce reporting obligations which should have some – albeit limited - cost implications. Detailed information on the specific type of data to be collected as part of the proposed reporting has not been provided. However, we can assume that the proposed reporting (every three years) will be in line with the analysis of options made in the ex-post evaluation which identified reporting under CVD in line/integrated with the requirements that apply to public procurement Directives in the case that an obligation at a Member State level is introduced.

Under all policy options except PO1, the national authorities in the 28 Member States will have to take on the final responsibility for engaging with local authorities, collating information on their procurement activities and vehicles procured and reporting every three years (starting with intermediate reporting in 2023 and full reporting in 2026) on the basis of information included in the TED database and additional information, as stipulated in the amended Directive. This will introduce some costs – in terms of time for collecting information and preparing the reports - for both national and local authorities. The costs will depend on the level of detail required. Effort/costs for collecting the data and reporting were not provided by stakeholders.

We have looked into possible parallels from the reporting obligations for the Public Procurement Directive (Directive 2014/24/EU on public procurement) but the relevant impact assessment and evaluation studies did also not provide any estimates of the relevant costs[42]. Estimates on the costs of reporting by national authorities are provided in the Impact Assessment of the Industrial Emission available for the Industrial Emissions Directive (Integrated Pollution Prevention and Control) (European Commission, 2007) with a total figure of costs per reporting cycle at around €1 million across the EU. Another study on the costs of reporting on the implementation of social legislation (Regulation 561/2006) by national authorities suggested annual reporting costs of €7-8 million/year. Both cases are not directly comparable with the reporting obligations under consideration but suggest that costs associated are still rather minor when compared to the impact on procurement or operational costs.

Finally, Member States will need to monitor and enforce the implementation of the CVD provisions ensuring that all procurement authorities comply with the relevant provisions. Such functions will need to be taken by public bodies with responsibility of monitoring and control that should be in place in all Member States according to the 2014/24/EU on public procurement. Furthermore, the CVD promotes the development of electronic procurement that should further help in monitoring and enforcement. Overall, while additional costs

[42] Studies available here: https://ec.europa.eu/growth/single-market/public-procurement/rules-implementation_en : 1. Evaluation Report: Impact and Effectiveness of EU Public Procurement Legislation (Summary, Evaluation Report Part 1, Evaluation Report Part 2); 2. Impact Assessment for the 2014 procurement directives (2014/24/EC and 2014/25/EC) (Summary, Report)

should be expected, there are also important synergies with other legislation which suggests that these costs may be rather limited.

5.2.2 Impacts on businesses (suppliers of vehicles)

5.2.2.1 Increased sales of clean vehicles

Changes to the procurement costs for authorities presented in Section 7.2 should also be translated to changes to the revenue for business from the procurement of vehicles. In general, we expect that the impact on procurement costs will be equal to the impact on the revenues from vehicle procurement.

Table 5-14 summarises the expected impact on the sales for vehicles suppliers during the 2019-2035 period.

Table 5-14: Impact on revenue for businesses involved in public procurement. Net present values for vehicles procured during the period 2020-2035 (€ million) and % change from baseline (negative values indicate decreases in revenues)

	Baseline	Net change from baseline (% change)							
		PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Total – Baseline	**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 – Alt. baseline	***91,240***	***0 (0%)***	***960 (1%)***	***1,960 (2%)***	***1,790 (2%)***	***1,080 (1%)***	***2,640 (3%)***	***8,630 (9%)***	***2,740 (3%)***
Cars	25,250	0 (0%)	290 (1%)	1,680 (7%)	1,520 (6%)	710 (3%)	1,350 (5%)	90 (0%)	1,520 (6%)
Vans	3,460	0 (0%)	40 (1%)	280 (8%)	270 (8%)	190 (5%)	340 (10%)	-110 (-3%)	270 (8%)
Rigid trucks	12,550	0 (0%)	150 (1%)	0 (0%)	0 (0%)	150 (1%)	260 (2%)	1,860 (15%)	260 (2%)
Buses - baseline	47,590	0 (0%)	820 (2%)	0 (0%)	0 (0%)	1,500 (3%)	2,140 (4%)	9,190 (19%)	2,140 (4%)
Buses – Alt. baseline	*49,980*	*0 (0%)*	*490 (1%)*	*0 (0%)*	*0 (0%)*	*20 (0%)*	*690 (1%)*	*6,790 (14%)*	*690 (1%)*

These revenues will be distributed among business involved in the procurement process Vehicle dealers (independent or most often authorised) will generally keep a standard mark-up of up to 15% on top of the price per vehicle charged by manufacturers (UBS, 2017)[43] - although this may be reduced in the context of large procurement contracts. Manufacturers will then benefit from the remaining increase in the total revenues, with a small share translated to profits. It should be noted that while zero emissions vehicles such as electric vehicles may have very small or even negative profit margins, these are expected to become more profitable by 2025 (UBS, 2017) [44]. Tier 1 suppliers of vehicles will also benefit from the increased sales, although the increase in sales of electric vehicles will benefit firms outside the traditional Tier 1 sector which dominate the vehicle battery industry and are mostly based outside the EU (IEDC, 2013).

Furthermore, leasing companies and companies providing transport services will also take a share of the extra revenues under PO3-PO6, since the extension of the scope is estimated

[43] See Figure 76 in the UBS report

[44] See figures 8 and 9 in UBS the report

to lead to a 28% increase in the number of vehicles procured due to leasing and services contract falling under the scope of the CVD.

5.2.2.2 Administrative costs for business

In terms of the impact on administrative costs for manufacturers/suppliers of vehicles, impacts similar to the impacts for procurement authorities are expected. In the ex-post evaluation study, 12 of the 38 respondents to the survey of suppliers (31%) indicated that they incurred costs related to obtaining information, including costs of test procedures on non-type-approved vehicles to establish emissions impacts. However, whenever authorities used the minimum standards or award criteria approach (which according to the procurers' survey represents more than 85% of the cases), the required information was easily available and the additional administrative costs are very close to zero. According to contractors, the monetisation approach is more demanding – since additional information is required to support the relevant calculations – and vehicle suppliers often have to spend additional time to collect this information and fill in the relevant forms.

Thus, under PO2, a certain level of fragmentation among procurement authorities across the EU is expected to remain. Member States may select different approaches (clean vehicle definition or monetisation methodology) with, at the same time, different targets set in the context of the national plans. As a result, while improved in comparison to the baseline, suppliers of vehicles will still face different procurement procedures across the EU28. This may lead to some additional costs in comparison to the other policy options where a common approach will apply across the whole of the EU. They will also face significant uncertainty concerning the national targets and the resulting demand for vehicles. Thus, certain additional information collection costs will apply to all vehicle suppliers. For EU-wide suppliers the costs may be significant if there is a need to monitor different targets and procedures set in multiple Member States.

In contrast, in the case of POs 3-4 as well as 6 under consideration, the adoption of clean vehicle definition and the setting of specific targets - should make the procurement process easier and bring certain administrative cost savings. This is a point that was also strongly supported by a number of industry representatives during the stakeholder interviews.

Finally, the adoption of the monetisation methodology (PO5) may lead to an increase in the costs per contract for those procurers that have used so far technical specifications, given the need for providing relevant information to authorities to be used in the calculation of the internal and external costs.

In addition, an overall increase in the total administrative costs should be expected in the case of POs 3, 4 and 5 as a result of the extension of the scope to cover leasing and services contracts.

Table 5-15 summarises the expected impact for each policy option.

Table 5-15: Expected impact of policy options to administrative costs for authorities

Policy option	One-off costs	Impact on ongoing costs
1 – Repeal	Eliminate any costs	Eliminate any costs
2 – Light revision	Very limited cost to familiarise with new approach	Some time savings per contract due to use of clean vehicle definition in most contracts
3 – Clean vehicle definition on the basis of tailpipe emissions	Very limited costs to familiarise with new approach	Time savings due to use of common clean vehicle definition Increase in ongoing costs from extension of the scope (more contracts covered)

Policy option	One-off costs	Impact on ongoing costs
4 - Clean vehicle definition based on alternative fuels AND double-counting for zero emission vehicles	Very limited cost to familiarise with new approach	Time savings per contract due to use of common clean vehicle definition Increase in ongoing costs from extension of the scope (more contracts covered)
5 - Mandatory application of MM	Cost to familiarise with approach for most suppliers that are not familiar with approach	Additional time per contract for use of monetisation (in comparison to current approach) Increase in ongoing costs from extension of the scope (more contracts covered)

In the absence of input from stakeholders on the expected time and resources needed for the proposed policy options we have used the information from the ex-post evaluation on the resources/time needed per contract. In the ex-post evaluation study, it was assumed that each bidder spends around 1 hour on average per bid and that, on average, there are 4 bidders per contract[45]. We have also assumed a similar level of impact on the time needed per contract as a result of the requirements of the proposed options with that we used for the administrative cost to authorities. Thus, in the case of PO3, PO4 and PO6, a 50% reduction to the time needed is expected, while in the case of PO4, an increase of the time needed by 27%[46] would be in line with the impact on the time required for authorities. Clearly, such analysis on the basis of very limited direct input from suppliers is very uncertain. Thus, we have also considered the possibility that the time needed per contract is closer to 1 day (8 hours) per bid.

[45] Based on information from a general study of public procurement in Europe by PWC (PWC, 2011). While this study did not isolate procurement of road transport vehicles in particular, it found that procurement actions for machinery or manufactured goods typically elicited 3-5 offers, with the mean value for manufactured goods being 4 bids.

[46] For the monetisation, it was assumed that a total of 3.8 hours/contract will be needed, in comparison to the average of 3 hours/contract (27% increase).

Table 5-16 summarises the estimations of the additional administrative costs in terms of net present values for the period 2020-2035. As expected, there are additional costs under PO5 (in the range of €1.5 million-€11.9 million) and savings for all other options. In the case of the repeal option, the savings are equivalent to costs under the baseline.

Table 5-16: Impact on administrative costs for suppliers from the proposed policy options – Net present value for the period 2020-2035

	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Number of vehicles procured over reference period (million) [1]	1.6	1.6	2.2	2.2	2.2	2.2	2.2	2.2
Average number of vehicles/contract [2]	27							
Number of contracts affected (thousands)	**59.6**	**59.6**	**80.7**	**80.7**	**80.7**	**80.7**	**80.7**	**80.7**
Hours in FTE per bid in baseline – Range [2]	1-8							
Bids per contract [3]	4							
Savings from Policy option (% from baseline)	-100%	-40%	-50%	-50%	-50%	-50%	+27%	-50%
Average cost per hour for the business economy (€/hr) [4]	17							
Total net costs (million €)	-4.1 to -32.4	-1.6 to -13.0	-2.7 to -22.0	-2.7 to -22.0	-2.7 to -22.0	-2.7 to -22.0	+1.5 to +11.9	-2.7 to -22.0

Sources: [1] Estimated on the based data from TED and reference scenario; [2] and [3] Based on ex-post evaluation, [4] Eurostat labour force survey (Eurostat, 2016c)

Once more, we should highlight that that these figures are only estimates with high level of uncertainty. However, as in the case of administrative costs for authorities, the size of the expected net savings is relatively small in all policy options when compared to the potential impact on revenues.

5.2.2.3 Compliance costs for suppliers of vehicles

In principle, the adoption of more demanding criteria by public bodies means that suppliers of vehicles may need to invest in new technologies in order to be able to meet these criteria and/or to increase their production capacity to respond to an increase in the level of demand.

Among the alternative policy options, the introduction of the demanding minimum requirements in the case of PO3b, PO4b and PO6 may have such an impact. PO3b and PO6 set rather demanding tailpipe emission minimum targets for passenger cars and vans which by 2030 will only be met by zero emissions vehicles for a minimum share of the overall procurement volume. However, zero emission vehicles (electric and fuel cells) are already available in the market and thus there should not be any compliance costs for the development of such technologies. The less demanding requirements set under PO3a or PO4a will also be possible to meet with existing technologies.

Furthermore, it is not expected that manufacturers will need to invest in new production capacity to meet any increase in the demand for clean vehicles. Public procurement does not represent a sizeable share of the passenger cars and vans market (0.5% of total registration in 2016) and the proposed changes to the scope of the CVD will also not lead to measurable changes in that respect. Thus, existing production capacity will be sufficient to meet such increase in demand for clean vehicles.

While the importance of public procurement in the case of buses is much higher (20.3% of total registrations), a suitable offering of low- and zero-emission buses is already available and even more so are already available in the market by 2025. As a result, we do not expect that vehicle suppliers will need to make further substantial investments to develop relevant technologies, even under the demanding PO4b and PO6 although a surge

in the level of demand from procurement authorities may require investments in production capacity.

The picture may be different in the case of trucks, given the current share of public procurement in total volume of vehicles registered (5.9%) and the fact that electric or fuel cell vehicles are not expected to make up a sizable part of the market in the short term. As indicated in section, PO4b and PO6 may lead to an increase in the share of clean trucks, including zero emission trucks, which, according to the EU Reference scenario are not expected to become largely available in the market even by 2030. The expected share of zero emission trucks is still expected to be limited even under the more demanding PO4b and PO6; no more than 4% of the total number of vehicles procured for the whole 2020-2035 but is expected to reach 7% by 2030. Still, this will be less than 0.5% of the total market. Thus, while there is a possible contribution to innovation from an increase demand for electric trucks, the proposed policy targets do not suggest that vehicle manufacturers or suppliers will face compliance costs. There will not be a need for investment in zero emissions technologies for trucks in order for them to be able to participate in public procurement. Thus, unless there is a broader increase in demand for zero emission trucks in the market – to which public procurement may contribute - it seems unlikely that manufacturers will decide to invest strongly in zero emission vehicles[47].

In relation to the options that rely on the monetisation methodology (PO2 and PO5), compliance costs are also expected to remain limited. First of all, with the exception of buses, the use of methodology leads to the selection of conventional technologies for passenger cars, vans and trucks. Only in the case of buses can we expect a possible impact if electric buses are procured by all authorities. In this case, an increase in the production capacity may be needed. Furthermore, since the monetisation methodology is only used to select powertrains among those on offer, manufacturers will not need to make investments in new technologies. Procurement authorities will not mandate the type of vehicles procured but only rely on the methodology to select among the technologies available, thus not creating any additional compliance costs.

Overall, we do not expect significant compliance costs to arise under any of the policy options. In relative terms, PO4b and PO6 could lead to additional costs for manufacturers that focus on the development of electric trucks, but the limited share of such vehicles in procurement may not justify such an investment. For all other vehicles types and for all options, compliance costs should be expected to be rather small given that the relevant technologies will already be available and the volumes involved should be possible to meet without further investment in production capacity.

5.2.3 Impacts on innovation

Impacts on innovation are strongly related to the impacts on compliance costs presented in the previous section. In general, the limited scope of the CVD in terms of the volume of passenger cars and vans affected probably means that the proposed measures will not have an impact on the development of new cleaner technologies. In most cases, the proposed technologies will already be available by the time the requirements under PO3, PO4 and PO6 are introduced.

In the case of trucks, there is greater scope for influencing the development of new technologies due to the important share of public procurement in the total market. Thus, as indicated in Section 5.2.2.3, in the case of PO4b and PO6, a higher level of procurement of zero emissions trucks can potentially influence R&D activity and innovation towards the development of such trucks. Such an impact is not possible under the other policy options.

[47] Noting also the policy uncertainty around the introduction of CO2 emission performance standards for trucks in 2018 by the European Commission which can trigger a stronger impulse to further develop low- and zero-emission technologies in this sector.

Finally, in the case of buses, the more demanding PO4b and PO6 or PO5 focusing on the procurement of zero emissions buses may have a more important impact. This is due to high share of public procurement in the total buses market and thus the greater level of certainty concerning future demand for electric buses. While battery- and fuel-cell-electric buses are already in the market – and the UITP survey presented in the baseline possibly suggests a high level of uptake particularly of battery electric buses in the coming years – such a stable and predictable level of demand can play an important role in terms of directing R&D activity towards such powertrains and provide greater certainty to manufacturers concerning expected returns on their R&D investment. However, while PO5 may potentially to a significantly higher level of demand, there is also a certain level of uncertainty associated with the level of demand arising from use of the methodology and the fact that a common type of vehicle will be procured among all authorities. Thus, PO4b or PO6 is considered more favourable than PO5 in that respect.

5.2.4 Impacts on SMEs

Specific impacts on SMEs include possible additional administrative or compliance costs, or other barriers arising that may be particularly difficult for SMEs to meet in order to participate in tenders for the procurement of vehicles or transport services.

Due to more limited resources, SMEs that supply vehicles or replacement parts through public procurement contracts may face greater challenges – in relative terms - to adapt to changes in the type of vehicles demanded demand than larger businesses. Extension of CVD scope (under PO3-PO6) to cover leasing and services contracts – which are more often provided by SMEs – may also have some implications to SMEs that may find it more difficult to meet the proposed clean vehicle requirements, taking into account the flexibility arrangements for implementing the minimum targets set at national level and noting that it is likely that cities and regions will strongly contribute that are anyway planning to strongly engage in clean vehicles procurement, with related impacts on SMEs.

In terms of the impact on administrative costs, with the exception of PO5, the adoption of clean vehicle definition and removal of the monetisation methodology (under PO3, PO4 and PO6) will simplify the process and possibly lead to small cost savings that can benefit smaller firms with less resources more than larger firms. The use of monetisation methodology under PO5 – which has been identified as complex and more time consuming – with potential periodic changes to update the reference values, may entail some additional costs for SMEs, although as already analysed in section 4.2.1.2 such costs are very limited.

Overall, it has not been possible to identify any area where significant and disproportionate costs on SMEs would apply as a result of the proposed changes in the context of amending the CVD, and the interplay of these changes with other policy levers playing out at local and regional levels.

5.2.5 Impacts on energy dependency

In general, the low share of public sector vehicle use on the total fleet and, as a result, on the overall level of energy use in road transport, suggests that its role on energy dependency is very small. Among all POs, PO5 is expected to have the most sizeable impact with a total level of savings of a bit more than 1.6 million Terajoules over the period 2020-2050 (see Table 5-17) relative to the baseline scenario.

Nonetheless, even in the case of PO5 the level of energy savings as a result of the proposed measures to the total level of energy savings is very small in comparison to an annual energy consumption in the road transport sector at 12.3 million Terajoules in 2015 (Eurostat, 2017b). Thus, while there are positive benefits from moving away from petrol or diesel consumption, the overall level of savings – even assuming that all energy is produced within the EU based on renewable sources – is very small.

Table 5-17: **Estimated net impacts on energy consumption (thousand TJs) from the proposed policy options in comparison to the baseline (effects over the period 2020-2050 for vehicles procured over the period 2020-2035) and % change from baseline**

	Baseline	Net change from baseline (% change)							
		PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Total – Baseline	**3,340**	**0 (0%)**	**-140 (-4%)**	**-110 (-3%)**	**-100 (-3%)**	**-180 (-5%)**	**-320 (-10%)**	**-1,580 (-47%)**	**-340 (-10%)**
Total – Alt. baseline	***3,040***	***0 (0%)***	***-120 (-4%)***	***-110 (-4%)***	***-100 (-3%)***	***80 (3%)***	***-60 (-2%)***	***-1,280 (-42%)***	***-80 (-3%)***
Cars	670	0 (0%)	-30 (-4%)	-100 (-15%)	-90 (-13%)	-30 (-4%)	-60 (-9%)	-140 (-21%)	-90 (-13%)
Vans	100	0 (0%)	0 (0%)	-20 (-20%)	-20 (-20%)	-10 (-10%)	-20 (-20%)	-20 (-20%)	-20 (-20%)
Rigid trucks	800	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-10 (-1%)	-20 (-3%)	-40 (-5%)	-20 (-3%)
Buses - baseline	1,770	0 (0%)	-100 (-6%)	0 (0%)	0 (0%)	-120 (-7%)	-220 (-12%)	-1,380 (-78%)	-220 (-12%)
Buses – Alt. baseline	*1,470*	*0 (0%)*	*-80 (-5%)*	*0 (0%)*	*0 (0%)*	*140 (10%)*	*40 (3%)*	*-1,080 (-73%)*	*40 (3%)*

5.3 Analysis of environmental impacts

The analysis of environmental impacts from the proposed policy measures focused on the following parameters:

- Expected impact on GHG emissions
- Impacts on air pollutant emissions
- Impacts on noise emissions.

The quantification and, where possible, monetisation of the impacts is based on the assessment of the number and type of vehicles procured under each policy option combined with data on emissions for each vehicle type together with data on the unit cost of GHG and air pollutant emissions.

5.3.1 Impact on CO2 emissions

On the basis of the analysis of the number and type of vehicles purchased under each of the policy scenarios we can also estimate the impact on CO_2 emissions. The costs of the resulting CO_2 emissions have also been monetised on the basis of the unit climate change costs provided in the Updated Handbook on External Costs of Transport (Ricardo-AEA et al., 2014).

As can be seen, all options are expected to lead to a reduction of the CO_2 emissions. However, PO5 is expected to have significantly higher impacts (total reduction by 148 million tonnes of CO_2 emissions over the period 2020-2050; 61% change) on the basis of the assumed full uptake of zero emission buses that are identified as the least costly from the monetisation. Among the other options, PO6 and PO4b are expected to lead to a reduction of around 17% in comparison to the baseline (41.9 million tonnes of CO_2 emissions for PO6 and 41.3 for PO4b). The remaining scenarios have less sizeable impacts.

In monetary terms, PO5 has the greatest impact (close to €8.3 billion over the whole reference period; 60% reduction) followed by PO6 and PO4b (around €2 billion; 15% reduction)

In all cases, the reductions are mainly driven by the improvement from the use of clean buses and less so from other vehicles types. As a result, when considering the alternative baseline with an assuming higher uptake of clean buses, the expected impact on CO_2 emissions reduction is an all cases more limited.

.

Table 5-18: Estimated cumulative impacts on CO_2 emissions of the proposed policy options in comparison to the baseline (net effects over the period 2020-2050 for vehicles procured over the period 2019-2035) and % change from baseline

	Baseline	Net change from baseline (% change)							
		PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
CO_2 emissions (thousand tonnes CO_2)									
Total – Baseline	**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%)**
Total – Alt. baseline	***210,120***	***0 (0%)***	***-11,080 (-5%)***	***-11,520 (-5%)***	***-11,340 (-5%)***	***370 (0%)***	***-15,770 (-8%)***	***-117,240 (-56%)***	***-16,350 (-8%)***
Cars	45,950	0 (0%)	-3,230 (-7%)	-9,820 (-21%)	-9,690 (-21%)	-4,640 (-10%)	-8,590 (-19%)	-14,230 (-31%)	-9,690 (-21%)
Vans	7,300	0 (0%)	-530 (-7%)	-1,710 (-23%)	-1,650 (-23%)	-1,270 (-17%)	-2,170 (-30%)	-2,220 (-30%)	-1,650 (-23%)
Rigid trucks	58,470	0 (0%)	-260 (0%)	0 (0%)	0 (0%)	-1,720 (-3%)	-3,120 (-5%)	-2,380 (-4%)	-3,120 (-5%)
Buses – Baseline	129,510	0 (0%)	-10,870 (-8%)	0 (0%)	0 (0%)	-17,400 (-13%)	-27,390 (-21%)	-129,510 (-100%)	-27,390 (-21%)
Buses – Alt. baseline	*98,400*	*0 (0%)*	*-7,060 (-7%)*	*0 (0%)*	*0 (0%)*	*8,000 (8%)*	*-1,890 (-2%)*	*-98,400 (-100%)*	*-1,890 (-2%)*
Costs (NPV in million €s)									
Total – Baseline	**13,860**	**0 (0%)**	**-800 (-6%)**	**-610 (-4%)**	**-600 (-4%)**	**-1,260 (-9%)**	**-2,090 (-15%)**	**-8,300 (-60%)**	**-2,140 (-15%)**
Total – Alt. baseline	***12,180***	***0 (0%)***	***-600 (-5%)***	***-610 (-5%)***	***-600 (-5%)***	***30 (0%)***	***-800 (-7%)***	***-6,620 (-54%)***	***-850 (-7%)***
Cars	2,670	0 (0%)	-150 (-6%)	-510 (-19%)	-510 (-19%)	-230 (-9%)	-440 (-16%)	-630 (-24%)	-510 (-19%)
Vans	450	0 (0%)	-30 (-7%)	-90 (-20%)	-90 (-20%)	-70 (-16%)	-120 (-27%)	-100 (-22%)	-90 (-20%)
Rigid trucks	3,350	0 (0%)	-20 (-1%)	0 (0%)	0 (0%)	-80 (-2%)	-160 (-5%)	-170 (-5%)	-160 (-5%)
Buses – Baseline	7,400	0 (0%)	-600 (-8%)	0 (0%)	0 (0%)	-870 (-12%)	-1,380 (-19%)	-7,400 (-100%)	-1,380 (-19%)
Buses – Alt. baseline	*5,720*	*0 (0%)*	*-410 (-7%)*	*0 (0%)*	*0 (0%)*	*410 (7%)*	*-90 (-2%)*	*-5,720 (-100%)*	*-90 (-2%)*

Table 5-20 below also presents the expect impact of the Policy Options in 2030[48]. It shows that the most sizeable impact (6.7 million tonnes; 57%) is expected under PO5. It is mainly a result of the 100% switch to electric buses under PO5. The impact is less sizeable, but still significant, in the case of the alternative baseline scenario (51% reduction). With only a share of vehicles being clean, PO4a, PO4b and PO6 will lead to savings of no more than 1.8 million tonnes (8% reduction for PO4a, 14% for PO4b and 15% for PO6). With no impacts on buses and trucks, the impacts of PO3a and PO3b are limited to no more than 0.6 million tonnes in 2030 (5% reduction in comparison to the baseline).

Table 5-19: Estimated impacts on CO_2 emissions (thousand tonnes) of the proposed policy options in comparison to the baseline in 2030 (% change)

	Baseline	Net change from baseline (% change)							
		PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Total – Baseline	11,790	0 (0%)	-560 (-5%)	-590 (-5%)	-590 (-5%)	-950 (-8%)	-1,690 (-14%)	-6,710 (-57%)	-1,800 (-15%)
Total – Alt. baseline	*10,400*	*0 (0%)*	*-440 (-4%)*	*-590 (-6%)*	*-590 (-6%)*	*120 (1%)*	*-610 (-6%)*	*-5,320 (-51%)*	*-720 (-7%)*

5.3.2 Impact on air pollutants

The analysis of impacts on air pollutants covers impacts on non-methane hydrocarbons (NMHCs), nitrogen oxide (NOx) emissions and particulate matter (PM). The impacts of each option are assessed in terms of the level of emissions and have also be monetized to reflect costs of air pollution from transport. For the first, data on average new vehicles performance by powertrain type have been used. In the case of NOx, values for cars and vans referring to EURO 6 standards adjusted using a conformity factor as set in real driving emission (RDE) legislation. For buses and trucks, the Euro VI standard limit values have been assumed. For PM and NHMCs, the values have been to the legislative limits set in EURO 6 and EURO VI. In order to estimate the damage costs, we made use of unit damage costs for each air pollutant provided in the Updated Handbook on External Costs of Transport (Ricardo-AEA et al., 2014).[49]

In terms of NOx emissions, PO5 is expected to lead to a significant reduction of NOx emissions (78 thousand tonnes; 67% reduction) and respective cost savings (€520 million). This is mainly due to the expected 100% shift to electric buses but also a move from diesel to petrol passenger cars and vans. It is followed by PO6 and PO4b (15.9 thousand tonnes and 15.7 thousand tonnes reduction respectively). Under the alternative baseline scenario, the impact of all policy options is reduced given the assumed higher share of clean buses in the baseline.

[48] The numbers refer to vehicles in circulation in 2030, not only vehicles procured in 2030.

[49] In the Handbook, costs are presented in 2010 prices. These values have been converted to 2016 prices using the HCPI.

Table 5-20: Estimated net impacts on NOx emissions of the proposed policy options in comparison to the baseline (effects over the period 2020-2050 for vehicles procured over the period 2020-2035) and % change from baseline

	Baseline	Net change from baseline (% change)							
		PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Emissions (tonnes)									
Total – Baseline	**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%)**
Total – Alt. baseline	***104,640***	***0 (0%)***	***-5,940 (-6%)***	***-3,390 (-3%)***	***-6,330 (-6%)***	***890 (1%)***	***-5,960 (-6%)***	***-66,050 (-63%)***	***-6,180 (-6%)***
Cars	34,890	0 (0%)	-2,490 (-7%)	-2,730 (-8%)	-5,240 (-15%)	-2,830 (-8%)	-5,210 (-15%)	-20,250 (-58%)	-5,240 (-15%)
Vans	6,970	0 (0%)	-530 (-8%)	-660 (-9%)	-1,100 (-16%)	-540 (-8%)	-900 (-13%)	-5,030 (-72%)	-1,100 (-16%)
Rigid trucks	23,220	0 (0%)	-90 (0%)	0 (0%)	0 (0%)	-590 (-3%)	-940 (-4%)	-1,210 (-5%)	-940 (-4%)
Buses – baseline	51,300	0 (0%)	-3,960 (-8%)	0 (0%)	0 (0%)	-4,830 (-9%)	-8,620 (-17%)	-51,300 (-100%)	-8,620 (-17%)
Buses – Alt. baseline	*39,560*	*0 (0%)*	*-2,840 (-7%)*	*0 (0%)*	*0 (0%)*	*4,850 (12%)*	*1,100 (3%)*	*-39,560 (-100%)*	*1,100 (3%)*
Costs (NPV in thousand €s)									
Total – EU Ref.	**793,680**	**0 (0%)**	**-45,840 (-6%)**	**-21,270 (-3%)**	**-37,740 (-5%)**	**-52,330 (-7%)**	**-93,760 (-12%)**	**-519,730 (-65%)**	**-94,280 (-12%)**
Total – Alt.	***718,760***	***0 (0%)***	***-38,910 (-5%)***	***-21,270 (-3%)***	***-37,740 (-5%)***	***5,460 (1%)***	***-35,650 (-5%)***	***-444,810 (-62%)***	***-36,170 (-5%)***
Cars	239,050	0 (0%)	-15,090 (-6%)	-17,010 (-7%)	-30,910 (-13%)	-16,830 (-7%)	-31,520 (-13%)	-127,920 (-54%)	-30,910 (-13%)
Vans	51,160	0 (0%)	-3,610 (-7%)	-4,270 (-8%)	-6,830 (-13%)	-3,390 (-7%)	-5,700 (-11%)	-35,500 (-69%)	-6,830 (-13%)
Rigid trucks	156,940	0 (0%)	-730 (0%)	0 (0%)	0 (0%)	-3,490 (-2%)	-5,630 (-4%)	-9,770 (-6%)	-5,630 (-4%)
Buses – baseline	346,540	0 (0%)	-26,410 (-8%)	0 (0%)	0 (0%)	-28,620 (-8%)	-50,910 (-15%)	-346,540 (-100%)	-50,910 (-15%)
Buses – Alt. baseline	*271,620*	*0 (0%)*	*-19,480 (-7%)*	*0 (0%)*	*0 (0%)*	*29,160 (11%)*	*7,200 (3%)*	*-271,620 (-100%)*	*7,200 (3%)*

In terms of PM10 emissions, PO5 is again expected to lead to the highest level of reductions (2,500 tonnes; 55% reduction) and respective cost savings (€60 million) due to the expected shift to electric buses and trucks (see Table 5-21). PO6 is expected to lead to a reduction by around 650 tonnes (144% in comparison to the baseline) followed by PO4b (570 tonnes; 12% reduction), mainly as a result of the expected move to clean buses and passenger cars. However, in the case of the alternative baseline, the impacts in the case of buses are negative, due to their higher share of electric buses in the baseline and possible reduction in the share of zero emissions vehicles on the basis of the double counting rule.

Table 5-21: Estimated net impacts on PM10 emissions of the proposed policy options in comparison to the baseline (effects over the period 2020-2050 for vehicles procured over the period 2020-2035) and % change

	Baseline	Net change from baseline (% change)							
		PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Emissions savings (tonnes)									
Total – Baseline	**4,610**	**0 (0%)**	**-250 (-5%)**	**-190 (-4%)**	**-330 (-7%)**	**-320 (-7%)**	**-570 (-12%)**	**-2,530 (-55%)**	**-650 (-14%)**
Total – Alt. baseline	***4,220***	***0 (0%)***	***-210 (-5%)***	***-190 (-5%)***	***-330 (-8%)***	***0 (0%)***	***-250 (-6%)***	***-2,130 (-50%)***	***-330 (-8%)***
Cars	1,910	0 (0%)	-110 (-6%)	-170 (-9%)	-300 (-16%)	-120 (-6%)	-220 (-12%)	-690 (-36%)	-300 (-16%)
Vans	210	0 (0%)	-10 (-5%)	-20 (-10%)	-30 (-14%)	-20 (-10%)	-30 (-14%)	-80 (-38%)	-30 (-14%)
Rigid trucks	780	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-20 (-3%)	-30 (-4%)	-40 (-5%)	-30 (-4%)
Buses – Baseline	1,720	0 (0%)	-130 (-8%)	0 (0%)	0 (0%)	-160 (-9%)	-290 (-17%)	-1,720 (-100%)	-290 (-17%)
Buses – Alt. baseline	*1,320*	*0 (0%)*	*-90 (-7%)*	*0 (0%)*	*0 (0%)*	*160 (12%)*	*40 (3%)*	*-1,320 (-100%)*	*40 (3%)*
Costs (NPV in thousands €s)									
Total – Baseline	**116,790**	**0 (0%)**	**-5,740 (-5%)**	**-4,360 (-4%)**	**-7,310 (-6%)**	**-7,120 (-6%)**	**-12,710 (-11%)**	**-60,070 (-51%)**	**-14,350 (-12%)**
Total – Alt. baseline	***107,470***	***0 (0%)***	***-4,880 (-5%)***	***-4,360 (-4%)***	***-7,310 (-7%)***	***80 (0%)***	***-5,480 (-5%)***	***-50,740 (-47%)***	***-7,120 (-7%)***
Cars	48,490	0 (0%)	-2,150 (-4%)	-3,850 (-8%)	-6,500 (-13%)	-2,740 (-6%)	-5,030 (-10%)	-14,020 (-29%)	-6,500 (-13%)
Vans	5,620	0 (0%)	-210 (-4%)	-510 (-9%)	-810 (-14%)	-390 (-7%)	-650 (-12%)	-1,690 (-30%)	-810 (-14%)
Rigid trucks	19,540	0 (0%)	-90 (0%)	0 (0%)	0 (0%)	-430 (-2%)	-700 (-4%)	-1,220 (-6%)	-700 (-4%)
Buses – Baseline	43,140	0 (0%)	-3,290 (-8%)	0 (0%)	0 (0%)	-3,560 (-8%)	-6,340 (-15%)	-43,140 (-100%)	-6,340 (-15%)
Buses – Alt. baseline	*33,810*	*0 (0%)*	*-2,430 (-7%)*	*0 (0%)*	*0 (0%)*	*3,630 (11%)*	*900 (3%)*	*-33,810 (-100%)*	*900 (3%)*

Finally, in relation to NMHCs, the analysis suggests that most policy options are expected to lead to an increase in the level of emissions, which is mainly driven by the shift from diesel vehicles (that do not emit NMHCs) to other powertrains – primarily alternative fuels that do emit, such as LPG or CNGs. The highest negative impact (increase) is expected under PO4b (8,140 tonnes; 53% increase), although quite limited in monetary terms (€7.4 million) followed by PO4a (7,250 tonnes; 47% increase) and PO6 (6,180 tonnes; 40% increase) where the negative impact from the adoption of alternatively fuelled buses and cars is partly counterbalanced by the positive impact from the use of zero emissions cars and vans. In the case of PO5, the increase (3,520 tonnes; 23% increase in comparison to the baseline) due to the expected procurement of petrol vans and cars up to 2030. The same applies in a lesser extent in the case of PO2. In monetary (NPV) terms, the expected impact of all options is limited. PO4, PO5 and PO6 are estimated to have a similar level of impact, in the range of €5.7 billion (PO6) to €7.4 (PO5).

Table 5-22: Estimated impacts on non-methane hydrocarbon (NMHC) emissions of the proposed policy options in comparison to the baseline (effects over the period 2020-2050 for vehicles procured over the period 2020-2035)

	Baseline	Net change from baseline (% change)							
		PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Emissions savings (tonnes)									
Total – Baseline	**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%)**
Total – Alt. baseline	***17,180***	***0 (0%)***	***-120 (-1%)***	***-1,470 (-9%)***	***-2,130 (-12%)***	***6,190 (36%)***	***7,090 (41%)***	***1,820 (11%)***	***5,120 (30%)***
Cars	13,010	0 (0%)	-90 (-1%)	-1,450 (-11%)	-2,100 (-16%)	-150 (-1%)	-180 (-1%)	3,570 (27%)	-2,100 (-16%)
Vans	160	0 (0%)	190 (119%)	-20 (-13%)	-30 (-19%)	10 (6%)	20 (13%)	2,260 (1413%)	-30 (-19%)
Rigid trucks	610	0 (0%)	30 (5%)	0 (0%)	0 (0%)	180 (30%)	620 (102%)	-610 (-100%)	620 (102%)
Buses – Baseline	1,710	0 (0%)	1,090 (64%)	0 (0%)	0 (0%)	7,220 (422%)	7,680 (449%)	-1,710 (-100%)	7,680 (449%)
Buses – Alt. baseline	*3,400*	*0 (0%)*	*-240 (-7%)*	*0 (0%)*	*0 (0%)*	*6,150 (181%)*	*6,630 (195%)*	*-3,400 (-100%)*	*6,630 (195%)*
Costs (NPV in thousand €s)									
Total – EU Ref.	**15,480**	**0 (0%)**	**1,250 (8%)**	**-1,330 (-9%)**	**-1,870 (-12%)**	**6,280 (41%)**	**7,400 (48%)**	**5,920 (38%)**	**5,670 (37%)**
Total – Alt.	***17,180***	***0 (0%)***	***140 (1%)***	***-1,330 (-8%)***	***-1,870 (-11%)***	***5,320 (31%)***	***6,460 (38%)***	***4,230 (25%)***	***4,720 (27%)***
Cars	13,080	0 (0%)	140 (1%)	-1,300 (-10%)	-1,840 (-14%)	-130 (-1%)	-150 (-1%)	5,460 (42%)	-1,840 (-14%)
Vans	170	0 (0%)	230 (135%)	-20 (-12%)	-30 (-18%)	10 (6%)	20 (12%)	2,690 (1582%)	-30 (-18%)
Rigid trucks	560	0 (0%)	20 (4%)	0 (0%)	0 (0%)	150 (27%)	550 (98%)	-560 (-100%)	550 (98%)
Buses – Baseline	1,670	0 (0%)	860 (51%)	0 (0%)	0 (0%)	6,250 (374%)	6,990 (419%)	-1,670 (-100%)	6,990 (419%)
Buses – Alt. baseline	*3,370*	*0 (0%)*	*-240 (-7%)*	*0 (0%)*	*0 (0%)*	*5,290 (157%)*	*6,040 (179%)*	*-3,370 (-100%)*	*6,040 (179%)*

In total, the impact on air pollution from all policy options is still positive and it mainly determined by the net savings arising from the reduction of NOx emissions. Under PO5, the total net savings associated with the impact on air pollutants are estimated at around € 570 million (61% decrease in comparison to the baseline) and a bit less (58%) in the case of the alternative scenario for the total impact period (2020-2050). For the remaining policy options, the total net savings are around €100 million for PO6 and PO4b and less than €50 million for the remaining options

Table 5-23: Estimated impacts on damage costs associated with total air pollutant emissions (NOx, PM and NMHC) from the proposed policy options in comparison to the baseline (effects over the period 2020-2050 for vehicles procured over the period 2020-2035) (% change)

	Baseline	Net change from baseline (% change)							
		PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Total – Baseline	**930**	**0 (0%)**	**-50 (-5%)**	**-30 (-3%)**	**-50 (-5%)**	**-50 (-5%)**	**-100 (-11%)**	**-570 (-61%)**	**-100 (-11%)**
Total – Alt. baseline	***840***	***0 (0%)***	***-40 (-5%)***	***-30 (-4%)***	***-50 (-6%)***	***10 (1%)***	***-30 (-4%)***	***-490 (-58%)***	***-40 (-5%)***
Cars	300	0 (0%)	-20 (-7%)	-20 (-7%)	-40 (-13%)	-20 (-7%)	-40 (-13%)	-140 (-47%)	-40 (-13%)
Vans	60	0 (0%)	0 (0%)	0 (0%)	-10 (-17%)	0 (0%)	-10 (-17%)	-30 (-50%)	-10 (-17%)
Rigid trucks	180	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	-10 (-6%)	-10 (-6%)	-10 (-6%)
Buses – Baseline	390	0 (0%)	-30 (-8%)	0 (0%)	0 (0%)	-30 (-8%)	-50 (-13%)	-390 (-100%)	-50 (-13%)
Buses – Alt. baseline	*310*	*0 (0%)*	*-20 (-6%)*	*0 (0%)*	*0 (0%)*	*40 (13%)*	*10 (3%)*	*-310 (-100%)*	*10 (3%)*

5.3.3 Impact on noise

In general, a move from conventional vehicles to clean vehicles – particularly electric and fuel cell vehicles is expected to have a positive impact on the overall level noise. A review of available studies at noise levels from electric vehicles (Marbjerg, 2013) found that at low speeds there are significant differences between electric (and hybrid vehicles) when driven in electric mode) and ICE vehicles which reduce or even out at high speeds as tyre/road noise becomes more dominant. The same study concluded that are potential impacts on the level of city noise from a replacement of conventional vehicles by electric vehicles. However, in all cases the level of impact of the proposed policy options on the fleet composition and the type of vehicles on streets will remain limited since publicly procured vehicles will still represent a very small share of the total fleet.

The situation is possibly different in the cases of buses where public procurement falling within the scope of the CVD represents a high share of total registrations and can be a driver of developments in technology. Indeed, reports focusing on buses (Ross & Staiano, 2007) (Turcsany, 2014) (ZEEUS, 2016) show significant benefits in noise reduction from the greater levels of use of electric or fuel cell buses, smaller benefits from hybrid buses, while benefits from other clean vehicles types (CNG) are much more limited. Thus, the fact that both PO3a and PO3b are not expected to have any impact beyond the baseline also suggests that impact on noise levels will be zero. In terms of PO5, under the assumption of a complete move to electric vehicles, a measurable and significant positive impact should be expected, although this is not possible to quantify. Similarly, options 4a,

4b and PO6 – which lead to a significant increase in the share of clean buses – should also have a positive impact. PO2 is also expected to have a small positive impact.

Table 5-24 below summarises the expected impact for each policy option.

Table 5-24: Estimated impacts on noise of the proposed policy options in comparison to the baseline (effects over the period 2020-2050 for vehicles procured over the period 2019-2035)

	Expected impact on type of vehicles procured in 2025 (compared to baseline)	Expected impact on noise levels
PO1	No impact	No impact
PO2	Small positive impact on the share of clean passenger cars Small increase in share of clean buses (electric)	Small positive impact on the basis of increase in share of clean buses procured
PO3a	Positive impact on share of passenger cars, vans and trucks procured No impact on buses	Insignificant impact due to low share from passenger cars, vans and trucks public procured in total vehicle registrations
PO3b	Positive impact on share of passenger cars, vans and trucks procured No impact on buses	Insignificant impact due to low share from passenger cars, vans and trucks public procured in total vehicle registrations
PO4a	Positive impact on share of passenger clean cars, vans and trucks procured Significant increase (10 times) of zero emission buses	Positive impact on the basis of increase in share of electric buses procured
PO4b	Significant positive impact on share of zero emissions passenger cars, vans, trucks and buses procured Significant increase (17 times) of zero emission buses	Positive impact on the basis of increase in share of electric buses procured
PO5	Very significant increase (85 times) of zero emission buses	Potential very Positive impact on the basis of increase in share of clean buses procured
PO6	Significant positive impact on share of zero emissions passenger cars, vans, trucks and buses procured Significant increase (17 times) of zero emission buses	Positive impact on the basis of increase in share of electric buses procured

5.4 Analysis of social impacts

5.4.1 Impact on job creation

To the extent that the proposed changes to the CVD stimulate the manufacturing and sales of clean vehicles that lead to increased revenues for vehicle suppliers, a certain impact on the employment in the sector should be expected.

As already analysed in Section 5.2.2.1 the different policy options are expected to lead to increased turnover in the automotive sector – including manufacturing of vehicles and suppliers.

Thus, in the case that all additional revenue was to eventually lead to increased sales for the automotive manufacturing sector, EU level data on the average turnover per employee in the motor vehicle sector could be used to estimate the magnitude of the effects.

According to the most recent data from Eurostat (Eurostat, 2017) turnover per employee in the in the sector was €627,000. Thus, on the basis of the estimated impact on additional revenues for the vehicle manufacturing sector we can provide an estimate of the gross employment effects over the whole 2020-2035 period. This of course assumes that this ratio will remains constant over time and even across the different technology types.

As can be seen, PO5 is expected to have a much greater impact that any other option with around 17,600 additional jobs created over the whole period (see Table 5-25), an annual average of a bit more than 1,150 additional jobs. However, even in this case, the numbers of jobs created are very small in comparison the more than 2.4 million people occupied in motor vehicles manufacturing sector in 2015 (Eurostat, 2017).

Furthermore, as already indicated in Section 5.2.2.1, only part of the jobs created will be jobs inside the EU. Given that important part of the components for clean vehicles are produced outside the EU (particularly electric vehicle batteries) the impact in terms of jobs creation can be significantly reduced for measures PO3b, PO4b, PO5 and PO6 where significant share of electric vehicles is expected to be procured.

Table 5-25: Estimated gross employment effects over the period 2020-2035

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

Sources: [1]: Estimated increase in turnover (see Section 5.2.2.1); [2]: Eurostat – Turnover per person employed in motor vehicles manufacturing (Eurostat, 2017)

5.4.2 Impact on public transport accessibility

Any impact on public transport accessibility will mainly come from a possible increase in the price/costs for access to public transport or on the provision and frequency of transport services. In our analysis of the impacts on procurement costs we assumed that authorities will continue to provide services at the same level – adjusted for GDP growth. However, in practice, when confronted with increase costs for the renewal of their fleet, public authorities may either decide to cut down on the procurement of vehicles – primarily buses – or to increase fares. In both cases, once other important parameters (vehicle prices, presence of any form of government support) are taken into account, some negative impacts on public transport accessibility could arise, if these are not mediated by changes in the overall organisational model of organising public transport., including a different approach to factoring in total cost of ownership, or other trends including dropping prices for purchase or different valuation of the flexibility gained by operating with a new technology.

The analysis of the alternative policy options in terms of the impact on the procurement costs of buses, suggests that under all options an increase in the up-front procurement costs should be expected, although these are much higher under PO5. As a result, for authorities providing public transport services, the adoption of PO5 that will point to the selection of electric buses may lead have a greater impact on public transport accessibility.

However, under all cases, it should be expected that the most vulnerable groups will be protected by such negative impacts on the basis of existing practices of subsidising fares for certain groups.

5.4.3 Territorial impacts

The assessment of the territorial impacts of the policy options has been based on the input provided during the Territorial Impact Assessment Workshop that took place on 11th May 2017 (see Annex 2 for more details, as well as the annex of the IA report).

The workshop participants concluded that changes to the CVD, as discussed as part of the IA, should, overall, have positive socio-economic impacts with no specific territories expected to be particularly affected. As indicated, effects are expected to be distributed quite equally throughout the EU, as e.g. the impact on CO_2 emissions, PM10 emissions or R&D on climate. No strong regional distinction is expected by experts. In relative terms, urban regions should be expected to benefit more the other regions, given that they are exposed to greater problem pressure of urban air pollution, and, as a result, more ambitious options will have a greater impact on these regions.

At the same time, the TIA workshop concluded that the adoption of a clear and simple definition of clean vehicles could help understand the objectives of the CVD better and supports its acceptance and implementation. In that respect, PO3, PO4 and PO6 are more advantageous. At the same time though, it was stated that very ambitious goals (primarily under PO3b, PO4b and PO6) run the risk of non-implementation and higher costs, whereas unambitious goals (thus, primarily under PO2 and less so PO3a) could cause no effects.

The issue of high costs was also raised in the context of the capacity of authorities with different level of resources. The TIA workshop concluded that a certain level of flexibility will be required in terms of the adoption of the various targets and hence underpinned the relevance of the analysis in the context of the IA support study to examine options for installing flexibility at Member State level in the context of the implementation of the CVD provisions. Among the policy options considered, PO3, PO4 and PO6 provide for a transition period up to 2025 and a stepwise approach towards more demanding requirements. Thus, PO3, PO4 and PO6 better address this issue and help alleviate some of the impact on the costs of providing services. PO2 also provides some flexibility. In contrast, PO5 includes a mandatory use of monetisation for all authorities from 2019 onwards and therefore does not provide any real flexibility. In that respect, it is the option that can have the most negative impacts from the territorial impact assessment perspective.

Another aspect was the possible impact on governance capacity. A revision of the CVD leading to a clear definition of a clean vehicle and standard rules (primarily under PO4 and PO6) should particularly help less developed regions with weaker governance structures in their procurement processes. This may not be the case for PO5 where a similar clarity will still not be provided.

Table 5-26: Summary of impact on territorial impacts

Relevant parameters	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Distribution of environmental impacts	Negative				Positive impact in all regions			
Economic impacts/costs for provision of services	Removal of any costs	Limited costs	Increased difficulty to procure vehicles due to higher costs	Greater difficulty to procure vehicles due to high costs	Increased difficulty procure vehicles due to higher costs	Greater difficulty to procure vehicles due to higher costs	Greater difficulty to procure vehicles due to higher costs	Greater difficulty to procure vehicles due to higher costs

Relevant parameters	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Flexibility	Full flexibility		Flexibility to adopt to regional conditions due to transition period and stepwise approach		Negative: No flexibility and early implementation		Flexibility to adopt to regional conditions due to transition period and stepwise approach	
Governance impacts	No role		Support procurement procedures of weak regions with clarity on definition ad share of clean vehicles		Possible issues with monetisation methodology		Support procurement procedures of weak regions with clarity on definition ad share of clean vehicles	

5.5 Summary of impacts

5.5.1 Impacts over the total period

Table 5-27 and Table 5-28 below summarise the quantified impacts (socio-economic and environmental) presented in the previous sections for all the policy options analysed under the two baselines covering the total reference period. As can be seen, PO5 is the scenario with the higher net cost savings, both from the point of view of society in total (i.e. including the costs to businesses), and from the point of view of procurement authorities (i.e. net costs to procurement authorities and environmental costs). Total net cost savings are estimated at around €19.2 billion relative to the baseline scenario and €16 billion compared to the alternative baseline scenario, significantly higher than for any other option. Furthermore, when considering the view of procurement authorities only, adoption of PO5 can potentially lead to net cost savings of over €8.1 billion. The main drivers for both the high costs and the even higher benefits of option PO5 are:

- the assumed 100% adoption of zero emission buses;
- the fact that PO5 is expected to apply from day 1, in comparison to PO2 and PO3 where the first set requirements are expected to enter into force in 2025 and more demanding set of requirements (still allowing for a share of conventional vehicles) only by 2030.

Besides PO5, PO2 - which still relies on the use of monetisation for 11% of the vehicles procured - is expected to have more limited, but still positive, impacts. It needs to be noted that this policy options also rests on an ambitious, politically very challenging implementation scenario.

Among the remaining policy options, sizeable total net costs savings are expected for PO6 (€4.3 billion) and PO4b (€4 billion) when the expected increase in sales for businesses are considered. The net increase in the economic impacts is counterbalanced by the positive environmental impact with net costs of close to zero (net cost savings of €53 million for PO6 and net costs increase of €40 million for PO4b), which is relevant from an overall public benefits perspective. The less demanding PO4a scenario is expected to have reduced total net cost savings.

The main driver of the impact of PO4b and PO6 is the level of clean buses procured – particularly zero emission – which are mandated at rather high levels in some Member States. Thus, the estimated impacts reduce when considering the alternative baseline where a considerably higher level of uptake of clean buses is assumed. In this case, the impact of both PO4b and PO6 is strongly reduced. From the point of view of the authorities

this means that net costs are expected to be significantly higher (€1.4 billion under PO4b and €1.3 billion under PO6).

PO3a and PO3b – which are only expected to affect passenger cars and vans – have more limited net cost savings (€1.7 million and €1.6 respectively) and lead to a certain increase in the total costs from the point of view of the procurement authorities (up to €290 million for PO3a).

Table 5-27: Cost-benefit analysis of policy options in comparison to the baseline (millions €s) for the whole reference period 2020-2050 (negative numbers indicate savings/reduction in comparison to the baseline)

	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Economic impacts								
Procurement authorities	**-3.7**	**309**	**938**	**818**	**1,538**	**2,228**	**731**	**2,188**
Procurement costs	0	1,300	1,960	1,790	2,550	4,090	11,030	4,190
Operational costs	0	-990	-1,020	-970	-1,010	-1,860	-10,300	-2,000
Administrative costs	-3.7	-1.5	-2.5	-2.5	-2.5	-2.5	1.3	-2.5
Businesses costs	**-18.2**	**-1,310**	**-1,970**	**-1,800**	**-2,560**	**-4,100**	**-11,020**	**-4,200**
Sales (negative indicates increase in sales)	0	-1,300	-1,960	-1,790	-2,550	-4,090	-11,030	-4,190
Compliance costs		Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant
Administrative costs (average value)	-18.2	-7.3	-12.4	-12.4	-12.4	-12.4	6.7	-12.4
Total	**-21.9**	**-1,000**	**-1,040**	**-980**	**-1,020**	**-1,870**	**-10,290**	**-2,020**
Environmental impacts								
GHG emissions (costs)	0	-800	-610	-600	-1,260	-2,090	-8,300	-2,140
Air pollutants (costs)	0	-50	-30	-50	-50	-100	-570	-100
Noise	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified
Total	**0**	**-850**	**-640**	**-650**	**-1,310**	**-2,190**	**-8,870**	**-2,240**
Social impacts	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified
Total Net costs (million €s)	**-21.9**	**-1,849**	**-1,675**	**-1,635**	**-2,335**	**-4,065**	**-19,162**	**-4,255**
Net costs for procurement authorities	**-3.7**	**-542**	**298**	**168**	**228**	**38**	**-8,139**	**-53**

Table 5-28: Cost-benefit analysis of policy options in comparison to the alternative baseline (millions €s) for the whole reference period 2020-2050 (negative numbers indicate savings)

	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Economic impacts								
Procurement authorities	**-3.7**	**90**	**930**	**820**	**1,460**	**2,270**	**-320**	**2,220**
Procurement costs	0	960	1,960	1,790	1,080	2,640	8,630	2,740
Operational costs	0	-870	-1,030	-970	380	-370	-8,950	-520
Administrative costs	-3.7	-1.5	-2.5	-2.5	-2.5	-2.5	1.3	-2.5
Businesses costs	**-18.2**	**-970**	**-1,970**	**-1,800**	**-1,090**	**-2,650**	**-8,620**	**-2,750**
Sales (negative indicated increase in sales)	0	-960	-1,960	-1,790	-1,080	-2,640	-8,630	-2,740
Compliance costs		Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant
Administrative costs (average value)	-18.2	-7.3	-12.4	-12.4	-12.4	-12.4	6.7	-12.4
Total	**-21.9**	**-880**	**-1,040**	**-980**	**370**	**-380**	**-8,940**	**-530**
Environmental impacts								
GHG emissions (costs)	0	-600	-610	-600	30	-800	-6,620	-850
Air pollutants (costs)	0	-40	-30	-50	10	-30	-490	-40
Noise	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified
Total	**0**	**-640**	**-640**	**-650**	**40**	**-830**	**-7,110**	**-890**
Social impacts	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified	Not quantified
Total Net costs (million €s)	**-21.9**	**-1,520**	**-1,680**	**-1,630**	**410**	**-1,210**	**-16,050**	**-1,420**
Net costs for procurement authorities	**-3.7**	**-550**	**290**	**170**	**1,500**	**1,440**	**-7,430**	**1,330**

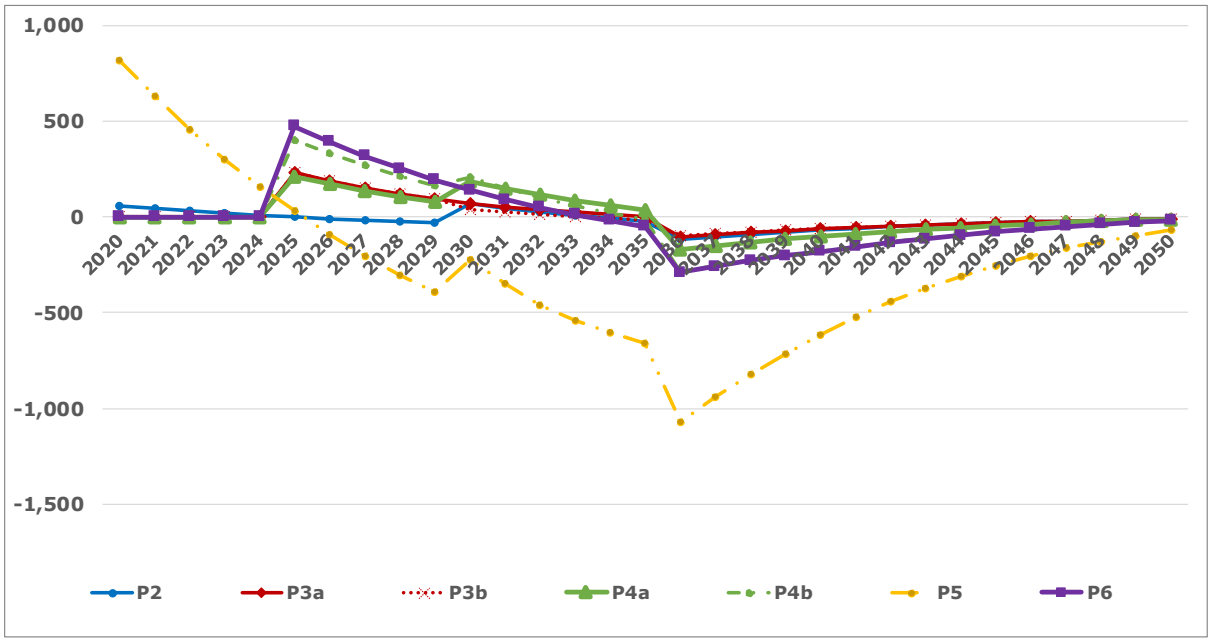
5.5.2 Evolution of net costs over time

In order to understand the various trade-offs surrounding the various options we also examined the evolution of the net costs and benefits over time in comparison to the baseline for each of the options considered.

Figure 5-8 below presents the results of the analysis. Following the strong assumptions taken for the implementation of this option, it points to the significantly different profile of PO5 that includes measures that come into effect at an early stage (2020) and are expected to lead to overall net cost savings when environmental costs are considered from much earlier (2026) than all other options. For all other options, the costs are more limited and come at later stage and the same applies to the benefits. As a result, the breakeven point of the other options is no earlier than 2034 (PO2, PO3b and PO6), 2035 (PO3b) or 2036 (PO3a and PO4a). This is at the time when the period of implementation of the measure is complete and no more procurement costs are considered in the analysis while cost savings (fuel) and environmental cost savings are still applicable.

In comparison to PO5, the remaining scenarios have a similar profile although, as expected, the more demanding PO4b and PO6 have higher initial net costs (in 2026) and higher net savings around 2036.

Figure 5-8- Comparison of total net impacts (economic and environmental impacts) for procurement authorities among the Policy options (in comparison to the baseline)



6 COMPARISON OF THE OPTIONS

In this section, we compare the policy options in relation to a number of key criteria:

- Effectiveness: The extent to which the examined options would achieve the identified policy objectives;
- Efficiency: The costs associated with the implementation of the policy options – in total and for specific subgroups.
- Coherence with EU policy objectives
- Proportionality and subsidiarity

6.1 Effectiveness and efficiency

The criteria presented in Table 6-1 have been used to help assess the effectiveness of the policy options and reflect in more detail the expected impacts of the proposed intervention.

Table 6-1: Objectives and assessment criteria related to the effectiveness of policy options

Objectives	Assessment criteria
General objectives	
Accelerate the public procurement of clean (i.e. low- and zero-emission) vehicles	• Number and share of clean (i.e. low- and zero-emission) vehicles procured
Stimulate the market uptake of these vehicles, particularly in the heavy-duty transport sector.	• Impact on the share of clean vehicles in the market
Improve the contribution from the transport sector to the reduction of CO_2 and air pollutant emissions	• Level of CO_2 and air pollutant emissions of vehicles procured
Contribute to competitiveness and growth, particularly in the heavy-duty transport sector	• Impact on the development of new technologies/innovation
Specific objectives	
Ensure that the CVD covers all relevant procurement practices	• Impact on the type of contracts covered by the CVD (increase of number of overall contracts and contracts addressing rental, lease, hire=purchase) (TED)
To ensure that the CVD supports clear, long-term market signals	• Increase of numbers of cars under public contracts (TED)Overall market uptake of clean vehicles
Ensure that the provisions of the CVD provisions are simplified and effective to use.	• Number of infringement cases of the CVD • Number of aligned or joint public procurements

In terms of efficiency, the net costs (or benefits) to the key stakeholders (authorities and suppliers of vehicles) were considered. Table 6-2, summarises the findings on the basis of the from the analysis presented in Section 2 for each of the policy options in relation to the relevant each of the assessment criteria.

Table 6-2: Assessment of effectiveness and efficiency of policy options compared to the baseline scenario and alternative baseline scenario

××	×	✓	✓✓	
Strongly negative	Weakly negative	Weakly positive	Strongly positive	Unclear

	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Effectiveness (values indicated representing NPVs)								
Type of contracts covered by the CVD	Negative – Eliminate impact of the CVD	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					
Number and share of clean vehicles procured	No or possibly even negative impact	Small positive effect (total increase by 138-154 thousand or 6-7 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 and vans with greater share of zero emission vehicles No impact on trucks and buses	Positive effect with total increase by 345-397 thousand vehicles or 16-18 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 640-691 thousand vehicles or 29-32 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 570-635 thousand vehicles or 26-29 p.p. increase in the share of clean vehicles procured) driven by increase in scope and higher share of clean buses and passenger cars	Positive effect with total increase by 448-500 thousand vehicles or 21-23 p.p. increase in the share of clean vehicles procured driven by higher share of clean passenger cars, vans and buses

××	×	✓	✓✓	
Strongly negative	Weakly negative	Weakly positive	Strongly positive	Unclear

	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Environmental impact of vehicles procured on								
- CO2 emissions	No impact	Reduction by 11-14.9 million tonnes (€0.6-0.8 billion cost savings)	Reduction by 11.5 million tonnes (€0.6 billion cost savings)	Reduction by 11.3 million tonnes (€0.6 billion cost savings)	Reduction by 0.4-25 million tonnes (€0-1.3 billion cost savings)	Reduction by 16-41 million tonnes (€0.8-2.1 billion cost savings)	Reduction by 117-148 million tonnes (€6.6-8.3 billion cost savings)	Reduction by 16-42 million tonnes (€0.8-2.1 billion cost savings)
- Air pollutants	No impact	Total damage costs reduction by €40-50 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	Impact from possible increase €10 million to reduction by €50 million mainly from reduction of NOx emissions, less so PM10	Reduction by €30-100 million mainly from reduction of NOx emissions, less so PM10	Reduction by €490-570million mainly from reduction of NOx emissions, less so PM10	Reduction by €40-100 million mainly from reduction of NOx emissions, less so PM10
- Noise	No impact	Limited impact on the of increase in share of electric buses procured	Insignificant impact due to low share from passenger cars, vans and no impact on trucks and buses	Insignificant impact due to low share from passenger cars, vans and no impact on trucks and buses	Positive impact on the basis of increase in share of electric buses procured	Positive impact on the basis of increase in share of electric buses procured	Potential very positive impact on the basis of increase in share of electric buses procured	Positive impact on the basis of increase in share of electric buses procured
Impact on the development of clean vehicle technologies /innovation	No impact – possible negative signal	Very limited/no impact Uncertainty due to different methodologies and uncertain results of the methodology	Very limited impact due to availability of technologies and small market share in the case of passenger cars and vans No impact on trucks and buses	Very limited impact due to availability of technologies and small market share in the case of passenger cars and vans No impact on trucks and buses	Incentive for the development of zero emission buses and trucks due to greater certainty for future demand Minor impact in the case of cars and vans	Significant incentive for the development of zero emission buses and trucks due to greater certainty for future demand Minor impact in the case of cars and vans	Potential strong incentive for the development of zero emission trucks (due to 100% demand) but also possible uncertainty from the use of the methodology	Significant incentive for the development of zero emission buses and trucks due to greater certainty for future demand Minor impact in the case of cars and vans

××	×	✓	✓✓	
Strongly negative	Weakly negative	Weakly positive	Strongly positive	Unclear

	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
impact on the share of clean vehicles in the market		Limited impact on buses due to high share of public procurement to total – No impact on other vehicle types	Limited impact due to small share of public procurement in total vans and cars – No impact on buses and trucks	Limited impact due to small share of public procurement in total vans and cars – No impact on buses and trucks	Positive impact on buses and trucks due to high share of public procurement to total – Positive but very limited impact on vans and cars	High impact on buses and trucks due to high share of public procurement to total – Positive but very limited impact on vans and cars	Potential (but uncertain) very high impact on buses due to high share of public procurement to total – No impact on other vehicle types	High impact on buses and trucks due to high share of public procurement to total – Positive but limited impact on vans and cars
Consistency of procurement rules concerning motor vehicles across the EU28	Strongly negative – no common framework and rules in place – most Member States or procurement authorities will follow different approaches	Negative – Member States may select different approaches (monetisation or clean vehicle definition)	Positive on the basis of common clean vehicle definition for passenger cars and vans Different minimum threshold to apply across the MS	Positive on the basis of common clean vehicle definition for passenger cars and vans Different minimum threshold to apply across the MS	Positive on the basis of clean vehicle definition for all vehicle types – However, different minimum threshold to apply across the MS	Positive on the basis of clean vehicle definition for all vehicle types – However, different minimum threshold to apply across the MS	Unclear - Only if standard values for monetisation are used across EU and authorities correctly apply the methodology	Positive on the basis of common clean vehicle definition for all vehicle types – However, different minimum threshold to apply across the MS
Simplification of procurement procedures	No impact – MS may choose more or less complicated approaches	Partial from the adoption of clean vehicle definition and national choice Potentially confusing by no changes to monetisation	Partial improvement by adopting clean vehicle definition as a basis for selecting vehicles Negative impact by not covering buses/trucks		Significant improvement by adopting clean vehicle definition as a basis for selecting vehicles		No improvement from current use of monetisation methodology that is considered complicated	Significant improvement by adopting clean vehicle definition as a basis for selecting vehicles
Efficiency (values indicated represent NPVs over the reference period)								

××	×	✓	✓✓	
Strongly negative	Weakly negative	Weakly positive	Strongly positive	Unclear

	PO1	PO2	PO3a	PO3b	PO4a	PO4b	PO5	PO6
Total net costs/savings (for society)	Very small (€21.9 million) net savings from removing admin costs	Range between €1.49-1.85 billion net savings (depending on baseline)	Net savings around €1.68 billion	Net savings around €1.63 billion	Range between €0.41 billion net costs increase to €2.3 billion net savings depending on baseline	Net savings between €1.2 and 4 billion depending on baseline	Net savings between €16-19 billion	Net savings between €1.38 -4.2 billion depending on baseline
Impact on procurement authorities	Small cost savings associated with elimination of existing administrative costs (€3.7 million)	Overall cost Increase of €0.3 million with reduced operational costs partly counterbalancing increased procurement costs	Costs increase of €0.9 billion with operational costs savings partly (54%) counterbalancing procurement increase of €2.0 billion	Limited total costs increase of €0.8 billion with operational costs savings partly (62%) counterbalancing procurement increase of €1.8 billion	Increase in costs by €1.5-1.6 billion with only 39% of capital costs (€2.5 billion) increase counterbalanced by operational cost savings	Increase in costs to procurement authorities in the range of €2.2-2.3 billion with only 45% of capital costs increase (€4 billion) counterbalanced by operational cost savings	Impact on costs vary between €190 million (savings) to €730 increase. High procurement costs of over €10 billion almost completely (97%) counterbalanced by operational cost savings	Increase in costs to procurement authorities around €2.2 billion with only 45% of capital costs increase (€4.1 billion) counterbalanced by operational cost savings
Impacts on businesses	Small cost savings associated with elimination of existing administrative costs (€18.2 million)	Additional revenues of €1.0-1.3 billion from increased clean vehicle sales	Additional revenues of €2.0 billion from increased clean vehicle sales	Additional revenues of €1.8 billion from increased clean vehicle sales	Additional revenues of €1-2.6 billion from increased clean vehicle sales	Additional revenues of 2.6-4.1 billion from increased clean vehicle sales	Additional revenues of €8.6-11 billion from increased clean vehicle sales	Additional revenues of 2.7-4.2 billion from increased clean vehicle sales
Compliance costs	No additional costs	Minimum additional costs	Minimum additional costs	Minimum additional costs	Minimum additional costs	Possible additional costs for increasing production capacity for clean buses	Possible costs for development of zero emissions buses production capacity (but not mandatory)	Possible additional costs for increasing production capacity for clean buses

The analysis above shows that PO5 offers the highest possible environmental benefits and share of clean vehicles procured, and balances the high procurement costs with sizeable operational savings. At the same time, the expected benefits are characterised by a high level of uncertainty that arises from the required application of the monetisation methodology; and moreover, this policy option considerably reduces the level of discretion and flexibility of public bodies in public procurement, as it strictly mandates an approach that all public bodies have to follow. In fact, the benefits attributed to PO5 largely stem from the identification of electric buses (and assumed 100% share of procurement from as early as 2020) using the monetisation methodology. However, for all other categories (passenger cars, vans) the monetisation methodology does not lead to the selection of clean vehicles. This suggests that in practice there could be significant potential problems and great uncertainty in terms of the outcomes of the specific approach relying on the correct and complete use of the monetisation methodology to achieve the proposed policy objectives. While the procurement process will be the same across the EU, the specific approach could lead to very different results and different levels of demand for clean or conventional vehicles depending on the values used to calculate the external costs. Furthermore, the proposed policy option does not address the inherent weaknesses of the monetisation methodology in terms of properly reflecting the external costs of different types of vehicles. Such updates require significant resources that, according to the Commission services, are not available at this point.

Along similar lines, PO2 can potentially lead to sizeable environmental benefits with the additional advantage of more limited costs for authorities. Again, these follow from the assumed potential results of the monetisation methodology in the case of the procurement of buses but also from the rather demanding threshold set for the definition of clean vehicles. However, while PO2 includes a definition of clean vehicles it does not provide the clarity and certainty needed to ensure a coherent approach in procurement across the EU, because Member States will be allowed to choose among the different options. In addition, PO2 does not provide for the extension of the scope of the CVD to leasing and services contracts provided by the other policy options – thus not fulfilling one of the specific objectives of the initiative. It means that the scope of the CVD remains with its current limitations. In most respects, while expected to have sizeable net costs, PO2 does not address the limitations of the CVD as identified in the ex-post evaluation and represents a choice that is not very different from the status quo.

As a result, PO3, PO4 and PO6, appear as more appropriate alternatives. Even though they do not have the principal potential scale of benefits associated with PO5, the uncertainty in terms of outcomes is significantly lower. They have positive and sizable impacts in terms of the number of clean vehicles procured and the respective environmental benefits. Furthermore, they achieve additional objectives of the initiative not fulfilled by PO5. These include providing 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 minimum action requirements apply across the Member States following differentiated minimum procurement targets. In fact, the level of flexibility in implementing the required minimum procurement targets at national level will allow Member States to best reflect the different capacities of local and regional public bodies to best contribute to the achievement of the minimum procurement target.

Both policy options also eliminate the use of the monetisation methodology which, at least in its current form, does not seem to be fit for purpose. Both options also provide for a staged adoption of more demanding targets the provide time to authorities to run existing contracts and to make adjustments in terms of necessary support infrastructure.

PO6 appears to be the most preferable option on the basis of the greater net cost savings (total and for authorities). PO6 is expected to lead to significant increase in the number of clean vehicles, including a high share of zero emission vehicles and provides the best balance between the total costs and benefits. PO6 is characterised by a continued

uncertainty about the future impact of regulation on CO_2 emissions of heavy-duty trucks and buses.

There are only small differences with PO4b. Both PO6 and PO4b are expected to lead to comparatively higher procurement costs for authorities relatively to the other policy options. However, when seen over the time frame of 2020-2035 the costs are certainly tolerable, particularly also when seen in relation to their broader socio-economic and environmental benefits,

PO3 has more limited upfront costs and the fact the operational cost savings are expected to counterbalance large part of the additional procurement costs. However, PO3 is clearly limited in scope, given the inability to use tailpipe emissions limits to define clean trucks and buses. This is an important consideration given that the urban bus market is the market in which public procurement represent a sizeable share of the total market turn-over. Thus, selecting PO3 can only come with a commitment to include a definition of clean buses and trucks once the necessary standards are in place. Among options PO3a and PO3b, there are small differences. PO3a leads to higher share of total clean vehicles than PO3b, but the latter gives greater weight to zero emissions vehicles. In terms of net costs, there is small difference between the two options.

Finally, the option of repealing the CVD should be expected to lead to some administrative cost savings while, considering the very limited current impact of the CVD, it should not have a negative impact on the type of vehicles procured. Repeal will not provide a more coherent and consistent approach for procurement across the Member States, nor have any potential to influence the market – particularly in the case of the adoption of clean buses and trucks. Nonetheless, this will not mean that procurement will cease to play a role, since national legislation and voluntary initiatives at national and EU level will encourage procurement of clean vehicles.

Concluding, the analysis suggests that options PO6 and PO4b most effectively address the current limitations of the CVD and have the potential for sizeable positive impacts that can contribute to the uptake of clean vehicles, covering all vehicle types. The staged approach to introduction can help to mitigate the impact of higher initial procurement costs that will only partly be counterbalanced by operational cost savings. PO6 leads to more sizeable net savings compared to PO4.

It is important to underline here the inherent uncertainty of the analysis of the impacts of policy options and the quantification of costs and benefits. The definition of the policy options required a number of assumptions concerning the costs of vehicles, the level of emissions and the environmental costs. Furthermore, we made assumptions about the approach to be followed concerning the use of the monetisation methodology and concerning the uptake of clean buses as part of the baseline scenario. We also assumed a distribution of different powertrains on the basis of the current EU Reference scenario. Changes to these assumptions could have significant impact on the costs and benefits associated with each policy option and possibly lead to changes to the relative ranking.

6.2 Coherence and proportionality

6.2.1 Coherence

In assessing the coherence of the proposed policy options, we considered the following aspects:

- Internal coherence
- Coherence in relation to relevant EU policies
- Coherence in relation to the other EU policies

6.2.1.1 Internal coherence

In terms of internal coherence, PO4 is considered the most suitable option since it covers all market segments (passenger cars, vans, trucks and buses) and types of procurement on the basis of a common approach and provides a predictable long-term timeframe. PO6 is comparatively less consistent, as it cannot yet apply the same emission-based threshold approach to defining a clean vehicle in the heavy-duty transport sector that it proposes to apply to the light duty transport sector. Still, it is consistent in the way that it seeks to incentivise the procurement of the same type of low- and zero emission vehicles. In contrast, PO3 does not cover all vehicles and PO2 only covers vehicles purchases. Even though it is based on a common procedure, PO5 is also not internally coherent, since it leads to the selection of vehicles of different powertrain depending on the vehicle type. Furthermore, PO5 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.

6.2.1.2 Coherence with relevant EU policies

Overall, with the exception of PO1 (repeal) all policy options are in line with the overall EU policy objectives as set out in the 2011 Transport white paper in relation the promotion of the use of clean vehicles. The White Paper foresees halving the use of conventionally fuelled vehicles and promoting the use of cleaner vehicles particularly in urban transport. It also refers to the need to adopt public procurement strategies to ensure a rapid uptake of clean vehicles. Depending on the level of ambition set all policy options considered (except PO1) are in line with this principal approach.

At the same time thought, the policy options differ in terms of their overall level of policy coherence. PO2 and PO3 are directly linked and consistent with the policy approach at EU level to regulating CO2 emissions from passenger cars and vans, as they use an emission-based threshold approach. On the other hand, PO4 is more closely linked closely to the implementation of Directive 2014/94/EU on alternative fuels infrastructure, where is can ensure additional security of demand for the recharging and recharging infrastructure. From its side, PO5 is in line with the objective of internalising external costs of transport serving the objective set in the 2011 White paper to set the correct price signals. The proposed approach under PO5 would make the link between external costs and procurement decision direct and clearer. Finally, PO6 combines elements of both PO3 (for cars and vans) and PO4 (for buses and trucks) reflecting the fact that there are currently no agreed CO2 emissions thresholds that could be used to regulated heavy duty vehicles.

Finally, by setting clearer objectives and measures, which simplify the implementation of the Clean Vehicles compared to the status quo, PO3 and 4 and PO6 contribute to the actions aiming at creating a *Resilient Energy Union with a Forward-Looking Climate Change Policy.*

6.2.1.3 Coherence with other EU policies

The assessment of coherence with other EU policy objectives focused on the following:

- Impact on the operation of the internal market.
- Impact on competitiveness of industry
- The impact on SMEs in line with the EU Small Business Act (European Commission, 2008)

- Social impacts, focusing on impact on transport accessibility, an important aspect of the EU policy identified in the 2011 White paper (European Commission, 2011c), and territorial cohesion.

In terms of the operation of the internal market, by setting common procedures and requirements for the procurement of vehicles, PO3-PO6 are expected to contribute to better alignment of procurement procedures across all Member States and thus contributing to actions aiming at achieving a *Deeper and Fairer Internal Market.* PO3, PO4 and PO6 allow for certain level of differentiation among Member States – in terms of the thresholds set, but ensure that common criteria are being used. PO5 set a far- reaching binding harmonisation of procurement procedure and criteria. However, it does not provide for a stepwise approach towards greater harmonisation and there is a higher level of uncertainty inherent in this process in terms of the actual results. Thus, in practice may not lead to a higher level of harmonisation. Finally, PO2 does not lead to the adoption of a common procedure since Member States will be given the option to select alternative approaches (monetisation or clean vehicles definition) and also to set their own national targets without any binding targets. Even more so, PO1 will remove any obligation for a common approach in the procurement of vehicles.

In terms of the EU policy of promoting the competitiveness of industry and innovation through demand for clean technologies, the proposed policy options are generally in line with the promotion of cleaner technologies, mainly through ensuring a certain level of demand through public procurement. PO4 and PO6, and less so PO3, set clear selection criteria and predictability. The more demanding options PO6, PO4b and PO3b (for cars and vans) are even more in line with the direction of strengthening the demand for cleaner technologies than the less demanding PO4a and PO3b. PO5 is, in principle, also in line with this objective by leading to an even higher level of demand. However, the unpredictability of the approach also means less certainty concerning the uptake of clean technologies.

In terms of the coherence with the SME policy, there are no specific provisions or measures that have a direct impact on SMEs. Still, the proposed simplification under PO3, PO4 and PO6 (with the removal of the monetisation methodology) is in line with the objective of removing administrative burden for SMEs.

6.2.2 Proportionality and subsidiarity

In terms of proportionality, none of the policy options goes beyond what is necessary to achieve the objectives. PO5 stretches this requirement to the extent possible by mandating the use of one methodology to underpin all procurements even though, the input into the monetisation methodology from individual authorities will still be the one determining the main outcomes. All other POs leave scope for public authorities to define a trajectory of low- and zero-emission mobility according to economic capacity and problem exposure with measures to upgrade the remainder of the fleet with efficient conventionally fuelled vehicles.

At the same time, the application of the minimum procurement target at national levels gives national, regional and local authorities flexibility to adjust the implementation of the mandate to their particular circumstances and capacities.

The choice of the legal instrument of a Directive appears appropriate for achieving the objectives. The repeal of the CVD 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, stakeholder reactions in the targeted interviews were, on average reluctant to support this option. It is clear that a Directive provides the flexibility needed to combine directional steer with adjustment to domestic circumstances.

6.3 Preferred option

PO5 has the greatest potential impacts in terms of the level of clean vehicle procurement and the total net costs. But it does not represent an appropriate approach in terms of addressing the current limitations of the CVD while respecting the need to find solutions tailor-made to regional and local circumstances. It also has a likely asymmetrical impact on the procurement of light and heavy-duty transport vehicles. It constrains flexibility of public bodies and creates considerable demand for additional information, while not providing a clear long-term market orientation.

PO3 and PO4 and PO6 are on average more balanced in terms of achieving their economic, social and environmental objectives. The costs of reaching objectives are reasonable over the time frame of 2020-2035. In terms of effectiveness of delivery on all specific objectives, PO6 and PO4b stand out as they have a strong and immediate impact on the heavy-duty segment, whereas PO3a and PO3b have a more limited impact due to the lack of addressing heavy-duty vehicles. PO2 provides for an even less costly option but does not fully eliminate the problems associated with the monetisation methodology and it is an option that allows for a high level of inconsistency across the EU.

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. Among the two options, PO6 and PO4b, the latter could be expected to lead to higher number and share of clean vehicles procured. However, PO6 has a slightly better performance in terms of net costs and furthermore it ensures coherence with relevant other policy levers such as the post 2020 CO2 emission performance standards for vehicles.

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.

Concluding, we consider that PO6 is the preferred policy option, in light of its overall impact on market uptake of the vehicles and principal coherence with the emission-based approach in CO_2 and air quality legislation at EU level.

6.4 Effectiveness in achieving the objectives to reduce regulatory burden

It is evident from the above assessment that the associated regulatory compliance costs 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 mandates for the Member States. However, besides the fact that important part of the additional costs will be counterbalanced by operational cost savings, 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 burden in the medium-to-long term.

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"[50] 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 clear 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;
- Simplification of the current purchase provisions for road transport vehicles through providing a clear and simple definition of the vehicles and related minimum mandates for procurement action that provide market actors with certainty;
- Simplification of the current purchase provisions through discarding the complex monetisation methodology.

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

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.

Thus, from a REFIT perspective of clear, simple and effective regulation, it can be considered that POs 2, 3 and 4 and 6 perform better compared to the baseline.

[50] COM (2017) 283 final

7 MONITORING AND EVALUATION

7.1 Operational objectives of the preferred policy option

A set of operational objectives that are derived from the respective specific objectives and reflect the nature and type of measures to be adopted as presented in Table 7-1.

Table 7-1: Objectives of the preferred policy options

Specific objectives	Operational objective
1. Ensure that the CVD covers all relevant procurement practices;	1. Bring contracts for lease, rental and hire-purchase of vehicles by public bodies under the responsibility of the Clean Vehicles Directive 2. Bring contracts for transport services (other than public passenger transport) by public bodies under the responsibility of the Clean Vehicles Directive
2. Ensure that the CVD supports clear, long-term market signals;	3. Introduce requirement to follow the definition of clean vehicles and setting minimum procurement mandates of the CVD for both light-duty and heavy-duty road transport vehicles
3. Ensure that the CVD provisions are simplified and effective to use.	4. Introduce a requirement to monitor and report on public procurement of clean vehicles

7.2 Monitoring and evaluation framework – Relevant indicators and data sources

The monitoring framework should cover the following aspects of the initiative:

- Implementation: Covers changes to the legislation and adoption of measures that are necessary to enable the implementation of the selected policy measures. In most cases relevant data should be available from the Commission services or possibly rely on reporting from the national authorities.
- Application: focuses on the actual changes observed as a result of the realisation of the policy option. Data for some of the relevant indicators should be relatively easily available and it should be possible to include this data in the monitoring reports submitted by authorities. Other aspects will have to be covered as part of the evaluation of the CVD where surveys and other tools will be used to collect relevant information (such as costs of compliance).

Table 7-2 below presents the indicators and data sources proposed for the four different aspects.

Table 7-2: Proposed monitoring and evaluation framework

Monitoring - evaluation aspect and objectives	Indicator	Source(s)
Implementation of adopted changes		
Make necessary changes to the CVD according to the proposed policy options	Extent that necessary changes to legislation have been adopted by a set date	European Commission

Monitoring - evaluation aspect and objectives	Indicator	Source(s)
Make necessary changes to respective national rules and other relevant provisions where relevant	Number of Member States that have adopted national rules (national targets) in accordance with the national mandates set in the CVD	European Commission + National authorities (monitoring reports)
Implement necessary changes to reporting systems	Number of Member States that have submitted monitoring reports on public procurement of vehicles according to set template	EU Commission
Application		
Ensure that the CVD covers all relevant procurement practices	Number of vehicle purchase 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	Tender Electronic Database + National monitoring reports
Ensure that the CVD supports clear, long-term market signals	Number of publicly procured low- and zero-emission vehicles under contracts that fall under the realm of responsibility of the Clean Vehicles Directive	Tender Electronic Database + National monitoring reports
	Overall market uptake of low- and zero-emission vehicles in the market	European Alternative Fuels Observatory.
Ensure that the CVD's provisions are simplified and effective to use	Administrative costs of procurement in accordance to CVD provisions	Evaluation (survey)
	Number of CVD infringement cases	National monitoring report + Evaluation (survey)
	Number of public procurements outside CVD scope that are either joined up or at least aligned in terms of their functional specifications	Evaluation (survey)

TED should be a main source of monitoring the implementation of the CVD, particularly in terms of the extension of the scope and the share of clean vehicles. It can be used to checking the registration of public procurement contracts in the TED database. This can be facilitated further, if a specific code for low- and zero-emission road transport vehicles would be included in the Common Procurement Vocabulary (CPV) of the EU. Reporting by Member States will also be important for monitoring the achievements and cross-checking the analysis of TED on a three-year basis from 2025 onwards.

.

8 REFERENCES

Clean Fleets, X., 2014. http://www.clean-fleets.eu/fileadmin/files/documents/Publications/CVD_Operational_Lifetime_Cost_Methodology_-_Clean_Fleets_Factsheet.pdf: s.n.

Defra, 2015. *Valuing impacts on air quality: Updates in valuing changes in emissions of Oxides of Nitrogen (NOX) and concentrations of Nitrogen Dioxide (NO2). UK Department for Environment, Food and Rural Affairs.* [Online] Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/460401/air-quality-econanalysis-nitrogen-interim-guidance.pdf

EC, 2015a. *Ex-post Evaluation of Directive 2009/33/EC on the promotion of clean and energy efficient road transport vehicles,* Brussels: European Commission.

EC, 2016e. *Energy Market Observatory: Retail electricity and gas prices, 2015 second half.* [Online] Available at: https://ec.europa.eu/energy/en/data-analysis/market-analysis

EC, 2016f. *Energy Market Observatory: Weekly Oil Bulletin -- Prices over time.* [Online] Available at: https://ec.europa.eu/energy/en/data-analysis/weekly-oil-bulletin

EC, forthcoming. *Exploration of EU transport decarbonisation scenarios for 2030. Final Report for the European Commission, DG Climate Action by Ricardo Energy & Environment.* [Online].

European Commission, 2007. *COMMISSION STAFF WORKING DOCUMENT : Accompanying document to the proposal for a Directive on industrial emissions (integrated pollution prevention and control)- Impact assessment,* online: http://ec.europa.eu/environment/archives/air/stationary/ippc/pdf/recast/ia_en.pdf.

European Union, 2009. *Directive 2009/33/EC on the promotion of clean and energyefficient road transport vehicles, Official Journal of the European Union..* [Online] Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0033&from=EN

Eurostat, 2016c. *Labour cost levels by NACE Rev. 2 activity (lc_lci_lev),* online: http://ec.europa.eu/eurostat/web/labour-market/labour-costs/database.

Eurostat, 2017b. *Simplified energy balances - annual data (nrg_10).* [Online] Available at: http://ec.europa.eu/eurostat/web/energy/data/database [Accessed 2017].

Eurostat, 2017. *Structural business statistics - Annual detailed enterprise statistics for industry (sbs_na_ind_r2).* [Online] Available at: http://ec.europa.eu/eurostat/web/structural-business-statistics/data/database [Accessed 2017].

ICCT, 2017. *NOx emissions from heavy-duty and light-duty diesel vehicles in the EU: Comparison of real-world performance and current type-approval requirements..* [Online] Available at: http://www.theicct.org/nox-europe-hdv-ldv-comparison-jan2017

IEA, 2014. *CO2 emissions from fuel combustion,* s.l.: s.n.

IEDC, 2013. *Creating the clean energy economy - Analysis of the electric vehicle industry,* online: http://www.iedconline.org/clientuploads/Downloads/edrp/IEDC_Electric_Vehicle_Industry.pdf.

Leaseurope, 2015. *Data for the year 2014 from survey of national leasing associations,* s.l.: s.n.

Marbjerg, G., 2013. *Noise from electric vehicles – a literature survey,* online: http://www.compett.org/documents/wp_3_report_noise_from_electric_vehicles_a_literature_survey.pdf.

Ricardo & TEPR, 2015. *Ex-post Evaluation of Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles,* online: https://ec.europa.eu/transport/sites/transport/files/facts-fundings/evaluations/doc/2015-09-21-ex-post-evaluation-directive-2009-33-ec.pdf.

Ricardo Energy & Environment et al., 2016. *Improving understanding of technology and costs for CO2 reductions from cars and LCVs in the period to 2030 and development of cost curves.,* s.l.: s.n.

Ricardo et al, 2015. *Ex-post evaluation of Regulation (EC) No 1071/2009 and Regulation (EC) No 1072/2009,* online: http://ec.europa.eu/transport/facts-fundings/evaluations/doc/2015-12-ex-post-evaluation-regulations-2009r1071-and-2009r1072.pdf.

Ricardo-AEA et al., 2014. *Update of the Handbook on External Costs of Transport. Final Report for the European Commission, DG MOVE..* [Online] Available at: http://ec.europa.eu/transport/sites/transport/files/themes/sustainable/studies/doc/2014-handbook-external-costs-transport.pdf

Ross, J. & Staiano, M., 2007. *A comparison of green and conventional diesel bus noise levels.* Reno, Nevada, http://staianoengineering.com/images/NC07_Ross_Staiano_-_A_comparison_of_green_and_conv.pdf.

T&E, 2015. *Europe's tax deals for diesel,* online: https://www.transportenvironment.org/sites/te/files/publications/2015_10_Europes_tax_deals_for_diesel_FINAL.pdf.

Turcsany, J., 2014. *ELECTRIC BUSES AND NOISE,* online: http://www.bullernatverket.se/wp-content/uploads/2014/05/Electric-buses-and-noise_Volvo-Bus.pdf .

UBS, 2017. *UBS Evidence Lab Electric Car Teardown –Disruption Ahead?,* online: https://neo.ubs.com/shared/d1BwmpNZLi/.

Volkswagen, 2016a. *e-Golf: Technik und Preise.* [Online] Available at: http://www.volkswagen.de/content/medialib/vwd4/de/dialog/pdf/golf-a7/egolf_preisliste/_jcr_content/renditions/rendition.download_attachment.file/e-golf_preisliste.pdf

Volkswagen, 2016. *Golf: Technik und Preise.* [Online] Available at: http://www.volkswagen.de/content/medialib/vwd4/de/dialog/pdf/golf-a7/preisliste/_jcr_content/renditions/rendition.download_attachment.file/golf_preisliste.pdf

ZEEUS, 2016. *An overview of electric buses in Europe,* online: http://zeeus.eu/uploads/publications/documents/zeeus-ebus-report-internet.pdf .

ZeEUS, n.a.. *Alternative Fuel Urban Bus Market Share,* : UITP.

Annexes

GETTING IN TOUCH WITH THE EU

In person

All over the European Union there are hundreds of Europe Direct information centres. You can find the address of the centre nearest you at: https://europa.eu/european-union/contact_en

On the phone or by email

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

– by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),

– at the following standard number: +32 22999696, or

– by email via: https://europa.eu/european-union/contact_en

FINDING INFORMATION ABOUT THE EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website at: https://europa.eu/european-union/index_en

EU publications

You can download or order free and priced EU publications from: https://publications.europa.eu/en/publications. Multiple copies of free publications may be obtained by contacting Europe Direct or your local information centre (see https://europa.eu/european-union/contact_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1952 in all the official language versions, go to EUR-Lex at: http://eur-lex.europa.eu

Open data from the EU

The EU Open Data Portal (http://data.europa.eu/euodp/en) provides access to datasets from the EU. Data can be downloaded and reused for free, for both commercial and non-commercial purposes.

MI-04-20-407-EN-N

Publications Office
of the European Union

ISBN : 978-92-76-20750-4

doi: 10.2832/118535