THE SMART PATH TO E-MOBILITY

How smart charging and standards can foster green mobility

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ECOS – the green line to standards
TODAY ON THE AGENDA

- The winding road towards e-mobility: EU policy context
- Smart charging for e-mobility: from theory to practice
- Paving the way for smartness: the importance of smart charging standards
- Q&A
THE WINDING ROAD TOWARDS E-MOBILITY
EU POLICY CONTEXT

Lucien Mathieu
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TIME FOR A POLL!
Europe's leading clean transport campaign group

26 Countries
61 Members
6 National experts
Transport is Europe’s biggest climate problem

- Transport & Bunkers: 27.17%
- Industry: 24.98%
- Public Electricity & Heat: 21.73%
- Buildings: 13.44%
- Agriculture: 9.77%
- Waste: 2.91%

Source: Member State reporting to UNFCCC GHG inventories
...and getting worse
Road transport is >70% of CO2 emissions.

- Cars 43.14%
- Heavy duty trucks and buses 18.46%
- Vans 8.99%
- Railways 0.48%
- Motorcycles 0.81%
- Navigation 14.50%
- Aviation 13.62%
T&E carmaker compliance analysis: 10% EVs in 2020 and 15% in 2021

Source: Transport & Environment analysis of ACEA Statistics
Under current policies:
- EV surge in 2020/21
- But stagnate until 2029

What we need from the car CO2 revision?
- Increased ambition: -25% in 2025, -65% in 2030
- Annual targets
- Phase-out in 2035
T&E CHARGING MASTERPLAN

HOME & WORK
- All buildings prepared for EV charging by 2035
- ‘Right to plug’ for EV drivers
- EU funding to cable buildings

COMMERCIAL PROPERTY
- A fifth of parking spots with chargers by 2025
- Incentives for property owners

INTERCITY ROAD NETWORKS
- Full coverage by 2025
- Support charging in towns, villages and remote areas

CHARGING HUBS IN CITIES
- Prioritise shared & electric mobility: taxis and ride-hailing
- Fast chargers for urban deliveries
- Grid upgrades

Link
Zero Emission Infrastructure Regulation (ZEIR)

» Focus only on electricity and hydrogen and phase out any gas targets
» Regulation for a rapid and harmonised implementation

Country binding targets

» Why? Harmonized pathway, long term coherence, alignment with EV uptake, reach Green Deal objective
» How many? 1 m in 2025 and 3 m in 2030

Need for a simple, fair and optimal methodology
Highways: Coverage of the TEN-T core network and comprehensive network (ultra-fast DC chargers above 150 kW)

Urban areas:
• Targets at public parking facilities / commercial properties
• Targets for Transport Network Companies (e.g. Uber, taxi, ride-hailing/sharing) and other fleets (vans)
• Minimum number of ultra-fast DC chargers per urban node
• ‘Sufficiency’ metrics/criteria to ensure that the number of public charge points increases in line with the number of EVs
SMART CHARGING FOR E-MOBILITY
FROM THEORY TO PRACTICE

Julia Hildermeier
Associate, Regulatory Assistance Project (RAP)
Benefits from EVs

- Provide flexibility
- Integrate renewables
- Decarbonise transport & power
- Reduce cost
Smart charging

Source: own compilation based on Westnetz, peak day 2017; red/green curves illustrative
1. Smart tariff design

- Time-varying tariffs direct charging to “cheaper” hours
- Use existing assets, avoid unnecessary investments
- Deliver wider benefits for all electricity users

Smart Tariffs can cut costs of charging by one fifth.

Source: IEEFA
Dynamic energy tariffs

Electric vehicle owners' charging habits change on time-of-use tariff

• Remove cost barriers to electrification for commercial consumers and services.
• Fast charging: temporary exemption or gradual phase-in can support commercial operation.
2. Grid-integrated charging infrastructure

- Focus investments on “essential charging network”
- Allocate subsidies in most effective manner

Source: UK Open Power Networks
Policy recommendations

• For Member States implementing electricity market reforms, network tariff reform is crucial: Time-varying network charges can advance the decarbonisation of transport.

• The reviewed Alternative Fuels Infrastructure Directive should require Member States to define an “essential charging network” based on grid-integrated planning.
More Information

- Building a market for EV charging infrastructure: A clear path for policymakers and planners
- Start with smart: Promising practices for integrating EVs into the grid
- Treasure hiding in plain sight: Launching electric transport with the grid we already have
- Electrifying EU city logistics: An analysis of energy demand and charging cost
PAVING THE WAY FOR SMARTNESS
THE IMPORTANCE OF SMART CHARGING STANDARDS

Luka De Bruyckere
Programme Manager, ECOS
How does standardisation work?

- **EU legislation** relies on standards to implement its requirements.
- The European Commission can **request** the European Standardisation Organisations (CEN, CENELEC and ETSI) to develop specific standards.
- Standards are mostly developed by industry to ensure **interoperability**.
- In the field of mobility these are often based on **international standards** developed by ISO and/or IEC.
What is smart charging?

**SMART CHARGING EXPLAINED**

**SUPPLY**

Smart charging enables your electric vehicle:
- To power the grid when there is a lack of renewable energy supply
- To keep the grid stable by balancing supply and demand
- To charge when there is excess renewable energy supply

**DEMAND**

Thanks to smart charging, your electric vehicle can:
- Store your locally-produced renewable energy and provide back-up electricity
- Interact with your smart home and appliances

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Why do we need smart charging standards?

- Smart charging - technically possible but lacks interoperability
- Communication is needed between the building and the grid as well as the charging station, car and grid
- Payment options should be easy and allow for choice of provider
- Customers should be able to freely choose their e-mobility service provider and integrate their EV into any home management system

WE NEED STANDARDISED COMMUNICATION INTERFACES AND DATA MODELS
The key standards

- Customer Energy Manager (CEM) standard
  EN 50491-12-2

- Vehicle-to-grid (V2G) standard
  ISO 15118-20

- Charging Station Management
  IEC 63110

- Charging Service Providers
  IEC 63119

- Requirements for generating plants to be connected in parallel with distribution networks
  EN 50549
The key standards

Customer energy manager (CEM) standard - EN 50491-12-2

Helps to reduce power peak demand and cost for consumers

- Manages energy consumption and production of EVs, household appliances, etc. inside buildings, based on user preferences and signals from the grid
- Optimises different consumption and generation profiles based on expected available energy and price offers
- Aligned with smart charging standards
- Coming in 2021, continuous improvements needed
The key standards

Vehicle-to-grid (V2G) standard - ISO 15118-20

- Integrates more renewable energy into the grid
  - Enables communication between the EV and charging station
  - Enables different smart charging features
  - Enables V2G: returning energy to the grid - Charge when green energy is available to be used later
  - Integrated in CEM standard
  - Coming in March 2021, interoperability tests until 2023-25
The key standards

**Charging Station Management - IEC 63110**

- Facilitates EV charging
  - Manages charging operations such as energy usage
  - Communication between the charging station, the operator’s software and the integration into energy management systems
  - Should be aligned as much as possible with ISO 15118-20 and the CEM
  - Should support grid codes for Distributed Energy Resources
  - Potentially published in 2025

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The key standards

Charging Service Providers - *IEC 63119*

- **Ensures people can charge abroad**

  - Standardises *roaming and payment* across Member States
  - Should provide *transparency* on the EV energy consumption
  - Manufacturers should be required to provide *open documentation* and access to the cars’ *charging control*
  - Potentially published in 2025
The key standards

Requirements for generating plants to be connected in parallel with distribution networks - EN 50549

- Enables safe injection of power into the grid
- Defines the technical requirements for the protection functions for power generating plants
- Should be revised / a new standard should be developed to ensure that EV manufacturers implement grid stability requirements
What is the EU doing?

- **Alternative Fuels Infrastructure Directive (AFID)**
  - **Standardisation request** (SR) will support smart charging

- **Trans-European Networks for Energy (TEN-E)**
  - Financing of cross-country energy transmission
  - Revision should support smart charging infrastructure

  - Charging points in buildings should be ‘smart’
New paper from ECOS

MOVING UP A GEAR
ECOS VISION OF CLEAN AND SMART MOBILITY SUPPORTED BY ENVIRONMENTALLY AMBITIOUS STANDARDS

THE POSITIVE SIDE OF BATTERIES
THE ROLE OF STANDARDS IN SUPPORTING SUSTAINABILITY REQUIREMENTS FOR BATTERIES

ELECTRIC VEHICLE SMART CHARGING
THE KEY TO A RENEWABLE AND STABLE GRID
Thank you!

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