KLOSTERENGA
ECOLOGICAL HOUSING

OSLO, NORWAY

Completed: 2000

Latitude:
59 deg. 55 min. N

35 dwellings,
54-104 sq.m.

The project is located in an urban renewal area in the eastern part of the Oslo city centre.

A series of measures was taken to minimize energy consumption and utilize solar energy.

Both active and passive solar energy systems are used, and the different systems are regulated both automatically and manually.

The sunspace is constructed as a double glazed wall, to provide thermal comfort in the living areas, to serve as a buffer zone between indoor and outdoor, and to preheat ventilation air to the building.

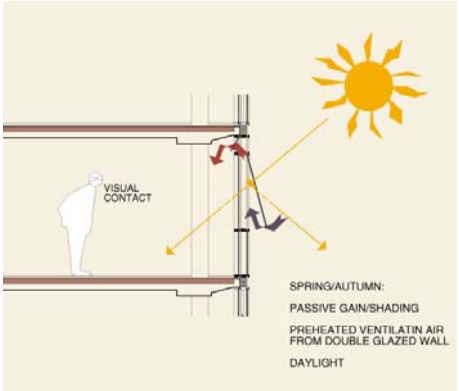
The outer glazed layer is a double zealed low-e glass. The wall between the sunspace and living areas are single glazed. The total U-value of the construction is U=1.1. The frames are totally made of wood. The inner wall can be removed during periods of the year for comfort reasons. During the first year of function, none has yet removed this wall.

Blinds are mounted between the two glazed walls, to provide shading and solar heat collection. Temperatures can be controlled by various positions of the blinds and by opening and closing the windows.

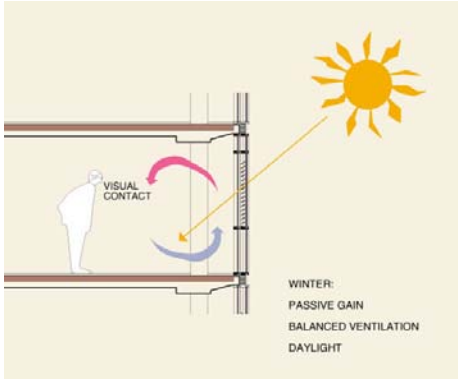
The sunspace reduces heat demand, and removes the need for summer cooling.

The picture to the far left shows a part of the large, south-facing double glass wall. It gives the project a distinct, architectural appearance, in marked contrast to the more closed north facade.

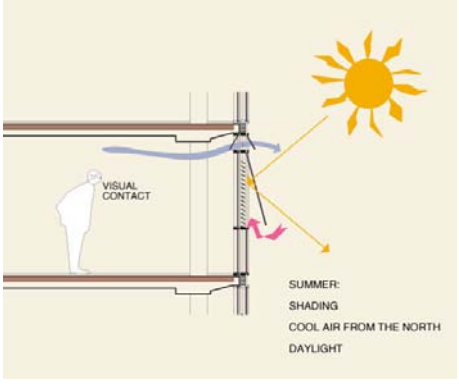
To the left is shown a typical living room. The large glass areas gives the space a light and airy impression, which is unusual in such dense, urban housing projects.



In the spring and autumn seasons, pre-heated air from the glass wall can be let into the living areas. The blinds between the two glass layers can be lifted to let the sunlight and warmth into the dwelling. Alternatively, the blinds are lowered to prevent heating.



In winter, the balanced, mechanical ventilation system provides necessary air exchange, however, regaining most of the heat from the used air. The large, glazed areas allow passive solar gain and generous dayligting.



In summer, openable windows, both in the inner and outer layer of the glass wall, can be combined to provide natural ventilation and to lead out the warm air in the facades, preventing heating of the the living areas. The blinds are used for shading.

South facade

Interior of south-facing living room with the double glass facade.

The graphs (calculated by FRES software) show that even during hot summer season the temperature in the living areas are comfortable, and approximately 10°C lower than appartments without sunspace. These calulations formed the basis for design decisions. They clearly indicated that the temperature in the living areas would stay within acceptable comfort levels, despite the extensive use of glass in the south facades.

Also during winter the sunspace serves as a buffer zone between inside and outside, reducing heat demand and offering better comfort close to the glazed zones in the living area.

Feedback from the inhabitants of the dwellings has so far been very positive. The good daylight conditions are emphasized.In flats with double glass facades, the temperatures remained acceptable during the summer of 2000. In the top floor, where the flats have ordinary windows (no double facade and no external sunshading), the habitants complained about overheating.

These reactions indicate that the calculated results reflect the conditions experienced by the dwellers. It also indicates that sunspaces can provide good comfort conditions in the living areas if they are built well, and the inhabitants are instructed how to use them.