

## Viktoriagade 10B at Vesterbro

In the summer and autumn of 1998 a large PV-system was erected on old business premises at Vesterbro in Copenhagen in cooperation with the urban renewal consultant Bjarne Lundt and the urban renewal company SBS and with funding from the EU/Thermie programme. The project is about urban renewal of the building Viktoriagade 10B, which is a five-storeyed back building with different business tenancies. The building is partly part of a large-scale urban renewal and renovation of the housing stock at Vesterbro. There are, however no specific requirements to this building, as it does not include living-quarters at all.

On the south facing gable of the building a total of 8.6 kWp crystalline PV-modules from the company Gaia Solar have been installed, which is equal to approx. 86 m<sup>2</sup> PV-modules. The PV-modules are mounted with an aluminium frame system developed for this purpose, which is easy to mount and at the same time made so they can preheat ventilation air.

This is the first gable project with crystalline PV-modules combined with thermal utilisation in Denmark. The PV-modules are connected to the electricity supply system and the space behind the black PV-modules is used to test preheating of ventilation air. This is done in part of the PV-wall by small holes with thermostatic controlled valves in the wall behind, so the preheated fresh air can be utilised. An advantage is that when the backside of the PV-modules is cooled their yield will be increased. In one of the apartments there is a heat recovery unit that ensures air supply and exhaustion in some of the workshops. The heat recovery unit consists of a counter flow heat recovery unit from TermoVex with a high efficiency of approx. 80%. Fresh air to the heat recovery unit is preheated first in another part of the PV-wall.

Measurements of the ventilation and heat recovery unit are made at the solar energy centre at the technological institute in Denmark, while the yield from the PV-modules has been measured by the utility company Copenhagen. Additional funding for follow-up of this project has been obtained from the Danish Energy Agency's CO<sub>2</sub>-means.

Figure 3.63 shows integration of the crystalline PV-modules and the ventilation damper on the top of the construction of PV-modules, which is going to avoid too high temperatures behind the PV-modules.

Figure 3.63. Building integrated PV-modules on a south-facing gable in Viktoriagade 10B at Vesterbro in Copenhagen.

By use of usual PV-module covered facades there will always be natural ventilation behind the PV-modules. But in this project it was the aim to utilise the solar heating from the PV-modules in addition to the produced electricity. Preheating the ventilation air in the PV-modules before it is supplied to the building has done this.

Figure 3.64. Detailed photo of the upper part of the PV-module wall in Viktoriagade 10B with an automatic exhaust unit.

According to director Dennis Aarø from Gaia Solar the price of the PV-system in Viktoriagade was very reasonable with 55 DKK/Wp, of which 36 DKK/Wp was the price of the PV-modules.

This can be compared with another urban renewal project that Gaia Solar has made the same year in Gasværksvej in Copenhagen, where the price was 125 DKK/Wp, which was expensive. The reason of this rise in price was primary the many stage in the process that were all going to be paid.