V2X roadmap: barriers and goals to accessing EV flexibility

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Introduction

The IEA TCP on Hybrid and Electric Vehicles aims to produce and disseminate balanced, objective information about advanced electric vehicles for governments and local authorities.

**2014 - 2018**
**Task 28 – Vehicle to grid technologies**
Use of storage from PEV for other uses than powering the vehicles.

**2019 - 2021**
**Task 43 – Vehicle grid integration**
Identify and give answers to the gaps preventing the electric vehicles to be fully integrated in the electrical grid.

**V2X**
**VEHICLE TO EVERYTHING**
*(NIST, 2010)*
Main benefits of V2G

- Electricity market participation
- Enhance grid stability, reliability and security
- Generate revenues
- Better integration of renewable sources
- Renewable energy storage

Self Consumption
Reduce peak power demand
Generator when outages
Emergency power

System

User
Roadmap

• Review of V2X technology, current status and barriers.

• Goals and actions required to support and accelerate the development of V2X technologies.

• Can be used by policy-makers and industrial partners in the promotion of V2X technology.
Lessons learnt

- Hardware and software
- Standards, regulation
- Business models
- Users
Lessons learnt

Hardware and software

- Advanced power electronic requirements
- Few electric vehicle with V2G capabilities
- Grid requirements for V2G services
- Protocols and communications requirements
- Data management
Lessons learnt

Standards and regulation

• Interconnection standards
• Different international electricity market regulations
• Metering regulation
• Lack of definition as DER
• Limited coordination between stakeholders
Lessons learnt

Business models

- High cost of V2G chargers
- Few cars with V2G capabilities
- Unclear roles in the business model
- Competition with smart charge take up

- Not enough clients for mass production
- Regulation not enabling market access
- Lack of coordination between stakeholders
Lessons learnt

Users engagement

- The awareness of the V2X capabilities is scarce
- TCO should be clearly decreased
- Guarantees (EV, battery, full charge, …)
- Stakeholders identification and clarity on costs and revenues
Roadmap

• **Tracks:**
  1. Technology Development
  2. Markets and Regulation
  3. Social Acceptance

• **Goals**
  What can be done in the next 5 years to advance V2X technology.

• **Actions**
  Which practical steps should be taken to achieve these goals, when do we take them and who needs to be involved.
# Tracks and goals

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| **Track 1: Technology Development**           | **Standardization and harmonization**
|                                               | Develop global standard for V2X technology and harmonize these with existing power, transport and communication systems. Agreement and application of global standards is a route to reduce costs, mitigate negative impacts and encourage participation by manufactures and service providers. |
| **Consensus on battery degradation**          | Cross OEM consensus on impact of V2X on battery degradation and development of set of standards or best practices. This should enable OEMs to include V2X capability without compromising existing and future battery warranties |
| **Reform Grid Codes for V2X**                | Reform grid codes to enable V2X to easily connect to the distribution network and inject power into the grid. This will require certification of equipment for different V2X applications, including V2B back-up power for buildings in post contingency conditions. |
| **Reform tariffs and capacity charges**       | Redesign energy tariffs to better reflect the real-time value of energy and capacity in the power system. This will enable buildings with smart flexible resources, such as V2X, to optimize charging and discharging. |
| **Reform TSO system services markets**        | Remove regulatory barriers which prohibit V2X from participating fully in TSO system service markets, including barriers which prevent resource aggregation and the entry of new player in the market. |
| **Develop DSO system services market**        | Develop new DSO system services markets, such as constraint management or voltage correction, in order to monetize the externalities of flexibility at the distribution network level. |
| **Track 2: Markets and Regulation**           | **Develop customer centered business models**
|                                               | Improve understanding of V2X value proposition to consumers and develop customer focused business models which distribute benefits and risk |
| **Improve public awareness of V2X technology**| Develop higher level of public awareness and understanding of V2X technology and its applications. |
What’s happening now?

R&D

- More than 50 projects running around the world
- 21 new projects lunched at UK

Industry

- Aggregators and other V2G services companies commercially active
- Different EV manufacturers working on its V2G capabilities
- New hardware manufacturers announced
What’s happening now?

Stay tuned – Task 43 Vehicle Grid Integration

Joint Workshop with Task 39 Interoperability

October 2019, Brussels

More information

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