IEA INTERNATIONAL ENERGY AGENCY





JOANNEUM RESEARCH Forschungsgesellschaft mbH



Task 19 "Life Cycle Assessment of Electric Vehicles"

> Update on status and plans

> > Gerfried Jungmeier 42th IA-HEV ExCo Gwangju South Korea May 1 – 2, 2015

THE INNOVATION COMPANY

http://www.ieahev.org/tasks/task-19-life-cycle-assessment-of-evs









Environmental Effects of EVs in Various Countries



Electricity consumption EV at charging point and real driving cycle: 15 - 30 kWh/100 km





Overview: Update on Status and Plans

Planing of 5th Workshop, Vienna November 11, 2015

ife Cycle Assert for Electric Velencest Management for Electric Velencest Management for Electric Velencest "LCA of Electric Vehicles – Current Status and Future Perspectives"

Dissemination: presentations&papers,

Proposal new Task (2016 – 2019)

"Assessment of Environmental

Effects of Electric Vehicles"





5th Workshops







Þ	Deutsches Zentrum	
DLR	für Luft- und Raumfahrt	
	German Aerospace Center	





bm👽 🚺

November 11, 2015, Vienna/AUSTRIA

Collocated annual A3PS-Conference 2015 (November 9 – 10, 2015)

"LCA of Electric Vehicles – Current Status and

Future Perspectives"

- Main topics:
 - 1. Results of Task 19 presented by the 4 participating countries (A, G, CH, US):
 - 2. International **Highlights** on LCA of EVs -Presentations from "*Call for contributions*"
 - **3.** Stakeholder discussion: "Is LCA killing the electric car?" or "How to communicate LCA results?"

THE INNOVATION COMPANY





Programm (I) 5th Workshop

Results of Task 19 presented by the 4 participating countries

- Results of IEA HEV Task 19 activities 2012 2015, Gerfried Jungmeier, Operating Agent, JOANNEUM RESEARCH, Austria
- Results of reviewing of 100 international LCA studies on BEV and PHEV, N.N.
- Real world drive cycle of electric and conventional vehicles, N.N.
- LCA of electricity generation and integration of renewable electricity, N.N.
- LCA of battery production, Jennifer Dunn, Vice Operating Agent ARGONNE, USA
- Critical Metals in the Automotive Industry, N.N., EMPA, Switzerland
- Automotive Battery Recycling and Critical Material Demand, Linda Gaines, ARGONNE, USA
- Scenarios for lightweight materials for EVs, Simone Ehrenberger, DLR, Germany



Programm (II) 5th Workshop International Highlights on LCA of EVs – Presentations from "Call for contributions"

- Influence of social issues and user behaviour on LCA results
- "…from LCA to LCSA Life Cycle Sustainability Assessment……"
- Impacts of mining of mineral resources/metals (Co, Ni) e.g. human health effects
- **Resource efficiency** of EVs e.g. criticality issues
- Including grid impacts of EVs charging in LCA
- Updating of databases for LCA of EVs
- Effects of EVs on water and land use
- Effects of EVs to waste management







Programm (III) 5th Workshop Stakeholder discussion:

"Is LCA killing the electric car?" or "How to communicate LCA results?"

with EV stakeholders from

- government
- automotive industry
- e-mobility regions
- electricity companies
- LCA experts

NGO







Dissemination

Presentations (& papers)

- EV2014VÉ (Vancouver, CA 10/2014) "LCA to maximize environmental benefits of electric vehicles – Results of the LCA platform in IEA-HEV"
- IEWT (Vienna 02/2015) "Environmenatl Effects of the Electric Vehicle Worldwide – A Life Cycle Assessment in Task 19 of the IEA HEV"
- EVS 28 (Korea 05/2015): "Estimated Environmental Benefits of the Worldwide Electric Vehicle Fleet in 2014 – A Life Cycle Assessment in Task 19 of the International Energy Agency (IEA) on Hybrid and Electric Vehicles (HEV)"





Source: EVI 2015, IEA-HEV, own assumptions

Estimated Change in GHG-Emissions of Electric Vehicles Worldwide (2014)





Estimated Change in PM-Emissions of Electric Vehicles Worldwide (2014)





Estimated Change in NO_x - &SO₂-Emissions of Electric Vehicles Worldwide (2014)





Estimated Change in CH_4 -, NMVOC-, NO_x -



EVS 28 reducional Ferror Technology

GHG Reduction of Electric Vehicles <u>using Renewable Electricity</u> Electricity consumption EV at charging point for real driving cycle (e.g. heating/cooling): 15 – 30 kWh/100 km





Source: own calculations using data of ecoinvent





AWARD "Best Publikation 2014"

Annual "Conference of the Future 2015" of JOANNEUM RESEARCH

- Procedure
 - 396 publications in 2014 of JOANNEUM RESEARCH
 - Nomination of 5 publication by stakeholder panel
 - Presentation of nominated 5 publication at conference, each in 2 minutes
 - Public voting of the 450 conference participants
- Winner: "Life cycle assessment of electric vehicles
- Key issues of Task 19 of the International Energy

Agency (IEA) on Hybrid and Electric Vehicles (HEV)"

Gerfried Jungmeier, Jennifer B. Dunn, Amgad Elgowainy, Linda Gaines, Simone Ehrenberger, Enver Doruk Özdemir, Hans Jörg Althaus, Rolf Widmer









Proposal of New Task "Assessment of **Environmental Effects of Electric Vehicles**"

- Water
 - Air
 - Land use resource consumption - waste management













Your Contact

Gerfried Jungmeier

JOANNEUM RESEARCH Forschungsgesellschaft mbH. RESOURCES – Institute for Water, Energy and Sustainability Energy Research Group



Elisabethstraße 18 A-8010 Graz AUSTRIA

+43 316 876-1313 www.joanneum.at/eng gerfried.jungmeier@joanneum.at

http://www.ieahev.org/tasks/task-19-life-cycle-assessment-of-evs

THE INNOVATION COMPANY