

PV Cells with Battery Storage in Housing Associations



Main sector

- Smart buildings
- Smart electricity

Overview

Solar cell plants have been installed onto roofs of housing association buildings in Sonderborg (DK). The excess of produced solar electricity has been sold to the public grid. However, the price for selling solar electricity to the public grid is rather low, and so it is more sensible to use the solar electricity in the apartments themselves. Therefore, in Sonderborg a solar-cells-solution with battery storage in bigger apartment buildings (6-8) will be demonstrated instead of connecting the solar cells to the public grid. If the housing association sells the excess produced solar electricity to the public grid, they will receive a price of maximum 0.08 Euro per kWh. On the other hand, if they store the electricity and use it at a later stage, they will save 0.28 Euro per kWh.

A battery storage solution is an interesting solution for bigger residential houses like apartment buildings, because it means, that the solar electricity produced during the day can be stored until the late afternoon or evening, when the electricity consumption is much higher than during the day, and thereby also contribute to reducing the peak load demand on the public grid.

Normally the solar cells area and therefore the production of solar electricity can be about 50% higher, if the solar panels are connected to a battery storage.



Business model

Roughly it can be stated, that the investment doubles up with a battery solution compared to solar panels connected to the grid.

In comparison to a grid connection which is most feasible with 100 m² of solar panels, a battery storage solution would be most reasonable with 150 m² of solar panels and to connect the panels with a local battery. The simple pay back period will approximately be the same with and without battery, but with the solution you save a lot more external energy and a lot more CO₂.

The payback periode, of course, depends very much on the local electricity price. In Denmark the price is rather high (0.28 Euro per kWh) due to local taxes.

Normally investments in solar cells and battery storage plants will be financed by 20-30 years with external loans from banks or financial instituts.

Citizen engagement

The battery storage projects will be implemented in social housing associations, where the tenants can decide independently, if they want to implement the battery solution or not.

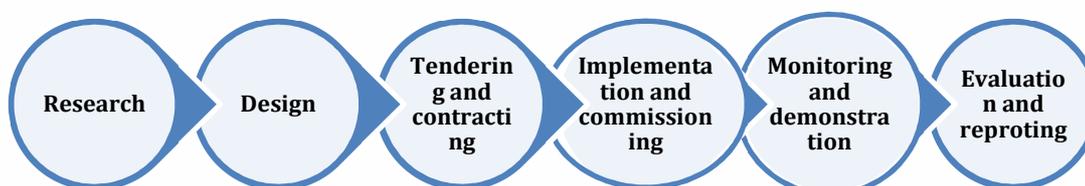
The procedure is, that the administration of the housing associations, together with the consulting engineers, prepare a conceptual plan with estimated investment and estimated energy savings.

The sketch project will be presented to the respective tenants on a meeting and followed by a voting procedure among all present tenants.

If there is a majority of attendees can agree on this investment, it is accepted, and then tender documents will be prepared.

Normally such investments will be accepted, if the simple payback period is less than 10-12 years.

Process



Benefits

- Better use of solar electricity.
- More feasible investment
- Demonstration of new technology
- Expected Energy savings: 1.030 MWh per year
- Expected CO₂ reduction: 400 tons per year



Stakeholders

Owner of the solution	The three housing associations: SAB, SOBO and B42
Service/technology provider	Not yet appointed.
Users	Tenants in 22 blocks with 352 apartments + 106 townhouses.
Investors	The three housing associations: SAB, SOBO and B42

Investment/Finance

Ca. 1.5 Mill. €

Potential for replication

Obviously, the battery storage solutions in combination with solar cells can be adopted in other cities and countries.

The technology can easily be replicated and the economic feasibility could be even better in other countries (e.g. if the local public grid administrators there does not allow solar cell systems to interfere with the public electricity grid). In many countries it is difficult to manage the input of solar electricity into the public grid, and therefore the public grid will not pay for this solar electricity. In these situations it would be much better solution to install solar cells in combination with battery storage plants.

Contact

Consulting Engineer Torben Esbensen, M.Sc
Danish Energy Management A/S
te@dem.dk

