HEV TCP

DECEMBER 2020 NEWSLETTER

IEA INTERNATIONAL ENERGY AGENCY

HYBRID & ELECTRIC VEHICLE TECHNOLOGY COLLABORATION PROGRAMME

TASK 1
A ROUND UP OF 2020

DEAR HEV TCP MEMBERS, OPERATING AGENTS, AND FRIENDS,

As 2020 comes to a close, this newsletter forms a round-up of some of the highlights from our member countries and ongoing tasks.

In January this year, we (Urban Foresight) had the privilege of starting as Operating Agents for Task 1, building upon nearly a decade's experience with the HEV TCP. We had a busy year with our Task 1 activities – despite the Covid-19 pandemic changing a lot of our plans for this year! Many of you will have been involved in our first virtual ExCo in November 2020, which saw lively participation from member countries and operating agents. We're looking forward to being able to see you all again when there will be a physical ExCo and supporting the HEV TCP in their 2021 activities which include updating the HEV TCP website.

Stay safe everyone, wherever you are in the world.

Festive wishes,
Kate Palmer, Task 1 Operating Agent

TASK 30

NEW PUBLICATION ON THE LIFE CYCLE ASSESSMENT (LCA) OF AUTOMOTIVE BATTERIES BASED ON A LITERATURE REVIEW

In Task 30, we collected and reviewed LCA studies on automotive batteries.

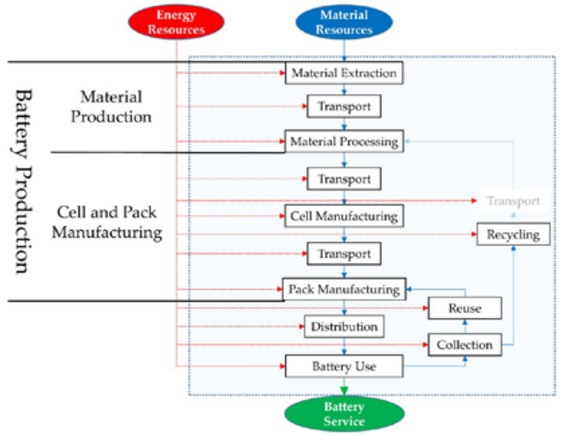
We reviewed a total of 50 publications, from the years 2005–2020, on the LCA of Li-ion batteries, in order to assess the environmental effects of the production, use, and end of life of EV batteries. Investigating these LCAs showed that the median energy for the primary energy consumption of a single battery pack per kWh of battery capacity is 280 kWh with associated emissions of 120 kg CO2 eq per kWh of battery capacity. We expect results for current batteries to be in the lower range.

Over the lifetime of an electric vehicle, these emissions relate to 20 g CO2-eq/km. Considering recycling processes, greenhouse gas savings outweigh the negative environmental impacts of recycling and can reduce the life cycle of greenhouse gas emissions by a median value of 20 kg CO2-eq per kWh of battery capacity.

Overall, many LCA results overestimated the environmental impact of cell manufacturing due to the assessments of relatively small or underutilised production facilities. Material emissions, such as those from mining and processing from metals and the cathode paste, could have been underestimated due to process-based assumptions and non-regionalised primary data. Second-life applications were also often not considered.

For further information, please download the full paper here.

FIGURE 1 THE LIFE CYCLE OF BATTERIES



TASK 33

2020 – 2030 WILL BE THE CENTURY OF BATTERY ELECTRIC BUSES IN URBAN ENVIRONMENT

Over recent years, bus transportation systems using battery electric buses, are receiving increasing attention.

After several years of testing battery electric buses in demonstration projects, several cities and urban bus operators have now started to electrify their bus fleets, either partially or completely. Recent developments show that new charging strategies and advanced energy storage technologies have helped to enable full-day operation of battery electric buses. The objective of the IEA HEV Task 33 "Battery Electric Buses" (2018 – 2020) is to analyse and assess the current state of technology and demonstration experiences of battery electric buses to determine future perspectives. The following partners are involved in Task 33:

Spain - IREC – Catalonia Institute for Energy Research
Canada - NRCAN – Natural Resources Canada, Office of Energy Research and Innovation
Finland - VTT, Germany – hySOLUTION
South Korea - Ulsam University
Austria - JOANNEUM RESEARCH (Operating Agent).

In addition to the participating countries, further partnerships were established with: IEA AMF Annex 53 "Sustainable Bus Systems", and PRO-EME: Promoting Electric Mobility in Urban Europe, a project as part of the ERA-NET Electric Mobility Europe program.

The organisation of workshops, with participation from industry, research organisations, technology policy experts, and governmental institutions, established an international basis for the exchange of information on the relevant issues on e-buses. Two workshops, the first on the state of technology, and the second on future perspectives of battery electric buses, were held in Helsinki in 2018 and Eindhoven in 2019.

Based on the workshops, the following key issues were identified regarding battery electric buses:

Key drivers: climate protection and decarbonisation of the transportation sector, improvement of air quality, the European Green Vehicle Directive,

Technological aspects: battery electric buses and adequate charging systems for depot or opportunity charging on the road are available on the market,

Experiences from demonstration projects:

- Paradigm shift from vehicle procurement to system procurement,
- Early stakeholder involvement in the planning and joint feasibility study necessary,
- IT supporting fleet monitoring to optimise operation,
- Integrating e-bus services into the overall city transport decarbonisation/de-fossilisation strategy,

Rolling out battery electric bus fleets in the Netherlands: Amsterdam and Eindhoven have the most innovative and biggest e-bus fleet in Europe,

Performance indicators: operating costs, energy consumption, charging, and overall system performance,

Environmental aspects: life cycle assessment necessary to determine environmental impacts. Battery electric buses are the most energy efficient bus system and the use of additional renewable electricity maximises the environmental benefits,

Economic aspects: in baseline situations, the total costs of the e-buses are slightly higher than for diesel ICE buses but significantly lower than hydrogen fuel cell buses.

R&D issues: fleet management, heating and cooling systems and strategies, inductive charging at stations/road, high power charging 1 MW and higher, light weight vehicles,

Outlook: the expectation is “that 2020 – 2030 will be the century of battery electric buses in urban environment”.

For further updates on this Task, please follow the HEV TCP website here.

TASK 34

BATTERY PACK COST ANALYSIS

As part of ongoing battery R&D that informs Task 34 on Batteries, the following represents a status update on the decrease in electric vehicle battery cost, which will help enable the competitive market entry of EVs.

These battery cost projections are derived by battery manufacturers using USABC's battery manufacturing cost model for specific battery cell and module designs that meet developed system performance targets and are based on a production volume of at least 100,000 batteries per year.

The Battery Performance and Cost (BatPaC) model is a calculation method that has been developed at Argonne for estimating the performance and manufacturing cost of lithium-ion batteries for electric vehicles, including hybrid-electrics (HEV), plug-in hybrids (PHEV), and pure electrics. The project is being funded by the Vehicle Technology Office (VTO), which is part of the Energy Efficiency and Renewable Energy (EERE) office of the U.S. Department of Energy (USDOE). BatPaC was first developed in 2007, and it has served Argonne researchers and the greater battery community in studying the impact of material properties on performance at the pack level. Experts from all aspects of battery development have reviewed the model both privately and as part of a formal peer-review process.

The 2020 modelled cost of a 300-mile EV battery pack is reported as $169/kWh of useable energy or $143/kWh of rated energy. Additionally, two DOE-funded battery developers have submitted EV battery cost estimates using the USABC battery cost model in this same range. The cost is based on a production volume of 100,000 batteries per year and is derived for batteries that are projected to meet DOE performance targets including the 1,000 cycle life requirement.

Full details including cell costs and materials are available here.

THE NETHERLANDS

DUTCH RESEARCH SHOWS ELECTRIC CARS JUST AS SAFE AS FOSSIL FUELED CARS

One of the ambitions in the Dutch National Climate Agreement is for all new passenger vehicles to be zero emission by 2030.

This requires a substantial increase in charging infrastructure over the coming years. Safety is an important boundary condition, and an extensive study into various safety risks has recently shown that electric cars are just as safe as conventional fossil fueled cars. There are also already many international safety regulations for conventional and electric cars.

The study addresses all important safety aspects including those relating to vehicles, fire, road safety and incident response. For example, the study found that electric vehicles do not lead to an increased fire hazard. It also addresses the safety of charging infrastructure - especially the current technique of Mode 3 and Mode 4 charging - used for regular and fast charging – which has been found to be very safe.

For the coming period, researchers stress the importance of incident management. For example more knowledge and practical experience is needed when it comes to firefighting and salvaging burning electric cars in parking garages. As a first step, an electric vehicles incident database is being developed in the Netherlands. Further research is also being undertaken into innovative firefighting methods and the fire safety regulations for parking garages are also being reviewed and adapted.

280 International scientific and semi-scientific sources and media reports were studied in order to inform this research and interviews were held with 25 experts. The study therefore gives a thorough overview of all current knowledge on safety issues.

SPAIN

ULTRA-FAST CHARGING FOR ELECTRIC VEHICLES "UFC PROJECT"

Spain joins the initiatives for charging ultra-fast electric vehicles thanks to UFC project, led by Repsol and Ibil, which have received recognition for their commitment to innovation in electric mobility, in the "EnerTIC Awards 2020".

The most innovative feature of the project, called "Ultra-Fast Charge", is the reduction of recharging times to between 5 and 10 minutes, a time similar to that of a conventional refueling, thanks to the implementation of the most powerful recharging terminals in Europe. The charging infrastructures, placed in Ugaldebieta town (Vizcaya), allows vehicles to be charged at powers of up to 400kW, which represents a great advance in Europe where the available terminals do not currently exceed 350kW.

Another innovative aspect of this installation is that distributed renewable generation and energy storage could be integrated into the site to optimise operating costs and stablise charging load on the grid.
Repsol and Ibil have developed this project together, along with strategic Spanish partners such as Ingeteam and Ormazabal.
The collaboration has resulted in a pioneering installation in which 100% of the technology and suppliers involved are national. This ultra-fast charging point allows Repsol to continue being

a leader in mobility on the Iberian Peninsula and is a clear example of Repsol's commitment to innovation and the development of new products and services capable of meeting the needs of customers. Specifically, Ibil was in charge of the conception, definition, and execution of the project, and now operates and maintains the infrastructure. Regarding the electrical and electronic element, the inverters and recharging satellites have been developed by Ingeteam and the transformation centres have been supplied by Ormazabal.
This is the second ultra-fast charging point that Repsol and Ibil have installed, with plans to have 4 more stations in its national network.

More information is available here.

SPAIN

MOVES PROGRAM TO INFLUENCE SALES OF ELECTRIC VEHICLES

Due to the COVID19 Health and economic crisis, the total market for passenger cars in Spain through January to October 2020 has fallen by 37% compared to 2019.

However, during this period, electric vehicle sales in the passenger car market has increased by 42% with a total of 8,277 units sold.

One of the key reasons for this increase in the sales of electric vehicles was the MOVES Program of incentives for efficient and sustainable mobility.

The first edition of the MOVES Program had a budget of 45 M€, with the possibility of being co-financed with FEDER funds. The program is coordinated by IDAE and managed by Regional Administrations. At the beginning of November 2020, the program was given a provisional budget for alternative vehicles acquisition (including all technologies, but mainly focused on electric vehicles) of 12.14 M€, and a budget of 21.7 M€ for recharging infrastructure.

To give continuity to the MOVES Program, a second edition was published on the 17TH of June 2020 (MOVES 2 Program), with an additional dedicated budget of 100 M€. Applications can be made within one year, from the date of publication of the different calls. At the beginning of November 2020, the program was given a provisional budget for alternative vehicles acquisition (including all technologies) of 20.15 M€, and a provisional budget of 8.14 M€ for recharging infrastructure.

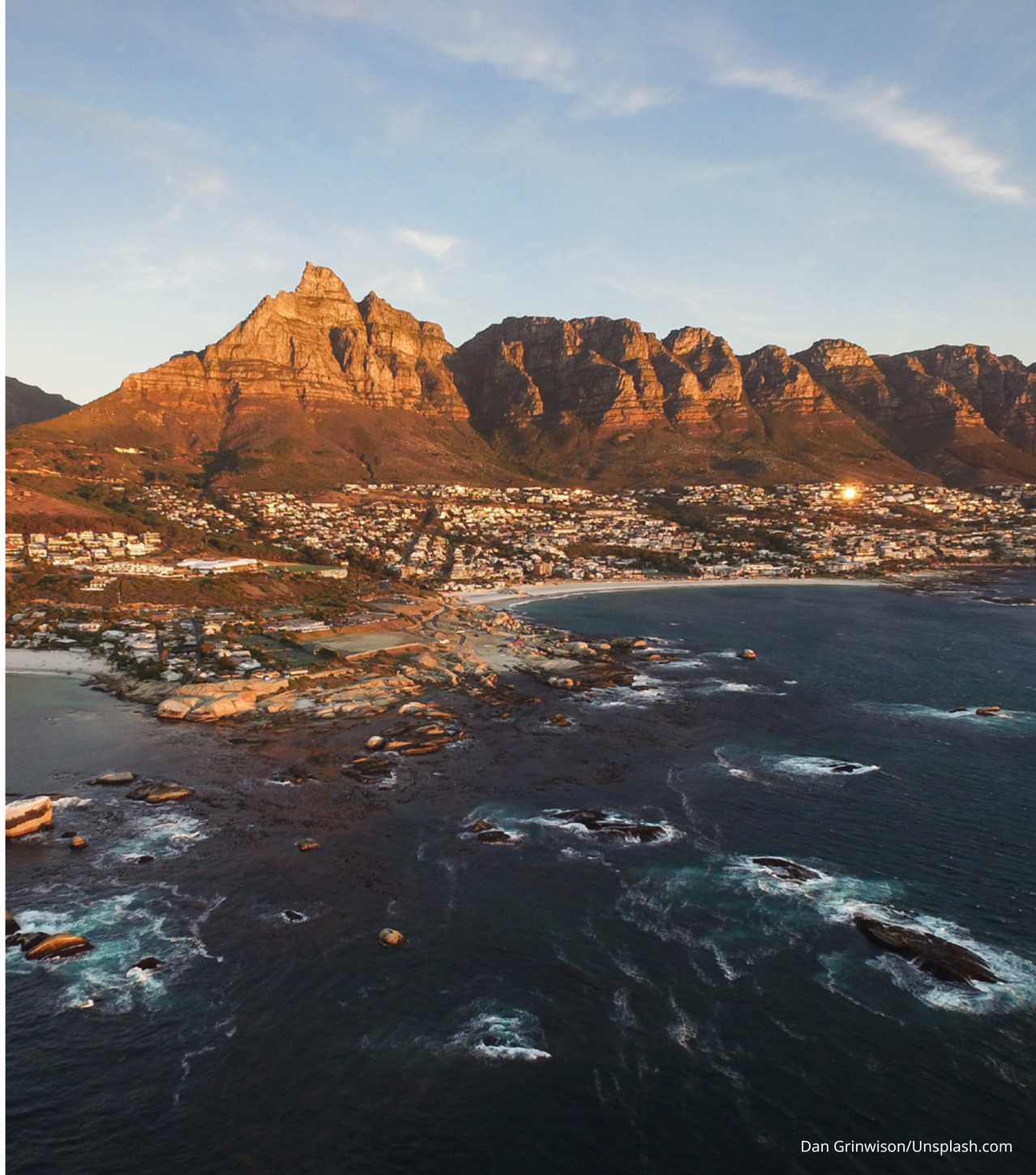
Note: the MOVES 2 Program is complemented by the RENOVE Program. RENOVE is a car scrapping program, managed at National level, which supports the acquisition of fuel efficient vehicles (using both alternative and conventional fuels), funded with 250 M€. RENOVE Incentives are not compatible with those of the MOVES Program.

SOUTH AFRICA
UPDATE

As a signatory to the Paris Agreement, under the United Nations Framework for Climate Change Convention, adopted in December 2015, South Africa is committed to continuing the fight against climate change, increasing its efforts beyond 2020 with assistance from the industrialised world in terms of technical and financial support.

The National Climate Change Response Strategy is the key policy document guiding climate change response across all departments. It recognises that the response should be of a developmental, cost effective, and integrated nature.

South Africa contributes 1.1% of global greenhouse gas emissions, with the energy sector contributing close to 80% and the transport sector contributing approximately 10.8% of the total emissions. The National Department of Transport's Green Transport Strategy highlights that road transport accounts for 91.2% of direct emissions across the transport sector, primarily from the combustion of petrol and diesel. The Green Transport Strategy includes Strategic Pillar 8 on the promotion of hybrid and electric vehicles. As a C40 member, the City of Cape Town has signed the 2030 Fossil Fuel Free Streets Declaration.



Dan Grinwison/Unsplash.com

UNITED KINGDOM
UPDATE

As part of the UK Governments 10-Point Plan for a Green Industrial Revolution, the Prime Minister announced that the phase out of new petrol and diesel cars and vans would be brought forward from 2040 to 2030, with all new vehicles in the UK required to be zero emission at the tailpipe from 2035.

In order to help achieve these targets, and place the UK at the forefront of LEV technologies, over £2.8billion worth of support packages were also announced including £950million to support the rollout of rapid EV charging hubs and £582million for plug-in car, van, taxi and motorcycle grants. As of December, green number plates for zero emission vehicles were also launched in the UK, enabling people to easily identify then, helping to normalise the use of clean vehicles.

Consumer experience is key in promoting the uptake of EVs. OZEV will shortly be launching a consultation paper focussing on how to improve the consumer experience of public charging which includes measures such as contactless payments.

In addition to investing heavily in EV technologies, the UK government is also focussing on public transport, through the electrification of bus fleets, and funding the research and development into sustainable transport technologies.

UK Gov / OZEV

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