

DEFINE: Project Presentation

Presentation at the Electromobility+ Launching Seminar

Michael Miess Stefan Schmelzer

Institute for Advanced Studies (IHS), Vienna

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Structure of Presentation

Introduction

General Scope of the Project

Evaluation Framework

Consortium and Work Plan

IHS

DIW

TUW

OEI

EAA

CASE

Timeline of Work Packages

Dissemination

Academic Audience

Policy Makers and Stakeholders

Evaluation Framework

Analysing an anticipated **change** in the mobility paradigm:

- From a fossil fuel-based individual transportation system
- to one relying on electromobility, public transport and in-between solutions.

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- the provision of electric energy,
- the impact on electricity grids, and
- environmental impacts and externalities such as GHG emissions.

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At the core of the evaluation framework are a **hybrid CGE model** and two **electricity market models**.

DEFINE Consortium - Partners

- 1 Institute for Advanced Studies (IHS), Vienna (Coordinator)
- 2 Center for Social and Economic Research (CASE), Warsaw
- 3 German Institute for Economic Research (DIW), Berlin
- 4 Institute for Applied Ecology (OEI), Berlin
- 5 Vienna University of Technology (TUW), Vienna
- 6 Environment Agency Austria (EEA), Vienna



TECHNISCHE
UNIVERSITÄT
WIEN
Vienna University of Technology

 DIW BERLIN



Öko-Institut e.V.
Institut für angewandte Ökologie
Institute for Applied Ecology

 umweltbundesamt
ENVIRONMENT AGENCY AUSTRIA

IHS, Vienna (Coordinator)

Computable General Equilibrium Model:

The hybrid structure allows for the analysis of overall economic relationships together with a higher detail in the technologies for electricity production:

- Model output: GDP (12 economic sectors), consumption (public and private), prices, wages, foreign trade, etc.
- Technologies: coal, oil, gas, water, wind, solar, biomass.

IHS, Vienna (Coordinator)

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- Technologies: coal, oil, gas, water, wind, solar, biomass.

Extensions planned in DEFINE:

- Detailed traffic sector (incl. electric mobility and household behaviour).
- Repercussions of higher demand for electricity on the economy.

IHS, Vienna (Coordinator)

Evaluating EV demand and transport mode choice (CGE model input):

- Representative household survey for Austria (1500-2000 respondents).
- Stated and revealed preferences for **vehicle purchase** and transport **mode choices** (two distinct choice experiments).

IHS, Vienna (Coordinator)

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Output from estimated **mixed multinomial logit** models:

- **Behavioural parameters** (elasticities) for the CGE-model.
- **Vehicle demand**: expected market shares of electric, alternative or conventional vehicles (various scenarios).

DIW, Berlin

Unit commitment power plant model for German power market:

- Determines the cost-minimizing dispatch, CO2 emissions and market prices.
- Reflects thermal power plants, combined heat and power restrictions, variable feed-in of renewables, storage facilities, and demand-side management.

DIW, Berlin

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- Reflects thermal power plants, combined heat and power restrictions, variable feed-in of renewables, storage facilities, and demand-side management.

Extensions planned in DEFINE:

- Additional demand, storage capacity or demand-side potentials related to future electric vehicle fleets will be incorporated.
- Coupling of the unit commitment model with existing European trade and investment modules in order to reflect power flows across countries.

TUW, Vienna

Electricity market and **electricity grid** modelling for Austria:

Various existing models are adapted to analyse the following issues for DEFINE:

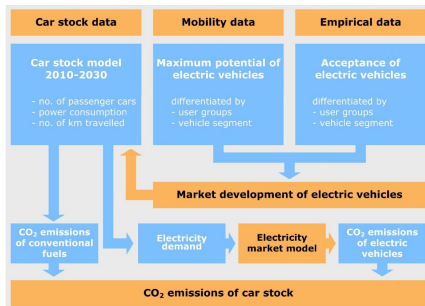
- **Hourly unit commitment** optimization and electric **capacity expansion** planning.
- Generation of **EV load profiles**, developing **charging strategies**.
- **Effects** of V2G/G2V use cases on the **low voltage grid**: energy demand control, battery characteristics.
- Overall effect of e-mobility on **electricity market prices**.

OEI, Berlin

- **Scenario Development for Germany:** electromobility and its impact on transport and energy sector up to 2030

OEI, Berlin

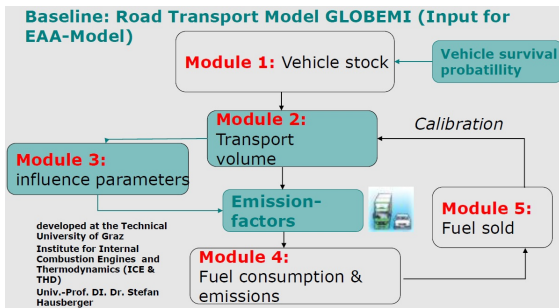
- **Scenario Development for Germany:** electromobility and its impact on transport and energy sector up to 2030
- **Emission Reduction Potential of Electric Mobility for Germany:** contribution of EVs to emission reductions in Germany



Suggested Modelling Approach (Source: OEI, 2012)

EAA, Vienna

- **Scenario Development for Austria:** electromobility and its impact on transport and energy sector up to 2030
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The Globemi Model as Input for EAA Model (Source: EAA, 2012)

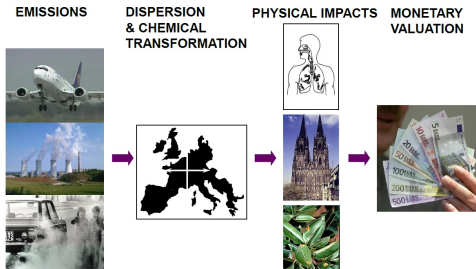


CASE, Warsaw

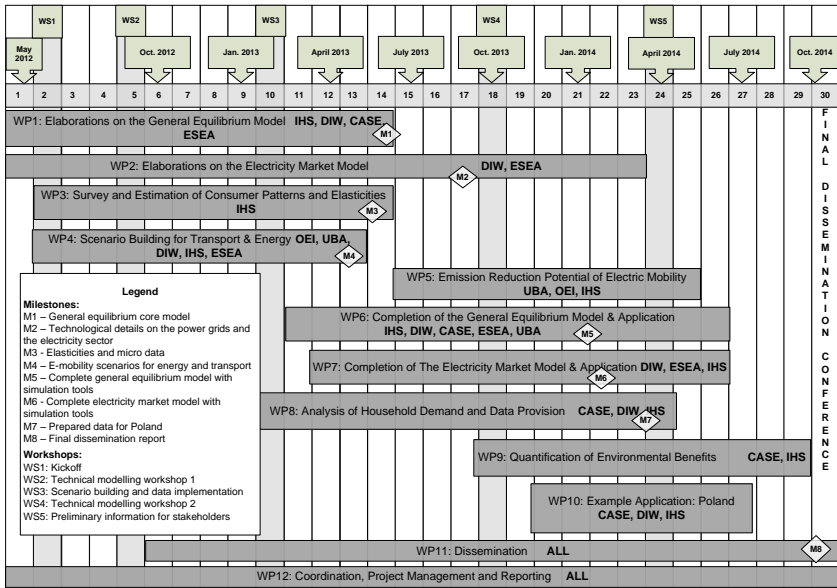
- **Analysis of Household Demand for Mobility and Low Carbon Vehicles:** household data survey and microestimation for Poland.

CASE, Warsaw

- **Analysis of Household Demand for Mobility and Low Carbon Vehicles:** household data survey and microestimation for Poland.
- **Quantification of Environmental Benefits:** ExternE methodology is used to quantify the external costs of electricity generation and electric vehicle use (including e.g. health, building materials, biodiversity loss).



The Impact Pathway Approach (Source: CASE, 2012)



Dissemination to Academic Audience

The academic audience is reached for by

- Publication of working papers,
- Submission of papers to peer-reviewed journals,
- Attendance of members of the DEFINE project at relevant conferences, and by
- Inviting experts to the DEFINE dissemination events.

Dissemination to Policy Makers and Stakeholders

The non-academic audience (policy makers and stakeholders) is reached for by

- The publication of **policy briefs**, bringing a short, comprehensible summary of the results of studies conducted with the to-be-developed evaluation framework,
- A more detailed policy guideline, describing a feasible and sensible “**Path to Electromobility**” taking account of the scientific outcomes of DEFINE in a manner suitable for policy purposes, and
- Invitation to the DEFINE dissemination events.

Thank you for your attention!

Michael Miess Stefan Schmelzer

Phone: +43-1-59991-138

Fax: +43 1 59991-555

e-mails: miess@ihs.ac.at, schmelzer@ihs.ac.at

Stumpergasse 56 / A-1060 Vienna