

## Atlantis Sanya

by pengpeng xu / 2018-06-19 07:52:08 / Chine / 11030 / CN

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New Construction

Primary energy need :  
**121.1** kWhpe/m<sup>2</sup>.  
(Calculation method : Experimental calculation method (China) )

**ENERGY CONSUMPTION**

Economical building	Building
< 50 <b>A</b>	
51 à 90 <b>B</b>	
91 à 150 <b>C</b>	
151 à 230 <b>D</b>	
231 à 330 <b>E</b>	
331 à 450 <b>F</b>	
> 450 <b>G</b>	

Energy-intensive building

**Building Type** : Hotel, boarding house

**Construction Year** : 2014

**Delivery year** : 2017

**Address 1 - street** : 36 572013 ,

**Climate zone** : [Am] Tropical Monsoonal

**Net Floor Area** : 259 585 m<sup>2</sup>

**Construction/refurbishment cost** : 779 978 400 ¥

**Cost/m<sup>2</sup>** : 3004.71 ¥/ m<sup>2</sup>

#### Certifications :



## General information

This project is the hotel construction, the project total investment is 779.9784 million yuan, the total land area 114601.03 , the total construction area of 251040 . The tower structure adopts the frame-shear wall structure, the skirt building structural system adopts the concrete frame structure. The hotel occupancy rate is 80%.

#### 1 renewable energy utilization

In this project, solar thermal collectors are installed on the roof platform of the skirt building, generate hot water to preheat 4 to 19 floors of room hot water. Solar thermal collectors cover an area of 850 . Solar hot water systems generate 26334.75m<sup>3</sup> thermal water annually, 17.10% of the total project annual demand for hot water. After economic analysis, the solar water heating system can save 14342 thousand yuan in the life cycle, the dynamic investment recovery cycle is 7.58 years, and the carbon dioxide can be reduced in 4519.30t during the life cycle.

#### 2 Chilled water thermal storage system

The cold source of the hotel air-conditioning in this project adopts the form of electric centrifugal chiller and Chilled water thermal storage system. The chiller unit consists of two 650RT, three 1250RT conventional main machines (of which one 1250RT is reserved for the second phase) and one 1250RT chilled water thermal storage main machine, of which the total cooling capacity is 9000RTH. Through analysis, the project adopts the chilled water thermal storage system, which can save the operation cost of RMB 1.2373 million per year. The initial investment of the system increases by RMB 4.885 million. The static investment recovery period is 3.95 years. The chilled water thermal storage system is reasonable.

#### 3 Waste heat utilization

In this project, cooling water heat recovery system is set up in two refrigeration plant rooms to

preheat the domestic hot water and marine life-support system. There are two sets of cooling water heat recovery system in the main refrigeration plant room one is the hotel's domestic hot water preheating system, which recovered heat is about 420KW. The annual energy saving of waste heat recovery system is 1814400MJ, annual electricity saving is 53,620,000 KWh and annual cost saving is 4450 thousand yuan.

#### 4 Exhaust air heat recovery system

The guestroom and its walkway adopt the fan coil and fresh air system, and the fresh air system adopts the form of heat recovery with exhaust air. The hotel lobby, banquet hall, front hall, restaurant, gym, lost world, children's club, circular shopping street and other large Spaces adopt the primary return air volume system, and set the transition season all-fresh air operation mode when the building conditions allow. The fresh air volume of exhaust air heat recovery equipment is 215590m<sup>3</sup>/h. The calculated annual saving cost is RMB 204,000, and the static investment recycling period is 8.45 years.

#### 5 The CO2 monitoring system

In personnel density populated area (> 0.25 person/ ), such as restaurant, conference room, commercial areas adopt carbon dioxide concentration sensor. According to the change of monitoring concentration, control the operation of the fresh-air fans, adjust the new air volume delivered to the room, and maintain the indoor air quality. According to the indoor CO2 concentration detection value increase or decrease the fresh air volume, the CO2 concentration is always maintained within the scope of the health standards.

#### 6 The intelligent lighting control system

The project adopts intelligent lighting control system for underground garage, walkway, lobby, elevator hall, banquet hall, restaurant, meeting room, fitness center, SPA, administrative lounge, etc which adopts the switching control module and the dimming control module, which controls the lighting of these parts according to different time periods and scenes to achieve the purpose of energy saving.

## Data reliability

3rd part certified

## Stakeholders

## Contractor

Name :

Contact : dongjy@fosun.com

# Construction Manager

Name :

## Stakeholders

Function : Thermal consultancy agency

825644833@qq.com

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

Declaring green building certification.

## Owner approach of sustainability

In the project design, the design ideas of "green building" and "energy conservation and emission reduction" are adhered to, and the economic rationality of various technologies is analyzed based on the architectural functional features. The green and low-carbon technologies are reasonably selected to build the building into an ecological hotel in harmony with nature. The main technical measures are as follows:

**Water-saving:** The project uses rainwater in the site, which will be used for greening and irrigation and road sprinkling. The non-traditional water use rate is 1.02%.

**Energy-saving:** Solar thermal collectors cover an area of 850 on the roof platform of the skirt building. Solar hot water systems provide 17.10% of the total annual domestic hot water supply. The fresh air unit adopts the rotary exhaust hot return unit to recover the exhaust air cooling quantity. The calculated annual saving cost is RMB 204,000. The project recycles air conditioning condensation heat for preheating hot water in the hotel's domestic hot water and maintenance system. This system annual cost saving is 4450 thousand yuan. This project adopts chilled water thermal storage system to make full use of the peak and valley electricity price at night.

**Material saving:** In this project, recycled materials, including steel, wood, glass, etc., were largely used. The weight of recycled materials accounted for 10.17% of the total weight of the building materials used, exceeding 10.00%.

**Indoor environment:** CO<sub>2</sub> quality monitoring device is installed to ensure good indoor air quality. The daylighting roof is set in the part of the skirt building to effectively improve indoor lighting and reduce lighting energy consumption.

This project will integrate land saving, energy saving, material saving and water saving technologies into the design. By giving priority to passive green building technology, fully optimizing active green building technology and adopting renewable energy, non-traditional water sources, green building materials and other technologies, the project will save resources, protect the environment and reduce pollution to the maximum extent, and provide

users with a high quality environment of high efficiency, low energy consumption, comfort and convenience.

## Architectural description

The project is designed in accordance with the three-star standard of China's green building standard, and a number of green energy-saving technologies are reasonably adopted to meet the requirements of the three-star standard of green building. The project mainly includes the following innovations:

- 1) Rational planning of water system, use of various water resources. Make full use of municipal water, seawater and rainwater. Sea water is used to sustain Marine life in the seaquarium. Rainwater is used for road sprinkling and green irrigation, and the recovery rate of rainwater reached 1.02%.
- 2 Indoor CO<sub>2</sub> concentration monitoring device is installed to ensure good indoor air quality.
- 3 The project recycles air conditioning condensation heat for preheating hot water in the hotel's domestic hot water swimming pool water park and marine life-support system.
- 4) The project sets exhaust air heat recovery device. Using the rotary heat recovery type of new fan treatment unit, can effectively recover indoor waste heat.
- 5) The project adopts efficient and energy-saving lighting tools and intelligent control methods.

The above technical measures can achieve the purpose of saving water resources and energy consumption, and indoor CO<sub>2</sub> quality monitoring device can guarantee indoor good air quality and make indoor personnel in a comfortable environment.

## Building users opinion

### 1 daylighting

72 Daylighting roofs is set in the roof of commercial strip, on the west side of skirt building, to improve the indoor daylighting effect. The lighting wells are set in the first floor underground, so the lighting effect of the main functional rooms of the first floor underground is good, especially the lighting effect of the refrigeration plant room, boiler room and generator room is improved, and the overall lighting effect of the project is favorable.

### 2 Thermal comfort and air quality

Air conditioning division is conducted according to different functions of the building. The fan coil + fresh air system is adopted in the hotel rooms and their footpaths, dress room, logistics office, retail, flavor restaurant, etc. The indoor temperature is convenient to adjust and the fresh air quantity is sufficient.

### 3 Acoustic environment

The indoor background noise of this project is small, free from external noise, and the room is comfortable and quiet.

## Energy consumption

Primary energy need : 121,10 kWhpe/m<sup>2</sup>.

Primary energy need for standard building : 151,81 kWhpe/m<sup>2</sup>.

Calculation method : Experimental calculation method (China)

Breakdown for energy consumption :

HVAC: 57.29Kwh/m<sup>2</sup>/year

General lighting socket equipment: 21.11Kwh/m<sup>2</sup>/year

General power equipment: 42.7Kwh/m<sup>2</sup>/year

## Envelope performance

Envelope U-Value : 0,65 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

Roof:0.65 W/ ·k; exterior wall: 2.52W/ ·k; external windows of east and west direction: 3.49W/ ·k; external windows of south direction: 4.00W/ ·k; external windows of north direction:3.64W/ ·k.

Building Compactness Coefficient : 0,11

Air Tightness Value : 6,00

## Renewables & systems

### Systems

Heating system :

- No heating system

Hot water system :

- Solar Thermal

Cooling system :

- Others

Ventilation system :

- Single flow

### Renewable systems :

- Solar Thermal

### Renewable energy production : 17,10

Solar hot water accounts for 17.1 percent of annual hot water demand.

### Solutions enhancing nature free gains :

This project towards: 24°south by east.

## Smart Building

### BMS :

Building control system: The system of this project includes: power management system, automatic fire alarm system, leakage fire alarm system, fire power supply monitoring system, video monitoring system, anti-theft alarm system, entrance guard and one-card system, building automation control system, hotel room management system, etc.

Air quality monitoring system In personnel density populated area ( $> 0.25$  person/ ), such as restaurant, conference room, commercial areas adopt carbon dioxide concentration sensor.

The opening ratio of the fresh air valve of the air conditioning box is controlled by the CO<sub>2</sub> concentration of the return air duct, and the operation of the fresh-air fan is controlled according to the monitoring concentration change. When the CO<sub>2</sub> concentration exceeds the set value, the fresh air quantity into the room is adjusted to maintain the indoor air quality.

Metering installation This project divides the hotel electricity consumption into four kinds, the lighting socket electricity, the HAVC system electricity, the power electricity, and the special electricity, carry on respectively the measurement. Lighting socket power consumption includes lighting power supply circuit of indoor non-public places, lighting of public parts and emergency lighting of evacuation, and lighting of outdoor landscape. Hvac electricity utilization including power consumption in the refrigeration plant rooms air-conditioning terminal system power consumption. Power equipment power consumption includes power supply of elevator and its ancillary equipment, water pump power supply and drainage system and fan power supply. Special electricity consumption includes electronic information room electricity, kitchen and restaurant electricity and other special area electricity. According to different usage, using units or management units, water measurement devices are set in the water storage pool, boiler room, kitchen, cooling tower, swimming pool, marine life-support system, SPA area, room division main pipe and green watering.

## Environment

### Urban environment

This project is located in north haitang road of haitang bay in sanya. The transportation is

convenient. The total land area 114601.03 , afforestation rate is 40%.projects including underground electrical room, logistics management, staff canteen, kitchen. Aboveground hotel supporting business, lobby, aquarium, banquet hall, restaurant, guest room. The project include underground electromechanical rooms, logistics occupancy, staff restaurant and kitchen. Aboveground hotel supporting business, lobby, aquarium, banquet hall, restaurant, guest room.

## Land plot area

Land plot area : 114 601,00 m<sup>2</sup>

## Green space

Green space : 45 840,40

## Products

### Product

Chilled water thermal storage system

customersupportchina@trane.com

<http://www.trane.com/commercial/asia-pacific/china/zh.html>

Product category :

Chilled water thermal storage system rated refrigerating capacity is 1250RT, the temperature of chilled water supply and return is 4/12°C, cold storage at 24:00- 7:00 in the night. Semi-closed compressor, liquid refrigerant cooling motor. The speed of the compressor is about 2950rpm, with low speed and few running parts. Cold discharge can be as low as 10% without surge.



The project adopts the chilled water thermal storage system. Cold storage takes place at 24:00-7:00 in the night. Cooling is carried out in the peak section of the electricity price, 9:00-12:00,16:00-22:00. Through analysis, the project adopts the chilled water thermal storage system, which can save the operation cost of RMB 1.2373 million per year. The initial investment of the system increases by RMB 4.885 million. The static investment recovery



period is 3.95 years. The chilled water thermal storage system is economically viable.

## Costs

### Construction and exploitation costs

Total cost of the building : 779 978 400 ¥

## Health and comfort

### Water management

Consumption from water network : 910 565,00 m<sup>3</sup>

Consumption of harvested rainwater : 9 339,67 m<sup>3</sup>

Water Self Sufficiency Index : 0.01

Water Consumption/m<sup>2</sup> : 3.51

Water Consumption/Bedroom : 197.95

## Carbon

### GHG emissions

Building lifetime : 50,00

## Contest

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

This project will integrate land saving, energy saving, material saving and water saving technologies into the design. By giving priority to passive green building technology, fully optimizing active green building technology and adopting renewable energy, non-traditional

water sources, green building materials and other technologies, the project will save resources, protect the environment and reduce pollution to the maximum extent, and provide users with a high quality environment of high efficiency, low energy consumption, comfort and convenience. It is of great promotion value, mainly reflected in:

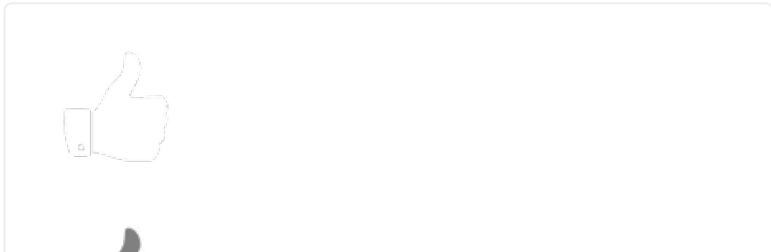
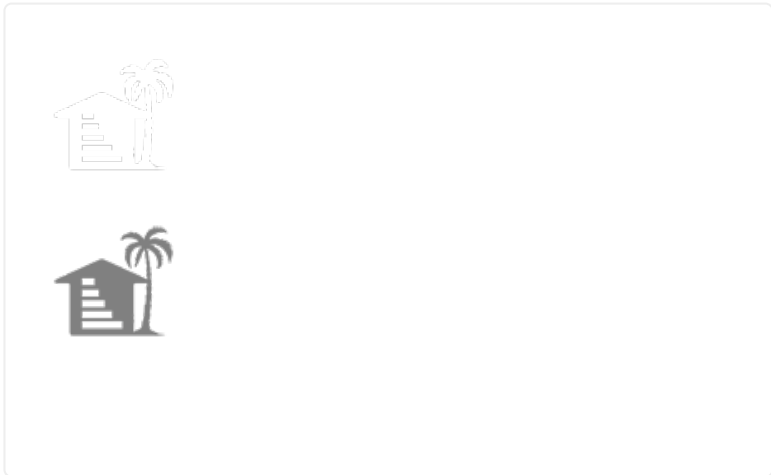
**Water-saving:** The project uses rainwater in the site, which will be used for greening and irrigation and road sprinkling. The amount of rain water recycled per year is 9339.3m<sup>3</sup>, and the total annual water consumption of the project's conventional water (excluding water for Marine life maintenance) is 9199,904.36 m<sup>3</sup>.The non-traditional water use rate is 1.02%.

**Energy-saving:** Solar thermal collectors cover an area of 850 on the roof platform of the skirt building. Solar hot water systems provide 26334.75m<sup>3</sup> per year, accounting for 17.10% of the total annual domestic hot water. The fresh air unit adopts the rotary exhaust hot return unit to recover the exhaust air cooling quantity. The calculated annual saving cost is RMB 204,000. The project recycles air conditioning condensation heat for preheating hot water in the hotel's domestic hot water and maintenance system. This system annual cost saving is 4450 thousand yuan. This project adopts chilled water thermal storage system to make full use of the peak and valley electricity price at night.

**Material saving:** In this project, recycled materials, including steel, wood, glass, etc., were largely used. The total weight of building materials is 621922.4t, and the weight of recyclable materials is 63274.68t.The weight of recycled materials accounted for 10.17% of the total weight of the building materials used, exceeding 10.00%.

**Indoor environment:** CO<sub>2</sub> quality monitoring device is installed to ensure good indoor air quality. The daylighting roof is set in the part of the skirt building to effectively improve indoor lighting and reduce lighting energy consumption.

## Building candidate in the category





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