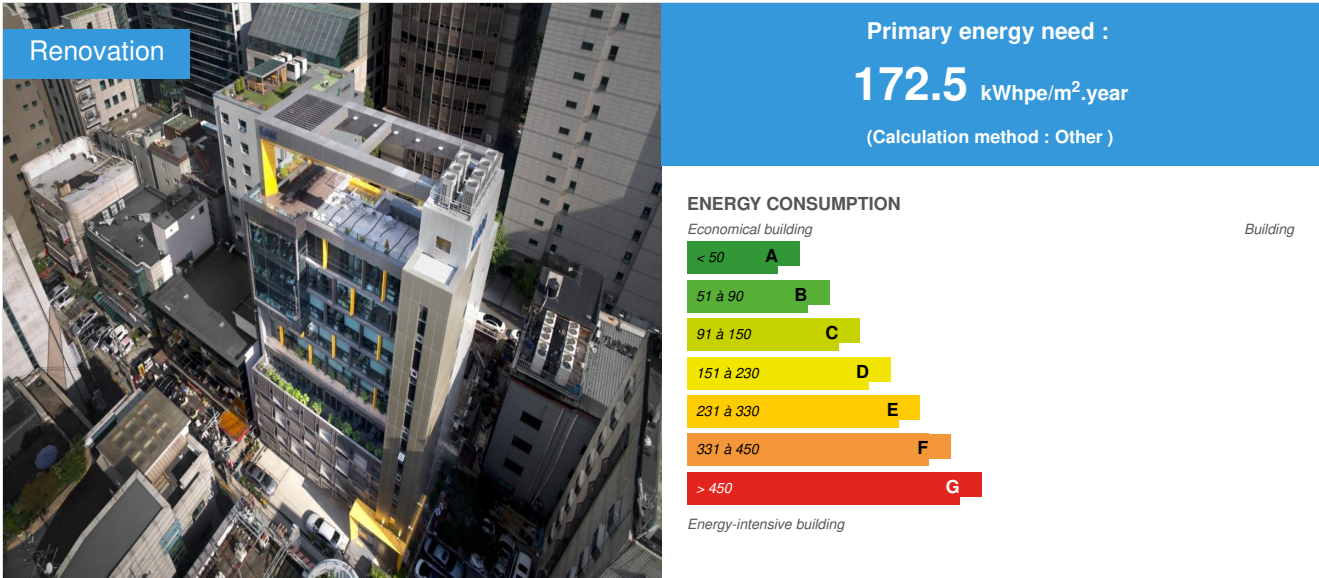


# EAN Technology Headquarters

by Sora Kang / © 2019-06-03 10:22:04 / International / © 5192 / EN



**Building Type** : High office tower > 28m  
**Construction Year** : 1997  
**Delivery year** : 2018  
**Address 1 - street** : EAN Bldg, 11-19, Teheran-ro 77-gil, Gangnam-gu 06159 SEOUL, Other countries  
**Climate zone** : [Dwa] Humid Continental Hot Summer, severe, dry winter

**Net Floor Area** : 1 997 m<sup>2</sup>  
**Construction/refurbishment cost** : 1 210 946 €  
**Number of Work station** : 117 Work station  
**Cost/m2** : 606.38 €/m<sup>2</sup>

Certifications :



Proposed by :



## General information

EAN Technology is Korea's leading architectural engineering and consulting firm specializing in assessing and improving various environmental qualities of the built environment. In 2016, EAN acquired an old office building that was built in 1997 to transform into an environment-friendly work-space that maximizes openness and energy efficiency through sustainable renovation for its new headquarters. Among various sustainable renovation concepts and methods applied in the EAN Technology Headquarters building, four fundamental sustainable approaches that integrated are as demonstrated below.

- Integrated Approach to Sustainable Building Design:

The window area in the north facade, where the main entrance of the building is located, was greatly increased to renew the outdated exterior design of the existing building. At the lower level floor of the building, horizontal louvers were installed as the implementation of the wind-capture design that maximizes the

natural ventilation. External shading devices and electric blinds were installed on the south-facing facade to prevent excessive day-lighting might cause occupants' visual discomfort and glare. Also, the window area at the south-facing facade was increased to maximize daylights. Outer terrace and rooftop floors are designed to provide surrounding views and communal area for occupants' recharging at the higher-level floors of the building. These sustainable architectural elements contributed to modernizing the building's exterior appearance and enhancing indoor environmental quality.

- Integrated Approach to Certified Green Building:

EAN Technology Headquarters project has implemented both Korean domestic and international green building certification systems. As a result, this project was awarded the Best grade in G-SEED (Korean Green Building Certification) and 1+ grade in Building Energy Efficiency Rating. Also, EAN's new headquarters building has certified Gold rating for LEED v3 NC.

## Photo credit

Park Young-Chae

## Stakeholders

### Contractor

Name : Kunst Engineering  
Contact : 82-2-6738-2010  
<http://www.kunsteng.com>

### Construction Manager

Name : EAN Architect  
Contact : 82-2-558-3654  
<http://www.eanarch.co.kr>

### Stakeholders

Function : Designer  
EAN Architect  
82-2-558-3654  
<http://www.eanarch.co.kr>  
Building Design and Planning

Function : Manufacturer  
LG Hausys  
82-80-005-4000  
<http://www.lghausys.com>  
Supply Turn & Tilt Window

## Energy

### Energy consumption

Primary energy need : 172,50 kWhpe/m<sup>2</sup>.year  
Primary energy need for standard building : 307,90 kWhpe/m<sup>2</sup>.year  
Calculation method : Other  
CEEB : 0.0001  
Breakdown for energy consumption : Heating: 38.4 kWhpe/m<sup>2</sup> year  
Cooling: 48.7 kWhpe/m<sup>2</sup> year  
Hot water: 19.3 kWhpe/m<sup>2</sup> year  
Lighting: 45.5 kWhpe/m<sup>2</sup> year  
Ventilation: 20.6 kWhpe/m<sup>2</sup> year  
Initial consumption : 184,70 kWhpe/m<sup>2</sup>.year

## Envelope performance

Envelope U-Value : 0,22 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

Roof U-Value: 0.134 W/m<sup>2</sup>K

Floor U-Value: 0.272 W/m<sup>2</sup>K

Glazing U-Value: 1.495 W/m<sup>2</sup>K

🔗 Reducing Energy Demand by Enhancing Insulation Performance:

The envelope performance for reducing energy demand were improved by making the roof insulation performance 2.73 times better than the conventional one, floor insulation performance 1.93 times, external wall insulation 2.23 times, and window insulation performance 2.25 times. In addition, the optimal insulation practices were applied to the basement floor of an aging building to prevent potential thermal loss and condensation. As a result, the energy demand was reduced by 37.6% from 119.5kWh/m<sup>2</sup>-yr to 74.6kWh/m<sup>2</sup>-yr compared to the existing building before the renovation. In this way, EAN Technology Headquarters archived 1+ grade in Building Energy Efficiency Rating in Korea.

## More information

🔗 Application of the High-efficiency HVAC Equipment:

To reduce energy load, the inefficient existing mechanical system of cooling had to be replaced. Therefore, high-efficiency EHP and electric instant water heaters were installed to provide energy efficient heating, cooling and hot water supply.

🔗 Application of the High-efficiency LED Lighting and Optimal Lighting Control:

Through the renovation, the lighting power density was reduced by about 31.6% as the lighting power density before the renovation was 9.38W/ and the lighting power density after the renovation was 6.42W/ . From the simple ON/OFF control, the optimal lighting control was implemented through automatic control with the occupant sensor and dimming control.

## Real final energy consumption

Final Energy : 172.50 kWh/m<sup>2</sup>.year

## Renewables & systems

### Systems

Heating system :

- Heat pump

Hot water system :

- Gas boiler
- Individual electric boiler

Cooling system :

- VRF Syst. (Variable refrigerant Volume)

Ventilation system :

- Natural ventilation
- Double flow heat exchanger

Renewable systems :

- No renewable energy systems

## Smart Building

BMS :

🔗 Efficient Energy Optimal Control using BEMS:

Through applying in-house developed BEMS, the efficiency of the building's energy usage is maximized as it comprehensively analyzes energy usage and environmental variables of the building, and operation patterns of facilities systems. With BEMS, the optimal control of the air conditioning system can be carried out, and the data collection and monitoring of the EAN Technology Headquarters building were enabled.

Users' opinion on the Smart Building functions :

## Environment

### Urban environment

The existing building before the renovation was previously used as an office and hostel facilities. Despite having good access to Seolleung metro station and Seonjeongneung, a UNESCO World Heritage site, the surrounding environment of the building was limited to narrow streets where entertainment and restaurants were located and creating an untidy and depressing atmosphere. To overcome disadvantages of the existing site characteristics, from a design perspective, this renovation project focused on maximizing the view of Seonjeongneung's greenery space and urban scenery of Seoul which are the excellent factors of the existing site characteristics. Also, this project has focused on complementing the depressing image that is interfered by the entertainment industry through implementing the wind-capture design as adding an external element on the building facade of lower level floors to blocking the view of entertainment and restaurant facilities.

Land plot area : 377,70 m<sup>2</sup>

Built-up area : 58,50 %

Green space : 38,06

## Products

### Product

Turn & Tilt Glazing

LG Hausys

82-80-005-4000

<http://www.lghausys.com>

Product category : Second œuvre / Menuiseries extérieures

LG Hausys's Turn & Tilt Glazing window is effectively three window types in one: a fixed window, an in-swing casement window and a hopper window. The benefits of this window are that the user can choose the adequate mode by purpose and operate easily. For draft-free natural ventilation, tilt mode is suggested and turn mode is suitable when exchanging polluted indoor air to fresh outdoor air.



LG Hausys is one of the leading domestic company for supplying high-quality window and door with advanced technology. EAN Technology has selected LG Hausys's Turn & Tilt Glazing window by respecting its ease of deliverable, cost-effective, and benefits in maintenance compare to overseas products.

External Venetian blinds

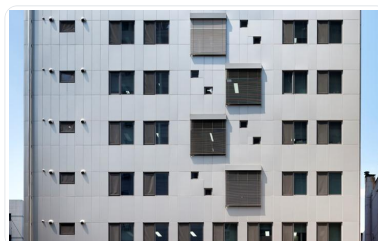
Somfy

82-31-600-5250

<https://www.somfy.co.kr/>

Product category : Second œuvre / Menuiseries intérieures, serrurerie, quincaillerie

Somfy's External Venetian blinds are for the exterior surface of a building window and can be adjusted by the user to control daylight and views. Also, the user able to control the External Venetian blinds automatically through the mobile application.



Somfy is a professional company producing high-quality products with advanced technology such as the external Venetian blinds with smart motorized systems. Considering the price and the company's vision towards innovative technology, Somfy's Venetian blind was selected to be installed.

## Costs

### Construction and exploitation costs

Total cost of the building : 12 788 590 €

### Energy bill

Forecasted energy bill/year : 30 650,00 €

Real energy cost/m<sup>2</sup> : 15.35

Real energy cost/Work station : 261.97

## Health and comfort

### Life Cycle Analysis

#### Eco-design material :

- Wind-capture design to maximize natural ventilation
- Improved external wall insulation with PF board
- Improved roof insulation with vacuum insulation
- High-performance window

## Water management

Consumption from water network : 423,90 m<sup>3</sup>

Water Consumption/m<sup>2</sup> : 0.21

Water Consumption/Work station : 3.62

🔗 Application of the Water-saving Sanitary Facilities:

The water consumption of the EAN Technology Headquarters building through sustainable renovation was reduced by 45.9% compared to the EPA standard by using a water-saving toilet bowl, urinal, faucet and shower head. For all selected sanitary appliances, the test certificate and the environmental label certificate were verified to confirm the reduction of water consumption.

## Indoor Air quality

- Improvement of Natural Ventilation Efficiency:

Due to the influence of surrounding buildings, low airflow condition that reducing indoor airflow speeds and reducing air circulation occurred. To solve this issue, the ventilation opening area of the window was increased during the renovation process, and the turn-and-tilt window was installed to maximize natural ventilation according to the wind direction. In addition, a high-efficiency total heat exchanger was installed on each floor to provide more fresh outdoor air to building occupants.

- Environment-friendly Interior Finishing Materials:

Indoor finishing materials such as paints, adhesives, and sealants with minimum VOC content were applied to reduce adverse effects on occupants and verify air quality tests.

- Indoor CO<sub>2</sub> Concentration Monitoring:

CO<sub>2</sub> monitoring sensors were installed on each floor which alarm will activate when indoor CO<sub>2</sub> concentration exceeds 1000ppm and the outdoor air of the total heat exchanger can be provided in conjunction with BEMS.

## Comfort

#### Health & comfort :

- Simulation Analysis:

Simulation of indoor wind speed, temperature and airflow environment were performed for analysis of thermal comfort. The simulation included various heat loads (human body, office equipment, etc.) of office facilities and external daylight loads based on 2 pm of the summer season, which is most affected by solar radiation.

- Improved Airflow Environment:

Before the renovation, there was a factor that obstructed the work due to the influx of the odor generated from the restaurants around the project building. However, the installation of the high airtight window and the total heat exchanger minimized the influence of odor influx.

- Improved Lighting Efficiency:

All lighting fixtures were replaced with LED lamps and office reflect the space-specific lighting control. The conference rooms were designed to enable dimming control of the room, so that the lighting, color temperature and layout can be freely changed according to the user's needs.

- Barrier Free Design:

Barrier Free design reflected to allow people with disabilities to respond to various situations. The handle of the toilet is made of appropriate material and thickness, and the door is also minimized in the inconvenience of opening and closing with the sliding door. Tactile paving was installed at the stairwell to allow visually impaired users could recognize the start and end of the staircase.

Calculated thermal comfort : 26°C in Summer, 20°C in Winter

Measured thermal comfort : 26°C in Summer, 20°C in Winter

## Carbon

## GHG emissions

GHG in use : 4,30 KgCO<sub>2</sub>/m<sup>2</sup>/year

GHG before use : 54,94 KgCO<sub>2</sub>/m<sup>2</sup>

Building lifetime : 50,00 year(s)

, ie xx in use years : 12.78

## Contest

### Reasons for participating in the competition(s)

EAN Technology considers environmental performance and sustainability in all aspects of the built environment. In response to the increasing awareness in sustainable refurbishment that provides the opportunity to transform existing buildings into green buildings, EAN established strategies to become a green retrofit business provider. As a first step towards our vision to become a world-class firm providing the green retrofitting engineering and consulting service, EAN strived its first green retrofitting project – EAN Technology Headquarters Renovation project.

In 2018, EAN Technology has opened its new headquarters in Teheran-ro, the economic center of Seoul, by renovating the old office building with the sustainable renovation design strategies and measurements. With EAN's in-depth knowledge and experience in environmental engineering and sustainable building design, the building performance, especially energy efficiency, and indoor environmental credentials of the existing building were greatly improved. As a result, this project has awarded major domestic and global Green Building Certifications and became the standard of sustainable renovation among outdated buildings which could be used for the future case study. The sustainably renovated new headquarters of EAN Technology building symbolically revealing the corporate value and the direction of EAN Technology in contributing to achieving environmental sustainability.

### Building candidate in the category



Energy & Temperate Climates



Users' Choice

