

FUTURE
BUILT



HOLMEN SWIMMING POOL

FutureBuilt pilot project, Asker 2017



Photo page 8: Asker kommune. All other photos: Tove Lauluten

INNHold

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SHORT DESCRIPTION

Asker municipality has built an innovative indoor swimming pool at Holmen in Asker. The building has two stories and contains an 8-lane pool, a therapy pool, a fitness room, a social room, changing rooms and canteen. There are also stands for spectators. The pool is primarily a training and competition arena. Asker's school children get their swimming lessons here, and it is the main training facility for the local swimming clubs.

In planning of the swimming pool, the municipality has focused on energy-saving measures and reduction of greenhouse gas emissions. Holmen swimming pool is built as a passive house. By combining different solutions the project is a leading example of energy saving technology, and the result is one of the most energy efficient swimming pools in Norway. The project received the Norwegian Building of the Year Award in 2017 (Byggeindustriens pris).

The building is designed by ARKÍS architects. Trio Entreprenør was the main contractor.

Read more about Holmen swimming pool at www.futurebuilt.no



KEY FIGURES

The project's total greenhouse gas emissions are reduced by 50 percent compared to a standard reference building.

CO ₂ -emissions for «as built»:	42 kg CO ₂ /m ² year
CO ₂ -emissions for «designed»:	46 kg CO ₂ /m ² year

Materials:	13 kg CO ₂ /m ² year (17 percent reduction)
Stationary energy:	17 kg CO ₂ /m ² year (65 percent reduction)
Transport:	12 kg CO ₂ /m ² year (35 percent reduction)

Energy consumption of sports facilities (NS3701):

■ Net energy requirement:	376 kWh /m ² year
■ Energy delivered:	131 kWh/m ² year

Energy sources:

- Geothermal energy from 15 geothermal wells
- Solar energy from photovoltaic panels (on roof and south façade)
- Solar energy from solar collectors under the parking lot
- Recycled heat from ventilation and grey water

Area (usable heated area):

- Pool building (excluding technical rooms): 4121 m²

Project grants from ENOVA: 10 million NOK

Project grant from Innovation Norway: 1 million NOK

URBAN ENVIRONMENT AND ARCHITECTURE

The pool is the first building to be completed in a development that will take place in the Holmen area. It is located on one of Asker's finest plots in a recreational area with a public beach. It has therefore been an important premise that the project safeguards green spaces, and that the area remains attractive for outdoor recreation.

The building's architecture is inspired by its surroundings and is intended to be a natural part of its environment, strengthening the movement between a future public square and the beach. In addition, the building recreates the green areas that it takes over. The concept was developed with the idea of activating the roof and the area around the building as green recreational spaces. The building's grassy roof is open to the public and provides great views of the sea.

The concept for landscaping is that the building and the landscape are one unit, and also create a frame for the future public square. The main approach to the building is from the square where there is a bus stop, access for bicycles and pedestrians and a drop off zone.

The project has had high demands for quality. This is reflected in the building's exciting architecture and visible materials. The building has a lot of exposed concrete and is clad with wooden slats of Siberian larch in different angles. This gives a modern expression, but also a natural and harmonious interaction with the surrounding nature.



GREENHOUSE GAS EMISSIONS

The project's total greenhouse gas emissions are reduced by 50 percent compared to a standard reference building. The reference building is defined by adapting a standard reference for a recreational/sports building and adjusting for the actual geometry of Holmen swimming pool and for the two pools.

The most important greenhouse gas measures for the project are:

- Swimming pool built as a passive house
- 15 geothermal wells for energy supply
- 650 m² solar panels on the roof and south facing façade
- Solar collectors underneath the parking area
- Recycling heat from gray water and ventilation
- Use of low carbon concrete (class B)
- Located near public transport (bus), good facilities for bicycle parking, limited car parking and sharing of parking spaces with nearby mall and marina

Complete greenhouse gas report is available at www.futurebuilt.no/English under pilot projects.



TRANSPORT

Public transport is easily accessible with a bus stop directly adjacent to the swimming pool. From Holmen buses go directly to Oslo city center, Sandvika and Asker with possibility of transferring to trains. The frequency of the bus departures is over 6 times per hour on weekdays and 5 times per hour on weekends. There is also a drop off zone for rented buses since many school classes are transported by bus from their schools.

There is a bicycle parking located by the main entrance. This consists of 102 parking spots of which 32 are under a roof and 16 have electricity for charging of electric bikes. There are bike paths in the area that lead to the swimming pool from several different directions.

There is a limited number of parking spaces for cars, 26 spaces including four for people with disabilities. Some of the spaces are between the swimming hall and the adjacent recreation areas/marina and can be shared between these facilities. This gives some flexibility across the seasons. In the autumn and winter there is a lower demand on parking for the recreation areas and more visitors to the swimming pool, while in the summer the pattern is reversed.



ENERGY

Swimming pool facilities require large amounts of energy, and saving energy has thus been a main focus in the project. This is accomplished by building according to passive house standard and combining many technical solutions.

Two water-water heat pumps collect energy from 15 geothermal wells for heating of the facility. Three other heat pumps recycle energy from the ventilation system to the air, pool and tap water. In this way the building also recovers the heat that evaporates from the pools themselves. To reduce required heating for the pool water, the therapy pool and three of the lanes in the main pool have adjustable bottoms. When the pool is not in use, the bottoms are raised up reducing the evaporation rate. In addition, a heat pump ensures recycling of heat from water used in the showers.

The geothermal wells also give potential for free cooling, which reduces cooling needs. Solar collectors in the entrance area and under the parking lot charge the geothermal wells in the summer and contribute to snow melting in the winter.

On the roof there are approximately 500 m² of highly effective photovoltaic panels. Together with the 150 m² of panels on the south-facing façade, it is estimated that these panels will produce 73 000 kWh annually. This covers about 10 percent of the electricity needs of the building each year.

CONSTRUCTION AND MATERIALS

It has been important to build a robust swimming pool that will withstand moisture and chemicals for a long time, which has led to an extensive use of steel structures and concrete. The architecture also requires the use of these main materials.

Low-carbon concrete class B has been used throughout the building. Apart from that, the project has not focused considerably on how to reduce greenhouse gas emissions from materials.

The project has had strict requirements for ensuring the lowest possible content of hazardous substances in the building materials.



PROJECT INFORMATION

Address:	Devikveien 6, Nesbru
Municipality:	Asker
Project period:	2015–2017
Status:	Completed June 2017
Project type:	New building
Building type:	Indoor swimming pool
Environmental standard:	Passive house energy standard
Pilot program:	FutureBuilt and ENOVA
Contract type:	Open competitions
Developer:	Asker kommune
Project management:	OP-VERKIS
Architect:	ARKIS architects
Landscape architect:	ARKIS architects
Consultants:	Verkis HF
Main contractor:	Trio Entreprenør



DEVELOPER'S EXPERIENCE

From early in the project it became evident that it was wise to invest in energy saving technology at Holmen pool. This goal has given us a lot of inspiration, learning and some challenges throughout the project. The project was not part of the FutureBuilt program from the start. However, in 2016 it was evaluated that it had enough additional aspects to qualify as a pilot project.

Architect and advisors were contracted in 2013. The building's energy needs and the potential for using local renewable energy were assessed in the early phase. We also received special advice for water systems and energy solutions from the Center for Sports Facilities and Technology (SIAT) at NTNU. To challenge the market and find innovative solutions, the project collaborated with NHO's supplier development program in 2014, and dialogue conferences were organized regarding pool solutions and cleaning technology. In 2015, open tender competitions were carried out for nine contracts, and Trio Entreprenør was chosen as the main contractor.

The beautiful plot gave the project important premises for good architecture and outdoor areas. We are very pleased

with the result and the elegant way that ARKÍS architects solved this through their design. We are also impressed by the consultants at Verkis HF for their efforts in finding energy efficient solutions. The expertise we "borrowed" from SIAT at NTNU is also much appreciated, and of course also the different funding we have received.

The project had a good building process with few conflicts and good HSE results. However, the complex building and technical systems were challenging – especially managing a large number of interfaces. We experienced great willingness from the main contractor to find good solutions to challenges when they arose.

We have enjoyed attending seminars and other events together with FutureBuilt to learn and share our experiences. There has been a lot of interest for the project and we are proud to have contributed to setting a new energy standard for swimming pools in Norway.

Vidar Nyhus,
Project manager
Municipality of Asker/OP-VERKIS

ARCHITECT'S EXPERIENCE

Holmen swimming pool is located at the edge of a forest coinciding with the foot of a slope. The building is a continuation of the landscape embracing a beach. It is a place that the residents hold dear since it is where many families traditionally have spent their Sundays.

Part of the challenge was to locate the building in this delicate landscape and to regain the qualities that the building might possibly erase from the site. By making the roof accessible with a sloping lawn against the south and a view over the Oslo Fjord, the existing condition was strengthened and made more interesting. Inside the building, a horizontal window band extending from the water level, characterizes the space. It frames the horizon for the swimmer, setting the Oslo Fjord at center stage.

The building is designed and constructed according to the passive house standard. That impacts the building's insulative qualities, but more importantly it impacts the recycling of the thermal energy found both in the building's operations and in the immediate surroundings. A total of 15 geothermal wells surround the building, 650 m² of solar panels are located on its surfaces and heat is recycled from parking lots and from waste water.

Aðalsteinn Snorrason,
ARKÍS architects

ENVIRONMENTAL ADVISOR'S EXPERIENCE

Holmen swimming pool is Asker's second pilot project in FutureBuilt. Because the project was not a pilot project from the start, main solutions were already designed. Learning about greenhouse gas reduction has thus to a large degree been through documentation and presentation of the project. It has been fun arranging site visits and seminars.

This is the first project where we have used low carbon concrete, and there were no practical challenges with this. Apart from the concrete, the project has not focused much on low carbon emission materials. This would have been different if FutureBuilt requirements had been set early in the project, and would probably somewhat have influenced architecture and material use.

There was some concern in the local community regarding parking logistics due to the limited number of car parking spaces near the building. However, the first operating period has shown that this has proceeded without significant problems.

It has been especially interesting to learn from the energy experts in the project about the complexity of a swimming pool facility. We have learned that this facility is more like a small factory than a building! There are many technical systems that need to work together in order to fulfill the energy goals. We have also learned a lot about the use of solar panels and solar collectors as this is one of our first projects to use such technology at a large scale.

Calculations stipulate that the energy need of the Holmen pool is approximately 45 percent lower than a conventional pool facility (TEK10 building standard). This also reduces greenhouse gas emissions from energy use significantly; approximately the equivalent of 140 fossil cars driving 12 000 km per year. In addition it will save the municipality over 1 million NOK in energy costs per year. A win-win situation!

Elisabeth Kolrud,
Environmental advisor
Municipality of Asker



WHAT IS FUTUREBUILT

FutureBuilt's vision is to show that climate neutral urban areas, based on high quality architecture, are possible. The aim is to complete 50 pilot projects with the lowest possible greenhouse gas emissions. These prototypes will also contribute to a good city environment.

Man-made climate change is one of the big challenges of our time. Our climate gas emissions must be reduced drastically, and this will in turn have big consequences for urban planning and architecture. The Oslo region is the largest urban area in Norway. The region is rapidly expanding, with an estimated population growth of 40 percent in the next 30 years. This implies development of new housing, workplaces and transport infrastructure.

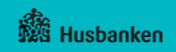
To support climate friendly urban development the municipalities in the western part of the Oslo region – Oslo,

Bærum, Asker and Drammen – launched FutureBuilt. The pilot projects are set to reduce greenhouse gas emissions from transport, energy and material consumption by at least 50 per cent. They will involve high quality architecture and contribute to a better environment for urban dwellers. The pilot projects are meant to inspire and change practices in both the private and the public sector.

PARTNERS

FutureBuilt is a collaboration between 10 partners: the municipal authorities of Oslo, Bærum, Asker and Drammen, the Ministry of Local Government and Modernisation, the Norwegian State Housing Bank, Enova (Norwegian energy national fund), the National Office of Building Technology and Administration, the Green Building Alliance and the National Association of Norwegian Architects.

Partnere i FutureBuilt:



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