


# Gyldenrisparken (Denmark)

**Savings on heat: 53-70%**

**Improved indoor climate**

**Ventilation with heat recovery, Insulation, Solar Energy**

## *Project data*

| | |
|---|---|
| Location, address: | Gyldenrisparken, Amager |
| Region: | Copenhagen |
| Surroundings: | Social housing area. Near the Copenhagen airport |
| Climate: | Continental and cold |
| Heating degree days: | 2906 |
| Year of construction and renovation: | 1965-1969 (construction); Start: 2007 (renovation) |
| Typology: | Apartment, business, institutions |
| No of dwellings: | 500 apartments |
| Total floor area: | 43.410 $m^2$ |
| Owner: | Housing association, Lejerbo |
| Architect and Builder: | Witraz architects; Housing association, Lejerbo |
| Costs of energy saving measures: | € 446.196 per house (incl. VAT) |
| Renovation financed by: | EU Ecobuildings and Lejerbo |

Fig. 1: Overview of Gyldenrisparken

## *Objectives and Results*

It is aimed to demonstrate 3 levels of improved energy quality for the retrofit project which shall be realised as a phase 1 of the total renovation project. This is stated as 33 apartments with only a 25 % energy improved compared to standard renovation (similar to a low energy class 2), a very advanced energy saving compared to normal of 70 % for another 33 apartments which include solar DHW and solar PV systems and besides 33 apartments.

## *Renovation concept*

### Key renovation features

- Insulation of facades, floors, roofs
- Low energy windows
- Heat recovery ventilation system
- Solar collectors for DHW
- PV system

## State-of-the-art

| Before renovation | After renovation |
|---|---|
| *Constructions [U-values: W/m²K]*<br>• Roof [0,37]<br>• Window frame [2,0]<br>• Windows glazing [0,74] | *Constructions [U-values: W/m²K]*<br>• Roof [0,19]<br>• Window frame [1,5]<br>• Windows glazing [0,74] |
| *Installations* | *Installations*<br>• Solar collectors for DHW<br>• PV for electricity use<br>• Heat recovery ventilation system |

## Energy saving and monitoring

*Energy consumption before renovation (apartments only, average):*
KWh/m$^2$: 147 KWh/m$^2$

*Energy consumption after renovation (apartments only, average):*
KWh/m$^2$: 69 – 44 KWh/m$^2$ (standard renovation – level A + solar)
Percentage saving on heating: 53 - 70 %

## Additional information

In the on going renovation project in Gyldenrisparken it is proposed to make about 100 apartments as part of a demonstration project. This demonstration project will cover three of the small buildings. The renovation is planned to be with three different levels regarding energy efficiency compared to the normal renovation level. The different levels consists of:

- **Standard renovation:** The standard renovation implies 100 mm isolation of facade, exhaust ventilation, new windows, new district heating and simple measures on water savings.
- **Level B:** Level B has extra initiatives and has PV assisted mechanical ventilation with low energy use and low noise level, isolation of roof, CTS, improved low energy windows and further water savings.
- **Level A:** Level A has energy savings as level B but has also ventilation with heat recovery, super low energy windows with U = 0,85 W/m$^2$K, reduced air infiltration and optimised insulation according to an total economy concept. Thereby costs for renewal for the heating plant is saved and used on the heat recovery ventilation instead. This level B has a very low energy demand and is close to the “passive house” level for apartments placed in the middle of the building.
- **Level A + PV and solar collector:** This level is the same as level A but has also a 64 m$^2$ solar collector and 100 m$^2$ PV modules, which deliver hot water and electricity. PV is part of the Copenhagen PV-Coop. The solar collector is planned to avoid use of district heating during summer to minimise transmission losses.

## Lessons learned and conclusions

Renovation yet not started.

## References

Reporting in relation to EU-Demohouse project. See also www.demohouse.net