



## **Background information – Solar Explorium**

### **Solar Danmark's new office building and centre for green energy and intelligent building solutions**

#### **Description of the new building**

Solar Danmark's new building in Vejlen spans 2,000 m<sup>2</sup> and holds offices, a canteen, meeting facilities and a 500 m<sup>2</sup> knowledge centre. This ground-breaking build is based on alternative energy sources and meets the requirement for the building regulations' low energy class 1 - requirements that do not become legally effective until 2015.

All technical building features (heating, light, intruder alarm, access control, ventilation, etc.) have been brought together in a NetControl solution. This means that the technical installations communicate internally and are monitored and managed via an IP network. Users can always access any required/accessible information and control the heating, lighting, ventilation, etc. of the entire building or individual rooms.

Consumption for heating and hot utility water is fully covered by renewable energy sources. Different types of heat pumps, including geothermal heat pumps and heat pumps connected to probe drillings 80 metres under ground, supply these systems. Solar panels on the building's roof also help to heat utility water.

Looking at related electrical features, Solar has implemented solar power cells in overhead lights and on the building fronts while free-standing modules have been erected on the ground, all in all totalling some 40 m<sup>2</sup> solar cells.

Mechanical ventilation has been installed in the form of a comfort system with injection and exhaust. Efficient recycling means that approx. 80% of the heat in the air exhausted is used to warm up the fresh injection air. In addition, a cooling effect from the heat pump system enables cooling of the office floor in the summer.

The new building was commissioned on 1 August 2009.

The latest calculations show energy consumption of 49.7 KWh/m<sup>2</sup>/year.

Requirements for low energy class 1, 2, 3 are as follows:

Low energy class 1 (2015) is 50.5 KWh/m<sup>2</sup>/year.

Low energy class 2 (2010) is 70.7 KWh/m<sup>2</sup>/year.

Low energy class 3 (2009) is 95.9 KWh/m<sup>2</sup>/year.

Thus, expected annual savings for the new building total 106,000 kWh compared to estimated consumption had the build observed traditional regulation provisions, i.e. low energy class 3. Clearly, Solar Danmark's new building exemplifies how it is practically possible to halve energy consumption in commercial buildings.

#### **Solar Explorium shows off industry's competences**

The opening of the new knowledge centre is Solar's way of demonstrating workable energy management using novel technology and energy-saving solutions within the electrical, hws and



ventilation fields. The knowledge centre reflects the industry's combined competences and targets end users, contractors, consultants, suppliers and manufacturers.

In connection with the official opening, Solar has chosen to show how new products, knowledge and technology can be used together to create solutions in energy-saving construction projects.

### **What is required of an energy class 1 building?**

Solar finds that the main factors leading to the build meeting the requirements for energy class 1 are:

- the building only runs on renewable energy sources in the form of geothermal heat, air/water heat pumps, solar panels and solar cells. These systems can generate more than 90 kW. The fitted solar cells' high contribution to the energy calculation underpins Solar's conviction that solar cells will prove a significant factor in future construction.
- The building is fitted with an integrated intelligent control system, allowing all technical systems to communicate on an open platform (IP, KNX, LON).

The intelligent NetControl solution offers many advantages:

1. Great building flexibility because light fittings, heat sources and ventilation units may be controlled and monitored individually, making it possible to quickly alter room functions and move partitions without adjusting the fittings. Also, this helps to future-proof the building as rearrangement to new functions is simple.
2. The interlocking system communicates with heating and light controls, meaning that light and heating are set to day when the first person arrives in the morning and night when the last person leaves at night.
3. If a window is opened, ventilation and heating are adjusted automatically. Displays mounted by all entries and exits show open and closed doors and windows.
4. The above examples help to change the employees' behaviours and attitudes towards energy consumption. This is a major prerequisite for gaining further energy savings without compromising comfort.
5. Cleaning staff can use the displays to see which rooms have been used and thus must be cleaned. This information is provided by comprising the movement sensors' activities over the day.

Solar finds that this low energy class 1 build has not been significantly more expensive than a traditional low energy class 3 build. As stated, however, it is important that you take into account from the very beginning of the build, that all technical solutions will form part of an "open communication protocol" and thus can be monitored and controlled via an intelligent integrated control system at any time.

This type of build does not require you to compromise window areas or layout or to use more insulation than normally, and Solar has not had to adjust or change the building's architecture in



any significant areas to meet the low energy class 1 standard requirements. Moreover, the application of renewable energy in the form of geothermal heat, air/water heat pumps, solar cells and solar panels has definitely been crucial to ensuring that Solar's new building met the intensified requirements.