SMART CHARGING AND DISCHARGING OF EVs
VEHICLE-GRID INTEGRATION SUMMIT
Road Map PSA EV

1994 – 2004
1st mass production EVs in EU (11,000 sold) (Saft-Sagem-Leroy Somer)

From 2011
MMC – Bolloré - GM Partnerships

From 2019
Up to 80% of portfolio (15 new vehicles) with EV or PHEV powertrain

From 2025
100% of portfolio with capacity to be EV or PHEV

→ Long EVs experience with multiple partners
→ V1G & V2G integration of EV available
V2x USE CASES

- **Vehicle-to-home (V2H)**
  - Local energy optimization → -10/-15% on electricity bill

- **Vehicle-to-load (V2L/V2V)**

- **Vehicle-to-building (V2B)**
  - Global grid services → From 300 to 1400€/EV/Year

- **Vehicle-to-Grid (V2G)**

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**Main customer benefits**

- TCO reduction
- Increase EV product attractiveness

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Uninterruptible Power Source
## EV TECHNICAL IMPACTS

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<th>Schema</th>
<th>Technological solutions</th>
<th>Functionalities</th>
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| **V1G** Smart charge | **IEC 61851**  
  Over the air commands  
  ISO IEC 15118 ed 1 | Smart charging with control either done by the EV or delegating to an off board agent |
| **V2G DC** | **Bidirectional V2G DC EVSE**  
  ISO / IEC 15118 ed2  
  CHAdeMO | Smart charge + bidirectional power flow in DC |
| **V2G AC** | **Bidirectional OBC + compatible V2G AC EVSE**  
  ISO IEC 15118 ed2 | Smart charge + bidirectional power flow in AC |
PSA Groupe Activities

Component level
V2G AC Charger exploration

Strong relationship with EVSE vendor (V2G DC CCS and CHAdeMO)

Academic partnership

Experimental project

Relab 2nd life Project
E-Mobility-LAB Hessen

Institutional implication

Strong activity in ISO/IEC 15118-2 Ed2 design (EU CCS V2G)
Technical bricks

- Charging components

**Bidirectional OBC**

OBC Bidir

Battery

AC

DC

Inlet CCS or AC+CHAdeMO/GB/T

V2G AC Wall Box

V2G Domestic electrical panel integration (grid switch, protection…)

SI Smart Grid = Bidirectional On Board Charger + Wall Box + DC Charger + Battery Ageing Impact
The car needs to be integrated into an ecosystem to generate value

- HMI: collect customer needs & provide feedback
- IT Interface with secondary actors (Energy provider & CPO, …)
- Improved communication / Embedded Algorithm

IT Architecture & HMI + EVSE improved communication

- CloudPSA
- Charging Point Operator
- Charging session information
- Customer data
- Cybersecurity

Battery

Metering

Data / Control

Identification PnC

OCPP 2.0, Other...

Extended Veh.

IT + HMI + Interface with Ecosystem + Value Chain analyze with ecosystem project engagement

November 22th, 2018
Example of project:

**B2C**
- 50 EVs
- Real users
- Unidirectional

**B2B**
- 15 EVs
- Service fleet
- Bidirectional

**Objectives:**
- Build the complete value chain for revenue evaluation of V1G & V2G and customer acceptancy,
- BM and marketing prospective,
- First real life project in France,
Example of project: Relab project

Integration of 2nd Life Batteries in micro grid with local EV 4 charging plugs, 12kW PVs. V2G CHAdeMO charger for cycling 2nd Life Battery.
Example of project: E-Mobility-LAB Hessen

>160 Charging points deployed in Russelsheim R&D center (DE)
V1G with investment reduction objective, cost management
Charging profile, parking and mobility Academic survey (learning, with real life, on the field activity)
• PSA Groupe experienced V2G application with current EV Product, Paving the way to commercial deployment for next generation EV
• Different technological brick are addressed to be able to proposed adaptive solutions for User (B2C or B2B)
• Ecosystem approach is mandatory for successful service rollout
• Regulation and standards should be adapted.

• Does the revenue perspective link to energy market and taxes (substitute to fossil fuel incomes) will allow robust business model ?
• Complete valorization of battery (V2G + 2\textsuperscript{nd} life + recycling) must be addressed.
Questions?