

# Sonderborg: Solar Cells with Battery Storage

## Overview

Solar cell plants have been installed onto roofs of housing association buildings in Sonderborg (DK) and the excess of produced solar electricity was sold to the public grid. But the price for selling solar electricity to the public grid was rather low, so it was more sensible to use the solar electricity in the apartments themselves. Therefore, in bigger apartment buildings (8-10), a solar-cells-solution with battery storage was implemented. If the housing association sold the excess produced solar electricity to the public grid, they received a price of maximum 0.05 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 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 feasible area of solar cells and therefore the production of solar electricity can be about 50% higher, if the solar panels are connected to a battery storage. Like this, more electricity is produced with CO<sub>2</sub> neutral power.

The demonstration project in Sonderborg involves three social housing associations with more than 20 departments. Four demonstration projects have been installed during the project. Tenants in housing departments voted to approve the investment in solar-battery solutions.

## Business Models

Roughly it can be stated, that the investment is 60 - 70% higher with a battery solution compared to solar panels connected directly to the grid.

In comparison to a grid connection which as an example is most feasible with 100 m<sup>2</sup> of solar panels, a battery storage solution would be most reasonable with 150 m<sup>2</sup> 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 CO<sub>2</sub>.

The payback period, 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 can be financed by 20-30 years with external loans from banks or financial institutes.

## Benefits

- ❖ Better use of solar energy
- ❖ More feasible investment in solar systems
- ❖ Demonstration of new technology
- ❖ Considerable energy savings
- ❖ Considerable reduction in CO<sub>2</sub> emission

## Facts & Figures

- ❖ 2.500 m<sup>2</sup> of solar panels are installed together with the batteries.
- ❖ Battery capacity in total is 2 MWh.
- ❖ Energy savings with solar + batteries are 2.950 MWh per year.
- ❖ CO<sub>2</sub> reduction is 1.250 tons per year.
- ❖ Payback period for the investment is 10-12 years.

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## Stakeholders

Owner(s)	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

## Citizen Engagement

The battery storage projects were implemented in social housing associations, where the tenants can decide independently, if they want to implement the battery solution or not. The administration of the housing associations, together with the consulting engineers, prepared a conceptual plan with estimated investment and estimated energy savings. The sketch project were presented to the respective tenants on an anual meeting and followed by a voting procedure among all present tenants. If there was a majority of attendees that agreed on this investment, it was accepted, and then tender documents were prepared.

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

## Investment/Finance

5.5 Mill €

Payback period: 10 - 12 years.

## Replication Potential

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 do 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 a much better solution to install solar cells in combination with battery storage plants.

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## More information:

<https://smartencity.eu/about/solutions/solar-cells-with-battery-storage-in-housing-associations-sonderborg/>



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