



El-Education  
Best practice example No 4 from Denmark



## Silkeborgvej (Denmark)

**18 % energy savings**

**Modern attractive apartments with good indoor climate**

**Long lasting façade covering, environmentally friendly materials for insulation, painting etc.**

### Project data

Location, address:	Silkeborgvej, Århus
Region:	Jutland
Surroundings:	City
Climate:	Mild and humid;
Heating degree days:	2906
Year of construction:	1945
Year of renovation:	2005
Typology:	Apartments
No of dwellings:	50
Total floor area:	4200 m <sup>2</sup>
Owner:	Housing association Ringgaarden
Architect and Builder:	Århus Arkitekterne and Housing association Ringgaarden
Costs of energy saving measures:	Information not available
Renovation financed by:	Housing association Ringgaarden and the Municipality of Århus



Fig. 1: Silkeborgvej 9-17

### Objectives and Results

As part of the renovation of the social housing block at Silkeborgvej in Århus a number of sustainable building methods and energy efficient solutions has been implemented. Furthermore there has been paid special attention on the architectonically and aesthetic dimensions where windows, façade covering and design have been given special focus for these dimensions.

### Renovation concept

#### Key renovation features

- Insulation; paper insulation in walls
- Rooftop apartments made from pre-fabricated elements.
- Environmentally friendly painting
- Reusable building parts
- Long lasting façade covering ( ~50 years)
- Low energy windows
- Use of passive solar energy

### State-of-the-art

#### Before renovation

Constructions [U-values:  $W/m^2K$ ]

Information not available

Installations

No – or natural - ventilation

#### After renovation

Constructions [U-values:  $W/m^2K$ ]

Information not available

Installations

Mechanical ventilation

### Energy saving and monitoring

Energy consumption before renovation:

KWh/m<sup>2</sup>:                      73,1 (heating)  
   5,3 (electricity)

Energy consumption after renovation:

KWh/m<sup>2</sup>:                      71,9 (heating)  
   49,4 (heating – new rooftop apartments)  
   8,03 (electricity)  
   3,17 (ventilation)

Percentage saving:            18 %

### Additional information

The elements for the façade and the rooftop apartments are made as wood constructions with insulation made from cellulose. The façade covering is made from cement based plates which do not need maintenance for up to 50 years. The rooftops are prefabricated and are hoist on top of the building. The prefabrication minimises the use of energy, the waste of material and raises the working conditions and the possibility of reuse.

Kitchen towers are made with large window areas facing south. Passive solar heat is given through the windows and is also stored in the walls. The windows also give an attractive view over the city.

Materials for kitchens and floors are chosen from indoor climate certified enterprises.

### Lessons learned and conclusions

It is important that the environmental and sustainable is clearly described in the project description as the workers may find these issues as extra tasks which will have to be mentioned and paid for as an extra service.

### References

SBS: "Grøn Værkstøjskasse" report from the project: "Økologisk Bæredygtig bygningsrenovering (ØBB)", Socialministeriet 2005.