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## Green Tower Office Center, Gårda, Sweden

### Case Study 82

The Gårda office building, located in Gothenburg, Sweden, was certified according to the EU GreenBuilding programme and became the first commercial building in Scandinavia to achieve LEED Platinum precertification.

### Aspects of Sustainability

This project highlights  
the following:

#### Social Aspects

Human Resources  
Corporate Community  
Involvement  
Business Ethics  
Health and Safety

#### Environmental Aspects

Energy and Climate  
Materials  
Ecosystems  
Local Impacts

#### Economic Aspects

Project Selection  
Supply Chain  
Value Added



### Project Introduction

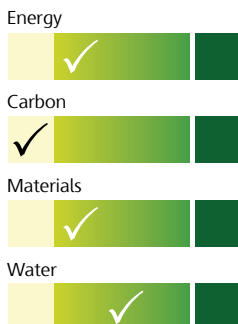
The Gårda office building is situated on Johan på Gårdas gata in central Gothenburg, adjacent to the E6/E20 motorway. The development offers 17,000 m<sup>2</sup> of rentable office space and consists of two connected buildings that are 16 stories and 6 stories high. The 60 m tall Gårda building, with its distinctive architecture and black and glazed façades, has become a landmark building in central Gothenburg. The development was also Gothenburg's first environmentally certified building and helped meet the demand for green commercial space in the city.

Skanska Sweden constructed the US\$ 75 million development for Skanska CDN (Commercial Development Nordic). The project was inaugurated in February 2011 and is occupied by several

companies, including Skanska's entire operations in Gothenburg. A main reception, restaurant and bistro are located on the ground floor, and a conference center, which is available for all tenants to use, is situated on the first floor. The building also has two levels of underground parking, which can accommodate approximately 140 vehicles.

The Gårda office building was the first in Scandinavia to achieve LEED Platinum precertification, which is the highest level possible. LEED is a voluntary U.S. Green Building Council certification process intended to encourage and guide the construction of more sustainable and energy efficient buildings. The development 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.

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## Contributing Toward Sustainable Development

The Gårda office building is an energy efficient building that was designed to provide flexible and healthy office environments for its tenants. The building also has an extensive green roof, employs water saving strategies and sources renewable energy from wind power plants. As the owner of the building, Skanska promotes the use of sustainable modes of transport among the building's tenants and offers environmental awareness sessions aimed at encouraging tenants to reduce the environmental impacts of their office activities. Prior to the project, Skanska contributed toward sustainable urban development by remediating the site, which was contaminated brownfield land in central Gothenburg. During construction, Skanska sought to minimize environmental impacts, employed thorough waste management procedures and incorporated environmentally responsible materials into the project.

## Social Aspects

### Project partner involvement

Skanska worked to involve all the project partners from the design phase. This early project partner involvement was crucial in meeting the challenging energy and environmental objectives of the project.

### Occupational health and safety

One minor lost time accident occurred on site during the project, and the Lost Time Accident Rate was 6.4 per million hours worked. The project team followed Skanska's standard health and safety practices.

### Healthy office environments

The building promotes healthy office environments by providing high quality ventilation and ensuring that all workspaces have access to natural light and external views. The ventilation system optimizes the indoor airflow and provides only fresh air ventilation. The offices have large windows and high ceilings, which allow natural light to penetrate the building. Skanska also incorporated only non-toxic and low emitting materials into the project to promote a healthy indoor environment.

### Functional and flexible office design

The office spaces are designed to be flexible to allow various sized tenants to occupy between 200 m<sup>2</sup> and 2,300 m<sup>2</sup> of space on each floor, and share common facilities, such as reception, conference



and restaurant services. Tenants decide how they want their office space to be organized from a range of open planned and “closed” office layout options, and they are given the opportunity to select the materials and colors to be used in their offices. The office spaces can be easily modified to meet the changing requirements of the building's tenants. Skanska also ensures that the offices are equipped with the latest and most robust technical solutions.

## Contributing toward sustainable urban development

Gårda is situated 1.5 km from central Gothenburg with good access to all necessary services and amenities. The building is also located in a mixed-use area, which provides opportunities to live and work. The site was previously an industrial brownfield site and the project consequently did not directly impact on natural ecosystems or greenfield land. Skanska conducted a soil assessment in 2004, which concluded that the site was contaminated with PAHs (Polycyclic Aromatic Hydrocarbons), heavy metals and oil, from the site's industrial history. Skanska cleaned up the site and excavated contaminated soil to a depth of between 2 and 4 m, which was properly treated at a remediation facility.

## Promoting more sustainable modes of transport

The Gårda office building is located close to two tram stops and is a short walk from the central train station. The development was also planned in a way that maintained and facilitated pedestrian



access through and around the site. Indoor bicycle parking is available along with changing and showering facilities to encourage tenants to cycle to work. An “environmental vehicle” pool is also available to tenants along with charging possibilities for electric vehicles. The building’s video conferencing facilities are intended to reduce the need to travel to external meetings.

## Economic Aspects

### Regional construction workforce

At the peak of construction approximately 115 workers were involved in the project on site. The majority of whom were from the surrounding region.

### Efficiency savings

The building uses almost 30 percent less energy than the Swedish building code, which corresponds to significant financial savings throughout the lifespan of the building. Tenant spaces are also sub metered to help them to monitor their energy use and to encourage further savings.

## Environmental Aspects

### Minimizing environmental impacts during construction

The construction site was certified according to Skanska’s internal Green Workplace (Grön Arbetsplats) environmental management system, which is aligned with Skanska Sweden’s ISO 14001 certification. The system has higher emission standards for site machinery, energy efficient indoor and outdoor site lighting, and stricter standards for chemicals and waste management than the Swedish building regulations demand.

### Environmentally responsible materials

The project complied with Skanska’s Restricted Substance List and environmentally certified materials were used where possible, including paint, ceiling panels and flooring. Other environmentally responsible materials included low-VOC (Volatile Organic Compound) adhesives, sealants, paints, coatings and carpets, and halogen-free electric cables that avoid the use of PVC (polyvinyl chloride). Only environmentally certified timber was used on the project.

### Waste management during construction

Construction waste was sorted on site and 94 percent of the materials were diverted from landfill. Waste management and recycling efforts were promoted through a close collaboration with the waste contractor, who employed thorough recycling strategies and utilized non-recyclable waste as fuel for a local CHP (Combined Heat and Power) plant.

### Energy efficiency

The building is designed to use 85 kWh/m<sup>2</sup> per year, which is 28 percent less than the Swedish building code that demands that commercial buildings use no more than 119 kWh/m<sup>2</sup>. Skanska calculated that the annual energy saved equates to each of Gårda’s occupants saving energy equivalent to one average Swedish person’s annual domestic electricity consumption. The building is well insulated and has a unique window solution with an integrated sunshade. The triple glass windows consist of a 20 cm deep cavity that contains an automatic sunblind, which can operate in all weather conditions. The outer glass is designed to reflect excess solar radiation and reduce overheating and the need for cooling in the summer. The Gårda building is equipped with an efficient ventilation and heat recovery system,

which is designed to recover 85 percent of the heat from outgoing air. The building also uses district heating and cooling, which is more energy efficient than conventional methods of generating heating and cooling on site.

### **Water efficiency**

The Gårda building employed water savings strategies, including low-flow taps and toilets, which ensure that the building uses over 30 percent less water than the LEED baseline figures. Native



drought tolerant plant species were also used for the green roofing and site landscaping, which avoids the need for landscape irrigation.

### **Green roofing**

Sedum green roofing covers approximately 80 percent of the building's roof area. Green roofing provides additional thermal insulation and extends 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.

### **Reducing the urban heat island effect**

The development contributes toward a reduced urban heat island effect in central Gothenburg by reducing the extent of dark and paved surfaces. Much of the non-pedestrian areas on the site are grassed and no parking spaces are located above ground. The green roofing also contributes toward a reduced urban heat island effect.

### **Renewable energy**

100 percent of the building's electricity is sourced from a local wind power plant, which supplies renewable energy and avoids the creation of carbon emissions.

### **Learning From Good Practice**

The LEED certification process provided a useful framework to promote and incorporate sustainability into the Gårda project. Early project partner involvement was also crucial in meeting the challenging energy and environmental objectives of the project.