

Clean vehicles directive and the transition to zero emission buses

October 2018

In the span of three years, multiple initiatives have been launched to promote the uptake of clean vehicles in Europe and across the world. The European Commission launched the “Clean bus deployment initiative¹”, the C40 network published a clean bus declaration², while the International Energy Agency initiated the EV30@30 campaign³. The public demand for decarbonisation of transport in urban areas is strong, yet few binding measures have been taken to steer society in this direction so far.

Against that background, the Platform for Electro-mobility considers the ongoing revision of the clean vehicles directive (CVD) as a major opportunity to stimulate the use of cleaner vehicles by public authorities. Given the importance of public procurement in driving the vehicle and bus market – public procurements account for 14% of the EU’s GDP⁴ and 75% of new bus registrations⁵ - this directive has the potential to accelerate the EU’s transition to clean transport, and can be instrumental in helping Member States achieve their 2030 climate and energy targets, while tackling health-damaging air- and noise-pollution levels.

The different options put on the table⁶ by the European Commission and by the rapporteur in ENVI Committee, MEP Andrzej Grzyb, and the one recommended by the Platform, would lead to very different outcomes compared to a business-as-usual scenario. This briefing models the results of the three different approaches in terms of CO₂ and NO_x emission savings.

The briefing also shows that ambitious objectives for zero emission buses would benefit the European economy and support local companies producing electric buses and components.

¹ https://ec.europa.eu/transport/themes/urban/cleanbus_en

² <http://c40-production->

[images.s3.amazonaws.com/other_uploads/images/884_C40_CITIES_CLEAN_BUS_DECLARATION_OF_INTENT_FINAL_DEC1.original_EC2.original.original.pdf?1479915583](https://s3.amazonaws.com/other_uploads/images/884_C40_CITIES_CLEAN_BUS_DECLARATION_OF_INTENT_FINAL_DEC1.original_EC2.original.original.pdf?1479915583)

³ <https://www.iea.org/media/topics/transport/3030CampaignDocumentFinal.pdf>

⁴ https://ec.europa.eu/growth/single-market/public-procurement_en

⁵ [http://www.europarl.europa.eu/RegData/etudes/BRIE/2018/614690/EPRS_BRI\(2018\)614690_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/BRIE/2018/614690/EPRS_BRI(2018)614690_EN.pdf)

⁶ By the date of publication, The Council had not reached a general approach.

Many European cities aspire to clean up public transport



Several cities across Europe have made pledges to clean up their public transport fleets, by setting requirements for new electric bus procurements or for whole bus fleets. Indeed, some members of the C40 Cities network have committed to the Fossil Fuel Free Streets commitment⁷, agreeing to only procure electric buses from 2025 at the latest. European cities participating in the pledge are: Barcelona, Copenhagen, Heidelberg, London, Milan, Paris and Rome. The ambitious cities of Copenhagen and Paris have gone a step further by deciding to only procure e-buses from 2019 and to electrify 80% of their bus fleet by 2025 respectively. The Belgian region of Flanders and the city of Amsterdam have set targets of having a zero-emission transport network by 2025, while Oslo has set the same goal for 2020. In the

⁷ <https://www.c40.org/other/fossil-fuel-free-streets-declaration>

meantime, a plethora of European cities across the continent are already ordering electric buses, as can be seen in the non-exhaustive map above. There is a clear commitment among European cities to switch towards electric buses, which the CVD will only help to strengthen and accelerate. As more and more cities continue to order electric buses, the European Union must encourage and support its urban areas to deploy clean transportation by setting ambitious targets.

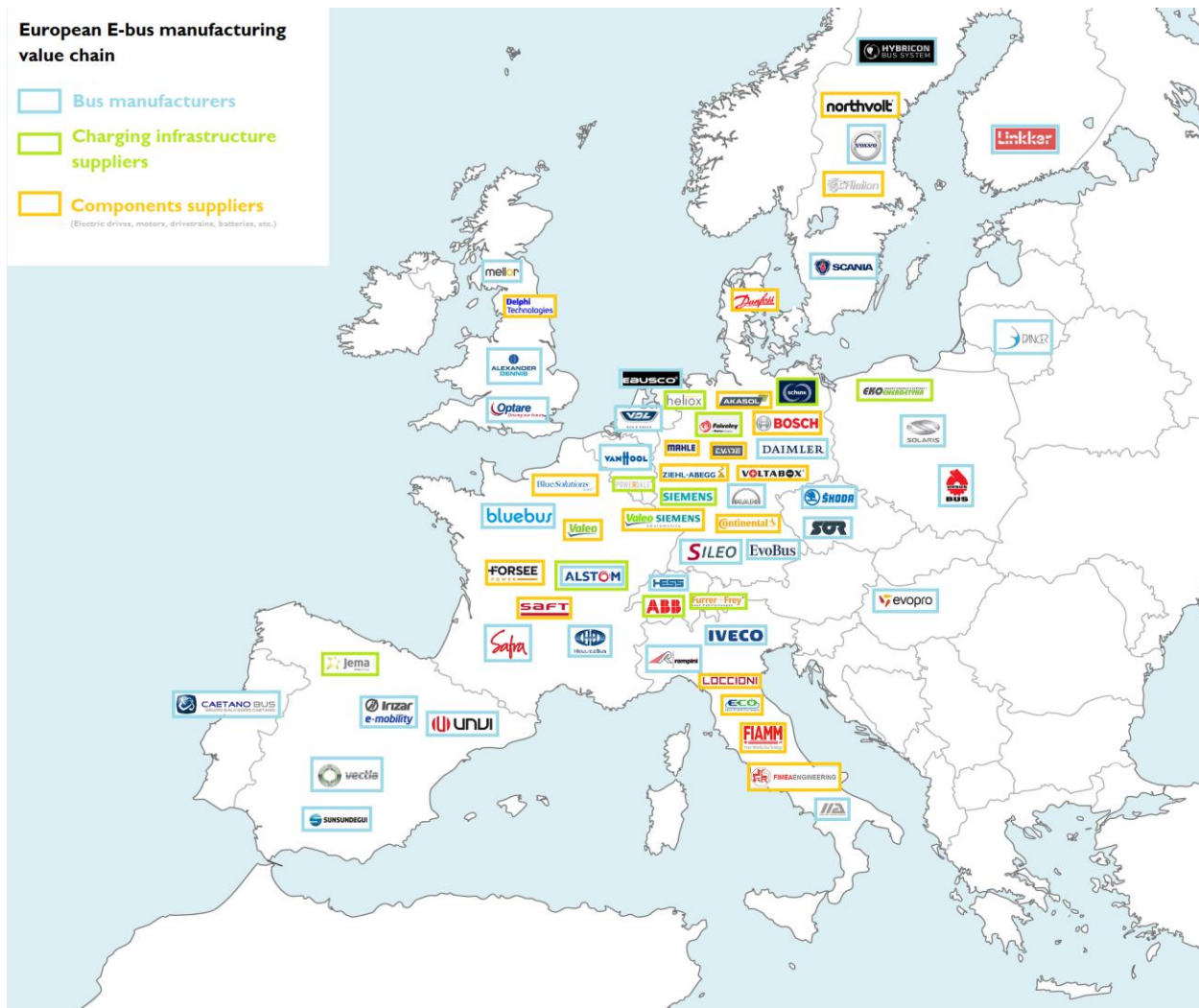
By creating a uniform regulatory framework, with ambitious procurement targets together with clear and forward-looking 'clean vehicle' definitions, the CVD can accelerate the deployment of electric vehicles, and drive their price down, making them affordable to more cities and communities.

European industry ready to deliver

With approximately 380.000 electric buses on its streets today⁸, China is clearly ahead of the curve in terms of EV deployment. Chinese buses are also appearing in European cities, sometimes giving the impression that promoting electric vehicles will mainly create jobs overseas.

Yet, a closer look at the European automotive industry shows that a strong industrial ecosystem already exists on the continent. All major European bus manufacturers have – or will have in 2018 - plugin-hybrid or fully electric vehicles on offer. In terms of components, European companies are in the lead and supply electric motors, drivetrains, control systems, etc. on a global scale. Global leaders in charging stations and electrical equipment also find their roots in Europe.

⁸ <https://www.weforum.org/agenda/2018/04/china-is-adding-a-london-sized-electric-bus-fleet-every-five-weeks/>



Moreover, it should not be forgotten that a growing number of non-European companies are opening factories to produce EVs (complete or parts of them) in Europe, close to their customers. The potential for job creation is real.

European policy-makers should not consider electric mobility has a threat for the European industry, but as an opportunity to be seized. This map shows that the objectives set by the Clean Vehicles Directive could be achieved while creating jobs in the EU. The technology and the expertise are present in Europe, only the political will is missing to actually make the continent a strong player in the electric bus market.

Can the CVD match public demand for clean public transport?

The CVD can support and accelerate the shift to clean modes of transport, or it could buck the trend and slow-down the adoption of electric buses. This will depend on the definition of clean vehicles and the procurement targets chosen by European policy-makers.

What are the different options currently discussed?

European Commission proposal

Clean bus technologies as defined in the Commission's proposal include electricity, hydrogen, and natural gas. Zero emissions buses are counted as 1 vehicle toward the target, while all others are counted as 0.5 vehicle.

The EC proposal sets 2025 and 2030 national objectives for the procurement of clean vehicles. For each Member State, a given percentage of the total bus procurements has to be 'clean' (between 29% and 50% in 2025; between 43% and 75% in 2030, differentiated on the basis of GDP/capita and population density).

Two scenarios based on the EC proposal have been modelled. In the first one, the clean vehicles targets are achieved only with natural gas buses. In the second one, targets are achieved with 75% zero emission buses.

While the EC proposal takes a pragmatic approach by prescribing technologies that qualify as clean, uncertainty remains as to how these targets will be achieved. As shown in the next section, if these targets are met with gas-powered buses, the climate impact will be far worse compared to a scenario with at least 75% zero emission buses.

MEP Grzyb proposal

In MEP Grzyb proposal, clean buses are defined as vehicles powered by one of the fuels defined in the Alternative Fuels Infrastructure Directive 2014/94/EU. This widens the definition of clean buses to those powered by biofuels. Zero emissions buses are counted as 1 vehicle toward the target, while all others are counted as 0.5 vehicle.

Member States have to procure between 16% and 35% clean vehicles as part of their total bus procurement from 2025 onwards. MEP Grzyb introduces a sub-target for zero emission buses, by which 30 % of the clean vehicles procured have to be zero emission in 2025; the sub target increases to 75% of the clean vehicles procured as of 2030.

As a result of this proposal, the real percentage of zero emission buses to be procured is substantially reduced, both in 2025 (between 5% and 11%) and 2030 (between 12% and 26%). As a consequence, greenhouse gases and pollutant emission savings are very modest compared to the baseline scenario [diesel base].

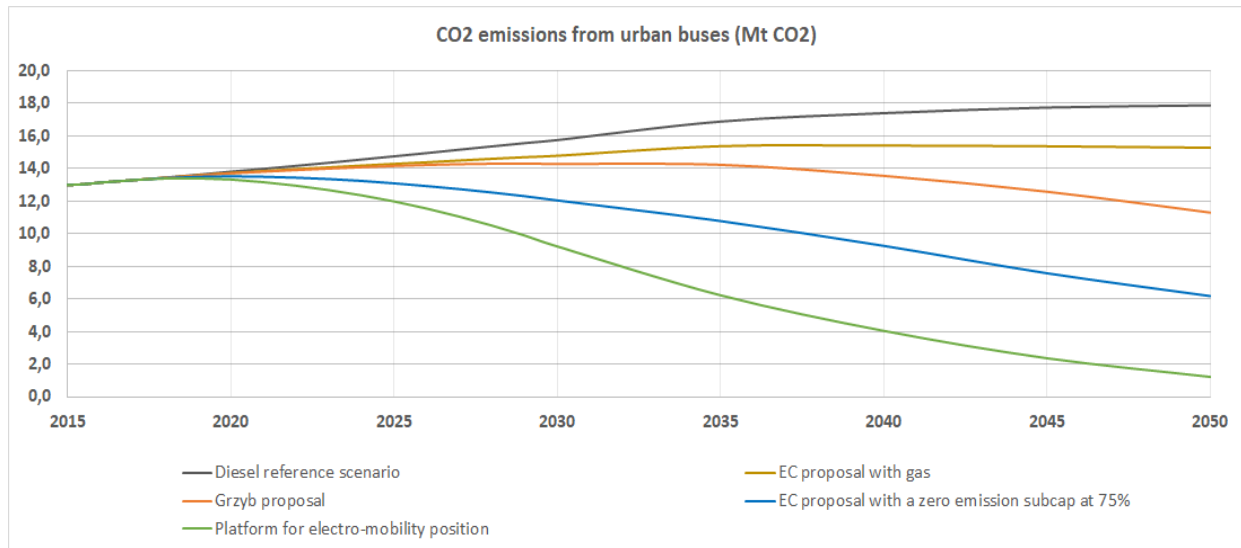
Emobility Platform position

The Platform for electro-mobility considers that clean buses should be defined in 2025 as buses emitting less than 275g CO₂/km, and as zero emission buses as of 2030. Depending on the country, clean buses should make up between 45% and 66% of total procurement volumes as of 2025. Member States should only procure clean buses as of 2030.

In light of electric buses' recent technology and market developments, which have seen the battery density improved⁹ and the costs decreasing¹⁰, the suggested targets are achievable.

Impact of the options

Greenhouse gas emissions



Depending on the outcome of the negotiations, the contribution of the CVD in bringing down CO2 emissions from European urban bus fleets would greatly vary.

In the most ambitious policy scenario (the Emobility platform position) the European bus fleet CO2 emissions would amount to 1,2 million tons in 2050. By comparison, if the EC proposal objectives were met with natural gas buses only, CO2 emissions from buses in 2050 would be 13 times higher, reaching 15 million tons. Assuming a 75% subtarget for zero emission buses, CO2 emissions would still be 5 times higher than in the scenario corresponding to the Emobility platform recommendations.

The proposal of MEP Grzyb would lead to European buses emitting 9 times more CO2 than in the Electro-mobility Platform scenario (11 million tons CO2). This discrepancy is significant, 11 million tons being the equivalent of the annual road transport CO2 emissions of Finland.

Since CO2 emissions are cumulative, the consequences of today's policy choices for the climate are much more important than those depicted by the situation in 2050. From 2020 to 2050, the European bus fleet could be responsible for the emission of a total of 435 million tons of CO2 (MEP Grzyb proposal) or could

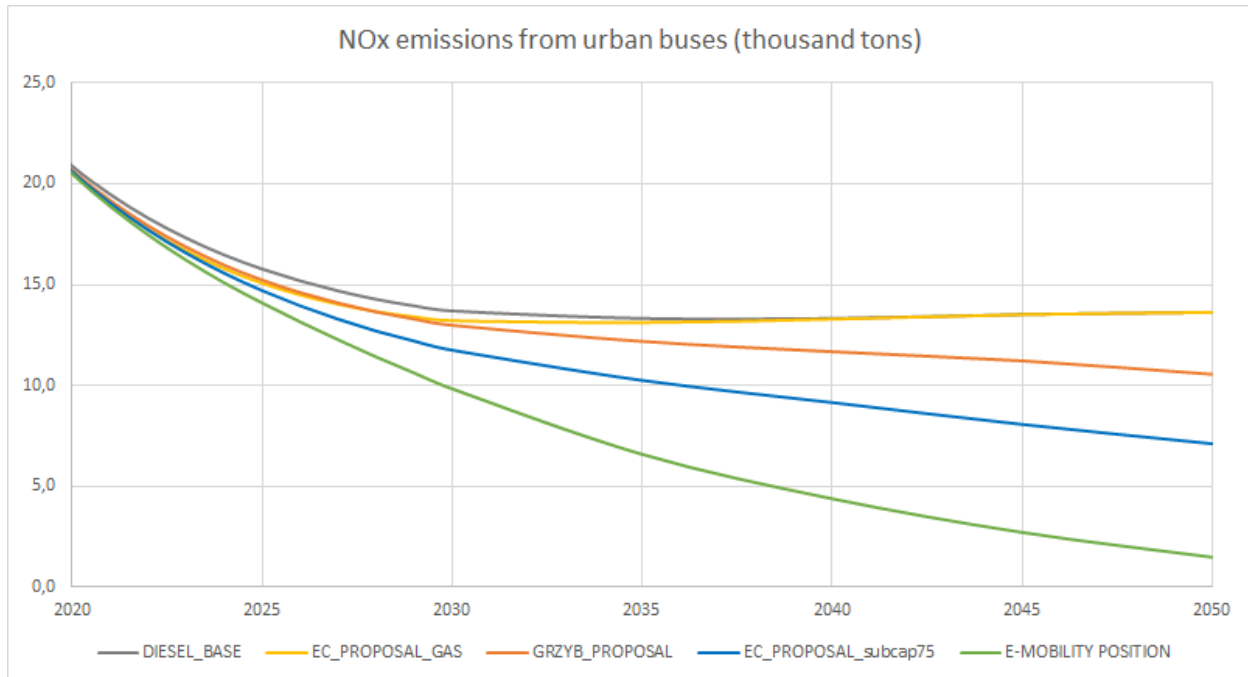
⁹ <https://www.economist.com/graphic-detail/2017/08/14/the-growth-of-lithium-ion-battery-power>

¹⁰ <https://data.bloomberglp.com/bnef/sites/14/2018/05/Electric-Buses-in-Cities-Report-BNEF-C40-Citi.pdf>

reduce its impact to 232 million tons over the same period (Emobility platform proposal). This ultimately depends on policy choices made today.

Air pollution

Beyond its effects on climate, the CVD will also impact EU citizens' health.



The figure above illustrates the CVD's impact on the European bus fleet nitrogen oxides (NOx) emissions. The first striking finding is that the objectives set by the Commission's proposal, if met solely with natural gas vehicles, do not lead to any environmental benefit compared to a business as usual scenario (euro VI diesel buses). This is because most recent diesel EURO VI buses have similar NOx emissions as natural gas buses of the same generation.¹¹ In both cases, levels of NOx emitted in 2050 are 9 times higher than in the scenario corresponding to the Emobility platform recommendations.¹²

Assuming the EC proposal objectives are met with 75% zero emission buses, NOx emissions of the European bus fleet in 2050 would still be more than 4 times higher than in the Emobility Platform scenario.

In the case of MEP Grzyb proposal, NOx emissions from the European bus fleet would amount to 10,000 tons in 2050, 7 times higher than in the Emobility platform scenario.

¹¹

https://www.transportenvironment.org/sites/te/files/publications/2016_02_TE_Natural_Gas_Biomethane_Study_FINAL.pdf

¹² In this scenario, NOx emissions from the bus fleet in Europe in 2050 amount to 1500 tons, because of few remaining conventionally fuelled buses.

Conclusion: A suggestion for compromise

Policy makers will soon face a decisive choice when voting on the review of the Clean Vehicles Directive. With European manufacturers ready to deliver zero emission buses and mature battery technologies only set to improve in coming years, the choice is straightforward between short term fossil options or a clean, renewable, future-proof transportation.

This briefing shows that a technology-based definition can lead to very different outcomes based on vehicle technology chosen to achieve the targets. If targets were to be achieved only with 'clean vehicles' powered by natural gas, the Directive would lose almost all its effectiveness.

Therefore, setting a CO₂/km emission threshold to define clean buses in 2025 taking into account technological progress, and defining clean buses as zero emission in 2030 ensures the Directive leads to greatest climate and health benefits possible, in a cost efficient way.

As an alternative, a sub-target for zero emission vehicles - the mechanism suggested by MEP Grzyb - according to which at least 75% of the clean buses procured should be zero emission, could be basis for a compromise. It would ensure that the objectives actually pursued by the CVD are going to be met, and that the spirit of the directive is respected.