Ministry of Infrastructure
and Water Management

Position of the Netherlands on future CO_2 standardisation for heavy-duty vehicles

Management Summary

This document sets out the joint position of the Ministry of Infrastructure and Water Management, evofenedex (Dutch Shippers Council), Natuur & Milieu (environmental NGO), TLN (Dutch association for transport and logistics) and BOVAG (Dutch trade association of entrepreneurs engaged in mobility) on future European emission standards for heavy-duty vehicles (lorries and buses). The position is based on technological and market developments and the urgent need to reduce CO_2 in order to achieve the Paris Agreement goals. When drawing up the position paper, the parties sought the advice of four technical agencies, namely TNO (Netherlands Organisation for Applied Scientific Research), CE Delft (independent research and consultancy organisation), ECN (Energy Research Centre of the Netherlands) and Sidekick Projects.

The European Commission will put forward a proposal mid-2018 for emission standards for heavy-duty vehicles for the period of 2025 to 2030. The Commission's proposal will serve as the point of departure for upcoming European negotiations about those new standards. This position paper forms the basis of the Dutch input for the negotiations. The document also serves as guidance for lobbying among the rank-and-file of the individual parties in the run-up to the Commission's expected proposal.

Research conducted by TNO revealed that vehicles with conventional power technology have a cost-effective reduction potential of 28%[1] in 2030 compared with the base reference year of 2015. If trailers and car bodies are factored in as well, the potential comes to as much as 33%. Other sources, including ICCT, claim potentials of 30% and 40%[2], i.e. excluding respectively including measures for trailers and car bodies. Besides being cost-effective from a societal point of view, the applied technologies will within a few years pay for themselves from an end-user's perspective. Introduction of emission standards for heavy-duty vehicles has advantages for carriers, consignors (i.e. shippers and logistic service providers) and manufacturers alike and will also reduce societal costs.

The new emission standards need to strike a balance between leadership, the transition to zero emission, investment certainty and technical feasibility. The EU has a role, as a frontrunner, in achieving ambitious climate goals. The Netherlands takes the view that the EU should retain this frontrunner role and should also pursue the transition to zero emissions by heavy-duty vehicles wherever possible.

[1] TNO study: *Assessments with respect to the EU HDV CO2 legislation*, TNO 2018 P10214, March 2018

[2] ICCT, Fuel Efficiency Technology in European Heavy-Duty Vehicles: Baseline and Potential for the 2020–2030 Time Frame

Parties advise the European Commission to draw up ambitious European emission standards that will reduce on-road CO_2 emissions by new heavy-duty vehicles in 2025 by 20 to 25% relative to 2015. This ambition needs to be expressed by:

- a hard standard for 2025 for vehicles in categories 4, 5, 9 and 10 to bring about a reduction of at least 20% relative to the reference year 2015;
- a standard for trailers and car bodies, to be developed before 2022 and introduced in 2025, to bring about an additional reduction of at least 5%;
- an incentive enshrined in legislation for zero emission vehicles in 2025 in order to accelerate the transition towards electric driving, also for heavy-duty vehicles.

Parties advise the European Commission to publish a 2030 target in the form of a provisional bandwidth based on the full reduction potential for conventional HD vehicles. At a later stage, the precise emission standards for 2030 can be defined based on technological developments, the emergence of zero emission alternatives for these vehicle categories and other new insights. This revision of the objective, for example in 2022, is the ideal time to widen the standard to include other vehicle categories and trailers. It has to be clear that an emission standard in 2025 is not the end-goal.

Parties jointly conclude that there needs to be a standard at the level of the entire vehicle, initially based on default assumptions for trailer or car body. This standard needs to be differentiated according to the different vehicle categories defined in the certification. The standard needs to be binding for the salesweighted average of all vehicles of a manufacturer within the designated category and should be set ex-ante. A standard expressed in grams of CO_2 per kilometre is strongly preferred. Provided that they are appropriately defined, parties support flexibilities in applying the standard. Parties advise the Commission to devote attention to enforcement of the standard and a policy on penalties.

Background and urgency

In the coming years, the mobility sector faces a major challenge to go ahead with sustainability. The Paris Climate Agreement represents a breakthrough. No fewer than 195 countries signed up to limiting the global temperature increase to well below 2°C, and to pursue a further reduction of warming to not more than 1.5°C. The Paris climate goals require overall reductions of 80 to 95% CO_2 in 2050 relative to 2015. But in the shorter term, too, the emissions must be significantly reduced in order to remain within the maximum emission scope (carbon budget) for 1.5 to 2 C°[3]. This makes it necessary to pursue virtually zero emissions for all modes of road transport.

Approximately one-quarter of all CO_2 emissions by road transport in the EU originate from heavyduty vehicles. Transport activities in the EU are expected to continue increasing over the coming 40 years, while the reduction of fuel consumption through technological advances will insufficiently compensate for the effect on total CO_2 emissions. Based on the policy as presently adopted, the CO_2 emissions of heavy-duty vehicles will, both in 2030 and 2050, be roughly 35%[4] above the 1990 level. Figure 1 shows the estimated emission from road transport, based on the current policy framework in relation to the reduction which is needed in order to stay on rack with the Paris agreement.

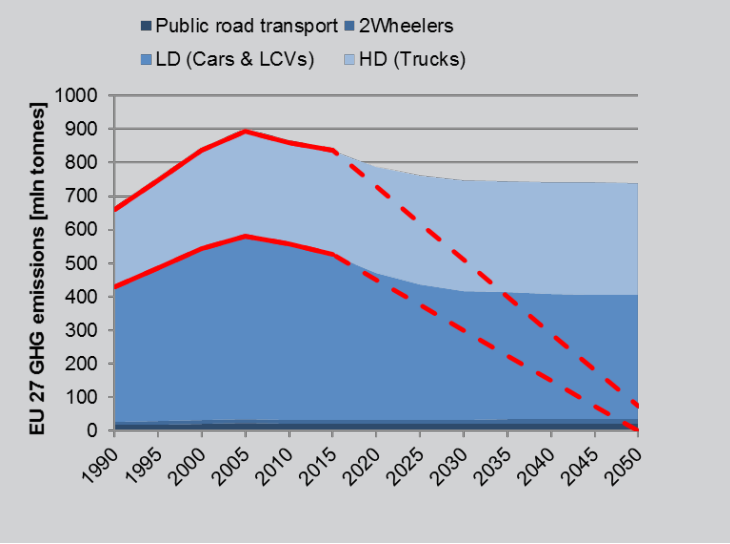

Figure 1: Expected European emissions of greenhouse gases by road traffic per mode of transport based on existing policy (blue sections) and reductions required to achieve the Paris objective (red lines)

[3] See CE Delft, 2017, *Klimaatbeleid mobiliteit op de kaart en de analyses van I&W voor het INEK voor de doorrekening van de opgave*

[4] Commission Notice sent to the Council and European Parliament. Strategy for reducing fuel consumption and the CO_2 emissions of heavy-duty vehicles

In the Netherlands, road traffic accounted for roughly 29 Mtons of CO_2 emissions in 2016. Of this, 5.4 Mtons were caused by rigid trucks and and tractor semi-trailer combinations[5]. This represents a 17% share of total emissions from road transport, even though trucks and semi-trailers do not even account for 2% of the total number of vehicles in the Netherlands. Around the time of the crisis, the emissions did go down, but this was due to the decline in demand for transport[6]. In the past year, the demand for transport increased again and consequently so did CO_2 emissions.

The European Commission is currently working on a package of measures to reduce the CO_2 emissions from heavy-duty vehicles. The Commission has developed simulation software called the 'Vehicle Energy Consumption Calculation Tool' ('VECTO') in order to calculate the fuel consumption and CO_2 emissions by new heavy-duty vehicles in a similar and cost-efficient way.

The VECTO tool creates the basis for the certification of vehicles, for the monitoring and reporting system and for future emission standards. The certification and monitoring will start in 2019 for the four vehicle categories with a gross vehicle weight above 16 tons (categories 4, 5, 9 and 10) that contribute most to CO_2 emissions by heavy-duty vehicles. This will be followed in January 2020 by certification of six other categories. The European Commission will put forward by mid-2018 a proposal for introducing emission standards for the four aforementioned vehicle categories. This position paper presents the joint standpoint of the Dutch signatory parties on the standards.

[5] CBS Statline: Emissions into the air on Dutch territory; road traffic
[6] Panteia, August 2017. Transport and Logistics sector study, *Stilstand CO_2-reductie in Transport & Logistiek*

Position

The Netherlands has committed to the 1.5°C target contained in the Paris Agreement and recognises that this will necessitate all sectors striving for zero emissions in 2050. A reduction of approximately 50% is necessary before 2030. To achieve this goal in the transport sector, there will be a need in the short and medium term for the large deployment of highly-efficient conventional vehicles and, in the medium and long term, the large deployment of zero emission vehicles. By adopting this position, the parties are giving substance to the declaration of intent in the SER Energy Agreement "... jointly to endeavour to ensure that European emission standards and policy are laid down or tightened up, including for modes of transport in freight haulage"[7].

European emission policy is the cornerstone of Dutch policy for achieving the climate goals. Emission standards have proven effective, provide a level playing field, pull down market barriers, promote innovation and thus contribute efficiently to the attainment of the climate goals. Emission standards can bring about a bigger market offering of low and zero-emission clean vehicles. Emission standards for vehicles must be set at the European level. In addition at national level, the European certification and registration of CO_2 emissions will make it possible to develop policies to incentivise the deployment of clean vehicles. Stringent emission standards are necessary for the Netherlands in order to meet the Europe-wide reduction target for non-ETS sectors.

The main goal of emission regulation is firstly to reduce significantly the climate impact of the transport of goods and people. Secondly, this measure will help to reduce operational costs of the transport sector, because the benefits of lower fuel consumption outweigh the investment costs. Thirdly, this measure will contribute to strengthening the competitiveness of European manufacturers, who will be encouraged to use the most innovative technologies. That will also create major advantages in markets outside Europe. The United States, Canada, China and Japan already have standards for reducing CO_2 emissions from heavy-duty vehicles. The regulation of emissions in the US is expected to lead in the short term to an average CO_2 emission that is lower than in Europe.

Ambition

Parties advise the European Commission to set ambitious European emission standards that will reduce on-road CO_2 emissions by new heavy-duty vehicles by 20 to 25% in 2025 relative to 2016. This ambition needs to be expressed in the first instance by:

- a hard standard for 2025 for vehicles in categories 4, 5, 9 and 10 to bring about a reduction of at least 20% relative to the reference year 2015;
- a standard for trailers and car bodies, to be developed before 2022 and introduced in 2025, to bring about an additional reduction of at least 5%;

[7] Agreed in the SER Agreement

- an incentive enshrined in legislation for zero emission vehicles in 2025 in order to accelerate the transition towards electric driving also for heavy-duty vehicles.

Parties advise the European Commission to publish a 2030 target in the form of a provisional bandwidth that fully utilises the reduction potential of conventional HD vehicles. At a later stage, the precise emission standards for 2030 can be defined based on technological developments, the emergence of zero emission alternatives for these vehicle categories and other new insights. This revision of the objective, for example in 2022, may also be the ideal time to widen the standard to include other vehicle categories and trailers. It has to be clear that an emission standard in 2025 is not the end-goal.

Elements and usability

Parties jointly conclude that there must in any event be a standard at the level of the entire vehicle, initially based on default assumptions for trailer or car body. The standard for the entire vehicle must be designed in a way that encourages manufacturers to use all available technologies, including all specific engine-related technologies. An additional engine efficiency standard may be useful, provided that the standard is based on a test cycle that is more appropriate to the specific usage of the vehicle (or the category to which the vehicle belongs) than the WHDC[8] used for European pollutants emission standards. A distinction needs to be made between an emission standard in the form of:

a. a weighted average per vehicle category;
b. a weighted average for all new sales;
c. maximum limit not to be exceeded ("not-to-exceed-limit").

A standard based on a weighted average will help manufacturers to develop and implement innovative technologies in a cost-effective manner. Parties prefer a standard per vehicle category, applied to the sales weighted average of a manufacturer within the category concerned. This is because it offers a possibility to differentiate the standard according to the technological potential of each category. This design of the standard is, moreover, similar to the standard for passenger cars. A not-to-exceed limit for individual vehicles is unnecessarily stringent and would, with the stated broad definition of categories, be far more stringent for some vehicles in the same category than for others.

Parties express their preference to limit exceptions. As a rule vehicles are designed for specific purposes, but in 7 out of 10 cases they fall into one of the four main categories designated by the European Commission. An exception can obviously be made for usage profiles that are non-relevant for a specific vehicle. A refuse collection vehicle that hardly ever drives on a motorway does not need to satisfy specific requirements for a user profile with a high degree of motorway usage. However, the definitions of specific vehicle categories and usage profiles must be worded carefully. VECTO simulates four different CO_2 emission values, namely short distance, long distance, no load and full load. These four emission profiles must apply to every vehicle. The standard must be applied to a weighted average of the various emission profiles. Allowance needs to be made for realistic conditions of use and at the same time a situation must be avoided where incorrect incentives arise, for example the use of more powerful engines where such is not necessary.

Baseline and ex-ante reduction potential

Parties are in favour of defining ex-ante a fixed timeline for the emission standards, with 2025 as a first step. This will create clarity and ensure the market gets sufficient time to work towards the goal. The objectives can be laid down based on knowledge of the expected technological developments. Determination ex-ante will lead to more ambitious objectives, because the saving potential -and the reduction that is necessary in light of the Paris objective – is greater than the current difference between an average and a best-in-class vehicle. Therefore, it is advisable to determine the standard ex-ante in legislation, taking into account the realistic potential for technological improvements compared with a certain baseline. Sufficient data is available at the European Commission to determine a baseline and a realistic saving potential. This same system is used in the United States.

[8] WHDC: Worldwide Heavy-Duty emissions Certification procedure

Unit of emission standard

The primary objective of CO_2 emission standards is to reduce direct emissions of vehicles by applying CO_2-reducing technologies to the vehicles. Therefore, parties greatly prefer an emission standard expressed in grams CO_2 per km. A standard expressed in g/tonkm gives vehicles with greater capacity de facto a higher g/km target. The relationship between CO_2 in g/km and load capacity, however, is weaker than the implicit relationship that follows from a standard based on grams CO_2 per ton km. As a result, bigger vehicles would get an excessively high g/km target and smaller ones an overly stringent target. As long as the load is a default value a g/tonkm target is effectively equivalent to a g/km target multiplied by a constant. In the longer term, however, a g/tonkm based standards opens the way to differentiation on the basis of payload with the adverse effects as mentioned. A target in g/km encourages manufacturers to use the most efficient technology, including for vehicles with a greater capacity. The difference in emission between a vehicle with a full load and a vehicle without any load will subsequently be calculated and weighted in the VECTO simulation.

Flexibilities in applying the standard

Flexibilities in application of the standard will make a stringent target more feasible and acceptable for OEMs, may help to stimulate utilisation of the best and most cost-effective technologies and reward manufacturers that respond to this situation. However, such instruments must be chosen carefully because they can also be counter-productive. Moreover, flexibilities may make legislation unnecessarily complex and increase administrative burdens. Provided that they are appropriately defined, parties support the types of flexibilities stated below. Parties note in this regard that flexibilities must also be determined based on independent (financial) research into the financing and risks in the period that the total cost of ownership (TCO) still differs too much from the regular energy carriers.

Flexibilities per manufacturer

- Exchanging credits between vehicle categories: Exchanging credits between categories is effective only when a weighting of credits is applied, based on the expected CO_2 emission during the life of the vehicle, i.e. based on the average lifetime mileage.
- Banking & borrowing: the use of accrued credits from earlier years (banking), or advance use of credits from future years (borrowing), can only be meaningful in combination with binding annually declining targets.

Flexibilities between manufacturers

- Trading credits between different manufacturers may provide an extra stimulus for innovative technology. Financial resources coming from “laggards” will go to “front-runner” manufacturers that lead the way. At the same time, this will be an incentive for manufacturers not to be laggards.
- Pooling: the combination of targets between manufacturers can also contribute to this, because it is an implicit form of trading credits.

Specific incentives for zero emission vehicles

Zero emission powertrains for inner-city haulage are on the verge of a breakthrough. The expectation is that electric trucks, post-2025, will in many applications have a lower total cost of ownership (TCO) than the present conventional vehicles. To accelerate the transition to electric heavy-duty vehicles, the European Commission should develop specific incentives for zero emission vehicles. This might include a system in which zero emission vehicles get credits or extra credits. The introduction of a reward/penalty (or bonus/malus) system for zero emission vehicles is a highly effective measure for encouraging their production and sale. It is advisable to set a maximum for the number of credits that manufacturers can earn in this way, and the credits must take into account the expected deployment (number of kilometres over the lifetime) within the vehicle category. The level of any quota must be in line with the technological feasibility of zero-emission vehicles in the various categories and provide an effective incentive for all manufacturers to put on to the market sufficient zero emission vehicles. The specific embodiment of the incentives for 2030 needs to be laid down at the time of the evaluation in 2022, based on further evolved insights in the feasibility and costs of zero-emission propulsion technologies for HD vehicles.

Enforcement and penalty policy

Parties advise the European Commission to devote attention to the enforceability of the standard. Elements that play a role in this context are independent checking of vehicles against the standards (and thus the certified CO_2 value) and the consequences for manufacturers if the standards are not met. Parties request the European Commission to set up an adequate policy on penalties. The size of the penalty per g/km CO_2 must be set in a way that ensures that it can never be worthwhile for manufacturers not to use available technologies that are cost-effective for the end-user. One idea might be a similar regime to the one for passenger cars, but with a 'lifetime mileage' correction. This will assure the proportionality and the consistency between different vehicle categories.

Additional policy

Fuel consumption is a major cost component for businesses. Besides the standards, it is essential to ensure good information for buyers. Customers must be supplied in a simple manner with accessible and reliable information on the fuel consumption of vehicles, based on the VECTO simulations, including the option to be able to evaluate the effects of additional technologies.

The impact of emission standards can be increased by having additional policies that encourage replacement of the on-road fleet by newer, more economical vehicles. At national level, a differentiated kilometre price, environmental zones and subsidy schemes will help to bring this about. Similarly, the roll-out of charging and alternative tank infrastructure is essential to the success of the transition to zero emission vehicles. National investments in charging infrastructure, including fast chargers, are indispensable for the deployment of the vehicles. Harmonisation of weight-and-dimensions legislation in Europe and the allowing of cross-border use of longer and heavier commercial vehicle combinations ("EMS trucks") Europe-wide can also help to reduce CO_2 emissions. It is definitely not the intention to tag national measures on to European rules. There is no question of an additional national standard.

Reduction potential of trucks

The technically feasible reduction potential was identified in order to be able to provide advice on the level of the emission standards. Preferably, in €/ton CO_2 the CO_2 reduction should not be more expensive than CO_2 reductions in other sectors. The emissions of trucks and the reduction potential will depend on several factors. Some of these factors are directly related to the physical properties of the trucks, while others depend upon their usage. Figure 2 shows factors that may contribute to reducing CO_2 emissions in goods transport.

Research conducted by parties including TNO shows that between now and 2030 a wide array of technologies will be available that will reduce fuel consumption and CO_2 emissions of HD vehicles at limited cost. Based on cost estimates applicable to large-scale use of the technologies, with economies of scale and learning effects being fully utilised, various studies have concluded that the technologies available up to 2030 will yield a reduction potential of 28% to 40% and that the additional costs of the technologies used can be earned back within five years (refer to example in Figure 3). With a reduction potential of 20-25% and the stated earn-back time, the annual benefits will be three times higher than the costs. Beyond 20-25% the investment costs for further reduction do increase, but the entire reduction potential of around 30% will still be attainable at net negative cost to society and end-user. If trailers and car bodies are also factored in, the potential rises towards 40%.

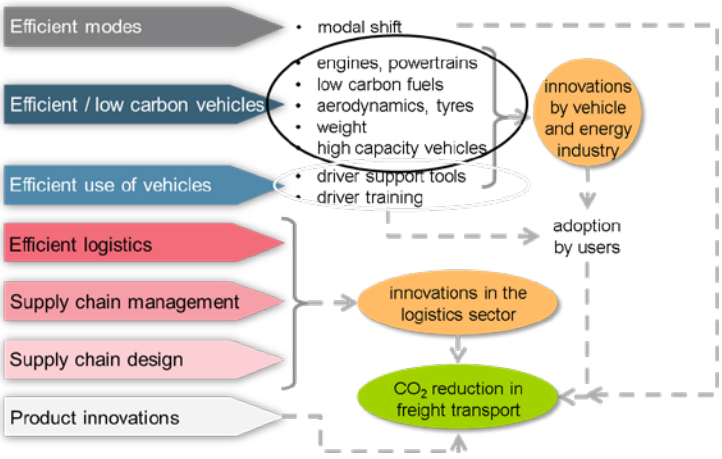

Figure 2: Factors that contribute to the reduction of CO_2 emissions from vehicles and from freight transport in general[9]

[9] TNO, workshop, 28 November 2017

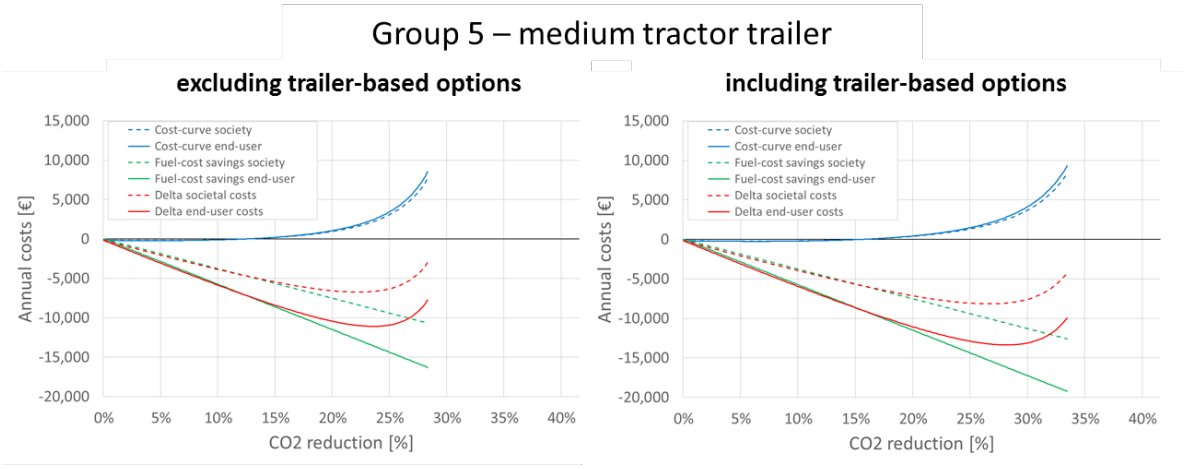

Figure 3. Annuity of the additional purchase costs (blue lines), annual saving on fuel costs (green lines) and resulting impact on total cost of ownership (red lines) as a function of the CO_2 reduction achieved with technical measures for the example of a medium tractor trailer combination. Annuities were determined based on a depreciation period of 5 years and an discount rate of 4% (societal) and 8% (end-user perspective).

The assumption of large-scale use is consistent with a situation where application of the measures is imposed through CO_2 emission standards. In the short term, many technologies will still be expensive, however, which may deter individual manufacturers from using them. The level playing field that will be created by introducing emission standards can break this 'early mover' dilemma.

Carriers are very loyal to the brand of truck they drive and for information they rely on the dealer[10]. A study conducted by ECN revealed that buyers often have little confidence in the consumption stated by manufacturers and that fuel efficiency still plays a relatively small role alongside other factors in the decision to purchase trucks[11]. Here again we see an 'early mover' dilemma, but now from the user's perspective. A wide offering of new technologies by all brands, stimulated by European emission standards, and reliable information about the achievable savings, based on European certification using VECTO, will persuade fleet owners to purchase trucks with new, fuel-saving technologies.

These technologies may form part of the vehicle newly delivered by the manufacturer, but it is also conceivable that a separate supply industry will come about for this, for example a supplier with a package of aerodynamic improvements to lower the air resistance of a trailer. If VECTO and the associated input data were to become available to this supply industry, it might even be possible for fleet owners to determine in very concrete terms the earn-back time of those technologies.

[10] T&E webinar June 2017, GIPA market survey
[11] ECN study "A perspective of truck dealers on CO_2 emissions from trucks"

Advantages of ambitious emission standards for the Netherlands

Ambitious standards will ensure that cost-effective technologies for reducing emissions will become available and affordable for carriers and consignors. Higher fuel efficiency will produce, through the lower consumption of fuel, a direct saving on operating costs. By reducing their carbon footprint, companies can give substance to their sustainability strategy by purchasing or renting fuel-efficient and clean vehicles. If the standard is directly aimed at increasing the market share of zero emission vehicles, this will also be conducive to achievement of the ambition defined in the Green Deal for Zero Emission Urban Logistics. Current CO_2 emissions by trucks in urban logistics are estimated at 4 Mtons CO_2 per year[12].

For manufacturers of trucks, the standards will provide a boost to innovation in the field of emission-reducing technology. As a knowledge-driven economy with a key logistics sector, the Netherlands can benefit from this situation. A market will come about for suppliers of components and Dutch industry can play a role in that market. By defining standards at EU level, a level playing field will be created both for manufacturers and for customers. Outside Europe, European players will become more competitive, because standards exist also in other countries and parts of the world and they will be tightened up. For the Netherlands as a whole, the standards will contribute to lower societal costs. This will be accomplished directly through lower vehicle usage costs and indirectly through lower external costs.

[12] CE Delft, July 2016, *Segmentering CO_2-emissies goederenvervoer in Nederland*

Goal, process and method

In the SER (Social and Economic Council) Energy Agreement, the importance of reducing emissions from the transport sector was recognised and it was agreed that parties would jointly pursue and advocate ambitious European standards. This position paper describes the joint position adopted by parties. The objective is to influence the process of establishing European standards on the one hand, and to provide a basis for the Dutch input during negotiations in the European Council on the other. This will also put the importance to Dutch stakeholders of having sufficiently ambitious standards on the agenda of European policymakers.

Parties obtained the advice of four technical agencies, namely CE Delft, ECN, Sidekick Projects and TNO. The Ministry of Infrastructure and Water Management commissioned the publication of two studies, namely "A perspective of truck dealers on CO_2 emissions from trucks" (ECN), and "Assessments with respect to the EU HDV CO2 legislation" (TNO). A picture was provided of what the reduction potential is for conventional lorries, what the potential is of zero emission vehicles and what investment costs and savings on fuel costs are involved. The outcomes of the studies were of great importance when formulating this joint position paper.

Parties will in due course agree follow-up arrangements for how to bring this Dutch position paper to the attention of relevant players in Europe in the preliminary phase and during the negotiations on a new standard and to this end will develop a joint lobbying strategy.

Dit is een uitgave van het

Ministerie van Infrastructuur en Waterstaat

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