



Impacts of Electric Vehicles - Summary Report

Report for the Directorate General Climate

Publication

[Report](#)

Citation

Essen, Huib van; Bettina Kampman and Max Grünig 2011: Impacts of Electric Vehicles - Summary report. CE Delft, ICF, Ecologic Institute, Delft.

Electric vehicles have the potential for significant contributions towards achieving the EU's climate protection goals in the transport sector. However, the environmental impacts of a large scale introduction of electric vehicles are still unknown. This project has developed scenarios for the increased dissemination of electric vehicles in the EU until 2050 and formulated policy recommendations from these findings. The full report of this project is available for download.

In order to reach the long-term EU climate goals, a severe reduction of greenhouse gas emissions in the transport sector will be necessary. Therefore, the Directorate-General for Climate Action (DG CLIMA) commissioned CE Delft, ICF and Ecologic Institute to carry out a study on the potential impacts of a large scale market penetration of EVs in the EU, with a focus on passenger cars and light commercial vehicles. This study includes an assessment of both the transport part (e.g. composition of vehicle fleet) and electricity production and provides estimates of the costs, impacts on well-to-wheel GHG emissions, pollutant emissions, other environmental impacts.

In this study three types of EVs are distinguished:

- Full Electric Vehicles (FEVs) that have an electric engine and batteries for energy storage, no internal combustion engine (ICE).
- Plug-in Hybrid Electric Vehicles (PHEVs) that have both an ICE and an electric engine, with a battery that can be charged on the grid.
- Electric Vehicles with a Range Extender (EREVs) that have an electric engine and an ICE that can be used to charge the battery and so extend the vehicle's range. The battery of an EREV can be charged on the grid.

The results of the study should help the European Commission with developing GHG policy for transport, in particular in the field of EV and in relation to the wider EU transport policy and EU policy for the electricity sector.

The [report](#) [pdf, 300 kB, English] is available for download.

Language

English

Authorship

Max Grünig
[Dominic Marcellino](#)
Benjamin Boteler
Jordan Selig
Zoë Robaey
Marc Witte
[Huib van Essen](#) (CE Delft)
[Bettina Kampman](#) (CE Delft)
Duleep Gopalakrishnan (ICF Consulting)

Funding

European Commission, [Directorate-General for Climate Action](#) (DG Climate),
International

Published by

[CE Delft](#), Netherlands

Year

2011

Dimension

26 pp.

Project

[Environmental Impacts of Electric Vehicles](#)

Project ID

[2328](#)

Table of contents

- 1 Introduction
 - 1.1 Background
 - 1.2 Aim and scope of the study
 - 1.3 Approach and deliverables
- 2. Electric Vehicles on the market and in development
 - 2.1 Introduction
 - 2.2 Specifications of electric cars
 - 2.3 Developments in other electric road vehicles
 - 2.4 Research and government programs on EVs
- 3. Electric Vehicle and battery technology

- 3.1 Introduction
- 3.2 Battery technology and cost
- 3.3 Other EV Components
- 3.4 Safety Issues
- 4. Future electricity sector
 - 4.1 Introduction
 - 4.2 Related trends in the electricity sector
 - 4.3 Interaction between electricity production and EVs
 - 4.4 Charging technology
- 5. Economic analysis and business models
 - 5.1 Introduction
 - 5.2 Total cost of ownership
 - 5.3 Existing government policies
 - 5.4 Business models
- 6. Impact analysis and policy recommendations
 - 6.1 Introduction
 - 6.2 Impacts of market uptake of Electric Vehicles
 - 6.3 Main policy implications
 - 6.4 Recommendations for further study

Keywords

[Climate](#)

[EU](#)

[Evaluation](#)

[Mobility](#)

Transport, Climate, EU Environment, Policy Assessment, Greenhouse Gases, CO2-Emissions, Electric Vehicles, Plug-In Hybrid Electric Vehicles, Market Penetration, EU-27 + Norway & Iceland, automotive industry, Investment, Research, Market, Economy
Analysis