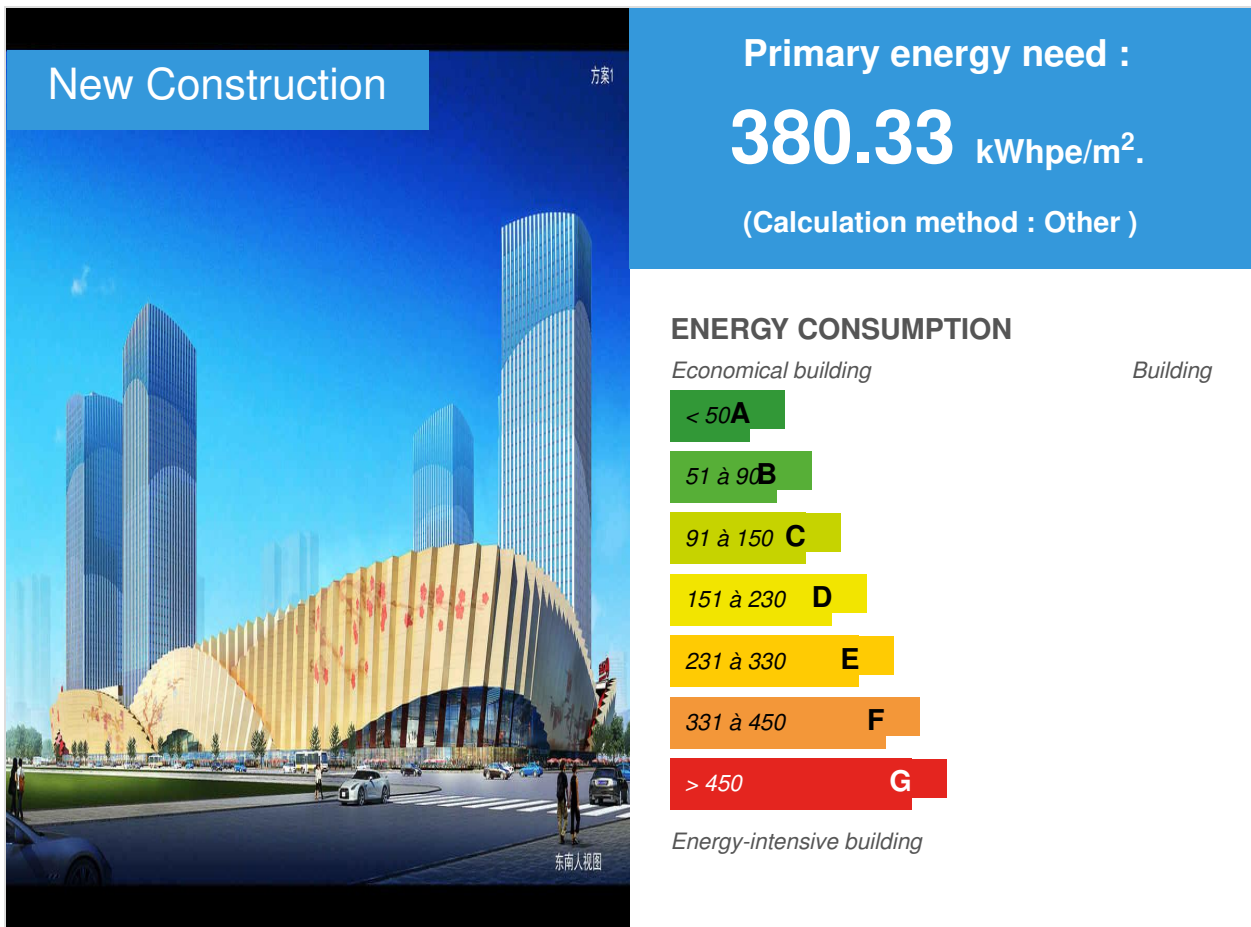


## Nanjing Wanda Mall

by / 2018-06-13 11:43:37 / China / 10554 / CN



**Building Type :** Store in a shopping mall

**Construction Year :** 2016

**Delivery year :** 2018

**Address 1 - street :** 210000 ,

**Climate zone :** [Dfb] Humid Continental Mild Summer, Wet All Year

**Net Floor Area :** 262 905 m<sup>2</sup> Other

**Construction/refurbishment cost :** 1 199 010 095 ¥

**Cost/m2 :** 4560.62 ¥/ m<sup>2</sup>

## Certifications :



## General informations

The project is located in the northwest corner of Xianlin Avenue and Hudong Road, Qixia District, Nanjing City, Jiangsu Province. It is a new Large commercial complex with a cast-in-place reinforced concrete frame structure for shopping, dining, cinema, children's entertainment and fitness.

From the design stage of the project, the project has positioned two-star green buildings of China and LEED silver certificate in the United States. Taking full consideration of the local natural climate conditions in Nanjing, through various simulation tools, it considers the orientation of the buildings, the window-wall ratio and the performance of the envelope structure. To optimize design, it adopts a number of green ecological and building energy-saving technologies for commercial buildings, including the full use of underground space, reasonable surface rainwater runoff control, convenient public transportation, green energy-saving lighting, water-saving appliances, water-saving irrigation technologies, energy-saving elevators, indoor air quality monitoring, renewable energy, non-traditional water source utilization, energy management systems. In addition, it also considers the six aspects of two-star green buildings of China (land saving, energy saving, water saving, material saving, indoor environmental quality and innovation) and LEED Silver score requirements.

The illuminance of all the space of the project meets the Chinese relevant provisions of *the Architectural Lighting Design Standard GB 50034-2013*, and the lighting power density value meets the requirements of the target value of *the Architectural Lighting Design Standard GB 50034-2013*.

This project adopts national first-level water-saving efficiency sanitary appliances, and meets the requirements of *Water-saving water appliances CJ164-2002* and *General technical conditions for water-saving products GB/T18870-2011*.

The water-saving irrigation method, mainly adopts the micro-sprinkler irrigation and drip irrigation technology, while the soil moisture sensor and the rain-day automatic shutdown system are set up. The high-efficiency water-saving irrigation method or the water-saving control measure reaches 100% of the green area of the project site for saving irrigation water.

Set indoor CO<sub>2</sub> and air quality (PM<sub>10</sub>, formaldehyde) monitoring system for real-time monitoring of CO<sub>2</sub> and air quality (PM<sub>10</sub>, formaldehyde) concentration in cinema lobbies, cinemas, supermarkets, large retail stores, swimming pools, indoor pedestrian streets, and linkage control with fresh air fans and incorporated into the building equipment monitoring system.

Set up a set of air quality monitoring systems. The underground garage is equipped with a CO concentration monitoring system. The sensor is installed 1.5m high from the ground to detect the CO concentration of the basement. The sensors are set according to the fire zone, interconnecting with the exhaust fan. When the CO concentration is greater than 30mg/m<sup>3</sup>, the exhaust fan is activated and increased its exhaust volume.

Rainwater collection and reuse technology is adopted to collect roof rainwater for green irrigation, road washing and underground garage washing. The utilization rate of non-traditional water source reaches 8.14%, the annual water saving fee is about 30,000 yuan, and the investment recovery period is 15 years.

The project set up Huiyun intelligent management system, integrating 16 light-current systems and more than 30,000 information points on one management platform, realizing all-round and three-dimensional management of realization of fire protection, security, equipment, operation and energy saving in this commercial plaza.

## Data reliability

3rd part certified

## Stakeholders

### Contractor

Name :

Contact : 215222769@qq.com

<https://www.wanda.cn/>

### Construction Manager

Name :

### Stakeholders

Function : Thermal consultancy agency

<http://www.cabr.com.cn/>

As the green building consulting company of the project, China Academy of Building Research Co., Ltd. participated in the project design from the stage of the construction project, formulated supporting technical measures and implementation plans, and gui

## Contracting method

General Contractor

## Owner approach of sustainability

From the project design and construction drawing to the final construction completion, the project is always positioned in the sustainable development of green buildings. Through the deepening discussion on all stages of the project, the green building technology is effectively integrated with the building itself and the surrounding environment, by using the best technical solution for China's green building two-star and US LEED silver requirements.

Under the full consideration of the local natural climate conditions in Nanjing, a number of green ecological and building energy-saving technologies suitable for commercial buildings have been adopted. Firstly, increasing the shading for road and square, reducing heat island intensity, planning public transportation facilities properly, and connecting the underground vehicles, controlling surface rainwater runoff properly with reaching 55% of the total annual runoff control rate, selecting energy-saving lights, adopting intelligent lighting control system and advocating efficient lighting. Additionally, selecting level 1 water-saving appliances, high frequency use sanitary wares are all inductive, adopting the water-saving irrigation method equipped with the soil moisture sensor and also rainy-day automatic shutdown system, setting the indoor CO<sub>2</sub> and air quality (PM<sub>10</sub>, formaldehyde) monitoring system. By using the intelligent cloud management system, which is researched and developed independently by the Wanda Group with intellectual property rights, the project has realized the all-round and three-dimensional management of fire protection, security, equipment, operation and energy savings. Specifically, the energy consumption of the electromechanical system is automatically recorded and stored in the database every 10 minutes to create big data for operational management, which purposes for providing opportunities for further energy saving potential. Through the integrated application of the above technologies, the energy saving rate is 65.00%, the non-traditional water source utilization rate is 8.14%, the renewable energy power generation provides 0.4% of the building electricity consumption, the solar hot water supply ratio is 12%, and the recycled building material ratio is more than 10.05%.

Through the application of a series of green building technologies, it aims to solve the problems relating to land saving, water saving, energy saving, material saving and environmental protection, and provide excellent shopping and leisure places for surrounding residents while integrating better into the surrounding environment.

## Architectural description

The project set up Huiyun intelligent management system, integrating 16 light-current systems and more than 30,000 information points on one management platform, realizing all-round and three-dimensional management of realization of fire protection, security, equipment, operation and energy saving in this commercial plaza. Specifically, the energy consumption of the electromechanical system is automatically recorded and stored in the database every 10 minutes to create big data for operational management, which purposes for providing opportunities for further energy saving potential. Huiyun system can collect passenger flow information, business and operational data and environmental parameters of the square, and upload it to the group headquarters in real time for big data analysis and auxiliary operation management. The management personnel can remotely access the platform through the mobile terminal network, which can conveniently and quickly monitor the operation of each square subsystem. Even if it is overseas, it can be queried anytime, anywhere, find and solve problems, and truly realize the intelligent operation and management of Wanda Plaza. After applying Huiyun system, the number of property management personnel in a single shopping center is reduced by 11 people, and the annual labor cost can be saved by about 580,000 yuan.

In 2017, “Huiyun Intelligent Management System” won the “Global Top 50 Digital Transformation and Innovation” award from the International Data Group (IDG).

## If you had to do it again?

1. During the construction of the project, the construction drawing design has many problems, such as pipeline cross collision, conflict with structural components and unreasonable pipeline elevation. Through Wanda's BIM model, such problems are solved in the drawing stage at the initial stage of construction.
2. In view of the low-level intelligent operation and management system of shopping malls, there are some problems, such as over-reliance on management personnel, huge management team, uneven management level and responsibility, high building energy consumption. Huiyun intelligent management system is researched and developed independently by the Wanda Group with intellectual property rights to solve the problems mentioned above. Through Huiyun intelligent management system, 16 light-current systems and more than 30,000 information points of the building are integrated to one management platform. It creates the energy consumption management system, by setting smart metering tools to record the electricity consumption and water consumption of each commercial rental unit to realize independently metering and charging management. It can also calculate the energy consuming through classified energy consumption categories, process automatic measurement, record automatic statistics. Huiyun intelligent management system includes many characters, including the management calendar has built-in annual HVAC operation mode, lighting in public area automatically determines the number of lights to be turned on according to the weather, night lighting automatically lights up according to sunrise and sunset time, real-time display information about equipment operating status and environmental quality parameters, air conditioning system automatic operation ensures Indoor environmental quality, intelligent lighting control system that instantly illuminates all fixtures and automatically monitors real-time status. Managers can view building energy consumption indicators, building energy consumption exceeding alarms, shopping center passenger flow data, and

passenger flow over-limit alarms in real time through computers, mobile phones, etc., anytime, anywhere.

## Building users opinion

During the trial operation phase of Nanjing Wanda Mall, buyers were very satisfied with indoor air quality and thermal comfort, and were very satisfied with the intelligent lighting and intelligent vehicle management system of the underground parking garage of the project.

## Energy

### Energy consumption

Primary energy need : 380,33 kWhpe/m<sup>2</sup>.

Primary energy need for standard building : 492,33 kWhpe/m<sup>2</sup>.

Calculation method : Other

Final Energy : 114,33 kWhfe/m<sup>2</sup>.

Breakdown for energy consumption :

HVAC 52.94

General lighting socket equipment 26.12

General power equipment 5.49

### Envelope performance

Envelope U-Value : 0,75 W.m<sup>-2</sup>.K<sup>-1</sup>

Building Compactness Coefficient : 0,09

Indicator : GB/T 7106-2008

Air Tightness Value : 6,00

## Renewables & systems

### Systems

Heating system :

- Gas boiler
- Low temperature floor heating

- o Fan coil
- o VAV System

#### Hot water system :

- o Solar Thermal

#### Cooling system :

- o Water chiller
- o Fan coil

#### Ventilation system :

- o Double flow

#### Renewable systems :

- o Solar photovoltaic
- o Solar Thermal

Renewable energy production : 2,10

#### Solutions enhancing nature free gains :

This project is equipped with daylighting roof system and built-in adjustable and operable sunshade. The proportion of daylighting roof area is 15%, the heat transfer coefficient of daylighting roof glass is  $K=2.1 \text{ W}/(\text{m}^2\cdot\text{K})$ , and the shading coefficient is

## Smart Building

#### BMS :

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## Users' opinion on the Smart Building functions :

Huiyun intelligent management system integrates 16 light-current electronic systems. Wanda Group's professional commercial property management team is very satisfied by Huiyun management system, and cooperates with Huiyun management R&D team to continuously improve and upgrade the system. From the Huiyun 1.0 Basic Edition in 2013, the Huiyun 2.0 Optimized Edition in 2015, and the Huiyun 3.0 Cloud Edition in 2017, Huiyun Intelligent Management System is continuously improved and better served with the help of Wanda Business Management Team. The business management of Wanda Mall has won the trust and praise of Wanda Business Management Team and Wanda Mall customers.

## Environment

### GHG emissions

Building lifetime : 50,00

### Water management

Consumption from water network : 127 220,00 m<sup>3</sup>

Consumption of harvested rainwater : 9 898,82 m<sup>3</sup>

Water Self Sufficiency Index : 0.07

Water Consumption/m<sup>2</sup> : 0.48

Water Consumption/Visitor : 2.64

### Indoor Air quality

Building indoor CO<sub>2</sub> test concentration mg/m<sup>3</sup> 800

The project sets indoor CO<sub>2</sub> and pollutant concentration monitoring system to monitor the CO<sub>2</sub> concentration in the cinema lobby, cinema hall and indoor pedestrian street in real time. In total of 37 measuring points are set up, linked with the fan control, and incorporated into the building equipment monitoring system. The specific control measures are as follows:

Fresh Air System control: When the indoor pedestrian street CO<sub>2</sub> concentration is higher than the setting value 100ppm, the system in the corresponding area is turned on; when the setting value is lower than 100ppm, the system in the corresponding area is turned off.

Combined air handling unit control: When the outdoor air enthalpy value in the cooling season is higher than the indoor air enthalpy value, or during the heating season, the opening of fresh air system valve and return air valve are automatically adjusted according to the indoor CO<sub>2</sub> concentration control. if the CO<sub>2</sub> concentration is 50 ppm higher than the setting value, the



fresh air system valve opening degree is increased, while the CO2 concentration is 50ppm lower than the set value, the fresh air valve opening degree is reduced. The upper limit of the fresh air valve opening degree is 70%, and the lower limit is 15%. The CO2 sensor is wall mounted and is located indoors near the return air outlet.

Large air-conditioning areas such as supermarkets, retail collection stores, electrical appliances, video games, sub-main stores, baby kings, cinema auditoriums, cinema lobbies, etc., use full air system with single fan. Indoor pedestrian street shops and theme restaurants use fresh air system with fan coils. The indoor pedestrian street public area and the atrium are equipped fresh air system with ceiling units. The theater projection mezzanine, the theater audience corridor, and the cinema office area use fresh air system with fan coil. The commercial management staff restaurant uses fresh air system with fan coil.

The combined air treatment unit of the full air system and the combined fresh air treatment unit of the fresh air system are provided with a primary to medium efficiency filter on the fresh air side, and a filter screen is arranged on the exhaust side. The fresh air side primary to medium efficiency filter ensures the air quality of the indoor personnel space, and the exhaust side filter helps to remove indoor pollutants, ensure the exhaust air quality, and reduce the impact on the atmospheric environment.

## Products

### Product

Huiyun Intelligent Management System

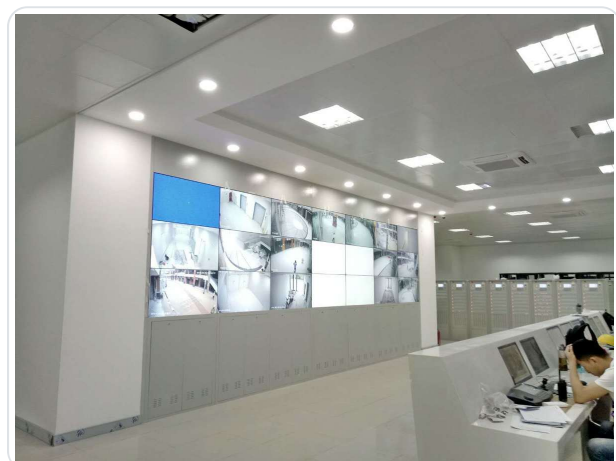
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<https://www.wanda.cn/>

Product category :

Huiyun intelligent management system is researched and developed independently by the Wanda Group with intellectual property rights to solve the problems mentioned above. Through Huiyun

intelligent management system, 16 light-current systems and more than 30,000 information points of the building are integrated to one management platform. It creates the energy consumption management system, by setting smart metering tools to record the electricity consumption and water consumption of each commercial rental unit to realize independently metering and charging management. It can also calculate the energy consuming through classified energy consumption categories, process automatic measurement, record automatic statistics. Huiyun intelligent management system includes many characters, including the



management calendar has built-in annual HVAC operation mode, lighting in public area automatically determines the number of lights to be turned on according to the weather, night lighting automatically lights up according to sunrise and sunset time, real-time display information about equipment operating status and environmental quality parameters, air conditioning system automatic operation ensures Indoor environmental quality, intelligent lighting control system that instantly illuminates all fixtures and automatically monitors real-time status. It applies indoor CO2 detection system, underground garage set CO detection system linked with the exhaust system and vehicle intelligent management system.

Huiyun Intelligent Management System, with the cooperation of Wanda Group's professional commercial property management team, constantly improves and upgrades the system. From the Huiyun 1.0 Basic Edition in 2013, Huiyun 2.0 Optimized Edition in 2015, 2017 Huiyun 3.0 cloud version. The designer combined with the feedback from the construction company and the commercial property management team to continuously optimize the intelligent management system of Huiyun and improve management efficiency. For example, user feedback suggest increase the parking congestion alarm system. After comprehensively inspecting multiple Wanda Plaza and Wanda Mall, the design will effectively improve the operational efficiency of the parking lot and increase the customer's shopping happiness index.

#### Rainwater harvesting equipment

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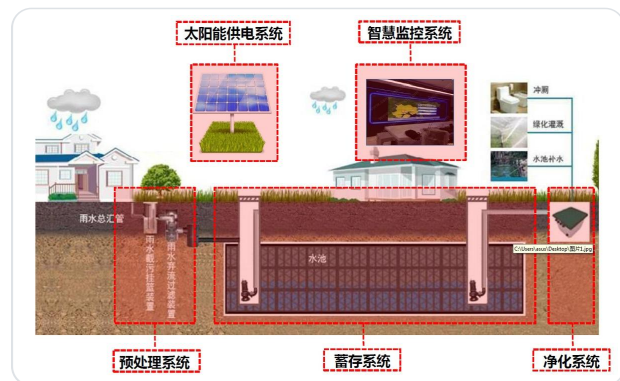
<http://www.cass-eco.com/>

#### Product category :

The rainwater collection equipment of this project adopts the “HUI+LING” system independently developed by Zhongke

Shiwo Ecological Technology Jiangsu Co., Ltd. The rainwater recovery system adopts a smart monitoring system and is incorporated into the Huiyun management platform to record the collection, usage and supplementary water capacity of rainwater in real time. Solar photovoltaic power generation is used to provide system operating energy.

The “Hui+LING” system rainwater harvesting equipment is intelligent and sustainable, and is perfectly integrated into the intelligent management system of Huiyun. It facilitates the maintenance and real-time monitoring, which satisfied the property management team very well.



## Costs

### Construction and exploitation costs

Renewable energy systems cost : 110,16 ¥

Total cost of the building : 1 199 010 095 ¥

## Energy bill

Forecasted energy bill/year : 3 578,81 ¥

Real energy cost/m<sup>2</sup> : 0.01

Real energy cost/Visitor : 0.07

## Urban environment

The location of the project is rectangular, and the traffic streamline organization is mainly composed of people flow, non-motor vehicle flow and motor vehicle flow.

There are 8 entrances and exits in the project block, including 6 people entrances, 1 non-motor vehicle entrance and 2 car entrances, which are convenient for external contact. The project implements the diversion of people and vehicles. The motor vehicle roads are arranged on the outside of the plots. The pedestrian roads are horizontally and vertically distributed between the buildings to meet the traffic needs of different buildings. There are 3 bus stops and 2 bus lines within 500m of the project entrance and exit, which also brings convenient transportation modes for internal employees. Set up a convenient pedestrian channel to contact public transportation stations.

The project is a shopping center with complete commercial facilities, including supermarkets, main stores, baby kings, big players, cinemas, dark knights, indoor pedestrian streets, and catering shops. The outdoor plaza is open to the public free of charge. The public can rest and shop at the outdoor plaza and indoor pedestrian street at any time. The outdoor plaza is open to the public at full time, and the indoor pedestrian street is from 9:00 to 21:00.

## Land plot area

Land plot area : 60 012,00 m<sup>2</sup>

## Green space

Green space : 2 589,43

## Parking spaces

The parking lot of this project is mainly located underground, and the total area of the garage

is 97484.0 m<sup>2</sup>. The total number of parking lots is 3,586, and there are 3,323 underground, including 1,532 mechanical parking lots, 1,791 non-mechanical parking lots. The parking lot intelligent management system is also built into the Wanda Huiyun intelligent management system.

## Building Environmental Quality

### Building Environmental Quality

- Building flexibility
- renewable energies
- integration in the land
- mobility
- products and materials

## CONTEST

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

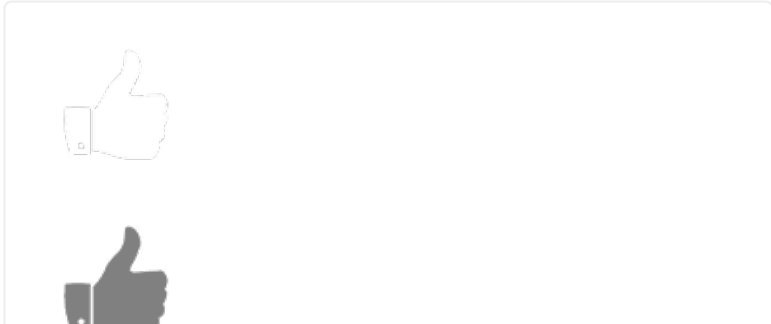
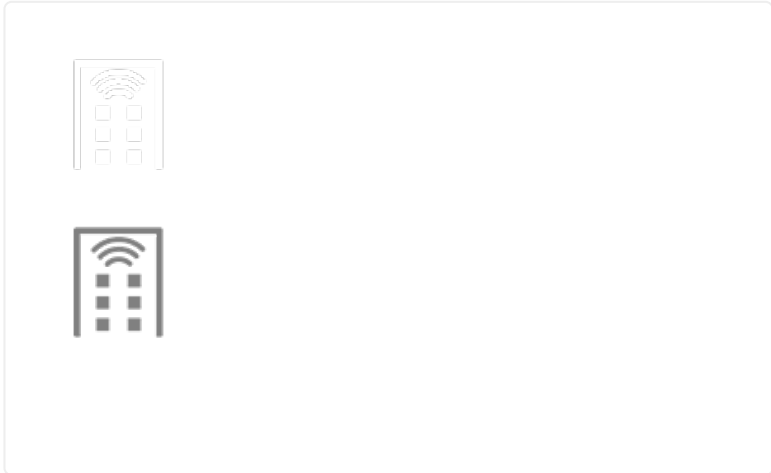
The exploration and practice of Nanjing Wanda Mall with the intelligent management system and green buildings technologies provides a large amount of practical data for the design and operation of large-scale green commercial buildings in the future.

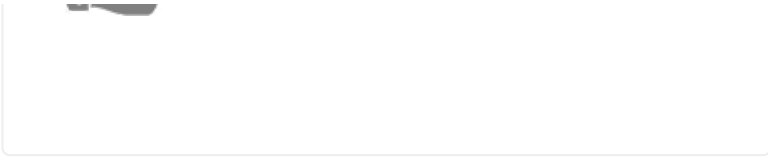
The project selected a number of green building technologies based on its own climatic conditions, topography, and rational use of land, water and renewable energy. For example, high energy-efficient cold and heat source units, free cooling for transitional cooling towers, intelligent rainwater reuse systems to provide water for green sprinkler irrigation, high-grade water-saving appliances, efficient energy-saving lightings, solar water heating, solar photovoltaic power generation, etc. . Optimize the design of the building's shape, functional layout, window opening area and daylighting roof to improve indoor comfort and reduce building energy consumption. The energy consumption analysis software PKPM-Energy is used to simulate the energy consumption and energy load, and the contribution rate of different energy-saving technical measures to the building energy saving is analyzed.

The project building energy saving rate is 65%, the non-traditional water source utilization rate is 8.14%, the renewable energy power generation amount is 0.4%, the renewable energy supply hot water ratio is 12%, and the renewable recycled building material ratio is 10.5%, which greatly saves energy. The operational process combined with Huiyun intelligent management system will further reduce the energy consumption of the building. Huiyun

intelligent management system is researched and developed independently by the Wanda Group with intellectual property rights to solve the problems mentioned above. Through Huiyun intelligent management system, 16 light-current systems and more than 30,000 information points of the building are integrated to one management platform. It creates the energy consumption management system, by setting smart metering tools to record the electricity consumption and water consumption of each commercial rental unit to realize independently metering and charging management. It can also calculate the energy consuming through classified energy consumption categories, process automatic measurement, record automatic statistics. Managers can view building energy consumption indicators, building energy consumption exceeding alarms, shopping center passenger flow data, and passenger flow over-limit alarms in real time through computers, mobile phones, etc., anytime, anywhere.

### Building candidate in the category





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