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Bassängkajen, Sweden

Case Study 88

Bassängkajen is a modern and energy efficient office building that was the first LEED (Leadership in Energy and Environmental Design) Core and Shell Platinum pre-certified building in Malmö.

Aspects of Sustainability

This project highlights the following:

Green Aspects

Energy
Carbon
Materials
Water
Local Impacts

Social Aspects

Human Resources
Corporate Community Involvement
Business Ethics
Health and Safety



Project Introduction

Bassängkajen is a seven-story office building located in Universitetsholmen, which is an attractive and dynamic waterside area in central Malmö. The building is located 400 m from the Malmö central station, and provides office space for companies and organizations of various sizes. The development was constructed to high standards and has helped to meet the demand for green commercial space in the city.

Bassängkajen was built by Skanska Sweden for Skanska Commercial Development Nordic (CDN) in two phases. The 8,500 m² first phase was completed in September 2011 and the 7,800 m² second phase will be completed in 2012. Bassängkajen consists of two connected buildings that are situated around a central square. The building also has an underground garage with 70 parking spaces.

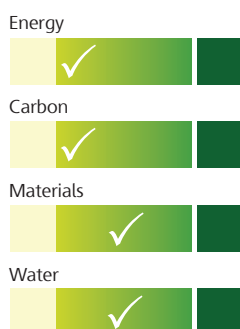
Bassängkajen focused on environmental and safety issues. The project was the first building in Malmö

to be pre-certified to LEED Platinum Core and Shell certification. LEED is a voluntary U.S. Green Building Council (USGBC) certification process intended to encourage and guide the construction of more sustainable and energy efficient buildings. Bassängkajen was also certified according to the EU GreenBuilding programme, which requires that non-residential buildings consume over 25 percent less energy than the local building code.

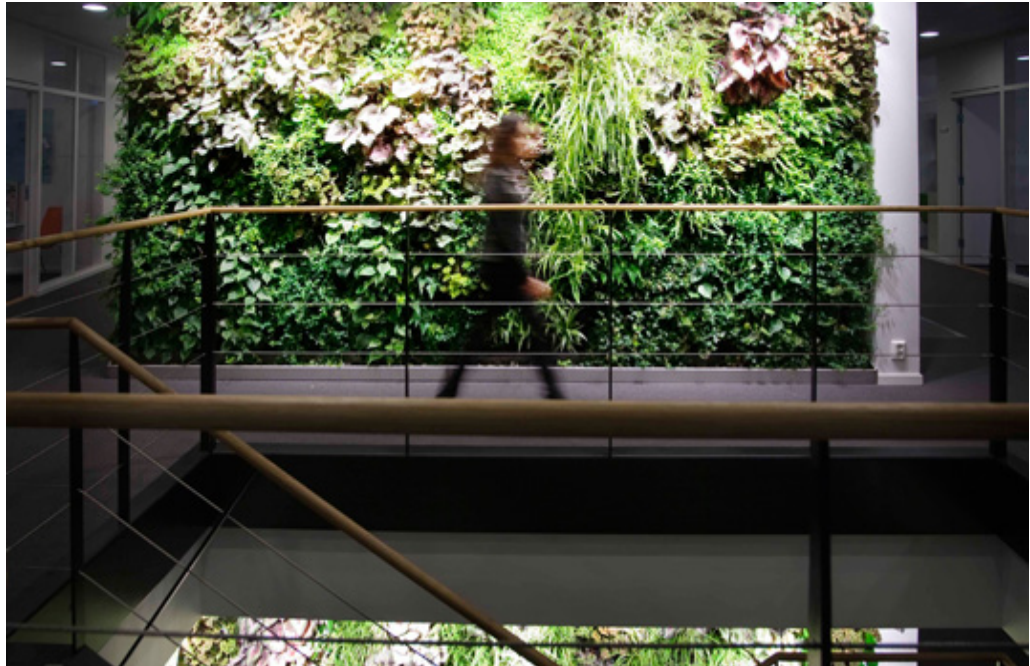
Contributing Toward Sustainable Development

Bassängkajen is a resource efficient office building that minimizes its use of energy and water, and sources all its energy from renewable sources off-site. The building provides healthy working environments, and functional and flexible office design for tenants. Bassängkajen also has green roofing and has contributed toward sustainable urban development. Skanska remediated the industrial brownfield site prior to construction

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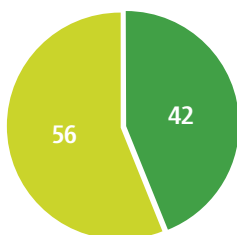
and incorporated the use of environmentally responsible construction materials and thorough waste management procedures into the project. Skanska also conducted a carbon footprinting study for the project, which will be used as a baseline to develop more sustainable projects in the future.

Green Aspects

Energy

Energy efficiency

Bassängkajen is designed to use 76 kWh/m² per year, which is 36 percent less than the Swedish building code that demands commercial buildings use no more than 119 kWh/m². The building's energy use is also 48 percent less energy than the ASHRAE (American Society of Heating, Refrigerating and Air-conditioning) 90.1-2007 standard. Bassängkajen is equipped with both CAV (Constant Air Volume) and VAV (Variable Air Volume) HVAC (Heating, Ventilation and Air Conditioning) systems to optimize energy use. CAV systems efficiently serve permanently used spaces that require a constant air flow, such as offices, while VAV systems effectively serve spaces with great variations in occupancy levels, such as meeting rooms. Other efficient features include energy efficient lighting and chilled beams for cooling, which use around 30 percent less energy than conventional fan coil units. All building tenants are offered energy consultancy services to discuss how they can further reduce their energy use and other environmental impacts.



Embodied (56%) and operational (42%) carbon

Energy monitoring

Skanska implemented an energy measurement and verification plan for the post-construction period, which was intended to make any necessary adjustments to ensure the building realized its energy efficiency objectives. An electronic monitoring system has also been installed, which can easily be connected to individual tenant sub-meters. Sub-meters enable tenants to monitor their energy use and support efforts to make further savings.

Renewable energy

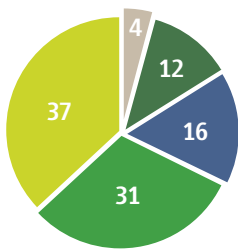
Skanska signed an initial two-year wind energy contract to provide Bassängkajen with 100 percent renewable energy.

Carbon

Carbon footprinting

The project's carbon footprint was calculated with Skanska Sweden's own-developed ECO₂ carbon footprinting tool. The aim of the footprinting study was to enhance Skanska's knowledge of how various construction processes and materials affect carbon dioxide emissions, and to help promote carbon savings on future projects. The study calculated the building's embodied carbon and operational carbon, which were responsible for 42 percent and 56 percent of the building's total lifespan emissions respectively.

The embodied carbon emissions from the extraction, manufacture, processing and transportation of construction materials to the site, as well as the construction process, was calculated



Operational carbon emissions

Tenant electricity – 37%
 Heating – 31%
 Communal electricity – 16%
 Cooling – 12%
 Hot water – 4%

to amount to 6,900 ton CO₂ or 382 kg/m². The structure and foundations were responsible for approximately 75 percent of the embodied carbon emissions, due to the large quantities of cement and steel used. Carbon reduction efforts on future projects should focus on these construction components by incorporating low-carbon design solutions and materials with a high proportion of recycled content.

The building's annual operational carbon emissions were calculated to be 7.6 kg/m², or 3.8 kg/m² when renewable electricity is used. Tenant electricity use and the building's heating were responsible for the greatest proportion of the total operational carbon emissions, accounting for 37 percent and 31 percent respectively.

Materials

Environmentally responsible materials

Low-VOC (Volatile Organic Compound) substances and materials, such as paints and sealants, were used on the project. 12 percent of the project's construction materials (by cost) contained either post-consumer or post-industrial recycled content. Products made from recycled materials included all the gypsum board used on the project and the reinforcing steel (rebar), which contained 99 percent post-consumer recycled steel. Almost 50 percent of the steel doors and 8 percent of the concrete were also made from recycled material. The HVAC systems do not contain Chlorofluorocarbon (CFC)-based refrigerants, which are banned in Sweden, and refrigerants with low ozone depletion potential and minimal direct global warming potential were used.

Waste management during construction

Bassängkajen implemented a Construction Waste Management Plan that resulted in the recycling of over 95 percent of the project's construction and demolition waste. Skanska had regular waste management briefings with subcontractors, which informed project partners about how to sort waste on site and how they can minimize their waste. The project team continuously inspected and followed up waste management efforts on site.

Office waste management

Bassängkajen has comprehensive office waste recycling facilities in a centrally located recycling station, which is easily accessible for both tenants and collection vehicles. Tenants can sort paper, cardboard, glass, plastics and metals at the recycling station. Tenants are also strongly encouraged to create a dedicated recycling area on each floor to facilitate the efficient sorting and recycling of waste materials.

Water

Water efficiency

Bassängkajen uses around 30 percent less water than the LEED baseline for the building, which equates to annual potable water savings of approximately 1,700 m³. The building has efficient low-flow plumbing fixtures, such as dual flush toilets, which use around 50 percent less water than conventional toilets. The site is also landscaped with drought-resistant plants and the drip irrigation system uses treated greywater to ensure that no potable water is used.

Other Environmental Impacts

Site remediation

Prior to construction, the brownfield site was contaminated with low levels of heavy metals, slag and coal ash. Skanska remediated the site by excavating and transporting the contaminated soils to appropriate treatment facilities.

Reducing the urban heat island effect

The site's surface vegetation contributes toward a reduced urban heat island effect by decreasing the extent of asphalted surfaces on the site. Bassängkajen's underground vehicle parking areas also contribute toward a reduced urban heat island effect.

Green roofing

Sections of Bassängkajen's roof are covered with Sedum plants, which provide additional thermal insulation and extend the roof's lifespan by



protecting it from weathering and ultraviolet light. Roof vegetation can also provide habitats for birds and insects, filter airborne pollution and reduce stormwater runoff. Areas of the roof that do not have sedum plantings are covered with Noxite® membrane, which is made from recycled bitumen roofing products and neutralizes nitrous oxides in the air throughout its lifespan. Noxite uses sunlight to produce an autocatalytic reaction that permanently converts harmful airborne nitrous oxides into harmless levels of nitrates that are washed away by rainwater.

Social Aspects

LEED involvement throughout the project

The LEED certification was integrated into the project from the design stage by involving two LEED Accredited Professionals on the design team and green consulting team. Skanska will continue to integrate LEED certification into the building following the construction process by encouraging tenants to pursue LEED CI for Commercial Interiors certification.

Occupational health and safety

The Lost Time Accident Rate as of October 2011 was 22.3 per total million hours worked by Skanska and the project's subcontractors. This relatively high figure was due to three minor incidents and Skanska conducted an analysis for each. The analyses were shared among the entire project team and project partners also discussed what could be done to ensure similar accidents would not reoccur. For example, following an accident involving an electrician using a knife, Skanska promoted the use of alternative tools that are safer.

Healthy working environments

Bassängkajen's ventilation system promotes good indoor air quality by providing 30 percent more ventilation than is required by the ASHRAE standard. Outdoor airflow and CO₂ monitoring systems ensure optimal ventilation and indoor air quality. The CO₂ monitoring systems can also be expanded to monitor tenant spaces should individual tenants wish. Bassängkajen has prohibited smoking within 8 m of entries, outdoor air intakes and operable windows, and designated smoking areas have been provided on the site. The project team implemented an Indoor Air Quality management plan during the construction and pre-occupancy phases of the project to ensure a healthy indoor environment for tenants as soon as they move into the building. The plan included enclosed space ventilation, the protection of absorptive materials from moisture damage and the replacement of filters prior to occupancy.

The building has large windows that allow natural light to penetrate the building. More than 95 percent of the regularly occupied areas have outdoor views and over 75 percent of spaces have natural daylighting of over of 270 lux. The majority of multi-occupant spaces and workstations have individual comfort controls to enable adjustments to meet individual needs and preferences.

Functional and flexible office design

Bassängkajen offers modern office spaces with state-of-the-art IT and communications infrastructure. The offices promote the efficient use of space, for example, one of the Bassängkajen tenants, Malmö university, consolidated their administrative functions into half the floor space they previously occupied in other offices in Malmö.





Tenants have the opportunity to customize their office spaces by making interior design decisions, and choosing between open-planned office space and individual closed offices. The easily customizable office spaces are therefore flexible to meet the demands of current and future tenants.

Raising awareness of more sustainable buildings

Skanska produced a tenant handbook to help building occupants understand and take full advantage of the high-performance features of the building, and to guide tenants to reinforce these features in their own workplaces. Skanska also recommends that tenants use the LEED for Commercial Interiors rating system (LEED-CI) and provides tenant design and construction guidelines how this can also be achieved for their tenant space by adopting green building practices.

Contributing toward sustainable urban development

Prior to the project, the site was industrial brownfield land that had been most recently used as a car park. By reusing a brownfield site in a dense urban neighborhood in central Malmö, the project did not contribute toward urban sprawl or the pressure to develop on environmentally sensitive areas, greenfield land or natural habitats. Bassängkajen is situated close to cafes, restaurants, a pharmacy, a gym and a library, and within a short walk of other services and amenities in central Malmö.

Promoting more sustainable modes of transport

Bassängkajen has a total of 225 bike racks, and changing facilities and four showers are provided to encourage tenants to cycle to work. Skanska also

donates bicycles to tenants and the area has good bicycle provision in the form of cycle paths, which run adjacent to the building.

Bassängkajen is located within walking distance of two Malmö city bus lines and 400 m from the Malmö central station, which provides various regional and international rail services. The site has designated parking spaces for low-energy or fuel-efficient vehicles and three commercial electric vehicle charging stations are situated in the garage level.

Economic Aspects

Regional construction materials

56 percent of construction materials used on the project were extracted and processed regionally, within 800 km of the site. This compares with LEED's highest criteria of 20 percent regional materials. Examples of materials that were both regionally extracted and manufactured include the concrete materials, plasterboard, the insulation and 99 percent of the steel doors.

Efficiency savings

The building is designed to use 36 percent less energy than the Swedish building code. These energy savings directly translate into financial savings for the building's tenants.

Learning From Good Practice

The Bassängkajen project created an office building with superior sustainability credentials, which reduces resource consumption and makes significant financial savings, by meeting and often exceeding the highest LEED criteria.