DEC 2021 HEV TCP NEWSLETTER

54TH HEVTCP EXCO

The fifty-fourth meeting of the Executive Committee for the Hybrid and Electric Vehicle Technology Collaboration Programme (HEV-TCP) was again held virtually on November 19, 23, and 24.

New country delegates from the UK (Joscelyn Terrell) and from Finland (Ilkka Homanen) were welcomed by the Chair. The new IEA Desk Officer for HEV TCP (Ekta Bibra) was also welcomed.

A new task proposal on “Battery Swapping” was proposed by China, with Operating Agents to be Xiao Lin and Bert Witkamp. Germany agreed to join the task, and the ExCo voted to approve it as Task 48.

A proposal for a new task on “EV Accessible Infrastructure” was updated by Clare Pennington (UK). Several countries expressed an interest in possibly joining such a task, and they will seek to confirm participants.

The task proposal on “Electrification of ground goods movement in ports”, which was conditionally approved at the last ExCo, reported that Norway has now joined with the USA, so the task will officially begin as Task 47.

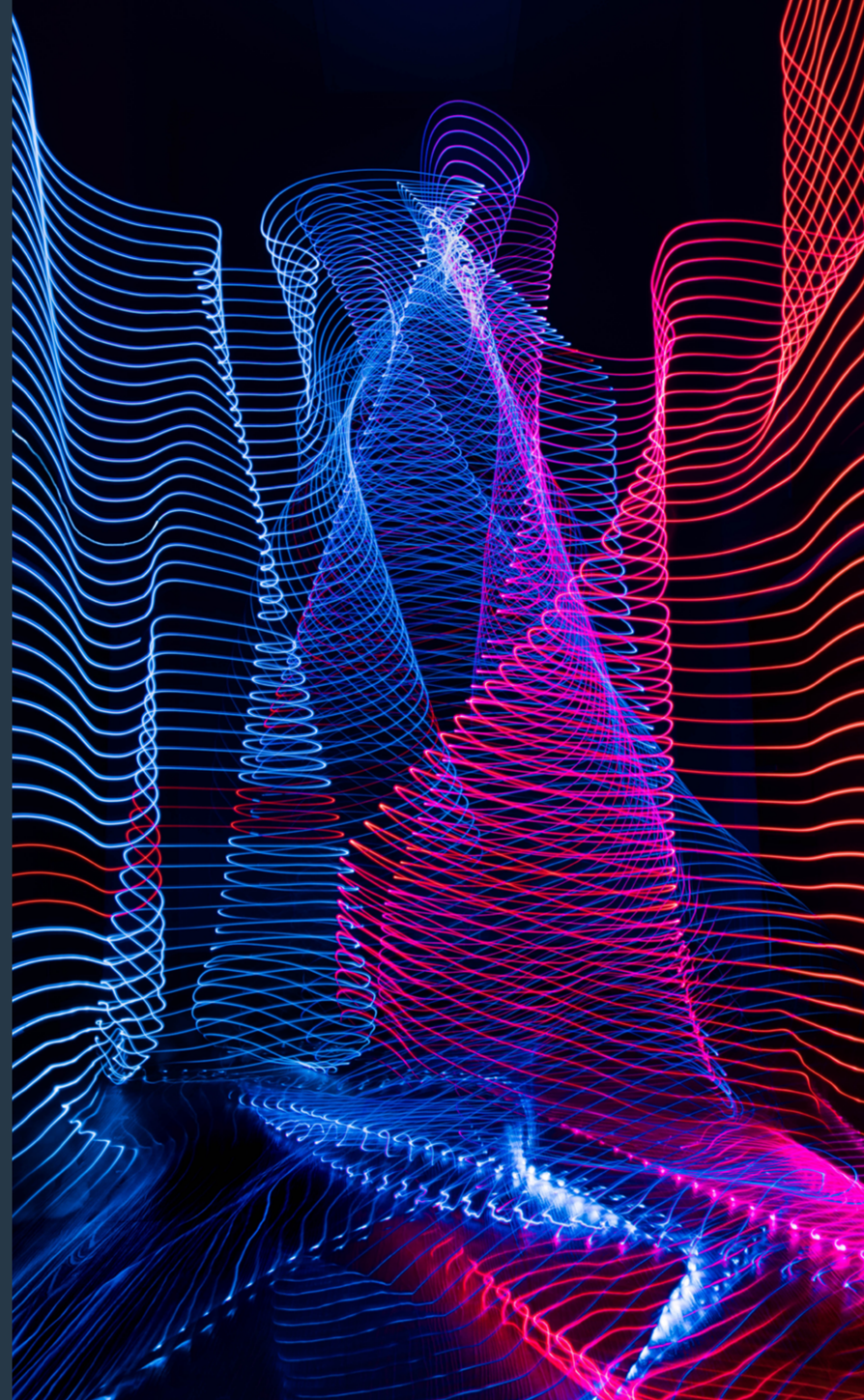
Task updates were given and discussed for all the other ongoing tasks. Task 29 (Electric, Connected, Automated Vehicles, e-CAVs) and Task 35 (Fuel Cell EVs) have completed their work and are preparing final reports. Time extensions were approved for Tasks 23, 34, 37, and 43.

Celeste Ferguson presented Task 1 activities, including the creation of a new LinkedIn account, new SharePoint folders for external collaboration, aligning data collection methods with IEA, and requests for submissions for the December newsletter.

Ekta Bibra (IEA) gave an update on recent IEA activities and described the goals and status of the GEF e-mobility programme. She also provided an update on the activities of the Electric Vehicle Initiate (EVI) of the Clean Energy Ministerial (CEM).

Brief reports were given on the HEV TCP’s participation in three IEA-related working groups, namely the GREET working group (Gerfried Jungmeier), the IEA Net Zero by 2050 working group on zero-carbon ready buildings (Cristina Corchero), and the GEF e-mobility working group #1on light-duty electric vehicles (Jim Miller).

The in-person Spring meeting hosted in Oslo has been planned and will go ahead for June 8-10th. This will coincide with the 35th EVS held from the 11-15th of June. The decision on the format for ExCo 56 (fall 2022) was deferred until we know more about hybrid meetings and their functionality.



INNOVATION CHALLENGE

AN INTERESTING AND LOW-COST INSTRUMENT TO SPEED UP ELECTRIC DRIVING

The ambition in the Netherlands is that by 2030 all new sales of passenger cars should be zero emission (i.e. BEVs or FCEVs). At the moment the zero emission share in newly sold cars is about 20%. It is going in the right direction, but more needs to be done to reach the goal.

There are a number of factors that currently prevent speeding up transitioning to electric passenger cars:

- Unfamiliarity with electric driving (many people have never driven electric);
- Unfamiliarity with charging possibilities (where can I find charging points and what will charging cost me);
- Range anxiety;
- Lack of clarity about costs (purchase and usage of an electric car).

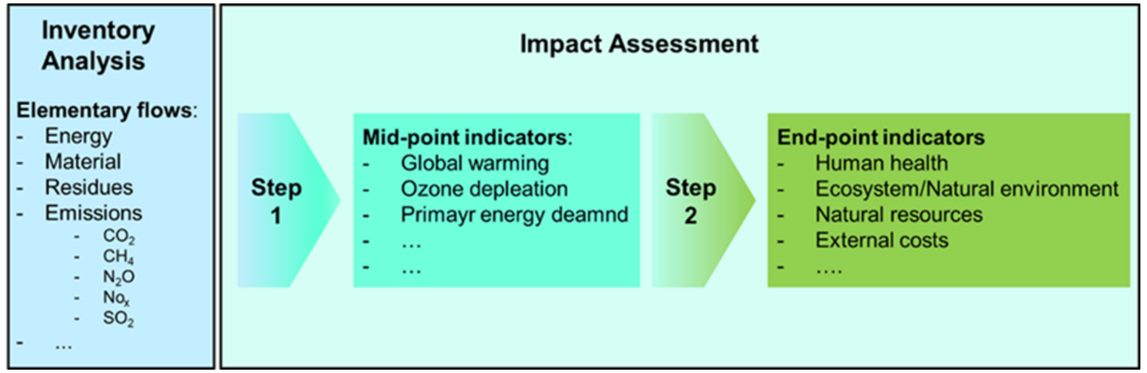
The Dutch Ministry of Infrastructure and Water Management has organized a challenge for start-ups, scale-ups and other innovative entrepreneurs to come up with smart and clever solutions to help speed up the transition, eg in the field of behavioral change or technological renewal. Companies could win € 20,000, exhibition space and access to professional networks within the Ministry and Netherlands Enterprise Agency.

A total of 39 innovative ideas were sent in, varying from communication campaigns to charger solutions to MaaS/car sharing to specialized apps. A professional jury with distinct backgrounds (policy, consumers, science, technology, charging/energy) judged the proposals. The top 3 was:

1. NLCharge with their AC/DC combined charger managed by a smart energy system;
2. Tap Electric with their charging app that combines several services;
3. SamenSlimRijden Zeist/Mobicoop with their shared cars initiative.

TASK 30
IMPACT ASSESSMENT OF EVS IN AN LCA

From Inventory Analysis to the Impact Assessment in LCA



Task 30 had an expert Workshop on "Overall Assessment in LCA of Electric Vehicles - From Inventory Analysis to Impacts of Electric Vehicles" (October 13 – 14, 2021).

The aim of the workshop was to conclude on the Impact Assessment methodologies and its impact categories - beyond global warming and primary energy consumption - relevant for LCA of electric vehicles and conventional ICE vehicles.

Life Cycle Assessment is a method to analyse and assess a system from cradle to grave for a transportation service. So LCA as a system assessment method addresses environmental impacts best on global scale like global warming or resource use. The assessment of regional and local environmental impacts like acidification, human toxicity and biodiversity depend very much on site-specific local conditions and need site-specific inventory in LCA. Otherwise, it is argued that other methodologies than LCA can address these regional and local environmental impacts more adequately; e.g. biodiversity is mainly relevant in agricultural and forestry systems.

Due to the methodological complexity and uncertainty the practical addressing and calculation of "end point indicators" is not recommend for LCA of electric vehicles and conventional vehicles.

The most relevant impacts and assessment methodologies for EVs using available and robust inventory data in LCA are for the global impact categories:

- Climate change
- Primary energy use (consumption) (fossil and renewable)
- Resource use minerals and metals
- Water footprint (inventory level)
- Land use (inventory level)

These global impacts should be documented the following:

- Total: sum of production, operation and end of life
- Production: vehicle, energy/battery storage
- Operation: fuel/energy supply, fuel use, maintenance
- End of life: recycling and/or reuse, substitution of secondary material

The "Resource use, mineral and metals" are becoming quite relevant for EVs, so future LCA should cover the amount of material in the inventory analysis for the most relevant materials like Cu, Li, Co, Ni, Mn. Water and land issues are mainly relevant for mining activities, e.g. Lithium extraction, and hydro power, wind and PV.

These global indicators also address the two most relevant environmental aspects currently on the public and political agenda e.g. GreenDeal:

- "Climate neutrality" and
- "Circularity".

A dynamic system perspective can address these aspects, e.g. recycling to secondary material, which needs further methodological developments towards a dynamic LCA approach.

Concluding, for LCAs on EVs in comparison to ICE it becomes obvious that Global Warming and Primary Energy Consumption are a minimum requirement and state of the art in Impact assessment. LCAs disregarding one of these two impacts are too limited or misleading in their conclusions and interpretations.

TASK 38
FIRST WEBINAR ON "EXPERIENCES AND OUTLOOK ON TECHNOLOGY FOR ELECTRIFICATION OF VESSELS"

The objective of Task 38 is to build and share knowledge on technology for battery-electric and hybrid operation of marine vessels. This includes identification of key segments, demands, operational experiences and potential for further developments.

The development of technology for hybrid and fully battery-electric propulsion systems for marine vessels has progressed rapidly over the last few years. Especially, the number of ferries utilizing on-board battery storage has been growing quickly after the MV Hallaig started operation in Scotland as the first battery-hybrid ferry in 2013 and the MS Ampere started operation in Norway as the first fully battery-propelled ferry in 2015. The same technology is also continuously finding new applications in multiple vessel segments, and further developments can help to enable zero- or low-emission operation of an increasing share of the maritime transport.

To monitor and support this development, activities in IEA HEV Task 38 are started from November 2021, and a first open webinar is organized on the 15th of December.

The aim of this webinar is to share expectations for and experiences from the design of battery-electric vessels and their propulsion systems. The program will include presentations from Siemens Energy, which delivered the electric power system for MF Ampere, and from Fjellstrand Yard which is currently building the first fully battery-electric high speed passenger vessel. Dedicated webinars on battery systems and shore-to-ship charging technology for marine vessels will be organized during the first half of 2022.

For further details and registration, please contact Jon Suul: Jon.A.Suul@sintef.no

TASK 39

MAKING PUBLIC CHARGING INFRASTRUCTURE MORE ACCESSIBLE FOR EV DRIVERS

Today, most EV drivers are still lacking easy access to all information necessary for charging their electric vehicle in the (semi-) public domain.

Detailed information on charging infrastructure location, availability, access options including transparent pricing are crucial for the EV drivers to remove range and price anxiety.

Task39 is collecting and sharing experiences/best practices/lessons learnt on ways to improve the user experience when charging passenger cars in the (semi-) public domain. Different workshops have been organized in 2021 focusing on important aspects like transparent pricing, EV market protocols and the importance of open protocols to stimulate interoperability, the role of the public and private stakeholders, data quality of available (semi-) public charging infrastructure and even on the growing importance of cyber security.

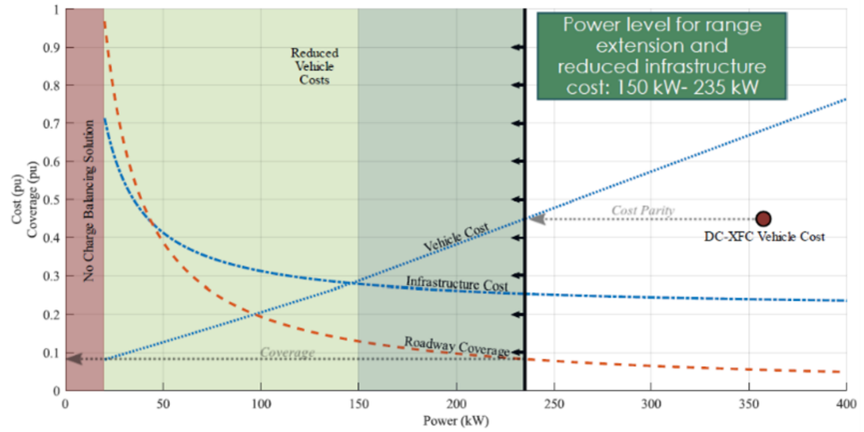
The charging infrastructure market is growing rapidly and is getting more mature worldwide. Of course there are differences between countries, but in general we can conclude that important progress has been made to improve the EV charging user experience in the (semi-) public domain. However, there are still some weak points which need to be improved especially since the profile of the newer EV drivers is changing. The “early adopters” were more motivated to put time and effort in collecting missing information on (semi-) public charging infrastructure and were less critical when some information was even wrong sometimes. For the “early and late majority” information need to be easily available and accurate. The Task39 workshop on “Transparent Pricing and Invoicing” made clear that improvements need to be made on price transparency. Prices need to be clear to the EV drivers before, during and after the charging sessions. Today, there is still a large divergence and complexity in tariff structures for contract-based and ad-hoc charging.

More information on Task39 and contact details: ieahev.org/tasks/39/ & ieahev.org/publicationlist/2021_annual_report/ (Task39: pages 61-69)

TASK 45
ELECTRIFIED ROADWAYS TECHNOLOGY PROGRESS

Task 45 will highlight Electrified Roadways (E-Roads) technology progress, deployment activities and the development of related standards as the three critical elements of eMobility (the energy grid, the road infrastructure, and the vehicle) will need to be integrated for successful E-Roads adoption.

Figure: Analysis determining E-Roads power transfer levels (Galigekere, et al ORNL)



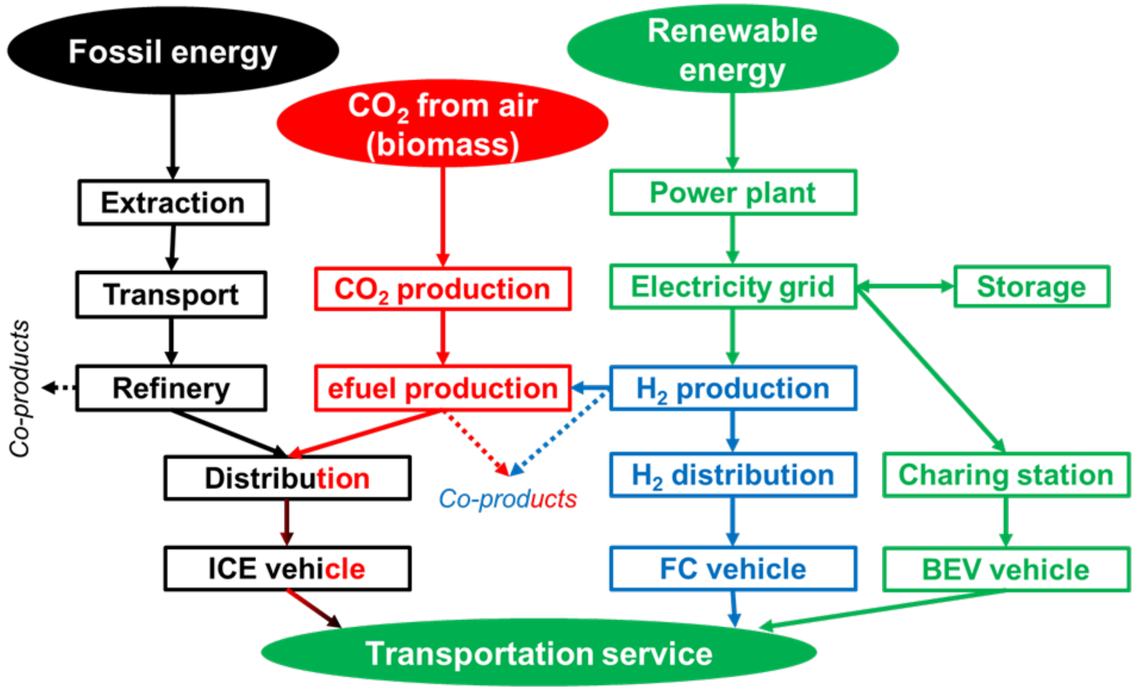
Basic information for the various technologies of interest (4 common types of E-Roads) can be found in the HEV-TCP member site here.

This task held the initial task meeting virtually in June of 2021. With participatory presentations by each of the member countries (six at the time), and additional presentations from industry and research. These presentations are available by request from the operating agent. The task kick-off meeting had more than twenty attendees, including participants whose organizations have since formally joined in support of this task. The task now has official partners from eight countries (Norway, Switzerland, the Netherlands, Germany, Sweden, Israel, Austria and the United States) with representatives from government, industry (including a vehicle OEM and two E-Roads system providers) and research sectors.

The task will hold its second virtual meeting as a joint session with Task 41 (Electric Frieght Vehicles) in December of 2021. This workshop will focus on new performance evaluations for electrified transportation and the relationship of the critical elements between these two tasks.

TASK 46

NEW TASK ON LCA OF EVS STARTS IN JANUARY 2022



LCA Comparing Transportation Systems using Renewable Electricity

The new IEA HEV TCP Task 46 (2022 – 2024) "LCA of electric Trucks, Buses, 2-Wheelers and other Vehicles" will start in January 2022.

Interested institutions in the HEV member countries are invited to join and contribute to this new task.

The major activities are

- Stakeholder involvement in three expert workshops
- Technology and system description with vehicle and infrastructure data, relevant issues and LCA data on buses, trucks, 2-wheelers and other vehicles with different fuel/propulsion systems
- Case studies on LCA of
  - Buses (urban and rural)
  - Trucks (from delivery truck to huge trucks incl. overhead line)
  - Two-wheelers
  - Other vehicles e.g. mining trucks (e.g. in ore mining Erzberg/Austria)
- LCA comparison to renewable hydrogen, e-fuel systems and conventional fuels
- Assessing "climate/CO2-neutrality" and "circularity" in a LCA perspective and methodology
- Dissemination and publications, e.g. presentations/contribution at conferences, Contributions to Annual Report and newsletter
- Identify R&D demand

This Task was initiated by Austria and the Operating Agent is Gerfried Jungmeier, JOANNEUM RESEARCH. The management of Task 46 is financed by the Austrian Climate and Energy Fund.

TASK 48

NEW TASK IS READY FOR KICK OFF

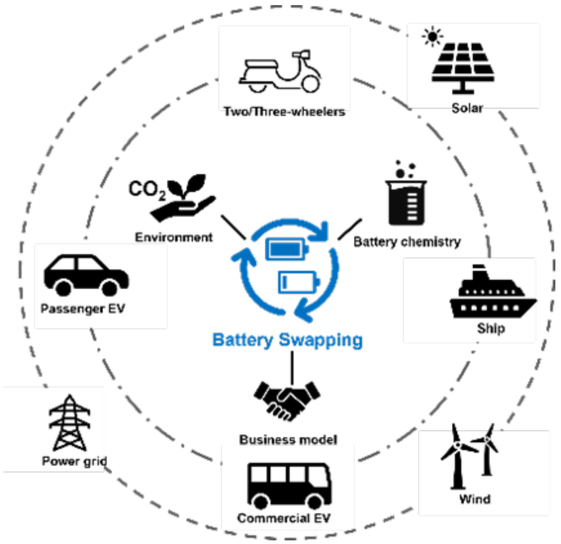


Figure: Illustration of task objective

After Germany's confirmation on participation, the new Task 48 - Battery Swapping is ready for kick-off.

Electrification in the transportation sector is the key solution to tackle global warming and help to achieve carbon neutrality. Recent years have witnessed a rapid development of electric vehicles, and most of the worldwide mainstream automotive manufacturers have announced their plan to phase out the ICE cars.

The promotion and popularization of electric vehicles heavily rely on the development of the supporting infrastructures. Battery swapping, as one of them, has drawn lots of attention in China recently due to its fast battery change time, better battery lifetime management, and smoother integration with the power grid. NIO and Aulton are planning to build more than 8000 battery swapping stations by 2025. Meanwhile, many more cases on battery swapping are picking up in US, Netherlands, Norway, Germany, Finland, Sweden, Italy, and Republic of Korea.

Battery swapping is still in its early adoption phase, and there are massive arguments on this technology, e.g., non-uniformity and poor reliability of battery swapping interface, difficulty in unifying battery design and structure, immaturity and high battery swapping station construction cost etc.

The main objective of this task is to investigate the influences of battery swapping employment on battery chemistry, grid infrastructure, environment, and business model, strengthen the global information exchange on battery swapping technology, help the formation of battery swapping ecosystem and traceability mechanism, and offer suggestions for policy makers and stakeholders.

If you want to participate in this interesting task, please contact

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