Electro-mobility and the electricity sector:
challenges and solutions

Thursday 7th June 2018
A favourable situation

EV penetration will increase significantly in the near future thanks to:

- **Technological improvements**, leading to a convergence in performances & prices between ICE & EV

- Critical developments in *power systems* such as:
  - New energy market regulation,
  - Decentralized generation & integration of renewable energy sources
  - Demand-side management,

- Increasingly-shared **concern about air quality**, leading to:
  - Local restriction for ICE (Amsterdam, Madrid, Oslo, Paris…)
  - National support schemes (State bonus, low taxes…)
  - European Mobility Package

*ICE: Internal Combustion Engines  EV: Electrical Vehicles*
A promising outlook

Annual global light duty vehicle sales

Source: BNEF 2017
The case for smart charging

As the share of EVs grows, the electricity distribution grids at local level will be first affected. Even at low market shares, EVs could easily congest local transformers and disrupt voltage levels.

The key enabler for electric vehicles is smart charging.

Smart charging involves:
• Charging of the batteries in a way that avoids spikes in power demand
• Maximising local integration of renewable energy sources (RES)
• Using the batteries as storage to deliver services to the electricity system

Smart charging is only possible if customers receive clear financial benefits that can lead them to play a more active role.

Source: Eurelectric, Smart charging, 2015
New services, new actors

The development of EV implies the deployment of charging points, public (motorways, urban streets, parking lots...) as well as private (offices, apartment buildings, detached house..). Smart charging opens the way to new actors, able to offer new services, such as management of the charge, interplay with home batteries, vehicle to grid services...
Some examples

Charging Points:
• Vattenfall currently operates 9,000 charging points under the brand "InCharge" (DE, NL, SE, UK)
• Vattenfall & Volvo: partnership for "InCharge Smart home" (SE)
• ENEDIS, partner in the pilot project BienVEnu (FR) for charging points in apartment buildings

Smart Charging:
• Renault Group with the subsidiary Renault Energy Services, devoted to smart charging, V2G and second life of batteries; experiments with Jedlix (NL) to optimize charging costs and with Connected Energy to test a new technology for fast charging on motorways (BE, DE)

In-house Technology & Applications:
• BMW with the Application ChargeNow for localization of charging stations, payment (FR) & the technology BMW Wireless Charging
More examples

Experiment of pilot bidirectional connection (V2G):
- **NewMotion** with ENEL, Mitsubishi, Nuvve & TenneT (NL)
- **ENGIE** with Hitachi & Mitsubishi (NL)
- E.ON with Nissan (DK) and with Ovo Energy (UK)
- Nissan with Nuvve and ENEL in the **Parker** Project (DK)
- PSA with Nuvve in the **GridMotion** Project (FR)

Fast Charging:
- **Open Fast Charging Alliance**: Fastned (NL), Sodetrel (FR), Smatrics (AU), Grønn Kontakt (NO) and Gotthard Fastcharge (CH). The alliance members own and operate more than 500 fast chargers in six countries.
- BMW with Audi, Daimler, Ford & Porsche, joint-venture **Ionity** to develop high power charging stations up to 350 kW (DE)
- Tesla network of free access "**Tesla Superchargers**" (683 globally)
- EnBW ordered from energy supplier EnBW 117 charging stations in 2017
- Allego with the 21 **Ultra-E** charging stations (DE, NL)
Comments & Questions are welcome

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