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GRPE contributions, future plans, and suggestions in support of climate change mitigation for the 85th session of ITC

Note by the Chair of the Working party on Pollution and Energy

Summary

The worsening globally situation due to the increasing frequency and severity of climate change impacts, combined with the call for enhanced efforts to achieve the Sustainable Development Goals, including via mitigation policies and measures the limiting of global warming to below two degrees Celsius as set in the Paris Agreement on climate change, creates the most pressing demand for inland transport to become part of the strictest solutions. Particularly as inland transport is the main contributor to CO₂ emissions. The Working party on Pollution and Energy (GRPE) has long expertise in providing regulatory measures to harmonize measurement procedure and lower greenhouse gas (GHG) since the inception of the World Forum for Harmonization of Vehicle Regulations (WP.29). GRPE has recently agreed to create dedicated activity on carbon life cycle assessment (LCA) to look holistically at how to measure and mitigate carbon emission from vehicles.

The Committee may wish to support GRPE in this challenging new task to look at LCA and to request all contracting parties and other interested stakeholder to engage in this activity.

The Committee may also wish to consider complimentary and intensified activities on vehicle usage and ownership where another significant GHG emission reduction potential exist and where GRPE is not active at the moment.

I. Introduction

1. At its 84th session, ITC “Noted with appreciation the secretariat’s paper (ECE/TRANS/2022/16) on the critical role of inland transport in accelerating climate change mitigation worldwide and on the overview of related activities by the Committee and its Working Parties” (Decision 34) and “invited its Working Parties to submit to the secretariat until 14 October 2022 their ongoing contributions, future plans and suggestions in support of climate change mitigation”(Decision 34 (c)).



2. The Working party on Pollution and Energy (GRPE), within the World Forum for Harmonization of Vehicle Regulations (WP.29), has a long experience in delivering harmonized procedures to measure carbon dioxide (CO₂) and other greenhouse gas (GHG) emissions from wheeled vehicles.

3. GRPE is ready to tackle the climate impact from vehicles and stand ready to support and contribute to ITC's vision "to accelerate the work of the Committee and its Working Parties and impact for climate change mitigation and adaptation" (Decision 34 (b)).

II. Existing activities undertaken by the World Forum for Harmonization of Vehicle Regulations and the Working Party on Pollution and Energy

4. WP.29 and its subsidiary Working Parties, especially GRPE (Working Party on Pollution and Energy), heavily contribute to climate change mitigation measures by elaborating the automotive related regulatory framework on both reduction of energy consumption, GHG and pollutant emissions of road and off-road vehicles as well as on the safety (usually tackled by GRSP) and durability of alternative propulsion systems such as electric / hybrid-electric and hydrogen powertrains.

5. WP.29 activities also cover elements on circularity by setting recyclability targets, and performance-based requirements on retrofit and replacement parts. WP.29 also recently adopted provision to deploy software updates and the monitoring of software versions by type approval authorities.

6. [reserved for other WP.29 subsidiary bodies contributions]

7. GRPE has developed worldwide harmonized test cycle for most vehicle categories (motorcycles, cars, vans and engines from trucks and buses) to be able to measure tailpipe CO₂ emissions in the most representative and realistic way, allowing the implementation of robust fuel economy improvement regulations by contracting parties.

8. GRPE is also working on zero-tailpipe emission technologies coming to the markets, as, for example, UN GTR No. 22 on in-vehicle battery durability. This UN GTR ensures minimum degradation from batteries in electric vehicles reducing waste and need for raw material extraction and associated carbon emissions. Such regulation is also expected to increase the trust in electric cars, further supporting a fast and successful adoption of such technology by car owners.

9. At its June 2022 session, GRPE agreed to initiate dedicated activities on carbon life cycle assessment (LCA), to develop harmonized methodologies to calculate the life cycle emission of carbon of vehicles, including carbon emissions during manufacturing, use and end-of-life phases of the vehicle:

(a) Under the initiative of Japan and Korea, GRPE organized a workshop on carbon LCA of vehicles on 31 May 2022 in conjunction with the 86th session of GRPE. The purpose of the workshop was to exchange information on the latest initiatives happening in the field of vehicle LCA and to assess whether GRPE was an appropriate body to tackle such issue;

(b) Following the successful workshop, GRPE agreed to include LCA into its list of priorities and to initiate dedicated activities through the creation of an Informal Working Group (IWG) on LCA. Japan agreed to host the 1st meeting of the IWG on LCA, where leadership team and Terms of Reference were finalized;

(c) Including LCA into GRPE portfolio significantly broaden its scope, which traditionally focused on exhaust emissions; looking at the climate and environmental impacts of all phases of vehicles, many opportunities are expected together with challenges especially as GRPE will need to expand its expertise to cover these new topics.

(d) the IWG on LCA is expected to deliver on a harmonized methodology to determine carbon footprint of vehicle throughout their life; harmonized procedure would

contribute to robust, repeatable, reproducible, and therefore comparable results for and between any given vehicle.

III. Regulatory tools to help mitigate carbon emissions from vehicles adopted by GRPE

10. GRPE has adopted many regulatory directly contributing to GHG measurement and reduction; GHG usually measured include CO₂, CH₄, PM (which for older engines include black carbon).

11. Under the 1958 Agreement, GRPE has adopted several UN Regulations that help measure carbon and other GHG emissions and mitigate climate impact

(a) UN Regulation No.24: procedure to measure smoke levels of diesel engines for light and heavy duty applications; smoke from diesel engines often contains black carbon which is a powerful GHG; the procedure provides a reference value which is also used at periodic technical inspections to assess the effectiveness of the emission control system of the vehicle to reduce particulate emissions

(b) UN Regulation No. 49: Definitions of Worldwide harmonized Heavy duty Steady Cycle (WHSC) and of Worldwide harmonized Heavy duty Transient Cycle (WHTC) to measure exhaust emissions from heavy duty vehicle engines, including CO₂, particulate matters and air pollution;

(c) UN Regulation No. 83 and 101: definition of harmonized test procedure for light duty vehicles (cars and vans) using New European Duty Cycle (NEDC) for air pollution and particulate matter (UN Regulation No. 83) and fuel economy / CO₂ (UN Regulation No. 101). UN Regulation No. 101 also contains provisions to measure range of electrified vehicles. UN regulation No. 154 gradually substitutes UN Regulations Nos. 83 and 101.

(d) UN Regulation No.96: Definitions of harmonized Non-Road Steady Cycle (NRSC) and Non-Road Transient Cycle (NRTC) for construction machinery, agricultural tractors, and all types of non-road mobile machinery. UN Regulation No.96 stipulates measurement procedures for CO₂, particulate matter and air pollution for engines fitted to those vehicles

(e) UN Regulation No. 115: defines performance requirement for CNG and LPG retrofit kits that should comply with procedures and limits defined in UN Regulations Nos. 49, 83 and 101, where appropriate.

(f) UN Regulation No. 132: Definitions of performance of Retrofit Emission Control devices (REC) for heavy duty vehicles, agricultural and forestry tractors and non-road mobile machinery diesel engines. Looks at particulate and NO_x emission reduction thanks to the REC device fitted to old engines.

(g) UN Regulation No. 133: Defines target for recyclability, recoverability and reusability of vehicles during their design phase, to improve material circularity and reduce natural resources extraction. No specific climate mitigation measures or target.

(h) UN Regulation No. 143: Provision specific for dual-fuel retrofit kits for engines operating with more than one fuel; prescribes limits for particulate matter and air pollution following UN regulation No. 49 limits (in most cases)

(i) UN Regulation No. 154: definition of worldwide harmonized test procedure (WLTP) for cars and vans for CO₂, particulate matter, air pollution, electric range for electrified vehicles. Use as a basis for CO₂ emissions in many fuel economy standards across the globe. Gradually replaces UN Regulations No. 83 and 101.

12. Under the 1998 Agreement, GRPE has adopted several UN GTRs that help measure carbon and other GHG emissions and mitigate climate impact

(a) UN GTR No. 2: Defines Worldwide harmonized Motorcycle Test Cycle (WMTC) with CO₂, particulate matter and air pollution emission limits for two- and three-wheeled vehicles

(b) UN GTR No. 4: Provide harmonized definitions for test cycles, measurement equipment and procedure for CO₂, particulate matter and air pollution, similar to UN Regulation No. 49. No emission limits in UN GTR No. 4

(c) UN GTR No. 10: defines emission allowance coefficient for emission events outside of the test cycle defined in UN GTR No. 4. Particulate matter and air pollution is included covering wider range of ambient temperature and atmospheric pressure.

(d) UN GTR No. 11: provides a methodology to measure emissions from non-road mobile machinery, similar to UN Regulation No. 96.

(e) UN GTR No. 15: Provides harmonized definitions for test cycles, measurement equipment and procedure for CO₂, particulate matter and air pollution, similar to UN Regulation No. 154. No emission limits in UN GTR No. 15.

(f) UN GTR No. 22: Provides performance requirement for the durability of batteries in electrified vehicles, to ensure only quality batteries are fitted to electrified vehicle, increase consumer trust in the durability of those batteries.

(g) UN GTR No. 23: Provides testing methodologies to measure the durability of emission control systems for two- and three- wheelers.

13. Under the 1997 Agreement, GRPE has developed UN Rules defining procedures to measure airborne emission and smoke level during periodic technical inspections and roadworthiness checks.

(a) UN Rule No. 1: Provides testing methodologies to measure the opacity of exhaust gases following test limits defined in UN Regulation No. 24.

IV. the need to look holistically to assess mobility's environmental impact

14. Improving the vehicle itself is an important step to mitigate climate impact from transport, but it is not sufficient to reach climate goals set by the Paris Agreement. Mobility demand management and mode choice should also be tackled simultaneously to mitigate transport sector emissions in proportions that can help meet internationally agreed climate targets, as stated in the key finding with a high confidence in the latest report from the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report, Climate Change 2022: Mitigation of Climate Change on all transport matters¹.

15. GRPE has a long experience and huge expertise to reduce climate impact from vehicles themselves and to transform vehicles to lower their carbon impact. The climate impact reduction potential from vehicles is significant, and GRPE is working hard to maximize this mitigation potential by improving the vehicle design, energy and GHG emissions efficiency during its use and lower its environmental impact at its end-of-life.

16. The Working Party on Pollution and Energy (GRPE) has contributed to UNECE's mobility podcast about "Circular Economy explained"² that highlights the need to look at the product transformation (the vehicle itself) and also usage transition (how vehicles are owned and used) to have a more holistic approach to circularity, and emission mitigation (Figure 1).

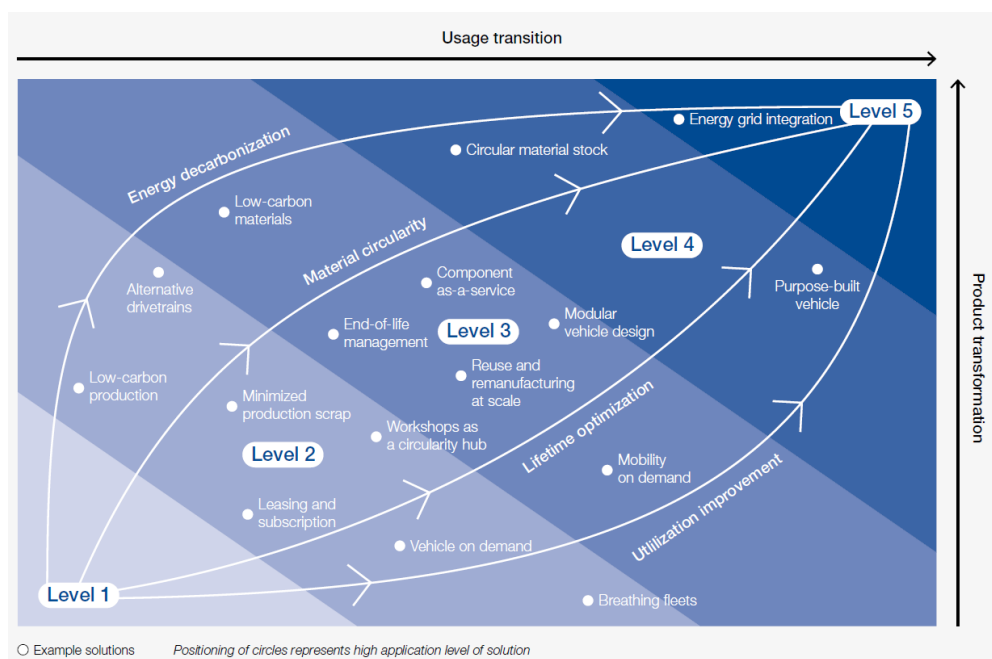
17. GRPE has nevertheless no mandate nor expertise to act on usage transition nor vehicle ownership, and these issues also offer significant climate mitigation potential according to the latest report from the IPCC on climate change mitigation¹.

18. GRPE calls ITC to intensify its contribution to usage transformation and would happily contribute to closely working with other ITC subsidiary bodies to work together to deliver on climate impact mitigation from mobility.

¹ IPCC AR6 WG3, Chapter 10, https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_Chapter10.pdf

² <https://soundcloud.com/unece/mobility-one-world-zero-waste-the-circular-economy-explained>

Figure 1
Transformation pathways and potential solutions (WEF, 2020)³



V. Suggestions to ITC to mitigate climate impact of road vehicles

19. GRPE has now decided to look at vehicle carbon LCA, to define harmonized methodologies to determine the climate impact of vehicles during their lifetime, from cradle to cradle. To take on this ambitious challenge within its purview, **GRPE requests support from ITC in this task.**

20. Through its carbon LCA activity, GRPE will tackle the product transformation part to make sure vehicle are designed and scrapped to minimize climate impact. The LCA approach at the vehicle scale is also expected to contribute to lower GHG-intensity rate during the use phase of the vehicle.

21. Mobility as a service, car sharing or carpooling are other elements which could have significant impacts on vehicle ownership, usage rates and therefore GHG emissions, which at the present time GRPE is not considering in its activities.

22. To maximize carbon mitigation:

(a) vehicles should decrease its carbon intensity over its life, GRPE has continuously been working on this over the years, and

(b) Ownership and usage behaviour are complimentary measures to reach climate goals according to latest literature from UNFCC bodies¹, where GRPE has no workstream at the present time.

23. To have a holistic approach, the **Committee may wish to take caution on vehicle ownership and usage** in the near future.

³ https://www3.weforum.org/docs/WEF_Raising_Ambitions_2020.pdf