Electric Vehicle / eMobility Projects & Requirements

In-Vehicle Data Access – W3C Automotive Web Platform – April 2016
About me:

**Volker W. Fricke, Technical Relations Executive, Europe**

![Volker W. Fricke](image)

Volker W. Fricke  
IT Architect, Technical Relations Executive, Europe  
Connected Car, eMobility, C-ITS  
IBM Deutschland Research and Development GmbH

Phone       +49 7031 16 2174  
Mobile      +49 177 2886 289  
Email       vfricke@de.ibm.com

Private: Renewable energy producer and EV driver since 2014
Agenda

1. The EU Green Vehicles Project „Green eMotion“ 2011 – 2015
2. Project IBM Research and Energy Producer EKZ, Switzerland for SmartCharging 2014
3. The EU Green Vehicles Project „NeMo“ 2016 - 2019
4. Requirements for EV In-Vehicle Data Access
 Agenda

1. The EU Green Vehicles Project „Green eMotion“ 2011 – 2015
2. Project IBM Research and Energy Producer EKZ, Switzerland for SmartCharging 2014
3. The EU Green Vehicles Project „NeMo“ 2016 - 2019
4. Requirements for EV In-Vehicle Data Access
The “Green eMotion” Project

Demonstration Project is part of European Framework Program for “Green Cars” Initiative of EU Economic Recovery Plan.

Objectives of the project:
1. Acceleration of the market roll-out of electric vehicles in Europe
2. Meeting EU policy on energy of supply, energy efficiency and green house gas emission reduction
3. Viability of different types of electrical vehicles for immediate market introduction

Key Facts of the project:
- 43 partners have signed the consortia agreement
- Over all EU Funding: 24,226,954 Euro
- Project Start: March 2011
- Project End: February 2015
What are the end-user's requirements about electromobility services?

- I want to charge at **ANY** charging station provider and get only **ONE** bill!
- I prefer to charge my EV „intelligent and smart“ at **ANY** charging station provider.
- I want to locate & find charging points from **ANY** charging station provider.
- Will I be able to charge my Electric Vehicle **ANYWHERE** in Europe?
- I want to find a parking-slot and use public transport (**Park, Charge & Ride**).
The Green eMotion Project Consortium

- **Industries:**
  - Alstom, Better Place, Bosch, IBM, SAP, Siemens

- **Utilities:**
  - Danish Energy Association, EDF, Endesa, Enel, ESB, Eurelectric, Iberdrola, RWE, PPC

- **Electric Vehicle Manufacturers:**
  - BMW, Daimler, Micro-Vett, Nissan, Renault

- **Municipalities:**
  - Barcelona, Berlin, Bornholm, Copenhagen, Cork, Dublin, Malaga, Malmö, Rome

- **Research Institutions and Universities:**
  - Cartif, Cidaut, CTL, DTU, ECN, Imperial, IREC, RSE, TCD, Tecnalia

- **EV Technology Institutions:**
  - DTI, FKA, TÜV Nord

+ **External Stakeholders** to facilitate the access to information not held by the consortium, to disseminate Green eMotion knowledge and encourage its application outside the consortium.
Who are the stakeholders around electromobility?

End-user

Customer / End-User
Who are the stakeholders around electromobility?

- Electric Vehicle Supply Equipment Operator (EVSE-Op)
- DSO/TSO Retailer/Utility
Who are the stakeholders around electromobility?

- **Electric Vehicle Service Provider (EVSP)**
- **IT Service Provider**
Operating EVs with many stakeholders is becoming very complex, costly and impractical.
Green eMotion Building Blocks

- **EVSP** (Electric Vehicle Service Provider)
  - **EVSP Backend**
    - (Electric Vehicle Service Provider Backend system)
  - **Customer Contract** (End Customer Direct)

- **External Network Provider**
  - **MP Provider**
  - **OEM / Fleet Op.**
    - **EVMS** (EV Management System)

- **Clearing House**
  - (Example of Business Service)

- **Marketplace**
  - (Business to Business)

- **EVSE Search**
  - (Example of Business Service)

- **PMS** (Power Management System)

- **CMS** (Charge Management System)

- **Utility**
  - **DSO / TSO / Retailer / Aggregator**
  - **AC Charger**
  - **DC Charger**
  - **Battery Swap**
  - **Inductive**

- **EV**

- **User / Driver**

- **Municipalities / Government**
  - **Policies**
  - **Legislation**
  - **Standards**

- **MP** (Electric Vehicle Service Provider Backend system)

- **EVSE Operator**
Mass market adoption of EVs is enabled by a B2B Marketplace that will interconnect all stakeholders ICT systems.

The **B2B Marketplace** is the central platform for all stakeholders. The Core Services include besides Partner-, Contract – and Service Management more functionalities.
Agenda

1. The EU Green Vehicles Project „Green eMotion“ 2011 – 2015
2. Project IBM Research and Energy Producer EKZ, Switzerland for SmartCharging 2014
3. The EU Green Vehicles Project „NeMo“ 2016 - 2019
4. Requirements for EV In-Vehicle Data Access
It would be nice to get my charge-plan loaded \textit{automatically} into my EV based on local PV generation and smartgrid information to charge it in \textit{eco-mode}.
Pilot architecture for ubiquitous smart-charging of EVs – 2014 - 2015

Virtual Power Plant of Utility

VPP

“Cloud”

Auto-Telematic Server

Here we need a non-proprietary interface

INFORMATION

Electrical Energy

Simple & Affordable Charging Infrastructure, „socket“

EV Monitor Box by Univ. Applied Science Zürich allows car connectivity

Source: Dr. Andreas Fuchs, EKZ
Agenda

1. The EU Green Vehicles Project „Green eMotion“ 2011 – 2015
2. Project IBM Research and Energy Producer EKZ, Switzerland for SmartCharging 2014
3. The EU Green Vehicles Project „NeMo“ 2016 - 2019
4. Requirements for EV In-Vehicle Data Access
European Union Call for Green Vehicle GV8 extends IBM contribution from EU Project „Green eMotion“ towards transport and smart grid integration and services.

- Integration of the overall cycle of EV energy management into a comprehensive EV battery and ICT-based re-charging system management, providing ergonomic and seamless user support. Such integration should build upon existing technology standards and may address:
  - Digital support for EVs such as common information model, marketplace interaction and service provision based on wireless / power line communication interfaces, roaming management, energy consumption and supply as well as cost.
  - Interoperability of EVs with the communication infrastructure and electricity grid regarding locally deployed smart-grid and smart-metering systems while investigating arising operational issues.

IBM has demonstrated „Open Marketplace“ ICT solution which allows new innovative business services to be provided by 3rd Party Developer. This will be the base of IBM‘s contribution in NeMo.

**B2B Marketplace from EU Project**  
Green eMotion  
(Open Marketplace)

**NeMo ICT services will allow EV integration services into smart grid and transportation ecosystem.**
Information and Communication Technology (ICT) plays an important role in realizing successful electromobility scenarios. NeMo Hyper-Network environment enables seamless integration of data and services.
Source: NeMo Proposal, chapter 1, figure 2: How actors will interact with the NeMo Hyper-Network
NeMo environment interconnect all stakeholders ICT systems allowing end-users to leverage interoperable ICT services.
Agenda

1. The EU Green Vehicles Project „Green eMotion“ 2011 – 2015
2. Project IBM Research and Energy Producer EKZ, Switzerland for SmartCharging 2014
3. The EU Green Vehicles Project „NeMo“ 2016 - 2019
4. Requirements for EV In-Vehicle Data Access
Initial Draft of EV Data Requirements for In-Vehicle Data Access

Draft by Robert Sharpe & Volker Fricke

C-ITS EU Platform Workgroup 6 In-Vehicle-Data Needs: Extract from report January 2016

<table>
<thead>
<tr>
<th>Group</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>New fuelOptions</td>
<td>capacity</td>
</tr>
<tr>
<td></td>
<td>level (as percent)</td>
</tr>
<tr>
<td></td>
<td>FuelTemperature</td>
</tr>
<tr>
<td>New refuellingPort interface</td>
<td>type</td>
</tr>
<tr>
<td></td>
<td>maxRate</td>
</tr>
<tr>
<td></td>
<td>maxLevel</td>
</tr>
<tr>
<td>Refuelling system</td>
<td>RefuellingStatus</td>
</tr>
<tr>
<td></td>
<td>selectedPortName</td>
</tr>
<tr>
<td></td>
<td>status</td>
</tr>
<tr>
<td></td>
<td>SupplyRate</td>
</tr>
<tr>
<td></td>
<td>MaxSupplyRate</td>
</tr>
<tr>
<td></td>
<td>availablePorts ???</td>
</tr>
<tr>
<td>Refuelling timers</td>
<td>startTime;</td>
</tr>
<tr>
<td></td>
<td>finishTime;</td>
</tr>
<tr>
<td></td>
<td>weekDay;</td>
</tr>
<tr>
<td></td>
<td>targetFuelLevel;</td>
</tr>
<tr>
<td>Refuelling plan</td>
<td></td>
</tr>
<tr>
<td>Climate control timers</td>
<td>TBD</td>
</tr>
<tr>
<td>Traction battery State of health</td>
<td>TBD</td>
</tr>
<tr>
<td>Available Range</td>
<td>TBD</td>
</tr>
</tbody>
</table>

6. Electric vehicles only

- EV charging plug (plugged/not plugged)
- Actual energy consumption
- Vehicle battery state-of-charge (SOC in%) [Read]
- Remaining vehicle range/distance [Range in km] [Read]
- Electric Vehicle Contract ID (EVCID) [Read]
- Electric Vehicle Charge Plan (Charge EV starting from date/time to date/time) [Write]
- Battery charging driving plan
- EV specific IDs for mobility service provider (EVCID)
- Age battery (dd/mm/yyyy)
- Status battery (ok/nok)
THANK YOU.