V2X - Vehicle-to-Everything

Smart solution 11
Alternative fuel-driven vehicles for de-carbonising and better air quality

Measured impacts

17,5%
reduction in CO_2 emissions

13%
reduction in energy consumption

16%
reduction in energy costs

Barcelona

Technical partners

NISSAN
Xavier Pons
*XPonsRoig@nissan.es*

IREC
Cristina Corchero
ccorchero@irec.cat

City contact

Gonzalo Cabezas
gcabezasr@bcn.cat

What is it?

The V2X (Vehicle-to-Everything) 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. With the V2X chargers, users can store energy in their electric vehicle and discharge it later to benefit them in terms of lower energy costs and CO_2 emissions, better autonomy, or demand profile flattering.

What did GrowSmarter do?

Within GrowSmarter, this measure has been deployed at Nissan's headquarters in Barcelona and focuses on the integration of V2B (Vehicle-to-Building) services with on-site renewable energy generation and energy storage systems in the building. This was done with the installation of two V2X chargers, a photovoltaic (PV) plant and an energy storage system.
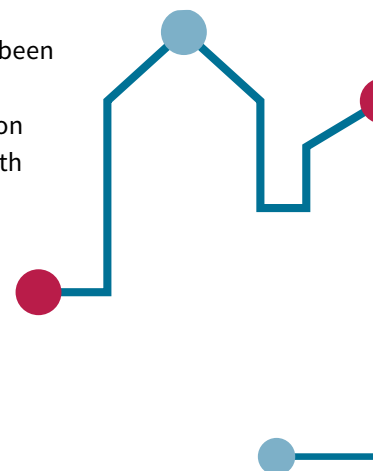
In order to control and optimize the operation of the V2X chargers and the storage, an Energy Management System and a Supervisory Control and Data Acquisition system were developed and integrated with the facility by the research center IREC.

Lessons learnt

The challenging technical issues faced during the implementation of the measure indicate that an improvement of the maturity of the technology is needed in order to facilitate the replication of this kind of solution. Concerning regulation, V2X should be included in grid codes. Grid-related policy frameworks in many countries do not recognize electric vehicles or the following supply equipment as a distributed energy storage resource capable of injecting power into the network.

It is not clear yet that business models using V2X technology are economically sustainable. Other factors, such as environmental responsibility and energy autonomy may also influence the V2X value proposition to end users. For a high social adoption of the technology it is recommended to promote its benefits, as well as manage potential concerns, such as data security, battery aging and range anxiety.

Upscaling & replication potential

The concept of electric vehicles in conjunction with the V2G chargers providing services to the building has been successfully demonstrated. Nevertheless, it is not clear that business models using V2X technology are economically sustainable. Concerning the replicability of the measure, further work should be done with the aim of reaching the full potential of V2X chargers.

A key issue is to improve the understanding of V2X'S value to consumers and develop customer-focused business models.

How did the measure work?

Technical feasibility

The measure is technically feasible. However, it has been challenging to implement due to the complexity of the solution and the lack of maturity of the V2X technology.

Economic feasibility

It is not demonstrated that business models using V2X technology are economically sustainable. Novel business models have to be tested.

Replication potential

The measure could be replicated in other cities in public or private buildings with EV fleets. How this measure is replicated will depend on the context of the city.