Smart management of photovoltaics and energy storage

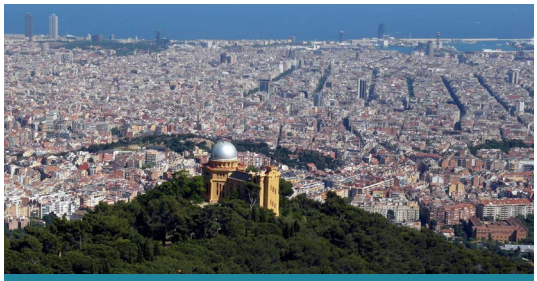
Smart solution 4
Local renewable energy production

Measured impacts

65%
of communal space power consumption at Sibelius covered by PVs and storage

20%
of power at Valldonzella covered by photovoltaics and storage

4%
Self consumption in BTC Naturgy Center



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What is it?

Installation of Photovoltaic units and electrical storage with smart energy management software in both tertiary and residential buildings, including different innovative PV cells (i.e. half-cell) and different urban integrations (i.e. PV pergola). The management software gathers relevant information and optimizes the energy flows based on the real-time operation and the forecasts of building consumption, weather and grid electricity prices.

What did GrowSmarter do?

The energy company Naturgy tested the viability of the business model as an ESCo that offers electricity self-consumption installations (PV and battery) to building owners. The research centre IREC developed the smart management software that controls the battery storage to optimize the performance of the system (usage of renewables, emissions, costs, etc.). These local electricity generation units were installed

in the residential building Sibelius (electricity used for the common staircase electrical consumption), the youth day-care service centre Valldonzella and at Naturgy's headquarters in Barcelona. The inputs for the smart management system developed at IREC include: weather forecast affecting energy production, electricity prices forecast and building demand forecast in order to correctly balance the system in real time

Lessons learnt

It is important to define a database maintenance procedure. The required accurate monitoring of smartly controlled self-consumption systems leads to a collection of very large amounts of data. Database maintenance is very important in order to have consistent data. Depending on the battery inverter manufacturer, the integration of energy management systems may be technically challenging.

> It is important to have a favorable regulation for the installation of distributed energy resources that makes them economically attractive.

Having regulation that facilitates the installation of distributed energy generation units is key for its replicability. New Spanish regulation (RD244) has allowed the collective self-consumption (i.e. various consumers associated to a photovoltaic generation installation) with different specificities. This use drastically reduces the payback period and is beneficial in case of multiple consumers with complementary load curves.

Upscaling & replication potential

It is only recently that the Spanish Government has approved a law that allows different consumers to own the same on-site energy generation unit as well as sell the surplus electricity to the grid. These kind of regulations increase the possibilities of applying smart management of local energy generation and enhances scalability.

How did the measure work?

Technical feasibility

Controlling the devices as planned in the energy management system definition may be challenging. Partnering with battery inverter manufacturers can be a good option to explore. The urban integration of photovoltaics is also an aspect to consider: Municipal Ordinances should ease the rooftop usages for photovoltaic generation.

Economic feasibility

Tax exemptions applied by Municipalities for PV installation shortens the payback periods and improves the ROI. For its economic feasibility, the acquisition of batteries by small/medium customers requires incentives from public institutions.

Replication potential

In order to reach the full replication potential of the solution, the two main drivers are a favourable regulation and a reduction of battery costs (through e.g. public incentives).

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