

Denmark: Solbyen

BIODATA

PV community name:	Solbyen
Kind of urban area:	Residential – urban
Main building type in community:	Houses - single houses
New/Retrofit/Added:	Retrofit – building integration & Added separately to the buildings
Type of project:	Demonstration project
Start of operation:	Year 1997
City, state, etc.:	Ring Sø, Brædstrup
Country:	Denmark
Latitude:	N55 57' 58"
Longitude:	E9 36' 13"

PV SYSTEM CHARACTERISTICS

Total PV power:	60 kW
Number of houses/buildings:	30 houses
PV power per unit:	1 - 3 kW/house
Energy yield per year:	800 kWh/kW
Main PV system type:	Grid-connected – demand side
Main PV application type:	Inclined roof – mounted
Main PV module type:	Framed regular module
Main PV cell type:	Crystalline silicon – multi
PV module manufacturer/brand:	Solarex/MSX 53
Inverter manufacturer/brand:	SAM/SWR700
Investment for PV systems:	8 000 DKK/kW

OWNERSHIP

Building owner:	Inhabitant
PV owner:	Inhabitant
PV energy user:	Inhabitant



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PV COMMUNITY DESCRIPTION

PV Community Brief

The SUN CITY is located in Ring Sø on the outskirts of Brødstrup. Since its commissioning in the summer of 1997, residents on the 30 houses with PV modules on the roofs have changed their habits of power consumption significantly. At the same time, it has been found that the PV systems produce more electricity than expected, and that they do not affect voltage quality in the electricity grid.

Grid issue

The project also investigates whether the electricity generated in the SUN CITY affects the power quality of the electricity grid.

The question was whether the electricity produced by the PV system would reduce the general power-quality on the grid. But no changes in the power quality were noted in the grid, and the PV systems' irregular electricity production has had no negative influence.

Urban planning and architectural issues

An architect participated in the planning of the PV arrays, which occupy 10, 20 and 30 m² respectively. Twenty-seven installations are on slanted roofs, one is installed on a vertical house wall, and two are situated on flat garage roofs. The installations are placed on existing buildings, designed without regard for the optimal placing of PV modules, that's facing south at an angle of 42 degrees. But none of the SUN CITY's houses meet the optimal requirements for the placing of PV arrays. Individual houses even have angles of up to 60 degrees to the south. Despite the generally non optimal options for placing the PV installations, the readings show that the PV systems are extremely productive. On installations orientated at 60 degrees to the south, only 10% reduction is found relative to the optimum electricity generation. All units have thus lived up to expectations, and in the periods with most sunlight, individual units have even covered the entire consumption in each house.

Economic / financial issues

One of the factors which make the practical use of PV-generated electricity difficult is that many families in the SUN CITY work away from home during daylight hours, when the PV plants generate the most electricity. The project has shown that half of the PV electricity cannot be used in the SUN CITY when produced, and is therefore sold to the electricity grid. At the beginning of the project, there were price differences between purchase and sale of electricity to the grid. But the project has been a factor in the Danish parliament's changing of the tariffs for a trial period, so that producers of PV electricity may store their electricity without charge in the grid (net metering).

Other remarks

To investigate consumer behaviour during the project, data on each family's electricity consumption were collected in the months before the installation of the PV systems.

Against this background, an average reduction of 4,5 % in the SUN CITY families' electricity consumption was found. It is noteworthy that the savings were achieved by altering consumption patterns. Only a few households bought energy-saving household appliances during the period in question.

Many households say that the newly developed »PV meter« has been a factor in drawing attention to electricity consumption, thus paving the way for savings. Neither did the residents of the SUN CITY compromise their comfort to save electricity.

In 2006 ten years after the project was started we can still see the added value in terms of energy savings, the households is still using 5-10% less energy than a reference group.

COMMUNITY INFORMATION

Project leader company: EnergiMidt

Other project company: Knudsen og Halling, Velux

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