SKANSKA

# 101 Seaport, USA

Further information
**Skanska AB**
www.skanska.com

Contact
Jennifer Clark,
SVP Green and Corporate
Community Investment
jennifer.clark@skanska.se

## Case Study 144

101 Seaport is a commercial development located in Boston that has been designed to achieve Leadership in Energy and Environmental Design (LEED) Platinum. The development uses around 50 percent less energy and 40 percent less water than a typical commercial building in the USA.

## Aspects of Sustainability

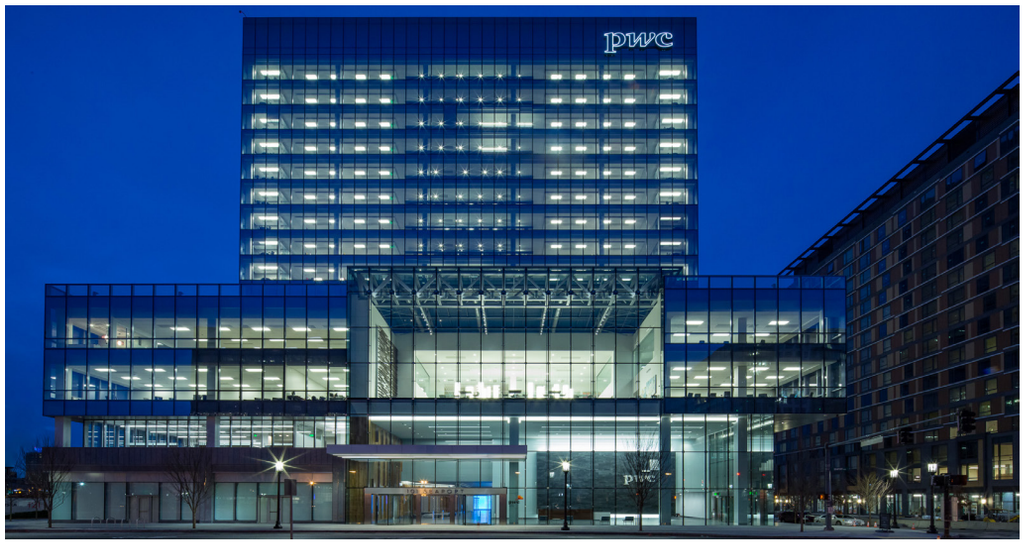
This project highlights the following:

**Green Aspects**

Energy
Carbon
Materials
Water
Local Impacts

**Social Aspects**

Human Resources
Corporate Community Investment
Business Ethics
Health and Safety




"Skanska's 101 Seaport represents the leadership in innovation, sustainability, and business that have become synonymous with the City of Boston and our business community."
*- Former Boston Mayor, Thomas M. Menino*

## Project Sustainability Highlights

### Economic

- 34% financial savings

### Green

- Approximately 50% less **energy** than baseline
- Over 96% of construction waste diverted from landfill
- Approximately 40% less **water** than baseline

### Social

- Extensive community investment program during construction
- Healthy indoor working environments
- Creation of a pedestrian retail promenade and public roof desck terrace

Energy
Carbon
Materials
Water

## Project Introduction

101 Seaport is a commercial development with office and retail space that is situated in the Seaport District of Boston. The development has created a thriving and energetic city block, and is a new landmark close to Boston Harbor. 101 Seaport is part of the Seaport Square development, which is redeveloping 9 hectares of Boston's Waterfront that was previously surface parking into a vibrant 24/7 'Innovation District' that will consist of 20 mixed-use city blocks. Skanska is developing two other projects in Seaport Square - Watermark Seaport, which is an apartment building, and 121 Seaport, which is a commercial development with offices and retail space.

Skanska USA Building constructed the US$ 265 million development for Skanska Commercial Development USA, which acquires, finances, develops and leases commercial properties.

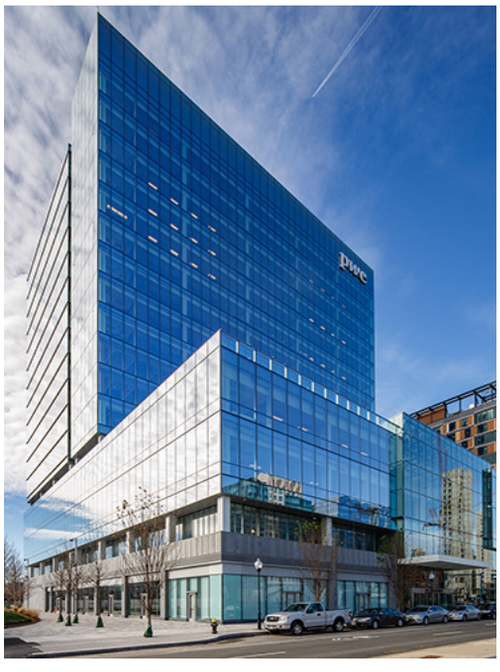
SKANSKA

101 Seaport is a 17-story building with 41,000 $m^2$ of leasable space in total, including 16 office floors, each between 2,320 $m^2$ and 2,600 $m^2$ in area, and 1,860 $m^2$ of ground floor retail space. The building also has a 740 $m^2$ two-story ground floor lobby, a fitness center on the second floor, an underground parking garage with approximately 200 spaces and a roof deck terrace that is open to the public. 101 Seaport has a steel structure with a concrete core and a floor-to-ceiling curtain wall envelope. The development includes a 1,400 $m^2$ tree-lined public open space that has been created at the building's base with a 20 m wide pedestrian retail promenade. PricewaterhouseCoopers (PwC) has signed a 15-year lease to occupy 75 percent of 101 Seaport, which is the company's new Boston headquarters. 101 Seaport was completed in October 2015.

All the buildings that are part of Seaport Square will meet at least LEED Silver Core and Shell certification. 101 Seaport is designed to LEED Platinum, which is the highest level achievable. LEED is a voluntary U.S. Green Building Council (USGBC) certification process intended to encourage and guide the construction of green buildings.

## Contributing Toward Sustainable Development

101 Seaport is designed to use around 50 percent less energy and 40 percent less water than the LEED baseline, and the development achieves financial savings of 34 percent compared with a typical newly built commercial building in the USA.




The building promotes healthy indoor working environments and incorporates environmentally responsible materials. 101 Seaport also manages stormwater on site, reduces the heat island effect in downtown Boston and is designed to be flexible in order to promote a long useful lifespan. The development contributes toward sustainable urban development by converting an underused site into a thriving mixed-use city block and promoting more sustainable modes of transport. During construction, the team succeeded in diverting over 96 percent of construction waste from landfill and implemented an extensive community investment program. Regional construction workforce and materials were used, and Skanska promoted the employment of Boston residents, minority groups and women as part of a local program.

## Green Aspects

### Energy

#### Energy efficiency

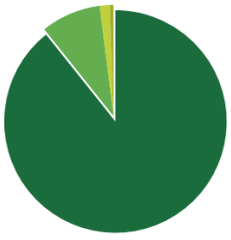
101 Seaport is designed to use 103 kWh/$m^2$, which is approximately 50 percent less energy than the LEED baseline. The building has a highly efficient triple glazed curtain wall, with a U-value of approximately 0.3 W/$m^2$K. The HVAC (Heating, Ventilation and Air Conditioning) system is equipped with heat recovery units and high-efficiency centrifugal chillers. Chilled beams and perimeter radiant heating have been installed in tenant fit out spaces to provide more efficient heating and cooling than conventional all-air HVAC systems that require higher fan power. The building is also equipped with a waterside economizer, which allows the use of "free cooling" from outdoor air when possible to provide cooling and avoid the use of mechanical chillers. Gas-fired condensing boilers help achieve heating efficiencies above 90 percent. The lighting system is designed to use 7.5 W/$m^2$ on average, which is approximately 30 percent below code. The system includes efficient LED lighting and occupancy sensors.

#### Intelligent energy management

101 Seaport is equipped with a multidisciplinary building automation system that promotes energy efficiency, thermal comfort and occupant safety. The robust system is essential in meeting the energy management demands and HVAC control sequences, and it allows building managers to closely monitor building data to optimize energy use. The system can monitor individual tenant energy use to encourage tenants to use energy more efficiently.

SKANSKA

101 Seaport Embodied Carbon Footprint ($tCO_2e$)



- Materials - 89.28%
- Material transport - 8.72%
- Waste - 1.43%
- Worker Transport - 0.55%
- Utilities - 0.02%

## Carbon

### Carbon footprinting

Skanska conducted an embodied carbon footprint for 101 Seaport, which calculated the total footprint to be 57,000 $tCO_2e$. The footprint covered carbon emissions from construction materials, site fuel use, worker transport and waste materials.

## Materials

### Environmentally responsible materials

Low-emitting adhesives, sealants, paints, primers, coatings, floor systems and composite wood products have been used throughout the building. The construction materials have an average recycled content of 33 percent. Materials with high recycled content include the structural and stainless steel, louvers, concrete, sheathing, fireproofing and metal studs. The lobby was built with locally sourced materials, such as reclaimed oak piles from Boston Harbor. 25 percent of the construction materials were classed as "regional" according to LEED standards.

### Waste management during construction

The team succeeded in diverting over 96 percent of construction waste from landfill. Skanska's waste diversion rate target for Commercial Development projects is 96 percent. The waste stream was co-mingled on site due to site space limitations and was sorted at an off-site facility. Much of the mechanical systems, including the main shaft ductwork, were prefabricated offsite, which helped to reduce the creation of waste on site.

## Water

### Water efficiency

101 Seaport is designed to use 40 percent less water than the LEED baseline. Low-flow fixtures, including toilets, urinals and showers, have been installed that annually save over 3,700 liters of potable water compared with conventional fixtures. A rainwater harvesting system provides water for toilet and urinal flushing, the cooling tower and for landscape irrigation.

### Stormwater management

The building's green roofing and rainwater harvesting system reduces the site stormwater runoff by over 35 percent and removes 90 percent of total suspended solids from the stormwater. The rainwater harvesting system collects rainwater from the building's roof drains and stores it in a 120 $m^3$ tank in the basement.

## Other Green Aspects

### Raising awareness of more sustainable buildings

The project has been featured in several industry publications that have focused on the sustainability aspects of the project. The team held site visits for college students during construction, which included the green aspects of the project.

### Reduced heat island effect

The site's landscaping and canopy trees, green roofing and underground parking contribute to a reduced urban heat island effect in Boston by minimizing the extent of dark and paved surfaces on the site.

SKANSKA

### Green roofing

The 1,450 $m^2$ roof deck terrace on the fifth floor is planted with green roof trays. Green roofing creates habitats for birds and insects, filter airborne pollution and reduce stormwater runoff.

## Social Aspects

### Project partner cooperation

All project partners were involved in the LEED certification process, which was used to guide the project, from concept development and design to construction. The LEED credits were allocated to specific project partners and regular LEED meetings were held throughout the project to update the certification progress and advise on issues and opportunities. Close project partner cooperation was vital in finding good practice solutions for the rain harvesting, green roofing and the building envelope, which was challenging due to the extent of glass façade and the project's energy efficiency targets.

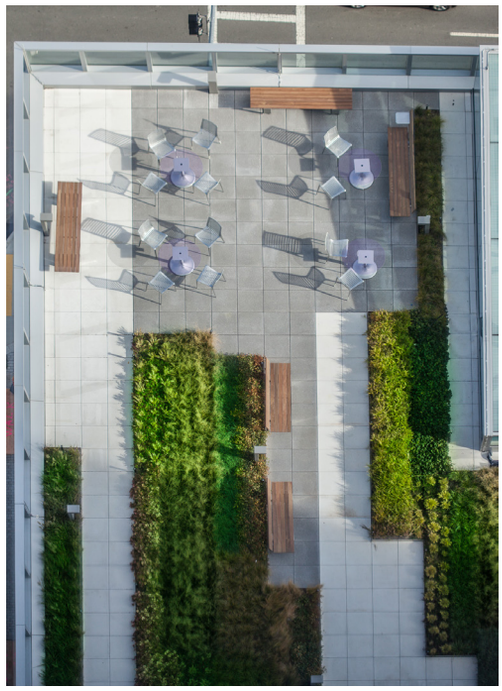
### Community investment

The team was involved in various community investment projects, including clothing and food drives and neighborhood clean-up projects. Specific projects that Skanska supported included a local women's shelter, which was provided with financial donations and volunteers to prepare and serve meals. The team also made financial and material donations to the Mass Fallen Heroes organization, which supports the families of fallen service men and women.

### Occupational health and safety

There were five lost time accidents during construction and the Lost Time Accident Rate per million hours worked was 3.28. The team strived to establish and maintain Skanska's Injury Free Environment® (IFE®) culture, which promotes a work environment intolerant of injuries and incidents and goes beyond standard safety practice in the USA. IFE practices included Skanska-led Stretch-and-Flex every morning, pre-task planning, a robust Safety Recognition Program, the establishment of a Project Safety Leadership Team comprising of craft workers and Skanska personnel, and Skanska Safety Week programs.

In addition, the team established a management level Safety Council that comprised of subcontractor principals and senior Skanska management that met monthly to assess the safety conditions and culture on the project. Pre-task planning enhancement training was held for foremen along with multiple weekly evaluations to continually assess site conditions.



Stairs were erected early during construction to allow workers to safely move from between floors during construction without having to use ladders.

### Healthy working environments

The building features 3 m high floor-to-ceiling glazing that optimizes natural light and views of the Boston Harbor and skyline. Interior glass partition walls also allow natural light to penetrate the building. The HVAC system supplies 30 percent more outdoor air ventilation compared with the US building code requirements. Chilled beams and perimeter radiant heating provide greater thermal comfort and fewer drafts than conventional HVAC systems.

### Flexible and long lige office building

101 Seaport is designed to be flexible in order to meet the needs of current and future occupants and promote a long useful lifespan. Office floors are virtually column free to allow open planned office space and a variety of office working environments. Each floor can also accommodate single tenants or up to three separate tenants, each with their own entrance.

### Contributing toward sustainable urban development

The site was previously a reclaimed wetland site that was used as a surface car park until 101 Seaport was developed. The project has created a thriving mixed-use city block, which complements the wider Seaport Square development that consists of space to live, work and play close to Boston Harbor.

SKANSKA

A 1,400 m$^2$ tree-lined public open space has been created at the building's base with a 20 m wide pedestrian retail promenade. 101 Seaport is also situated in downtown Boston with access to a variety of services and amenities.

### Promoting more sustainable modes of transport

101 Seaport has 191 secure indoor bicycle racks and 14 showers that are available to cyclists. In addition, the underground parking garage has electric vehicle charging stations. 101 Seaport is adjacent to a Silver Line subway station and a short walk from the Red subway line and Boston's Commuter Line that serves South Station. The wider Seaport Square is being designed to create a walkable mixed-use district with pedestrian promenades that reduce the need to drive vehicles.

## Economic Impacts

### Regional construction workforce and materials

Around 2,050 people worked on the construction of 101 Seaport, with 350 people working on site during the peak of construction. The project was predominately completed by contractors from the Boston area, including local companies executing excavation, pile driving, concrete, steel erecting, electrical, mechanical and plumbing.

### Boston Resident Jobs Program (BRJP)

The project was required to promote the employment of Boston residents, minority groups and women as part of the BRJP. On the 101 Seaport project, 28.4 percent of workers were Boston residents, 21.7 percent were from minority groups and 3.3 percent were women. All subcontractors attended pre-mobilization meetings with Skanska and BRJP staff to review the program in detail and the expectations of the Boston Employment Commission and Skanska. Subcontractors submitted weekly reports to the BRJP and progress was monitored throughout the project, with BRJP support to improve local, minority and female worker participation as necessary.

### Efficiency financial savings

101 Seaport is estimated to make financial savings of 34 percent compared with a typical newly build commercial building in the USA.

## Learning From Good Practice

101 Seaport is a green commercial building that realizes significant financial and environmental savings throughout its lifespan. LEED certification provided vital guidance for the project team to develop and construct this green building.