



POLISH AND NORWEGIAN CITIES
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DEICHMANSKE MAIN LIBRARY, OSLO

PASSIVE ENERGY BUILDING WITH TRANSLUCENT FAÇADE

Sector: Energy efficiency

Timeframe: 2009 – 2018

Location: Bjørvika, Oslo, Norway



foto: Lund Hagen Architects

PROJECT BACKGROUND

Deichmanske main Public library is planned in Bjørvika and will be built according to ambitious environmental standards. The library will have high architectural quality, and be functional and innovative in its use of future-oriented climate solutions. This will be a creative, visible, and accessible people's library and meeting place for culture. The library will reach many user groups through new technology and new services, with a special focus on children and the young.

PROJECT DESCRIPTION

Ambitions for the new library include 50 percent reduced carbon emissions compared to today's standard. The pre-project calculations show a combined reduction of emissions of 38 percent, and the rest is likely to be obtained through an ambitious mobility plan with practically no car use.

The building, planned to fulfil passive energy criteria, has a compact form. Ventilation is supplied via the floor structure in the second to fifth storeys, thus reducing the need for fan energy. Since ventilation air is distributed along the concrete in the floor structure, the thermal mass of the building is utilised and temperature fluctuations are reduced.

The same is true for the extensive use of exposed concrete ceilings. The concrete floors are cooled with built-in warming and cooling pipes in the concrete of the roof and floor, allowing ventilation air quantities to be reduced. Automatic external solar screening will be used to reduce the buildings cooling needs, and energy-efficient IT equipment will be required. The project is based on a district energy network for Bjørvika, which will supply the building with 100 percent energy for heating and cooling needs.

Pre-project phase calculations of greenhouse gas emissions from material use show low emissions from the chosen materials, when compared to similar buildings. A series of initiatives are underway to reduce the emissions further, among others the use of low-carbon cement, recycled steel reinforcement and recycled steel in the pile foundations. The façade consists of a composite solution with a three-layer glass with an internally positioned sunscreen. Between the glass panels there are tubes of 10 mm thick glass fibre reinforced plastic composite insulated with rock wool. Alternative façade solutions are also being evaluated to reduce greenhouse gas emissions. The floor slabs will be concrete with surfaces of natural stone, surface treated concrete and technical flooring. Interior walls are planned with recycled drywall on wooden studs. Wood based panels are also being considered.



foto: Lund Hagen Architects

PROJECT RESULTS

Gross area: 19,970 m²
 Heated area: 19,260 m²

Greenhouse gas calculations (tons CO₂ equivalents)

	Reference	Project	Completed	Operational
Energy	17.2	6.4	–	–
Material Use	28.3	14.2	–	–
Transport	60.4	11.4	–	–

Delivered energy: 71 kWh/m²/year (calculated)
 Energy label: Label A
 Net energy: 75 kWh/m²/year – passive house
 Estimated energy delivered: 80 kWh/m²/year
 Energy sources: Heat pump water-water (heating/ DHW)

The main focus of a library is, of course, cultural. But the environmental benefits will also be very visible to the users, including learning possibility for young people.

MORE INFORMATION

Project blog with contact details:
www.blogg.deichman.no/nyedeichman/in-english/

Future Built:
www.futurebuilt.no/prosjektvisning?lcid=1033&projectId=217300



foto: Lund Hagen Architects