CHAdeMO Fast Charging Projects

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In our presentation today

- About CHAdeMO
- CHAdeMO installation around the globe
- Standardisation and multi-standard chargers
- Ireland’s national network
- CHAdeMO to Home, CHAdeMO to Grid in Spain
# About CHAdeMO

<table>
<thead>
<tr>
<th>Length</th>
<th>Short Distance</th>
<th>Mid Distance</th>
<th>Long Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charging type</td>
<td>Office charging</td>
<td>Destination charging</td>
<td>Pathway charging</td>
</tr>
<tr>
<td>Charger type</td>
<td>Normal</td>
<td>Semi-fast or fast</td>
<td>Fast</td>
</tr>
<tr>
<td>Charging Site</td>
<td>Home/Office</td>
<td>Urban area (Super Market, Mall, Restaurant, Parking Lot or Gas station in city)</td>
<td>Inter city / National network (Service Area, Gas station)</td>
</tr>
</tbody>
</table>

**CHAdeMO**
About CHAdeMO

- Proven pioneer DC fast technology commercialised since 2009
- Safe and reliable, flexible for the future
• 430+ members in the world
• Over 70 entities from 17 European countries

Note: This represents a selection of CHAdeMO members

Locations of CHAdeMO Members
Almost 1,000 units are installed

TOTAL = 946
• 3,122 CHAdeMO chargers world wide
  • A rapid growth expected in Japan with government funding support

Note: data as of October 2013
• 115,000 CHAdeMO compatible EVs are already on the road globally, accounting for 71% of all EVs available

**Already Introduced**
- Nissan: LEAF
- Peugeot: Partner
- Citroen: C-ZERO
- Mitsubishi Motors: i-MiEV
- Citroen: Berlingo
- Mitsubishi Motors: Outlander PHEV
- Mitsubishi Motors: MINICAB-MiEV
- Protoscar: LAMPO2
- BD Otomotive: eTRAFIC
- BD Otomotive: eKANGOO
- BD Otomotive: eScudo
- BD Otomotive: e-Fiorino
- BD Otomotive: MINICAB-MiEV (Truck)

**To be Introduced**
- BMW: i3 (Japan)
- Nissan: eNV200
- Nissan: Infiniti EV Sedan

Note: data as of November 2013
A great majority of fast-charge enabled EVs on the roads in Europe are CHAdeMO compatible.

Note: Statistics as of September 2013 not including electric light commercial vehicles (LCVs) or e-quadricycles.
All Passenger EVs = 52,729, Fast-charge Enabled EVs = 38,234
• The IEC DC charging system catalog standards shall be published early 2014

**IEC DC Charging Systems**

<table>
<thead>
<tr>
<th></th>
<th>System A</th>
<th>System B</th>
<th>System C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Connector</strong></td>
<td><img src="image" alt="Connector A" /></td>
<td><img src="image" alt="Connector B" /></td>
<td><img src="image" alt="Connector C" /></td>
</tr>
<tr>
<td><strong>Vehicle Inlet</strong></td>
<td><img src="image" alt="Vehicle Inlet A" /></td>
<td><img src="image" alt="Vehicle Inlet B" /></td>
<td><img src="image" alt="Vehicle Inlet C" /></td>
</tr>
<tr>
<td><strong>Communication Protocol</strong></td>
<td>CAN</td>
<td>PLC</td>
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</tbody>
</table>

Note: TC69 61851-23, TC69 61851-24, SC23H 62196-3
**Why multi-standard chargers**

**EV USERS**
- More charge stations for all

**OPERATORS / INVESTORS**
- Faster recovery of cost
- Limited incremental cost (5-10% of overall cost)

**OEM’S**
- Competition with cars (not with charge standards)
Ireland – eCar Ireland Project

- **Public chargers Ireland**
  - All towns with population of 1500+
  - National Plan 1000 (654 to date)

- **Public Chargers Northern Ireland**
  - 320 in Northern Ireland (installed)

- **Fast Chargers every 60km on Key interurban routes**
  - Original Plan 40
    - 30 (Ire); 9 (NI)
  - Revised Plan
    - 100 (Ire); 14 (NI)

Worldwide Purchase - 15 companies in 11 countries
TEN-T Ireland

- Study role of Fast Charging in the deployment of EVs
- Technology requirements
- IT support systems
- 46 Fast Chargers on Core TEN-T Network
- Normal Chargers at Key Intermodal Transport Hubs
  - train stations, ports, airports (secondary objective)
Rapid Charge Network (TEN-T UK & Ireland)

- Consortium
  - Nissan, VW, BMW, Renault
  - ESB,
  - Newcastle, DfT
- 74 Fast Chargers
  - 2 routes North-South (M6) and East-West (M62)
- Linking Belfast & Dublin via UK to North Sea Ports
Capital Cost of DC Fast Charger

<table>
<thead>
<tr>
<th>Year</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012/3</th>
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<tbody>
<tr>
<td>€</td>
<td>50000</td>
<td>45000</td>
<td>40000</td>
<td>35000</td>
</tr>
<tr>
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<td></td>
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<tr>
<td></td>
<td>5000</td>
<td>10000</td>
<td>15000</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>20000</td>
<td>25000</td>
<td>30000</td>
</tr>
</tbody>
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• EV buyers are not just city dwellers

• 85% charging at home

• 89% believe fast charging needed
• CHAdeMO contributes to utilise EVs as an energy source: proven and available in the market today
Endesa Headquarters in Bcn, Smart Energy management with V2G
6 V2G chargers installed on the field

Biggest V2G demonstration in Europe
6 V2G chargers installed on the field
...results
Organized by Hosted by In collaboration with Supported by

@EV Rally Tour VE Poitou-Charentes, Sept 2013