

# Impact analysis of the European Commission proposal for amending the directive on the promotion of clean and energy- efficient road transport vehicles

Summary

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RIIGIKANTSELEI



MAJANDUS- JA  
KOMMUNIKATSIOONI-  
MINISTEERIUM



# 1. Overview of the impact analysis

Road transport is responsible for one-fifth of the European Union's (EU) CO<sub>2</sub> emissions, carbon dioxide being one of the primary components in greenhouse gases. Road transport is also a field where greenhouse gas emissions are on the rise.<sup>1</sup> To promote EU environmental policy, Directive 2009/33/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles was adopted<sup>2</sup> (hereinafter referred to as "the Directive"). The Directive governs requirements that are in force upon purchasing road vehicles at public procurement. The purpose of implementing the Directive in member states is to make the EU's vehicle fleet more environmentally friendly and energy-efficient by introducing environmental variables into procurement requirements. In the opinion of the European Commission, the Directive has not had the hoped-for impact<sup>3</sup>.

As a result, the European Commission has submitted a proposal for amending the Directive (hereinafter referred to as "the proposal"). The purpose of the proposal is to expand the scope of the Directive, unify the public procurement policies of member states, improve legal clarity of the regulation of the field and to send a clear and lasting market signal regarding the preferred status of clean vehicles. The proposal imposes transition periods with different thresholds: from 24 months after the entry into force of the proposal as a directive until 2025; and 2026-2030.

**The Estonian Government Office commissioned from Ernst & Young Baltic AS (hereinafter EY) an analysis aimed to assess the impact on Estonia of the proposal for amendment of the Directive on the promotion of clean and energy-efficient road transport vehicles. The study analysed the scope of the Directive in Estonia, the potential impact of implementing the proposal, the impact on the state budget and environmental and socioeconomic impact. The need for infrastructure investments was also evaluated and proposals were made regarding application of minimum procurement targets (minimum share). Throughout this analysis, we proceed from the wording of the proposal found in COM/2017/0653 final; 8.11.2017).**<sup>4</sup>

The study report is divided into four parts. The first part describes the scope of the proposal in Estonia. Among other things, it provides an overview of previous procurements in the scope and environmentally friendly technologies for the purpose of the Directive. The second part of the work sets out an assessment of the refuelling and charging infrastructure that would be needed for implementation minimum procurement targets (minimum share). The third part brings out the assessment of the impact of implementation from both the perspective of the state budget and the projected socioeconomic and environmental impact. The fourth part of the report sets out recommendations for implementation of the proposal in Estonia.

The study was carried out from August 2018 to January 2019. The project initiators and cooperation partners are the Ministry of Economic Affairs and Communications and the Ministry of the Environment. The impact analysis was financed from measure 12.2 "Development of policy planning quality" under priority axis 12 "Administrative Capacity" of the Operational Programme for Cohesion Policy Funding 2014-2020.

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<sup>1</sup> European Commission, Road transport: Reducing CO<sub>2</sub> emissions from vehicles; online at: [https://ec.europa.eu/clima/policies/transport/vehicles\\_en](https://ec.europa.eu/clima/policies/transport/vehicles_en); 03.12.2018

<sup>2</sup> Directive 2009/33/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles (ELT L 120/5, 15.05.2009)

<sup>3</sup> European Commission, Revision of the Clean Vehicles Directive; online at: [https://ec.europa.eu/transport/themes/sustainable/consultations/2016-clean-vehicles\\_en](https://ec.europa.eu/transport/themes/sustainable/consultations/2016-clean-vehicles_en); 22.11.2018

<sup>4</sup> Directive of the European Parliament and of the Council amending Directive 2009/33/EU on the promotion of clean and energy-efficient road transport vehicles 2009/33/EU; COM/2017/0653 final; 8.11.2017

## 2. Presumptions and limitations

The following primary presumptions and limitations should be borne in mind in reading the report and interpreting the results:

- ▶ The basis used for analysis was the wording of the proposal in *COM/2017/0653 final* (8.11.2017). Unless noted separately, the work does not take into consideration potential later changes in the text of the proposal.
- ▶ Pursuant to the positions of the Government of the Republic, upon agreement with the party commissioning the study, vehicle purchasers who procure of vehicles used for ensuring internal and external security or in the field of healthcare are not considered as persons within the scope of the proposal.
- ▶ The proposal establishes transition times with different thresholds for periods starting 24 months after the Directive enters into force until 2025, and 2026-2030. As it is not known at the time of the study when the Directive will enter into force, it was presumed that the Directive will be implemented in the periods 2023-2025 and 2026-2030.
- ▶ The basis for evaluating the cost of the infrastructure needed for implementing the minimum procurement targets (including the state subsidy component) was information on the cost of developing fuelling stations obtained from fuel sellers was used as the basis. To ensure reliability of the data, they were validated with various fuel sellers. Still, it should be remembered that the actual cost of the infrastructure depends on specific procurements, as fuel sellers may have a different strategic interest in different features and contracts (for example, developing the entire gas fuelling station network may be more appealing than developing an individual station). Thus, information on the cost of fuelling stations and the state subsidy component should be seen as an estimate that may prove lower or higher in the actual procurement process.
- ▶ The conclusions drawn and calculations made in this work are based on the currently known fuel prices, which depend on excise policy. The work does not consider potential changes in excise rates. Fuel prices have significantly different levels of volatility depending on their category (diesel and petrol in particular). As the profitability of gas-powered buses depends greatly on the price of gas (i.e. the main price advantages come from the price of gas), the conclusions drawn in this report may not hold true if the gas excise is raised or the excise on diesel is lowered.
- ▶ When evaluating the need for infrastructure, it should be considered that in addition to calculations of profitability, security of supply is also important for transport companies. At the moment, projected fuel volumes have been taken into consideration in assessing the fuel volumes. When planning the actual network, the need to ensure security of supply for provision of uninterrupted service must also be borne in mind (not treated in this study).
- ▶ Evaluation of change in the cost of services was based on the change in the price of inputs (acquisition value of vehicles, maintenance costs, fuel price). The study did not factor in the possibility that in making the transition to gas-powered buses, transporters may not proceed from the current inputs when pricing services. For example, even though it may be more economical in the long run to carry out transport using gas-powered buses, transporters may use the moment of transition to gas powered buses to raise prices (e.g. due to rise in labour costs, greater risks in the absence of experience with gas-powered buses). Thus, procurements may prove more expensive than one might presume based solely on the input price.

- ▶ The socioeconomic impact analysis in this work focuses more specifically on indirect impact and accompanying effects, calculated based on the increase in the maintenance cost of vehicles. Broader impacts on human and natural environment, traffic safety, total employment and entire business sectors may emerge as the proposal is implemented; these were not investigated in this work.

### 3. Implementation of the proposal

#### 3.1 Scope of the proposal

The proposal for amending the Directive stipulates that the Directive shall apply to contracts for the purchase, lease, rent or hire-purchase of road transport vehicles (M and N categories) as well as public service contracts covering certain transport services. The Directive is applicable to all contracting authorities or contracting entities in so far as they are under an obligation to apply the procurement procedures set out in Directives 2014/24/EU and 2014/25/EU. The Directive shall apply to all procurement procedures exceeding the EU procurement thresholds as well to those public passenger transport procurements not exceeding the thresholds for which a public service contract within the meaning of Regulation (EC) No. 1370/2007 of the European Parliament and of the Council has been concluded.

The proposal imposes minimum shares of environmentally friendly vehicles in public procurements. The minimum shares apply to procurements for the purchase of road transport vehicles (light-duty vehicles, buses, trucks) and also to procurements for public road transport services, special-purpose road passenger-transport services, hire of buses and coaches with driver, mail transport by road, parcel transport services and refuse collection services. Separate targets for minimum shares have been established for the periods up to 2025 and for 2026-2030.

To decide whether a procurement is within the scope of the proposal, five questions should be asked.

- 1) Is the contracting institution among the obligated subjects?
- 2) Are road transport vehicles or services provided with such vehicles being procured (as determined by the CPV code)?
- 3) Are road transport vehicles in vehicle categories M1, M2, M3, N1, N2 or N3 being procured?
- 4) Is the expected value of the procurement more than the limit established for obligated subjects and the category?
- 5) In answering the questions above, was it verified that there are no precluding circumstances in the field of implementation of the proposal (e.g. an excluded institution)?

In Table 1 the scope of the proposal is presented for the application of minimum procurement targets depending on the procurements of road transport supplies and services and vehicle category.

**Table 1.** Application of minimum procurement targets in procurements of road transport supplies and services

Type of vehicle	Procuring supplies	Procuring services	
	Road transport vehicle procurements (purchase, lease, hire or hire purchase)	Other services (not including public passenger transport) 60172000-3: hire of buses and coaches with driver 60160000-7: mail transport by road 60161000-4: parcel transport services 90511000-2: refuse collection services	Public passenger transport services 60112000-6: public road transport services 60130000-8: special-purpose road passenger-transport services 60140000-1: non-scheduled passenger transport
Light-duty vehicles (M1, M2, N1)	The minimum procurement targets apply only to procurements with a value of at least the international threshold (the obligation to adhere to percentages does not apply to smaller procurements)		The minimum procurement targets apply to all public passenger transport services procurements (the minimum procurement targets must be adhered to also in the case of procurements under the international threshold).
Buses (M3)			
Trucks (N2, N3)			

Source: Interpretation of the proposal made by EY and coordinated with the Government Office, which commissioned the study

## 3.2 Implementation of the proposal in Estonia

The proposal defines environmentally friendly light-duty vehicles through the emissions level (CO<sub>2</sub> g/km) and the shares of other air-borne pollutant emissions generated in actual traffic, listed in table 2. The proposal defines clean vehicles on the basis of the fuel they use: electricity, hydrogen, methane fuels (CNG, LNG, CBG). It was concluded from the study that the most realistic way to fulfil the target percentages in the Estonian context is currently to introduce electric vehicles in the light-duty vehicle categories and to adopt methane fuel-consuming vehicles (CNG, CBG) in the heavy-duty vehicle categories. This conclusion derives from the existing infrastructure, technological readiness and economic profitability. The extensive transition to other fuel categories (e.g. electric buses) may be realistic in the period 2023-2030 if the state decides to prioritize their transition, but this is not known at the time of the study. Thus, this study focuses on particularly the above fuel categories.

In Table 2 the overview of previous procurements in the scope of the proposal is presented. In the case of the services covered by the proposal, the minimum procurement targets would affect mainly public road transport contracts and non-scheduled passenger transport (i.e. mainly school buses and worker transport). There are fewer individual special-purpose and non-scheduled transport procurements, but the volumes of public-transport vehicles procured are larger. That means that upon transition to environmentally friendly vehicles in the scope of the proposal, gas-powered buses must be adopted in Estonia in an extent greater than the current share (53% of buses must be powered by natural gas in the period 2026-2030). The proposal also affects refuse collection services as since the minimum percentages for trucks in the periods of the proposal are fairly low (7% and 9% of the vehicles procured), the minimum percentages can be fulfilled solely by the introduction of natural gas powered refuse transport vehicles in a few local government units.

As to the other services in the scope of the proposal (i.e. mail transport by road, parcel transport services, hire of buses and coaches with driver), the minimum procurement targets will likely not have to be implemented in Estonia as the procurements with these CPV codes are either absent altogether in Estonia or do not belong to the Directive's scope (i.e. these procurements do not exceed the international threshold).

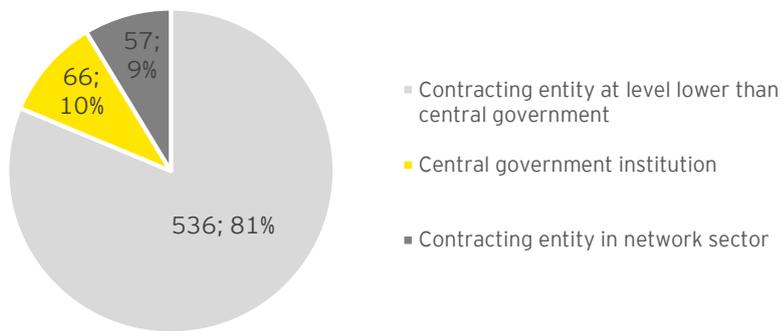
**Table 2.** Total number of applicable procurements by procured supplies and services, 2007-2018

Transaction categories		Procurements in the scope		
		Number of procurements	% of procurements in the scope	
Supplies	Procurements for road transport vehicles		132	20%
Procurements of services	Public passenger transport services	60112000-6: public road transport	155	24%
		60130000-8: special purpose road passenger-transport services	250	38%
		60140000-1: non-scheduled passenger transport	101	15%
	Other services	60172000-3: hire of buses and coaches with driver	<sup>5</sup> 3	0%
		60160000-7: mail transport by road	0	0%
		60161000-4: parcel transport services	0	0%
	90511000-2: refuse collection services	18	3%	
<b>Total</b>		<b>659</b>	<b>100%</b>	

Source: public procurement register

<sup>5</sup> CPV code 60172000-3 - hire of buses and coaches with driver - occurred in seven procurements over the 10-year period studied. In four procurements the code occurred together with other codes specified in the annex to the Directive. As there were few procurements with the 60172000-3 code, and they were omitted from the cost analysis, these four procurements were moved to other codes occurring in procurement: three procurements were moved to the procurements with code 60140000-1 and one procurement under code 60112000-6.

The proposal is likely to have the biggest impact on local governments, who are responsible for carrying out the majority of the procurements for services in the scope of the proposal.



**Figure 1.** Distribution of procurements in scope among buyers, 2007-2018

## 4. Impact of the proposal

The impact of implementation of the proposal was evaluated through two alternative scenarios, which were compared to the baseline scenario, where the proposal is not implemented (S0). The difference in the scenarios stems from the required share of vehicles that are environmentally friendly. The proposal's three different scenarios:

- ▶ **S0: baseline scenario** - proposal not implemented
- ▶ **S1: minimum scenario** - proposal requirements fulfilled in the minimum necessary amount
- ▶ **S2: bold scenario** - proposal requirements fulfilled in an extent greater than the minimum procurement targets. (+50%)

On the basis previous procurements and data from the traffic registry, the volume of vehicles to be procured in the period 2023-2030 was forecasted (including procurements of vehicles and services). The study concluded that, based on the analysis of the data from the Road Administration's traffic registry data, an average of 731 light-duty vehicles, 66 buses and 106 trucks will be procured as supplies in the scope of the proposal. Thus, primarily light-duty vehicles (81%) are expected to be procured as supplies in the scope of the proposal. Absent the impact of the proposal, more clean vehicles would be expected to be procured in the light-duty vehicles than in the buses and trucks categories (7%, 1.8% and 0.9% respectively). For obtaining services, only heavy-duty vehicles will be procured in the scope of the proposal (97% buses and 3% trucks). Public road transport makes up 58% (by number of vehicles) of the services provided with buses in the scope of the proposal. Absent the proposal's impact, the adoption of clean buses would be expected to be minimal, just as in the case of procurements of supplies. Only in Tallinn can a complete transition to clean vehicles be presumed in the absence of the impact of the proposal, as the city of Tallinn has set a course to changing over to gas-powered buses. Vehicles are procured in the form of services in the scope of the service mainly by institutions at a level lower than the central government, and light-duty vehicles are procured in the form of supplies by both central government institutions, institutions lower than the central government, and the network sector.

**Table 3.** The forecasted number of vehicles to be procured in different scenarios (need for procuring clean vehicles)

			S1: minimum scenario		S2: bold scenario	
			2023-2025	2026-2030	2023-2025	2026-2030
Light-duty vehicles	Supplies	Total vehicles procured	2193	3655	2193	3655
		S0: clean vehicles	152	254	152	254
		Additional need	308	513	308	915
Buses	Supplies	Total vehicles procured	199	332	199	332
		S0: clean	4	6	4	6
		Additional need	68	170	68	259
	Services	Total vehicles procured	731	1952	731	1952
		S0: clean vehicles	154	306	154	306
Trucks	Supplies	Total vehicles procured	347	530	347	530
		S0: clean vehicles	3	5	3	5
		Additional need	21	43	21	69
	Services	Total vehicles procured	29	48	29	48
		S0: clean vehicles	0	0	0	0
		Additional need	2	4	2	6

It can be concluded from the results that the greatest shortage of clean vehicles will be in the light-duty vehicle and bus categories. The need for clean vehicles in the case of buses is greater in procurements of services. An additional need for clean vehicles is apparent in the case of both scenarios during the 2023-2025 period, especially in the light-duty vehicles category. An additional

need for procurement of clean vehicles can be seen in the period 2023-2025, but will grow significantly in the period 2026-2030 (among other things, the minimum procurement targets are greater). The need is greatest in the second period in the case of the S2 scenario.

## 4.1 Direct financial impact

Direct impact was analyzed by comparing the procurement and upkeep cost of the potential new vehicle fleet to the business-as-usual vehicle fleet cost to meet the targets of the proposal. The cost of infrastructure was assessed separately. The basis used for calculating the expense on vehicles is the expense on vehicles with different engine types (according to fuel use). Included in the expense are the expenses on the vehicle's acquisition, maintenance and fuel throughout the vehicle's life cycle or the service period. The vehicle's acquisition cost was calculated based on the vehicle's sale price, residual value, leasing interest, leasing period or service period, and the cost of acquisition of the vehicle necessary for providing the service. It was presumed that new vehicles would be leased after the end of the leasing period.

Four sub-scenarios are grouped under each scenario (S1 and S2) under valuation to characterize the results.

- ▶ **D-CNG** - light-duty vehicles : diesel vs. electric + heavy-duty vehicles : diesel vs. CNG
- ▶ **D-CBG** - light-duty vehicles : diesel vs. electric + heavy-duty vehicles : diesel vs. CBG
- ▶ **B-CNG** - light-duty vehicles : petrol vs. electric + heavy-duty vehicles : diesel vs. CNG
- ▶ **B-CBG** - light-duty vehicles : petrol vs. electric + heavy-duty vehicles : diesel vs. CBG

**Table 4.** Expense on the scenarios distributed over the years of the period in the proposal (€)

	Years	D-CNG	D-CBG	B-CNG	B-CBG
S1: minimum scenario	2023	-45 425	-41 104	6 946	11 267
	2024	-90 851	-82 208	13 892	22 534
	2025	-136 276	-123 313	20 838	33 801
	2026	-746 901	-721 678	-537 415	-512 193
	2027	-1 357 526	-1 320 044	-1 095 669	-1 058 187
	2028	-2 231 947	-2 182 206	-1 970 090	-1 920 349
	2029	-3 106 368	-3 044 368	-2 844 511	-2 782 511
	2030	-3 980 789	-3 906 529	-3 718 932	-3 644 672
	<b>Total</b>	<b>-11 696 083</b>	<b>-11 421 451</b>	<b>-10 124 941</b>	<b>-9 850 309</b>
	S2: bold scenario	Years	D-CNG	D-CBG	B-CNG
2023		-45 425	-41 104	6 946	11 267
2024		-90 851	-82 208	13 892	22 534
2025		-136 276	-123 313	20 838	33 801
2026		-1 137 707	-1 104 108	-887 218	-853 618
2027		-2 139 137	-2 084 902	-1 795 273	-1 741 038
2028		-3 404 364	-3 329 493	-3 019 496	-2 944 626
2029		-4 669 590	-4 574 084	-4 243 719	-4 148 213
2030		-5 889 331	-5 773 639	-5 422 457	-5 306 764
<b>Total</b>		<b>-17 512 681</b>	<b>-17 223 854</b>	<b>-15 326 486</b>	<b>-14 926 657</b>

From the results, it can be concluded that all of the sub-scenarios will yield savings in the period 2023-2030. That means that in the long run, the transition to clean vehicles will generate direct financial savings. In the period 2023-2035, given the presumptions used, there would be a minor negative financial impact in the B-CNG and B-CBG scenarios. This is mainly due to the expense related to the transition to electric vehicles in regard to procurement of light-duty vehicles, which in the case of a transition from petrol vehicles is greater than when changing over from diesel vehicles. As a greater volume of transition to clean vehicles is projected for the period 2025-2030 in the heavy-duty vehicles category, this will result in a positive direct financial impact (i.e., savings).

From the perspective of savings on expenses, the sub-scenario D-CNG proved to be most favourable in both scenarios, meaning the replacement of diesel vehicles with electric vehicles and transition to CNG in the heavy-duty vehicles category. In the case of this scenario, it is possible to achieve greater savings if the transition to clean vehicles takes place in an extent greater than the minimum targets set out in the proposal (S2: bold scenario). The impact could be increased further by adapting the scenario in the hybrid scenario so that the requirement of clean light-duty vehicles - which generates the greatest expense - remains at the level of the S1 scenario. Sub-scenario B-CBG yielded the least savings, which is due to the higher price of CBG and the higher cost of replacing petrol vehicles.

## 4.2 Socioeconomic impact

The socioeconomic impact of implementing the minimum procurement targets stipulated in the proposal was assessed as a quantitative impact on GDP, tax revenues and employment using input-output tables. The input-output model makes it possible to analyse the ripple effects throughout the economy outside the sector taking the initial impact. This method can be used to estimate the changes across industries caused by a change in one specific industry, bringing out its indirect and induced impacts. The method is based on inter-industry transactions - industries use the outputs of other industries in their production process.

**Table 5.** The proposal's indirect and accompanying impacts and impact on employment

Category of the impact	S1 D-CNG	S2 D-CNG
Direct impact, millions of €	-4,5	-6,5
Indirect impact on GDP, millions of €	3,1	4,5
Induced impact on GDP, millions of €	0,8	1,2
<b>Total indirect and induced impact on GDP, millions of €</b>	<b>3,9</b>	<b>5,7</b>
Indirect and induced impact on employment (number of employees)	221	323

When we assess the additional indirect and accompanying impact on GDP and employment, S2 D-CNG (Bold scenario, light-duty vehicles: diesel vs. electric + heavy-duty vehicles: diesel vs. CNG) has the greatest positive impact. This stems from the fact that the direct impact in the form of increased maintenance costs is the greatest among the alternatives - greater expenditures will lead to a greater indirect and accompanying impact.

## 4.3 Impact on air quality

When estimating the environmental impact of the transition to clean vehicles, only the mass of the emissions in the proposal period was considered. The assumptions made in these calculations have been simplified to the extent that the results should be considered as trends, rather than exact indicators.

**Table 6.** Change in emissions into air upon transition to clean vehicles

		S1 D-CNG/CBG			S2 D-CNG/CBG		
		2023-2025	2026-2030	kt CO <sub>2</sub> total	2023-2025	2026-2030	kt CO <sub>2</sub> total
CO <sub>2</sub>	M1,M2,N1	-1.45	-5.82	-7.27	-1.45	-8.66	-10.12
	M3	4.79	29.46	34.26	4.79	82.76	87.55
	N2, N3	0.24	1.40	1.64	0.24	6.18	6.42
				28.62			83.86
		S1 D-CNG/CBG			S2 D-CNG/CBG		
		2023-2025	2026-2030	t CO total	2023-2025	2026-2030	t CO total
CO	M1,M2,N1	-0.99	-1.64	-2.63	-0.99	-5.87	-6.86
	M3	31.36	192.85	224.22	31.36	541.71	573.07
	N2, N3	1.71	9.77	11.48	1.71	43.23	44.94
				233.07			611.15
		S1 D-CNG/CBG			S2 D-CNG/CBG		
		2023-2025	2026-2030	t PM total	2023-2025	2026-2030	t PM total
PM	M1,M2,N1	0.00	0.00	0.00	0.00	0.00	0.00
	M3	-0.51	-3.15	-3.67	-0.51	-8.86	-9.37
	N2, N3	-0.01	-0.04	-0.05	-0.01	-0.18	-0.19
				-3.72			-9.56
		S1 D-CNG/CBG			S2 D-CNG/CBG		
		2023-2025	2026-2030	kt NO <sub>x</sub> total	2023-2025	2026-2030	kt NO <sub>x</sub> total
NO <sub>x</sub>	M1,M2,N1	-2.39	-3.98	-6.37	-2.39	-14.24	-16.63
	M3	-0.17	-1.03	-1.19	-0.17	-2.88	-3.05
	N2, N3	-0.01	-0.03	-0.04	-0.01	-0.14	-0.15
				-7.60			-19.83

From the results, it can be concluded that the transition to clean vehicles will have a lessening impact on emissions into air. This can be explained by the fact that no emissions into air are generated in situ by electric vehicles. At the same time, there are conflicting indicators in the heavy-duty vehicles category. Transition to CNG-/CBG-vehicles will reduce the total NO<sub>x</sub> and PM emissions but increase CO<sub>2</sub> and CO emissions. The greater the transition to clean vehicles, the greater the above-described impacts. Thus, the impact is orders of magnitude larger in the second period, especially in the S2 scenario, where clean vehicles are procured in a greater proportion. The results can be explained by the fact that nitrogen compounds make up a negligible proportion of methane fuels compared to petroleum-based petrol and diesel fuels and also due to the low level of polyaromatic compounds in methane compared to petrol and especially diesel. The greater CO<sub>2</sub> and CO emissions per kilometre driven in the case of methane-fuel-consuming engines can be explained by the different engine efficiency due to the fuel used. Upon transition to clean vehicles, the heavy-duty vehicles category has a larger impact than the light-duty vehicles category – three orders of magnitude in the case of CO and two orders of magnitude in the case of CO<sub>2</sub>. From the perspective of PM, the impact is even greater. The transition to both CNG/CBG and electric vehicles has a significant lessening impact on emissions in the NO<sub>x</sub> category. In the light-duty vehicles category, the impact of lowering NO<sub>x</sub> is about four times greater.

## 4.4 Need for additional infrastructure

It was concluded that due to technological and infrastructure readiness and economic cost-benefit, the most realistic option for fulfilling the minimum procurement targets from the standpoint of the scope of the proposal is the adoption of electric vehicles in the case of light-duty vehicles and pressurized natural gas powered buses and trucks in the case of heavy-duty vehicles. Thus, the

implementation of the proposal requires the existence of possibilities for electrical charging (for the light-duty vehicles) and a network of CNG fuelling stations (for the buses and trucks).

Charging of electric vehicles does not necessarily require the existence of public loading points, and thus the adoption of electric vehicles does not necessarily require investments into a charging network. In addition, there exists a nationwide quick charging point infrastructure and developing this further will take place separately from implementation of the proposal. The number of electric vehicles in the light-duty vehicles category that would have to be adopted to fulfil the minimum percentages is not so large that it would necessarily mean that the need to expand the existing charging network. That does not mean that further development of the charging network should not take place in a private-consumption-driven manner, but this is not within the scope of the proposal in question.

Estonia only has a partial natural gas fuelling station network, mainly in larger cities (Tallinn, Tartu, Pärnu, Narva, Võru, Viljandi, Jõhvi, Rakvere). The large-scale adoption of CNG-powered buses for public passenger transport would require the creation of additional fuelling stations in the main county population centres that currently lack a gas fuelling station - i.e., Haapsalu, Valga, Jõgeva, Kuressaare, Rapla, Paide, Põlva, Kärdla. It would mean the establishment of at least eight new fuelling stations, to which at least 2 new fuelling stations in Tallinn would be added. There is also a need to create additional fuelling posts in existing fuelling stations (depending on the scope implementation of the minimum percentages).

A large share of public passenger transport takes place in the city of Tallinn, and thus Tallinn's changeover to natural gas powered buses will have a significant impact on the feasibility of fulfilling the targets for minimum shares. As Tallinn has started implementing an incremental transition to gas-powered buses<sup>6</sup>, this will significantly simplify the fulfilment of the target for minimum share in the buses category. The adoption of electric buses in Tallinn has also been discussed, but since a specific plan for a transition in the period 2023-2030 is not known at the time this study was conducted, its potential impact was not modelled in the study.

As the volume of gas used for fuelling Tallinn public bus transport is sufficiently high, we deem it realistic that the natural gas stations needed for fuelling city buses in Tallinn are developed at bus depots in cooperation between the city of Tallinn and private market suppliers, i.e. state support is not necessary. In the case of other new fuelling stations forecasted, the state support is important and should remain in the range of 1-2 million euros as a total amount.

As the proposal does not presuppose a total transition to clean vehicles, forgoing the establishment of the fuelling stations in areas where it is more costly and requires greater state support (e.g. areas that lack a possibility for connecting to a gas pipes and where it is necessary to use a LNG-technology-based CNG fuelling station) is an option that can be considered. Its feasibility however depends on the means used to implement the proposal, i.e. whether the minimum shares are applied across all procurements or separately for individual procurements.

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<sup>6</sup>Pursuant to interview conducted with Tallinna Linnatranspordi AS (15 October 2018)

## 5. Main conclusions and recommendations

On the basis of the study, the following main conclusions can be brought out regarding implementation of the proposal and its impact:

- ▶ Estonia currently has a partial network of natural gas fuelling stations. Complete transition to gas-powered buses would require the establishment of additional natural gas fuelling stations (approximately 8-10 new stations) that would require state support in the amount of an estimated 1-2 million euros. The adoption of the electric vehicles necessary for meeting the minimum procurement targets (minimum share) will not necessarily result in an additional need for investment into the charging network.
- ▶ The study showed that the transition to clean vehicles will have a positive combined financial (cost-saving) impact. In the light-duty vehicles category, the transition to electric vehicles will result in an additional cost due to the higher acquisition cost of the vehicles, but in the case of heavy-duty vehicles, natural gas (CNG, CBG) powered vehicles are more profitable in the long run, exceeding the impact arising from light-duty vehicles. The greater the extent of the changeover to clean vehicles in the heavy-duty vehicles category, the more positive is the direct financial impact.
- ▶ The transition to CNG buses can take place in an extent greater than the minimum share targets listed in the proposal, as given current fuel prices, provision of public transport service using gas-powered buses may prove more economical than with diesel buses. Even though CNG buses are more expensive than diesel buses with the same functionality, the total cost of CNG buses measured in current expenses will be lower in the case of 8-10-year-long scheduled transport contracts. The more kilometres are driven during the service life, the greater this positive impact will be, and the greater it will be for public city buses, because the difference in acquisition value compared to diesel buses is smaller and the leasing period is longer.
- ▶ The implementation of the proposal is not expected to result in a significant increase in the contracting authority's administrative load. In accordance with the current Directive, there is a reporting obligation every two years. Under the proposal, the reporting obligation would be every three years, and thus solely due to the frequency of the reporting, administrative burden could be expected to decrease during the proposal period. Implementation of the minimum targets will not directly impact the frequency of procurements. The growth in administrative burden may manifest itself in regard to procurement of clean vehicles in the fact that the contracting authority will have to fill in additional fields in the public procurement register upon registering the contract notice if such an option (or obligation) has been established). Such additional fields cannot be considered significant time expenditure in the procurement process.
- ▶ Implementation of the proposal will have a positive socioeconomic impact. The changeover to CNG/CBG vehicles will be accompanied by some growth in maintenance costs, which through greater spending will lead to a higher indirect and accompanying impact and need for jobs.
- ▶ From the results, it can be concluded that the transition to clean vehicles will have a lessening impact on emissions into air in the light-duty vehicles category. As to the heavy-duty vehicles category, transition to CNG/CBG-vehicles will reduce the total NO<sub>x</sub> and PM (fine particles) emissions but will increase CO<sub>2</sub> and CO emissions. The greater the extent of the transition to clean vehicles, the greater the above-described impacts. Empirical, real emissions were used

as the basis for the analysis, and political interpretations were not applied as they may change greatly over time.

- ▶ If sufficient preparations are made for implementation of the proposal (see chapter 6), the fulfilment of the minimum targets can be considered realistic in both proposal periods (2023-2025 and 2026-2030).