European Parliament

Post 2020 CO_2 emission targets for cars and vans: the right level of ambition?

WORKSHOP

Tuesday, 27 March 2018 from 14:00 to 15:30

European Parliament (Brussels), Room: Altiero Spinelli 1G2

Organised by Policy Department for Economic, Scientific and Quality of Life Policies at the request of the Committee on Environment, Public Health and Food Safety (ENVI)

Chair : Miriam Dalli, MEP (Rapporteur)

PROGRAMME

14:00 – 14:05
Welcome by the Chair, opening remarks

14:05 – 14:15
The role of light duty vehicles in achieving emissions reductions
Kris Vanherle, Senior Researcher at Transport and Mobility Leuven

14:15-14:25
The proposed post-2020 targets for light duty vehicles
Peter Mock, Director of International Council on Clean Transportation Europe

14:25-14:35
Increasingly efficient light duty vehicles
Nikolas Hill, Ricardo Energy & Environment, Principal Consultant and Knowledge Leader in Transport Technology and Fuels Sustainable Transport Practice Area

14:35-14:45
The way forward: The future of electric vehicles
Peter Kasten, Senior Researcher Consultant OEKO-Institute Resources, Transport Division

14:45-14:55
The way forward: possible steps for further improvement
Richard Smokers, TNO, Sustainable Transport and Logistics

14:55 – 15:30
Q&A with closing remarks by the Chair

Presentation Summary and Speaker Biography

1. The role of light duty vehicles in achieving emissions reductions

Setting the scene CO2 emissions of passenger cars and vans:

- Transport, excluding international aviation and bunker fuels, accounts for about 20% of all GHG emissions in EU28. Road transport is the key responsible sub-sector (95%) and subsequently cars and vans account for about 3/4 of the road transport emissions. The regulation under discussion at the moment, affects about 14% of total EU GHG emissions.

- While total GHG emissions have decreased to less than 80% in 2015 compared to 1990, the GHG emissions from transport have increased some 15%. Transport emissions decreased in the wake of the financial crisis, but have bounced back more recently, as a consequence of economic recovery. The increasing efficiency, particularly after 2010 is offset by a higher increase in transport activity, leading to a net increase.

- Up to 2009, the driver for emission reduction was the voluntary agreement with ACEA to improve vehicle emissions, combined with mandatory and uniform labelling. When the objective wasn't achieved, in 2009 the European Commission set mandatory targets first for cars (130gr by 2015), 2 years later for vans (175gr by 2017) and amended in 2014 to more stringent targets: 95g for cars and 147g for vans by 2021 and 2020 respectively.

- Higher fuel efficiency leads to higher purchase price. There's a large bandwidth regarding the scale of the expected purchase cost increase, though most likely offset by lifetime fuel cost savings.

- The proposal at hand aims to reduce emissions from cars and vans by 30% in 2030 compared to 2021. To this end, the 95gr standard is maintained but will gradually be tested to more realistic driving conditions. The discrepancy between type approval and real-world CO_2 emissions has increased to 40% over the past decade. The New European Driving Cycle (NEDC) will be replaced by the Worldwide Harmonised Light Vehicle Test Procedure (WLTP) ensuring more realistic reductions.

Kris Vanherle

- Kris Vanherle is a biochemical engineer and holds a master's degree in environmental sciences. He is a Senior Researcher at Transport & Mobility Leuven focusing on the impact assessment of transport policies.

- He has broad expertise with particular focus on transport emissions of greenhouse gases and air pollutants and has managed several studies for European national governments on behalf of TML. A key research field in which Kris is active, is the quantification of emissions by various transport modes and the assessment of policy measures on transport emissions. To this end, he developed and managed various emission models (e.g. EMMOSS, TREMOVE, and MOVEET).

- Kris is regularly involved in impact analyses of various measures to reduce the environmental impact of transport (e.g. eco-taxation, CO_2 standards, subsidies for new green technologies, scrappage schemes, and electric vehicle incentives) using quantitative models.

- He is also in charge of TML's in-house modelling assessment tools, keeping them up to date with the latest developments in the market.

2. *The proposed post-2020 targets for light duty vehicles*

- The European Commission's technology cost curves for passenger cars indicate a 30% CO2 reduction by 2030 would maximize consumer benefits (fuel savings minus technology costs), while a 40% or 50% CO_2 reduction would still result in net benefits. Yet the EC's final cost curves discount the benefit of mass reduction and do not consider the cost reductions achievable by eco-innovation technologies. ICCT's cost curves indicate much higher CO_2 reductions are achievable at reasonable additional manufacturing costs. With ICCT cost curves, net benefits would be highest with a CO_2 reduction of 70% for cars by 2030.

- The proposed sales targets for zero-emission and low-emission vehicles (ZLEVs) incentivize greater deployment of electric vehicles. However, the ZLEV provisions stay behind some recent announcements of higher future market share goals by major European manufacturer groups. Essentially the ZLEV credits are rewarding car manufacturers with less stringent CO_2 reduction requirements for deploying electric vehicles in numbers consistent with what they have already announced they plan to do. Furthermore, the proposed regulation does not foresee any penalty for non-compliance with ZLEV target values for 2025 and 2030.

- According to the European Commission proposal, CO_2 targets for individual manufacturers would be based on their average vehicle weight, thereby discouraging light-weighting compared to a system that is based on vehicle size or that uses absolute targets instead. In addition, without adapting the proposed weight-based slope value, each individual manufacturer will have a strong incentive to actually increase vehicle weight.

Peter Mock

- Peter Mock is Managing Director of ICCT Europe and divides his time between the ICCT's Berlin and Brussels offices. His main focus is the coordination of ICCT activities in Europe, mostly for the light and heavy-duty vehicles sectors. This includes compiling well-based, credible data on the vehicle market and vehicle technologies, and making this information easily available to a broad audience.

- Prior to joining the ICCT, Peter Mock was staff member of the Daimler Global Environmental Protection department and completed a dissertation assessing future market potentials of different vehicle technologies and fuels at the Institute of Vehicle Concepts of the German Aerospace Centre (DLR). He holds a diploma degree in Chemistry and Economics (Dipl.-Chem. oec.) from the University of Ulm (Germany) and a doctorate in engineering (Dr.-Ing.) from the University of Stuttgart (Germany). In 2015/16 he was working as IPC-Mercator Research Fellow from Istanbul, Turkey.

3. *Increasingly efficient light duty vehicles*

- There are many technical options available to improve efficiency of conventional powertrains and also alternative low or zero emission / electric powertrains (xEVs)
  - Utilisation of 'off-cycle' technical options could reduce real-world reduction costs
- There have been questions raised on the future role of diesel for cars with respect to cost/CO_2 reduction/air pollutant emissions considerations:
  - Some OEMs discontinuing diesel options from market (e.g. Toyota, Porsche, FCA)
  - The rise of mild / 48V hybrids is widely expected to fill 2020 gap at similar/lower cost
  - However, overall net reduction potential by 2030 may be impacted → more xEVs
- xEV powertrains cost is rapidly reducing, the number of available models increasing – anticipated to cover over half of models accounting for >90% EU sales by 2025
  - Some suggest further investment in engine improvements/R&D may be limited
- Analysis of the total cost of ownership (TCO) for average new vehicles shows:
  - Greatest net benefits to end-users and society for 30% reduction for cars
  - There are still net benefits even up to 50% reduction versus the baseline case
  - Including accounting for GHG and AQ pollutant damage costs significantly improves the TCO net benefits from the societal perspective for higher ambition levels

Nikolas Hill

•Nikolas Hill is a Principal Consultant and the Knowledge Leader in Transport Technology and Fuels in Ricardo Energy & Environment's Sustainable Transport practice area, with over 18 years of experience working on transport, energy and climate change issues for UK Government, the European Commission and private sector clients.

•Over the years he has been involved in a wide range of projects exploring potential measures to reduce GHG emissions from transport and their respective roles in the context of over-arching objectives. Much of Nik's work has had a focus on modelling the potential costs and emissions impacts of efficient low carbon technologies and fuels in different transport modes, including a number pioneering UK and European projects.

- A significant number of these, particularly in the last few years, have involved the assessment of electric vehicles and their charging infrastructure. Most recently Nik has led key projects for the Commission including work developing new CO2 reduction cost curves for light-duty vehicles, and the work assessing the impacts of selected options for regulating CO2 emissions from new passenger cars and vans after 2020 that fed into the Commission's impact assessment for the post-2020 CO2 regulation proposals launched in November 2017.

4. The way forward: The future of electric vehicles

- Electric vehicles (EVs) are a key element of the EU GHG mitigation strategy in road transport (>80% light duty vehicle activity in electric mode by 2050; ~100% EV (incl. PHEV) sales share in 2040). How-ever, bringing EVs on the road not only implies replacing conventional cars but also entails systematic changes for consumers and industry. Thus, a good projection of EV market size and deployment speed facilitates the integration of EV in road transport. Currently, the EU market for EV is strongly driven by demand–side instruments such as tax benefits and driving privileges. Other regions such as China and California introduced binding mandates as a supply-side measure to increase market certainty and to accelerate the EV market uptake.

- There is an inherent interaction of the required emission level of new conventional cars and the LEV/ZEV sales share within the CO2 emission target framework: A higher share of LEV/ZEV implies less restrictive CO2 emission levels for conventional cars. Thus, the main incentivizing element of the CO2 regulation is the overall target level which can be met by either increasing the share of LEV/ZEV and/or by reducing the CO2 emission level of conventional cars.

- The CO2 reduction ambition level proposed by the Commission (2030: -30% w.r.t. 2021) provides a rather weak incentive for increasing the market uptake of EV. Given this target, the Impact Assessment indicates a (weighted) market share of LEV/ZEV of approx. 11% in 2030. The additional LEV/ZEV in-centive of the current proposal (crediting-system – one-way adjustment) is not expected to accelerate the EV market uptake since its impact is impeded by the overall target level. Therefore, a more ambi-tious CO2 reduction level would be needed to incentivize the EV market uptake. According to the Im-pact Assessment, a reduction level of -50% w.r.t. 2021 is expected to yield a (weighted) LEV/ZEV mar-ket share of approx. 21% in 2030.

- In combination with an effective overall target level, additional LEV/ZEV incentives can increase future market certainty (binding mandate) and accelerate the EV market uptake (crediting-system). Thus, a combination of both elements (binding mandate and crediting-system) could provide an improved regu-latory framework. A trading mechanism between OEM could add flexibility to the binding mandate.

- The proposed weighting function of LEV/ZEV credits would push the LEV/ZEV share towards very low emitting vehicles (REEV and ZEV) in case of an effectively incentivizing regulation framework. The proposal's LEV/ZEV share benchmarks of the crediting mechanism are in line with future LEV/ZEV sales share expectations announced by OEM.

Peter Kasten

- Peter Kasten is a senior researcher and consultant in the OEKO-Institute's Resources and Transport division. He has worked extensively on electric vehicle market deployment and the interactions between the transport and the electricity sector. He has developed and applied market deployment models and has analysed mobility and vehicle data as well as empirical data on the perception of electric vehicles. Additionally, Peter Kasten has investigated real-world challenges of EV market roll out in several scientific accompanying research projects.

- Since 2013, his research and consulting activities also focus on the analysis of electricity-based synthetic fuels. Currently, he is leading OEKO Institute's work on the interactions between the transport and the electricity sector and is advising the German Ministry of the Environment on light-duty vehicle CO_2 emission targets.

- Peter Kasten has joined OEKO-Institute in 2010. Previously, he was employed as a research associate at the laboratory for thermodynamics in new technologies at ETH Zurich. He holds a diploma in energy and process engineering from TU Berlin.

5. The way forward: possible steps for further improvement

The main issues with the current proposal for the post-2020 LD CO_2 legislation are related to:

1. The **target level**: The proposed targets do not utilise the full potential for CO_2 emission reduction in cars and vans that is technically feasible and cost effective by 2025 and 2030 from an end-user and societal perspective. Furthermore, the level of ambition is inconsistent with the 1.5 ˚C goal of Paris agreement and the needs of Member States in achieving goals of their Integrated National Energy and Climate Plans for 2030.

2. The **method for stimulating zero-emission vehicles**: Due to the alignment of CO_2 reduction percentages and ZEV target shares, OEMs that meet the ZEV target will not have to reduce CO_2 emissions of the remaining conventional vehicles (ICEVs), even though there is a large and cost-effective potential.

3. Target definition: The choice for **relative reductions compared to the 2021 WLTP-based average** creates an incentive for OEMs to "inflate" the WLTP-based CO_2 value of cars sold up to 2021.

- A fix for the second issue would be to add a malus to the bonus in the proposed system of ZEV targets, in the form of tightening the CO_2 target for OEMs that do not meet the ZEV target. This would ensure better utilisation of the available reduction potential for ICEVs. Alternatively, a separate target for ICEVs could be considered in combination with a ZEV mandate.

- An important option for solving both the first and the second issue is setting more ambitious targets that require utilisation of the full cost-effective reduction potential for ICEVs and a significant share of ZEVs in the new vehicles sales. In relation to the third issue this option may have a positive effect, in the sense that it makes the impact of the legislation less dependent on development of the WLTP/NEDC ratio. A negative impact of a more stringent target setting, however, is that it increases the incentive for OEMs to "inflate" the WLTP-based CO_2 value of cars sold up to 2021.

- For the third issue it could be considered to set a (sufficiently stringent) relative 2030 target as indicative only, and to determine an absolute 2030 target (in g/km) later when the WLTP/NEDC correlation is better understood. The latter requires independent testing and validation. This would also allow alignment of the 2030 target with progress in the understanding of the implications of the Paris agreement and the resulting needs of Member States in realising their Integrated National Energy and Climate Plans for 2030.

Richard Smokers

•Richard Smokers (22/09/1964) holds a PhD in experimental physics. Since 1992 he has built an extensive track record in technology assessment and policy-oriented studies in the field of transport, energy and environment. Richard's experience includes the development of test procedures for vehicles with alternative powertrains, monitoring of field trials / pilots with electric and hybrid vehicles, technical and economic assessment of emission abatement technologies and of alternative powertrains (electric, hybrid and fuel cell vehicles), and environmental and economic impact assessments. He also has extensive expertise on the (measurement and modelling of) real-world emissions and energy consumption of conventional vehicles.

- From 2005 onwards, Richard Smokers has worked as a consultant for the European Commission in a consecutive series of projects assessing options for and impacts of regulation of the CO_2 emissions of passenger cars, light commercial vehicles, and more recently also heavy-duty vehicles.

- During his entire career Richard Smokers has worked in interdisciplinary projects combining knowledge on vehicle and propulsion system technologies with traffic and mobility research, air quality modelling and transition and innovation theory, applying this knowledge for design and evaluation of strategies and policy instruments for sustainable mobility. Over the last years Richard has expanded his field of work to include the wider aspects of sustainable logistics, including activities to promote the development and application of carbon foot-printing method