



## The new Munch Museum

The City of Oslo is building the new Munch Museum in Bjørvika. The new museum is a landmark by the fjord close to the Opera House. Together with the new public library, this represents the largest ever investment in cultural edifices in the City of Oslo.

The new Munch Museum is built like a tower surrounded by a lower podium. The building is 60 metres high and comprises 13 floors. The upper part of the tower leans towards the Opera House.

The façade towards the west is made up of glass and external perforated wavy panels in aluminium. The façade reflects water, light and the sky in different ways throughout the day and during the various seasons. At night, the light will shine through the panels.

The podium, which forms the lower horizontal base, primarily houses external public functions such as the main entrance, foyer area, museum shop, cloakrooms and café. There is also a small amphitheatre surrounded by glass walls where it is possible to show films or hold presentations. The upper part of the podium also contains a hall for diverse events. The hall is suspended from the ceiling of the podium without any support from columns below.

The tower constitutes the core of the museum and contains areas for exhibitions, storage rooms, conservation and research. The museum's 11 exhibition halls are organised vertically and distributed over seven floors, and the large areas offer new and different ways of experiencing art.

The main part of the tower is built in an enclosed concrete structure in order to address safety issues and also provide a stable interior climate and appropriate conditions for the art work. The front of the tower is light and transparent. Visitors can move between the floors via escalators and lifts. The city outside can be glimpsed through the glass façade and the perforated wavy panels, which makes the transition from one floor to another a part of the museum experience.

The two upper floors will house a restaurant, bar and roof terrace – and the view over the city and fjord is stunning!

The new Munch Museum will open to the public in 2020.

### Environmental ambitions

Oslo City Council has set ambitious environmental goals for the project with the requirement that the building is at the forefront in terms of both energy savings and reduced climate gas emissions. Environmental and sustainability considerations have been addressed from the very start.

The new Munch Museum is a model project for the FutureBuilt programme and is being constructed in accordance with the criteria of at least 50 % less climate gas emissions than equivalent buildings. Reductions in climate gas emissions apply to the areas of transport, energy and choice of materials and entail reducing climate gas emissions throughout the building's life cycle – during the planning, construction and operational phase.

The new Munch Museum is being built as a passive house, i.e. the energy requirements of the building will be reduced through “passive measures” such as optimal heat insulation, optimally insulated windows and heat recovery.

As a model project in the FutureBuilt programme, the Munch Museum has helped to inspire and motivate public and private stakeholders to take environmental and sustainability considerations into account in construction processes from the very start.

## **Examples of environmental measures**

### **Façade**

The external perforated wavy panels provide excellent solar shading. The perforations in the panels vary in size and have been customised to provide the most optimal level of solar shading. For example, there are larger perforations in the circulation areas, to give visitors the best view of the city. At the entrances to the various exhibition halls, the perforations are more dense in order to prevent light from penetrating and ensure a lower temperature in such areas. The excellent solar shading in the panels helps reduce the need for cooling.

The glass used in the façade throughout the front of the building is solar reflective. It is made up of three layers of glass, resulting in minimal heat loss. The window frame system also insulates extremely well, reducing the need for heating and cooling.

The eastern side of the building primarily uses concrete behind the panels. This part of the building intentionally faces east in order to reduce solar heating.

### **Two climate zones in the tower**

The most significant device in the building's energy and environmental concept are the different needs and functions of various parts of the building. It has been important to distinguish between the zone offering visitors access to the exhibits and the parts of the museum dedicated to preserving the artefacts.

The tower has been divided into two climate zones. The main part of the tower is built in concrete and features climate locks at the entrances to the exhibition halls to ensure a stable interior climate for the exhibits. The concrete has thermal properties that make it easier to maintain a stable temperature and a regular interior climate, thereby contributing to a reduction in energy consumption. The temperature in the exhibition areas will be 21°C and 50 % air humidity in order to provide appropriate conditions for the respective artefacts.

A greater temperature range is permitted in the circulation areas for visitors and it is planned that natural ventilation will reduce energy consumption.

### **Sedum roof**

The podium will have a green sedum roof that provides optimal stormwater management.

### **District heating and cooling from seawater**

The new Munch Museum is connected to a district heating plant. The district heating plant was connected during the construction phase in order to use eco-friendly heating as soon as possible. The museum is also connected to a seawater cooling plant.

### **Low carbon concrete**

The new Munch Museum has been built from low carbon concrete in order to reduce climate gas emissions.

One of the greatest environmental challenges when using concrete is the high level of climate gas emissions generated when cement is made. Low carbon is defined as concrete that has been adapted to limit climate gas emissions – for example, through the use of new additives such as fly ash as a replacement for cement or that a high proportion of climate-neutral fuel is used during production in order to reduce CO2 emissions.

### **Recycled steel in the structure and in reinforcing rods**

Recycled steel has been used in both the building's structure and reinforcing rods.

### **Materials with a long life cycle**

The new Munch Museum has been built from robust materials with a long life cycle. The building has been designed with a technical life cycle of 200 years on load bearing and structure.

### **Energy control system**

The new museum is equipped with an energy control system that optimises the building's energy consumption.

### **Well served by public transport**

The new Munch Museum is centrally located close to Jernbanetorget and is well served by public transport.

## Facts:

- Client: The Municipal Undertaking for Culture and Sports Facilities of the City of Oslo
- Project management: ÅF Advansia
- Architects: Estudio Herreros  
Norwegian partner: LPO arkitekter AS
- Interior architect: AS Scenario Interiørarkitekter
- Consulting engineers: Multiconsult, COWI, Rambøll and Asplan Viak
- Gross floor area: 26,313 m<sup>2</sup>
- Visitor capacity: 500,000 per annum, 2,000 per day
- Construction period: 2015–2019
- Opens to the public in 2020
- Environment: Passive house standards and a minimum 50% reduction in CO<sub>2</sub> emissions relative to equivalent buildings. A model project in FutureBuilt.