UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

REAL-TIME $CO_{2\text{-}e}$ EMISSIONS OF ELECTRIC VEHICLES DURING RECHARGE

Online workshop

28 May 2021, from 10:00 to 14:00

DRAFT CONCEPT NOTE

Electric vehicle fleet (EVs, consisting of pure electric vehicles and plug-ins) has significantly increased worldwide over the last decade, alongside expansion of charging infrastructure. Coupled with technology advances and supported by favourable regulatory and fiscal measures, uptake of electric vehicles is expected to only accelerate in the future.

Powered solely by electric motors, EVs have zero tailpipe emissions. Yet, EVs virtually emit carbon when being charged, as electricity has its greenhouse gas footprint. And despite most studies use average annual carbon content of the electricity mix to derive well-to-tank emissions from EVs, these may vary over time depending on multiple factors including the source of energy used for electricity production. A 'well-to-wheel' approach, considerate of time and location of EVs charging, is therefore thought to be expedient for assessing real environmental benefits of locally carbon-neutral EVs. Achievement of this target, however, is reliant on improved vehicle connectivity, real-time $CO_{2\text{-}e}$ content data reporting, and decision-making support for more economically rational and environmentally favourable EVs recharging options – all enabled by ICT and digitalization.

This workshop aims to assemble experts from the power generation (including decentralized) and transmission side, and bring expertise from the ICT, recharging infrastructure, and vehicle sides. Through presentations and open discussion, it will help assess how digital technologies could enable more accurate measurement and reporting of real-time carbon emissions of electric vehicles. Due consideration will also be given to pathways for a balanced integration of electric mobility by the means of coupling charging profiles with urban mobility, to ensure overall net benefit to energy system and its actors. Specifically, the workshop targets to answer the following questions:

1. Potential effects on stakeholders
   - What possibilities does estimation of real-time $CO_{2\text{-}e}$ emissions of EVs offer to energy service providers (including utilities and charging station operators)?
   - What are potential effects on end-users (EVs owners)?
2. Organizational and technical means
   - What information needs to be collected to evaluate real-time $CO_{2\text{-}e}$ emissions of EVs?
   - What are the current practices of collecting the required information?
   - How can this information be collected for all EVs when plugged (i.e., stakeholders to be involved, technical means to be used)?
3. Policymaking implications
   - What is a potential use of real-time $CO_{2\text{-}e}$ emissions data from the policymakers' perspective?
   - What recommendations could be provided regarding solutions for measurement, monitoring and analysis of real-time $CO_{2\text{-}e}$ emissions of EVs?

DRAFT PROVISIONAL AGENDA

Moderator: Alisa Freyre, Vice-Chair, Group of Experts on Energy Efficiency

Time	*Item*	*Speaker*
10.00–10.05	Introduction	**Aleksandar Dukovski,** Chair of GEEE **Piyush Verma,** Chair of the GEEE Task Force on Digitalization in Energy
10.05–10.30	Setting the scene: the need for monitoring upstream emissions of EVs	**XXX,** International Energy Agency or World Business Council on Sustainable Development
10.30–11.15	Grid side: real-time monitoring of electric mix and associated emissions	**XXX,** Distribution Network Operator, tbd **XXX**, electricitymap.org **Elliot Romano,** University of Geneva Group discussion
11.15–11.30	Recharging infrastructure side: tracking recharging emissions and vehicle communication	**XXX,** Fastned **XXX,** SIG Group discussion
Break		
11.45–12.30	Vehicle side: vehicle communication protocol to monitor recharging	**XXX**, AVERE and/or OICA **XXX,** DG GROW, European Commission Group discussion
12.30–13.15	Potential applications: for consumer/owner, for legislator, and for energy companies	**XXX**, TEzlab app **XXX,** DG ENER **XXX,** Tiko (tbc) Group discussion
13.15–13.50	Moderated group discussion and next steps	
13.50–14.00	Conclusion	**Aleksandar Dukovski,** Chair of GEEE **Mike Olechiw,** Chair of the EVE IWG

Abbreviations: GEEE, Group of Experts on Energy Efficiency; EVE IWG, Informal Working Group on Electric Vehicles and the Environment; SIG, Services Industriels de Genève.

ABOUT THE ORGANIZERS

Group of Experts on Energy Efficiency

Group of Experts on Energy Efficiency, a subsidiary body of the Committee on Sustainable Energy, addresses, among other, matters related to energy consumption and emissions of EVs. Its newly established Task Force on Digitalization in Energy explores benefits and obstacles of digitalization to ensure net benefit to the energy system and its actors, and naturally contributes to the process of developing smart charging solutions for EVs.[1]

Informal Working Group on Electric Vehicles and the Environment

Informal Working Group on Electric Vehicles and the Environment (EVE IWG) is hosted by the Working Party for Pollution and Energy (GRPE) of the World Forum for harmonization of Vehicle Regulations (WP.29). The work developed by GRPE is about vehicle regulation. Life cycle analysis (LCA) and Automated, Autonomous and Connected vehicles (AACV) are high on the policy agenda development, mainly in relation to safer and smoother mobility. Activities using the AACV functionalities with the objective to minimize environmental impacts should be further developed and deployed in vehicles. Both LCA and AACV have been identified as priority items that GRPE might be working on in the near future.[2]

The EVE IWG has initiated a task to determine a "method to state energy consumption of EVs", which has led to the publication of a tool to compare WtW emissions of different powertrain types. GEEE has been approached to assist and lead the work for the upstream emission part.

[1] For more information, please see: https://unece.org/sites/default/files/2020-12/ECE_ENERGY_133_CSE-29%20_report.pdf and https://unece.org/sites/default/files/2020-12/GEEE-7.2020.INF_.3.pdf

[2] For more information, please see: http://www.unece.org/fileadmin/DAM/trans/doc/2020/wp29grpe/GRPE-80-04.pdf