

Vehicle to Everything (V2X): Charging Infrastructure for Electric Vehicles

SMART SOLUTION 11: ALTERNATIVE FUEL DRIVEN VEHICLES



- **V2B (Vehicle to Building):** The integration of charging infrastructure for electric vehicles into buildings facilitates the transition from conventional to electric vehicle fleet and allows its integration with local renewable energy sources.
- **V2G (Vehicle to Grid):** Experiences from the use of electric vehicle chargers able to exchange energy with the grid have shown that they can benefit from different grid applications.
- **Installation of an EMS (Energy Management System)** optimizing the management of the Vehicle to Everything (V2X) charging infrastructure, the PV local generation and the energy storage system (ESS) will reduce energy costs.

SUSTAINABLE
URBAN
MOBILITY



Barcelona

Technical partner:

- Nissan: Xavier Pons: XPonsRoig@nissan.es
- IREC: Cristina Corchero, ccorchero@irec.cat



What is the solution?

The measure will be deployed at Nissan headquarters (Gran Via) and focuses on the integration of V2B applications with renewable energy generation in buildings. This will be done with the installation of V2X chargers integrated in the building, a Photovoltaic (PV) plant with energy storage system.

This measure is built on the following elements:

- Installation of 2 V2X charging stations (10kW)
- Installation of a PV and energy storage system (ESS)
- Development and integration of an Energy Management System (EMS)
- Development and implementation of a SCADA system

How does it work?

The V2X system allows for bi-directional energy flow and interaction between the vehicle and the grid. In this way, the electric vehicle can be efficiently charged and discharged while connected to the electrical grid. With the V2X charger, customers may store energy in their electric vehicle and use it later. Like this, customers may benefit in terms of lower energy costs and CO2 emissions, better autonomy, or demand profile flattering.

The EMS will do optimal energy management of V2X chargers, the PV generation and the ESS installed in the building by communicating in real time and sending set-points to the controllable elements. The EMS will manage the

different elements based on weather, energy price and building energy loads forecasts.

The deployment of the SCADA system will allow the building owner to control the performance of the installation with real time monitoring, historical data, alarms, etc.

Expected Impact

The main benefits the present system offers are:

- Integration of V2X charger enabling the EV to be a Distributed Energy Resource (DER) in buildings, with a potential increase of self-consumed energy.
- Improved building efficiency due to V2X integration, energy storage system and use of an EMS.
- The EMS brings economic benefits for the end-user as the battery and/or the electric vehicle infrastructure are used in an optimal manner to reduce the electricity bill.
- Decrease of CO2 emissions of the building due to the fleet electrification, decrease of building energy consumption from the grid and the inclusion of local renewable energy resources (PV).