

Green Bonds Promote Energy Efficiency in Public Buildings

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01

Subject background

01 Subject background

China's public buildings have high energy consumption and great energy-saving potential. It is imperative to improve energy efficiency

The energy consumption of public buildings is large, and the average energy consumption per unit area is 2 ~ 3 times that of other buildings;

In 2018, the public building area accounted for about 19% of the total building area in China, but the energy consumption of public buildings accounted for about 40% of the total building energy consumption.

02 Subject background



The building has comprehensive functions and complex energy consumption composition.

Complex composition of energy consumption



There are many equipment involved in the building, and the equipment energy consumption is high

Great energy saving potential



The waste of energy is serious and the supervision of energy consumption is difficult

Difficulty in energy consumption supervision



Energy saving work lacks systematic guidance and data basis

Lack of systematicness



Lack of financing channels for energy efficiency improvement and energy-saving technological transformation

Lack of financing channels

Public buildings face problems such as energy efficiency improvement technology and financing difficulties

02 Subject background

The key to promoting the improvement of energy efficiency of public buildings is solve financing problems

Concept of green Bond: "green bond" refers to a bond instrument that uses the obtained funds to finance or refinance green projects that meet the specified conditions.

Green bonds can provide various benefits for green projects and investors

Provide new financing channels other than traditional credit for green projects;

Green bonds are generally highly rated and favored by investors. Compared with ordinary bonds, they have a certain issuance premium;

Provide more long-term investment for green projects, and solve the problem that green projects are difficult to match the capital period due to their long cycle;

Encourage the issuer to invest its income in green projects and actively develop new green projects, so as to form sustainable reputation benefits.

02 Subject background

With the rapid development of green finance, green bonds also usher in opportunities for innovative development.

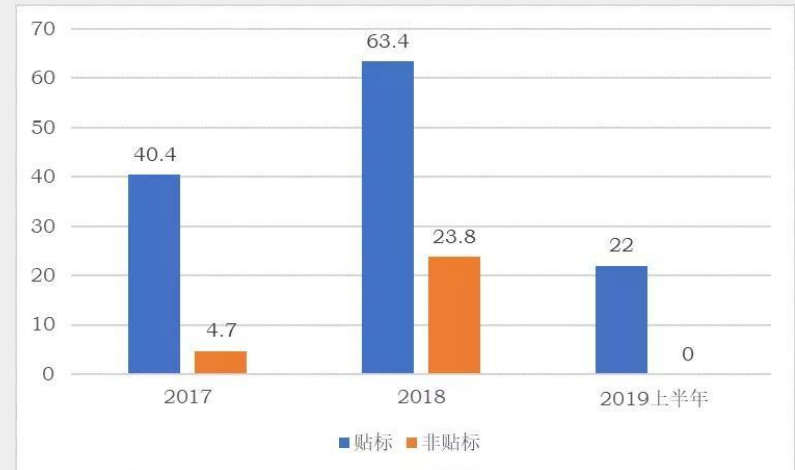
China's green bonds started late, but developed fast.

The issuance of green building bonds began in 2017, and only 5 bonds were issued in that year; A total of 12 were issued in 2018; Two were issued in the first half of 2019.

Over the past two years, China has issued 15.43 billion yuan of bonds invested in green buildings.



Number of green building bonds issued in China's green building bond market from 2017 to the first half of 2019 (unit: piece)



Green buildings in China from 2017 to the first half of 2019 Issuance scale of bond market (unit: 100 million yuan)

02 Subject background

research contents



This subject analyzes the demand for energy efficiency improvement of the Qingdao Haitian Center project and conducts energy efficiency improvement technology demonstrations;

Through the financing scheme and cost-benefit analysis of energy-saving demonstration projects, the successful experience in building green financing is summarized and refined

Explore a market-oriented financing model suitable for China's green finance to support the improvement of energy efficiency of public buildings.



02

Introduction to demonstration project

02 Introduction to demonstration project

Qingdao Haitian Center T2 Tower Building: located in Qingdao, it is composed of international banquet and Conference Center, hotel and high-end Seaview apartment. T2 tower is 369 meters high, with a construction area of about 490000 square meters and a total investment of 13.7 billion yuan.

It is the first super high-rise building in China to effectively solve the project financing needs with green bonds

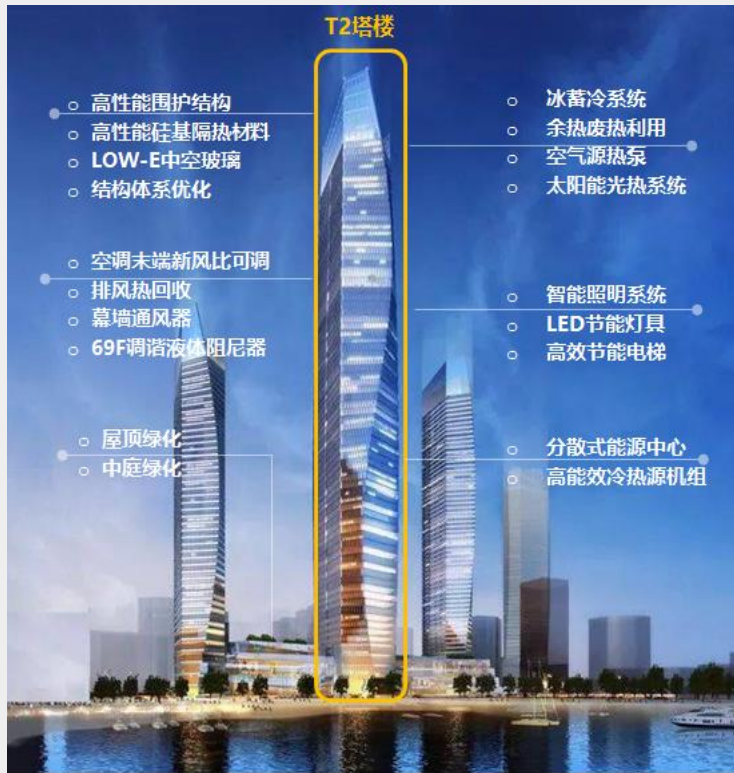




Technical scheme

03 Technical scheme for energy efficiency

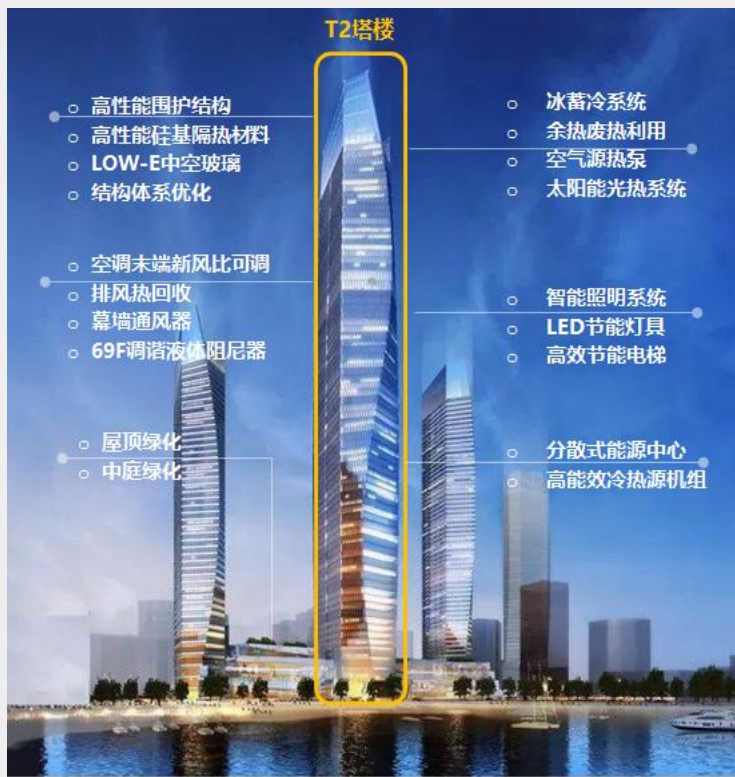
Summary of technical highlights of demonstration projects



- **High performance envelope:** Double hollow Low-E glass, external window heat transfer coefficient is 15% higher than the reference building
- **Curtain wall ventilators:** Curtain wall ventilators are set on each floor below the 18th floor to enhance the indoor ventilation effect
- **High efficiency cold and heat source unit:** The energy efficiency of cold and heat source units is about 5% better than the current national standard
- **Air conditioner with adjustable fresh air ratio:** The variable fresh air ratio and fresh air operation can be realized in the transition season, and the maximum total fresh air ratio can be greater than 50%
- **Ice storage system:** Compared with the conventional refrigeration system, the operating cost of the air conditioning system in the whole summer decreased by 27.19%

03 Technical scheme for energy efficiency

Summary of technical highlights of demonstration projects



- **Energy Center:** Four energy centers are set up to manage energy consumption
- **Energy saving lamps and intelligent lighting:** Energy saving light sources such as LED are used for indoor lighting, and intelligent lighting system is used in public places
- **Energy saving elevator:** Elevator group control, escalator automatic start and stop, energy feedback, no segment speed control technology
- **Waste heat recovery and utilization system:** Compared with the traditional method, the waste heat recovery and utilization system can save about 500300 yuan per year and reduce the carbon dioxide emission by 424.1 tons / year
- **Renewable energy utilization system:** Air source heat pump, solar hot water

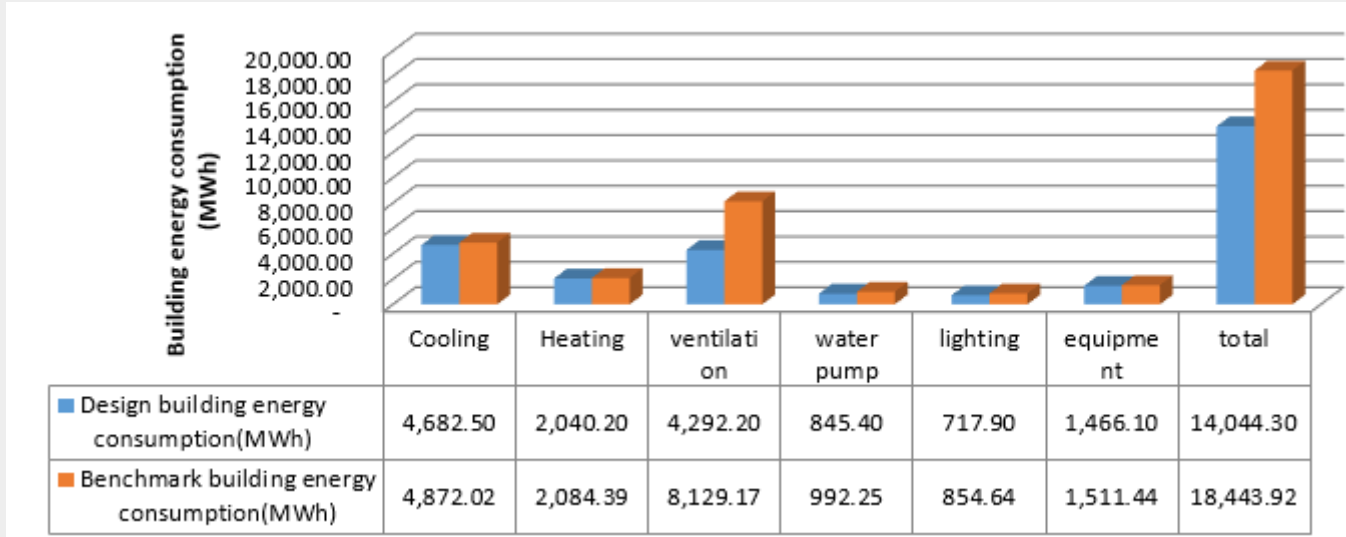


04

Results and benefit analysis

04 Results and benefit analysis

Pre evaluation of energy saving effect



- The simulation results show that the annual energy saving is 4067.28 MWh; The comprehensive energy-saving rate of buildings is 23.45%;
- The annual carbon dioxide emission reduction is 3845.62 tons, the effect of energy conservation and carbon reduction is remarkable.



05

Green bond financing scheme

05 Green bond financing scheme

□ Issuance process of green bonds

1

Identify green assets and projects

For example, renewable energy, clean water, public transportation.

Prove whether the asset or project meets the green standards of the China Banking Regulatory Commission or the International Climate Bond Standards Program.

2

Arrange an independent review

Trustworthy independent review and verification can maintain credibility.

The reviewer can also assist in clarifying green assets.

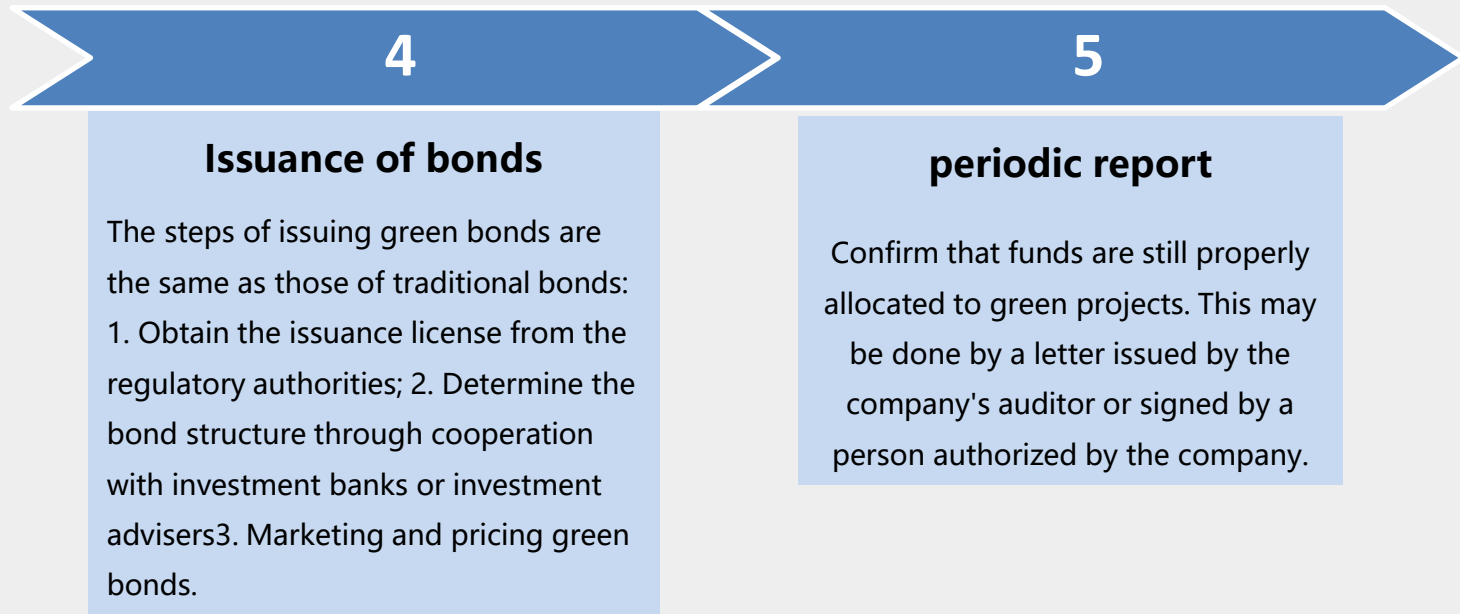
3

Create tracking and reporting

The total value of the asset or project must be maintained or greater than the total value of the bond. The issuer needs to track it and be able to explain how to track it-transparency is essential.

05 绿色债券融资方案

□ Issuance process of green bonds



05 Green bond financing scheme

□ Identify green assets and projects

Haitian centerproject is a LEED gold and three-star certified green building, which meets the standards of green industry projects.

□ Arrange an independent review

Most green bond issuers use independent review to increase investors' confidence that the projects supported by green bonds have green qualifications.

The owner of the project entrusts an independent review company to provide independent evaluation and certification services for the green bonds before issuance. This certification is to provide a professional assessment of this green bond, clarify the category of green industry projects and the environmental benefit of the project, so as to ensure that all the funds raised by the bond are invested in green industry projects.

05 Green bond financing scheme

□ Create tracking and reporting

Full disclosure of the distribution of raised funds is very necessary for dry green bonds. The funds raised by green bonds must only be used for special projects, so we should establish a system that can isolate and track the funds raised by green bonds.

The owner has established a reliable control system and established a special account for the acceptance, storage and use of the raised funds, to ensure that the funds are earmarked for special purposes; The owner has carried out information disclosure management and improved the relevant disclosure systems. The information disclosure affairs are led and managed with the consent of the board of directors.

□ Issuance of bonds

After completing the above procedures, the green bonds of this project will be issued non publicly in the stock exchange: the total issuance amount of green bonds of the project is 2.5 billion yuan, which is divided into two phases.

By the end of March 2021, the remaining green bond funds of Haitian center were 76 million yuan, and the cumulative net expenditure of green bond funds was 2.414 billion yuan.



THANKS!



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