POLISH AND NORWEGIAN CITIES
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# GRENSESVINGEN 7 (EPA), OSLO
# REHABILITATION OF OFFICE BUILDING FROM THE 1980s
# HALVED CARBON EMISSIONS

**Sector:** Energy efficiency

**Timeframe:** 2012 – 2014

**Location:** Helsfyr, Oslo, Norway

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## PROJECT BACKGROUND

Although not a municipal building, this type of building is relevant for bigger municipalities. It houses the Oslo branch of the national environmental protection agency (EPA). In addition, it is always interesting to see how the state environmental bureaucrats perform themselves.

## PROJECT DESCRIPTION

The house, completed in 1986, is transformed into one of Norway´s most climate-friendly rehabilitated office buildings, with energy class A and an "excellent" classification in the BREEAM-NOR environmental certification system. The new 8th floor meets passive house standard. The building is located near the Helsfyr public transport hub, and has good facilities for indoor bike parking with amenities for washing and maintenance of bicycles as well as a changing area. It is next door to Fyrstikktorget, a pleasant area with a good variety of services.

The new top floor re-uses the original steel structure, but is entirely rebuilt as a highly insulated and modern building structure. The outer walls on the rest of the building got 150 mm internal additional insulation and a damp proof membrane for improved air tightness. The cold bridges in the building are partially eliminated and partially improved. The windows are replaced with as few mullions as possible. This gives better daylight penetration in addition to limiting the heat loss from the windows. The glass has automatic control systems for solar screening, with user-controlled switches for opening and closing the screens. Decentralised ventilation in each floor lowers energy consumption noticeably, while also freeing up the top floor for office space. The ventilation system is demand controlled, including night cooling when necessary. A rotating heat recovery unit with an efficiency of 80 % is also being installed.

The primary energy source consists of two reversible air to water heat pumps. The waste heat from the cooling unit in the server room is also used by heat exchanging with the heat pump and domestic hot water system. Space heating is primarily supplied by the ventilation system. At night the ventilation system has the capability of recycling air to maintain room temperature.

The existing building was designed and executed with durable and robust materials in the structure and facades. The brick façade contributes well to relate the building to the historic buildings in the


area. Retaining the existing concrete structure, the original stairwells and the majority of the brick façade results in a large resource saving and reduced greenhouse gas emissions for the project.

## PROJECT RESULTS

Heated area: 16,373 $m^2$
Number of users: 700

Greenhouse gas calculations (tons CO2 equivalents)

| | Reference | Project | Completed | Operational |
|---|---|---|---|---|
| Energy | 14 | – | 8 | – |
| Material Use | 5.1 | – | 2.5 | – |
| Transport | 30.8 | – | 17.9 | – |

Energy label: A
Classification of heating system (% renewables): light green
Net energy: 98 kWh/$m^2$/year
New floor: 87 kWh/m2/year - passive house
Estimated energy delivered: 82 kWh/$m^2$/year (Ns3031)
New floor: 75 kWh/$m^2$/year - passive house
Energy sources: Heat pump air-water (primary load space heating, ventilation and DHW), district/ local heating system (peak load)
Room heating: 19.7 kWh/$m^2$/year
Ventilation heating: 8.3 kWh/$m^2$/year
Domestic hot water: 5 kWh/$m^2$/year
Fans: 7.7 kWh/$m^2$/year
Lighting: 12.5 kWh/$m^2$/year
Technical equipement: 34.4 kWh/$m^2$/year
Ventilation cooling: 10 kWh/$m^2$/year
Specific fanpower 1.23 kW/($m^3$/s)
Heat recovery efficiency 84 %


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## MORE INFORMATION

FutureBuilt:
www.futurebuilt.no/prosjektvisning?lcid=1033&projectID=254887