A Practical Study of Green Building Energy Efficiency Solutions for Public Building Projects

Yiwen Song* and Cheng Chang

1 Pennsylvania State University, 2006 Strawberry Court, Edison, NJ, USA
2 Qingdao Beiyang design group co., LTD, No. 10 Gaochang Road, Laoshan District, Qingdao, China
*Email: songyiwen95@gmail.com

Abstract. Under the background of ecological civilization construction, this article aims at the Qingdao Shooting Sports Center project, with the specific technical scheme, and energy consumption calculation adopted in green construction and energy saving. Combining the theoretical knowledge of green buildings with actual projects, through the energy-saving assessment of the project, the type and quantity of energy consumption of the project are grasped, the energy consumption level of the project is analyzed, and the rationality of the energy utilization of the project and the feasibility of energy-saving measures are evaluated. This article provides some reference data and research for preparing the green and energy-saving design and evaluation report of public building projects.

1. Introduction
Green building energy assessment is a basic national policy in China. The green building energy assessment of fixed-asset investment projects is a practice to eliminate energy waste from the source and save energy at the root. The total energy consumption of society can be divided into three major parts: building energy consumption, transportation energy consumption, and industrial energy consumption, while fixed-asset investment projects cover all areas, including construction, transportation, and industry. Thus, the trial implementation of green building energy conservation assessment of fixed-asset investment projects could be managed from the source of the demand for new energy, which could eliminate the waste of energy from the beginning. It is of great practical significance to rationalize the use of energy and improve energy use efficiency to promote industrial restructuring and industrial upgrading. This paper takes Qingdao Shooting Sports Center as an example to analyze and elaborate the theoretical composition and preparation method of green building energy-saving scheme assessment of public building projects.

2. Project Overview

2.1. Project Location
The project is located within the Genesis New District of the Jimo Provincial Economic Development Zone jurisdiction. The indoor shooting range of the Shooting Sports Center is located east of Longshan Road and at the junction of Zhuangwu Road and Weilan Road in the Blue New District. Project scale and content: The total site area of the indoor firing range project is 56,786 square meters, with a total
construction area of 38,974.38 square meters, including a total construction area of 38,437.72 square meters above ground and a total construction area of 536.66 underground.

2.2. Project Schedule
The project started in November 2016 and will be completed in 2 years.

3. Green Building Energy Efficiency Measures

3.1. Rationalization of Energy Options

3.1.1. Selected Energy Sources. The following principles should be adhered to when selecting energy sources for projects.

- Principle of high efficiency: The energy source chosen for the project should achieve the maximum energy conversion rate and be highly efficient.
- Principle of the economy: When selecting energy sources for a project, priority should be given to those with low overall costs and contribute to the project’s overall efficiency.
- Principle of environmental protection: The energy source chosen for the project should prioritize energy sources that produce relatively little wastewater, waste gas, and waste residue.
- Stability principle: The energy source selected for the project should have a stable source of supply and a safe supply channel and guarantee the regular operation of the project.

Type of energy consumption:
The primary energy consumption of the project is electricity, heat, and water supply.

3.2. Rationalization of Green Building Energy Efficiency Measures for Building Structures

3.2.1. Sunlight. The practical design of this project considers full use of natural light and daylight conditions, which includes the building spacing and arranges the functional space distribution of each unit. So that the primary orientation of each building is close to the south, thus making full use of winter sunlight and avoiding east-west Sunlight and glare in summer.

3.2.2. Building Ventilation. In public buildings, the opening design of windows and doors (including transparent curtain walls) ensures that the effective ventilation opening area is not less than 10% of the external wall area of the room. In comparison, the openable area of exterior windows is not less than 30% of the window area. The openable part of transparent curtain walls is not less than 15% of the curtain wall area to ensure natural ventilation to obtain good indoor air quality. Natural ventilation improves thermal comfort and reduces energy consumption in summer and excessive seasons. When the wall area ratio of windows (including transparent curtain walls) is less than 0.4, the visible light transmission ratio of glass (or other transparent materials) should not be less than 0.6.

3.2.3. Body Size Facto. Consider the building form factor, minimize the exterior building area, avoid unnecessary concave and convex, and control the building form factor to a low level. The public building form factor shall be held within 0.4 to meet the green building energy efficiency standards.

3.2.4. Window-Wall Ratio. Under the condition of ensuring sunshine, light, ventilation, and view, minimize the area of external window and door openings as much as possible and strictly control the window-to-wall ratio of public buildings. The ratio of the window-to-wall area of public buildings in each direction shall be held within 0.7.

3.2.5. Green Building Energy Efficiency Measures for the Building Envelope. The project is located in a cold area, and the buildings adopt the external thermal insulation system. The thermal insulation materials meet the safety grade standards, and the fire performance meets the relevant regulations: the
fire isolation belt is set as required to meet its safety indicators; environmental protection, green building energy-saving building materials are used; exterior walls All the protruding components take measures to cut off the thermal bridge and heat preservation; the walls around the outside of the window are heat preservation.

The roof of public buildings is insulated with the extruded plastic board, and its heat transfer coefficient is not more than 0.45 W/m²°K; the outer wall is insulated with 270 thick sand aerated concrete block walls, and its heat transfer coefficient is not more than 0.40W/m²°K; The windows (including the curtain wall) are made of heat-insulating aluminum alloy hollow glass (6 high light transmission Low-E+12 air+6 transparent), the heat transfer coefficient is less than 2.8 W/m²°K, and the shading coefficient is not more than 0.5 (east, south, west ); Use sun-shading curtains, blinds and other internal and external sun-shading measures at appropriate locations.

Choose doors and windows with good airtightness and improve the airtightness of doors and windows by adding sealing strips to prevent air convection heat transfer; the gaps between door and window frames and walls are filled and plugged with high-efficiency insulation materials. The airtight performance level of external windows (including balcony doors) shall not be lower than the national standard “Graduations and Test Methods of Air Permeability, Watertightness, Wind Load Resistance Performance for Building External Windows and Door” [1] GB/T 7106-2008: thermal insulation aluminum alloy hollow glass (6 high light transmittance, Low-E+12 air+6 transparent); the heat transfer coefficient is 2.80W/m²°K; the solar heat gain coefficient of the glass is not required, the airtightness is level 6; the visible light transmittance is 0.72.

The partition wall between the non-heating and air-conditioning room of all buildings shall use self-insulated with 200-thick sand aerated concrete block wall, and the under the floor slab shall use 70-thick rock wool board (Grade A), which the integrated heat transfer coefficient K is less than 0.49 W/m²°K. The external raised floor slab contact with outdoor air with the bottom surface shall made with 70-thick rock wool board (Grade A) under the floor slab, and its heat transfer coefficient is not more than 0.5 W/ m²°K; the ground is made of 30-thick flame retardant extruded polystyrene board (B1 grade), which the heat transfer resistance is 0.91 m²°K/W.

3.3. Green Building Energy Efficiency Measures for Air Conditioning, Ventilation, and Heating Systems

3.3.1. Cold and Heat Sources, Media, and Transport. The four shooting ranges, including the main shooting range, 10-meter shooting range, 25-meter shooting range, and 50-meter shooting range in Area C, adopt the centralized cooling and heat source air conditioning method, and the air conditioning cooling source adopts the modular air-cooled heat pump unit, with a single cooling capacity of 130kW and chilled water supply and return temperature of 7/12°C; the municipal heat source supply and return temperature: 110/70°C, and the heat exchanger is set to provide low-temperature water of 50/40°C in winter, and the air-cooled heat pump unit Set at the roof. The circulating water pump and water treatment device are installed in the heat exchange station on the ground floor.

Small rooms such as offices and lighting control rooms in the main shooting range shall use fan coils plus fresh air systems.

Independent air conditioning systems are set up in the office and athletes’ lounge rooms in Zone B and D. The air conditioning form is a multi-connected air conditioning system plus fresh air system. The outdoor unit of the multi-connected air conditioner is set at the roof.

3.3.2. Air Conditioning and Heating Systems. In the design of centralized heating, pipelines are reasonably arranged according to different functional partitions. Room temperature control devices are set separately; hydraulic balancing devices are placed on the branch pipes of the water supply or return pipes of the heating system.
The parts of the building belong to different units of use, and heat metering devices are installed separately.

3.3.3. Air Conditioning Systems. The air-conditioning hot water system is a variable flow primary pump system, with varying frequency control of the pumps according to the pressure difference at key points. The air conditioning cold and hot water system is a closed circulating water system, which has two control zones. The design temperature difference between the chilled water supply and return water of the chiller should not be less than 7°C. The cooling tower of the cooling water system is set on the roof, and the water flow metering device is set on the main pipe of the cooling tower make-up water.

3.3.4. Ventilation System. The meteorological data of Qingdao shows that the number of days of the temperature below 8°C is 141 days in a year. The use of heat recovery system is very beneficial to the energy saving of green buildings. Considering this, the ventilation system is designed to be discharged outside after heat exchange with untreated fresh air in places with large exhaust air volume. When the energy efficiency ratio of its heat recovery system is lower than the central heating system, the system will discharge outside directly through the bypass pipe of the heat recovery device.

3.3.5. Air Conditioning Automatic Control. Green building energy saving is the starting point of the building word automatic control system and the ultimate purpose achieve. This project automatic control system contains the following aspects: variable flow primary pump frequency speed control; chiller start/stop control, equal time control and soft start control; minimum chiller flow electric bypass valve control; cold and hot water plate heat exchanger secondary water supply temperature control; air conditioning and ventilation system start/stop control and its status display; indoor temperature and humidity control of fixed-air volume all-air conditioning system.

3.4. Rationalization Of Green Building Energy Efficiency Measures for Electrical Systems

3.4.1. Green Building Energy Efficiency in Power Supply and Distribution Systems. To increase the energy efficiency in power supply and distribution system, the design needs consider reasonable option of transformer capacity and number of transformers; choose green construction energy-saving transformers; strengthen operation management to achieve economic operation of transformers; choose conductors with high conductivity for distribution lines, try to use copper-core wires and not aluminum-core wires; reasonably determine the cross-section of wires to reduce transmission losses and ensure safety; substations should be set in the load center, while each layer of distribution rooms and layer of distribution boxes should also be set in the load center as far as possible to reduce The length of the line; try to improve the voltage level and power factor as much as possible under the condition of meeting the code requirements. When the measures to improve the natural power factor still fail to meet the requirements for reasonable operation of the grid, shunt power capacitors are used as reactive power compensation devices.

3.4.2. Green Building Energy Efficiency for Electric Motors. The primary way to increasing the electric motor energy efficiency is improving the efficiency and power factor of the motor. The use of speed regulation and power-saving techniques for fans and pumps.

The design shall consider adopting high efficiency motors and frequency-controlled motors can save electricity; choosing motors reasonably according to the characteristics of the load; adopting star-delta switching devices; taking local reactive power compensation for motors according to the load situation to reduce line loss and voltage loss; adopting speed-controlled motors for equipment that needs to be adjusted according to load changes.
3.4.3. Green Building Energy Efficiency in Lighting. Lighting green building energy saving, that is, to ensure that the visual requirements are not reduced under the conditions of the effective use of electricity for lighting, specific measures include: full use of natural lighting, the use of green building energy-saving light sources and high-efficiency lamps and lanterns, do not use less than 75% efficiency of lamps and lanterns, the use of reasonable light distribution lamps and lanterns to achieve lighting equipment green building energy-saving requirements; according to visual requirements, to determine a reasonable standard value of illumination, and the use of appropriate lighting methods Indoor roof, walls and floors should be decorated with light colors; indoor part of the special lighting can be automatically controlled by light-sensitive induction, in order to control the number of lights on during the day by the external window lighting; corridors and other public areas of the lighting can be controlled by time; indoor lighting lines should be divided into fine, according to the size of the lighting area set switch to achieve zoning switch; building facade and landscape lighting can be properly considered using part of the light-emitting Diode strip and laser projection lighting, and appropriately reduce the use of large-capacity projection lighting to save energy; outdoor lighting should use photovoltaic controllers to prevent the lights from coming on during the day; separate lighting switches should be set at windows or places where people do not often go.

3.4.4. Rational Selection of Lighting Options. The design of architectural lighting, should be practical, to avoid the one-sided pursuit of form; zoning set general lighting and mixed lighting; in the need for high illumination has to improve the light color requirements of the place, it is appropriate to use more than two light sources consisting of mixed lighting; indoor roof, walls, ground should be lighter color building materials, so as to be more effective use of light energy; strict control of lighting power indicators, preferably with high efficiency of light flux utilization Lighting design scheme.

3.4.5. Green Building Energy Efficiency Measures for Building Control Systems. Building Automation System (BAS) is a building management and control system that centralizes the operation, safety, energy use and decentralized control of many decentralized equipment and systems such as power distribution, lighting, elevators, air conditioning, heating, water supply and drainage, monitoring systems, security systems, automatic fire alarm and linkage systems in a building or building complex. The system is selected for use in local commercial areas to improve the level of self-control management.

3.5. Rationalization of Green Building Energy Efficiency Measures for Water and Drainage Systems

The project has set up rainwater utilization facilities, and after rainwater collection and treatment by rainwater utilization facilities, it is mainly used for outdoor greening irrigation and road washing.

3.5.1. Water Supply Systems and Zoning. One municipal water supply inlet for the indoor range in this project is introduced from DN600 municipal water supply pipe on Zhuangwuwu Road west of the district. The diameter of the inlet pipe is DN200, and the pressure is about 0.5MPa; one municipal water supply inlet for the skeet range is introduced from the DN200 municipal water supply pipe on Longshan Road west of the district. The diameter of the inlet pipe is DN150, and the pressure is about 0.5MPa. A backflow preventer is set on the inlet pipe.

3.5.2. Water-Saving Sanitaryware. (1) The spouts, toilets, urinals, showers and squatting toilets used in this project should meet the performance parameters required by “Minimum Allowable Values Of Water Efficiency And Water Efficiency Grades For Faucets” [2] GB 25501-2010 Grade III, “Minimum Allowable Values Of Water Efficiency And Water Efficiency Grades For Water Closets” [3] GB 25502-2010 Grade III, “Minimum Allowable Values Of Water Efficiency And Water Efficiency Grades For Urinals” [4] GB 28377-2012 Grade III, “Minimum Allowable Values Of Water Efficiency And Water Efficiency Grades For Showers” [5] GB 28378-2012 Grade III, and “Minimum Allowable
Values Of Water Efficiency And Water Efficiency Grades For Flush Valve For Water Closets” [6] GB 28379-2012 Grade III.

2) Use a toilet with a flushing water tank with large and small urine stalls, or a direct drainage water-saving toilet or an induction water-saving toilet with less than 6L, and do not use a toilet with a flushing volume greater than 6L.

3) Public showers shall be equipped with user-pay facilities, and showers shall be equipped with water temperature regulators and water-saving shower nozzles; water-saving washing machines shall be used, etc.

4) Sanitary appliances such as washbasins should use aerated water-saving faucets, ceramic spool faucets, automatic water shut-off faucets and other spouts with good and durable sealing performance.

3.5.3. Hot Water System. The dormitory, kitchen, and public shower parts of indoor range A are supplied with centralized hot water. The heat source adopts solar collector system and air source heat pump system, and when these two heat sources cannot meet the demand in winter, the municipal heat source is used. The city provides supply/return water temperature 120℃/70℃, pressure 5-6kg, introduction pipe diameter 273. It is introduced from the north extension of Longshan Road. A hot water plant room with an effective volume of 80 cubic meters of hot water is installed on the first floor of Area A. The kitchen, public shower and dormitory are equipped with variable frequency pressurized hot water supply equipment. The centralized hot water system adopts the same range circulation water supply. Solenoid valve and temperature control device are installed at the end of the return pipe. When the temperature of the end pipe is less than 45 degrees, the temperature control valve is opened to release water to the hot water storage tank, and the solenoid valve is closed when the temperature rises to 50 degrees.

3.6. Reasonableness of Energy Consumption Indicators
The indoor firing range project has a total construction area of 38,974.38m2, and its electricity consumption sources include heating, air conditioning units, lighting and sockets, ventilation and air exchange, water heating equipment and other equipment.

3.6.1. Electricity Consumption. (1) Multi-connector energy consumption.

| Working Condition | Load Indicators | Area | Total Load | Use Modules | Daily Running Hours | Days of Operation |
|------------------|-----------------|------|------------|-------------|---------------------|------------------|
| Heating          | W/m² | m²  | KW        | h           |                     |                  |
| 82               | 8531  | 699.542 | 0.6       | 8           | 99                  |
| Cooling          | 108              | 921.348 | 0.6       | 8           | 120                 |

| Working Condition | Energy Consumption | cop | Electricity Consumption |
|------------------|---------------------|-----|-------------------------|
| Heating          | 332422.3584         | 2   | 166211                  |
| Cooling          | 530696.448          | 4.6 | 115369                  |

Table 2. Multi-connector heating energy conversion table.

| Electricity Consumption | Conversion Factor | Standard Coal |
|-------------------------|-------------------|---------------|
| KWh                     | 0.312             | tce 51.9      |
| 166211                  |                   |               |
| 115369                  |                   |               |
| Total                   | 0.312             | 36            |
|                         |                   | 87.9          |
The multi-connector heating consumes 87.9tce.

(2) Energy consumption of air-cooled heat pumps.

**Table 3. Multi-unit heating power consumption calculation table.**

| Working Condition | Load Indicators | Area | Total Load | Use Modules | Daily Running Hours |
|-------------------|----------------|------|------------|-------------|--------------------|
|                   | W/m² | m²  | KW         |             | h                 |
| Heating           | 80   | 12112 | 968.96    | 0.6         | 8                 |
| Cooling           | 103.2 | 12112 | 1249.9584 | 0.6         | 8                 |
| Working Condition | Days of Operation | Energy Consumption | cop | Electricity Consumption |
| Heating           | d    | KWh  |             |             | KWh               |
| Cooling           | 99   | 460449.792 | 2         |             | 230225             |
|                   | 120  | 719976.0384 | 3.43    |             | 209906             |

**Table 4. Multi-connector heating energy conversion table.**

| Electricity Consumption | Conversion Factor | Standard Coal |
|-------------------------|-------------------|---------------|
| Thousand KWh            |                  | tce           |
| 2302250                 | 0.312             | 71.8          |
| 2099060                 | 0.312             | 65.5          |
| Total                   |                   | 137.3         |

The multi-coupling heating consumes 137.3tce of electricity.

(3) Energy consumption of split air conditioners.

**Table 5. Multi-unit heating power consumption calculation table.**

| Working Condition | Load Indicators | Area | Total Load | Use Modules | Daily Running Hours | Days of Operation | Energy Consumption | Electricity Consumption |
|-------------------|----------------|------|------------|-------------|--------------------|------------------|-------------------|------------------------|
|                   | W/m² | m²  | KW         |             | h                 | d                | KWh               | KWh                   |
| Heating           | 80   | 428 | 342.91     | 0.6         | 8                 | 99               | 162954.44        | 2                     |
|                   | 6.47 | 76  |             |             |                   |                  | 35               |                       |
| Cooling           | 110  | 428 | 471.51     | 0.6         | 8                 | 120              | 271590.73        | 4.6                   |
|                   | 6.47 | 17  |             |             |                   |                  | 92               |                       |

**Table 6. Multi-connector heating energy conversion table.**

| Electricity Consumption | Conversion Factor | Standard Coal |
|-------------------------|-------------------|---------------|
| Thousand KWh            |                   | tce           |
| 814770                  | 0.312             | 25.4          |
| 590410                  | 0.312             | 18.4          |
| Total                   |                   | 43.8          |

The multi-connector heating consumes 43.8tce.

(4) Electricity consumption for components other than air conditioning.

According to "National Civil Building Engineering Design Technical Measures - Green Building Energy Saving Special" (Electrical), the electrical power density of sports building design is 40w/㎡, according to which the electricity consumption of other parts besides air conditioning is calculated as follows.
Table 7. Calculation table for each component load except air conditioning.

|                         | Lighting | Ventilate | Plumping | Equipment | Other | Total |
|-------------------------|----------|-----------|----------|-----------|-------|-------|
| Percentage of Load      | 36%      | 26%       | 28%      | 11%       |       | 100%  |
| Power Density (w/m²)    | 10       | 12        | 13       | 5         |       |       |
| Building Area (m²)      | 42560.98 | 42560.98  | 42560.98 | 42560.98  |       |       |
| Days of Operation (d)   | 365      | 365       | 365      | 365       |       |       |
| Daily Running Hours     | 10       | 8         | 8        | 8         |       |       |
| Use Factor              | 0.4      | 0.3       | 0.3      | 0.3       |       |       |
| Annual Power Consumption (kWh) | 621390 | 447401 | 484684 | 186417 | 186417 | 1739892 |

Table 8. Other parts consumption.

| Electricity Consumption | Conversion Factor | Standard Coal |
|-------------------------|-------------------|---------------|
| kWh                    | tce               |               |
| 1739892                | 0.312             | 542.8         |

Other than the air conditioner the other parts consume 542.8 tce of electricity.

(5) Total annual electricity consumption of the project

The total annual electricity consumption of the project is 87.9+137.3+43.8+542.8=811.8 tce.

3.6.2. Energy Consumption for Air Conditioning and Heating. The heat consumption of the project is mainly used for air-conditioning heating of the building in winter, which is calculated according to the following formula.

\[ Q_a = 0.0036T_a N Q_a \frac{t_i-t_o}{t_i-t_o} \] (1)

- Heat consumption for air conditioning heating (GJ)
- Average daily hours of operation of air conditioning units during the heating period (h)
- Number of heating period days (d)
- Air conditioning winter design heat load (kW)
- Calculated indoor temperature (°C)
- Average outdoor temperature during the heating period (°C)
- Average outdoor temperature of air conditioning in winter (°C)

Table 9. Based on the previous calculations, the winter heating heat load for centrally heated buildings is obtained as follows.

| Working Condition | Heat Load Indicator (W/m²) | Area (m²) | Thermal Load (KW) |
|-------------------|-----------------------------|-----------|-------------------|
| Heating           | 78                          | 3500      | 273               |

Table 10. The annual heating heat consumption is calculated in the following table.

| Number of Heating Operating Days | Indoor Calculated Temperature | Average Outdoor Temperature during Heating Operation | Calculated Outdoor Temperature of Air Conditioner in Winter | Heat Consumption of Air-Conditioning Heating (GJ) |
|----------------------------------|--------------------------------|------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------|
| d                                | °C                             | °C                                                  | °C                                                       | GJ                                             |
| 99                               | 20                             | 2.1                                                 | -5                                                      | 1672                                           |

The annual heating heat consumption is 1672 GJ equivalent to 57 tce.
3.6.3. Water Consumption. This project calculates water consumption separately according to the nature of use of each room and the characteristics of the project itself.

**Table 11.** Project daily water consumption calculation table.

| Building Usage | Water Indicator | Usage Quantities | Average Daily Water Consumption (m³/d) | Frequency (day or times) | Total Annual Water Consumption (m³) |
|----------------|-----------------|------------------|-------------------------------------|-------------------------|-----------------------------------|
| Athletes       | 40 L/person-day | 100 person       | 4                                   | 48                      | 192                               |
| Audience       | 3 L/person-day  | 1000 person      | 3                                   | 48                      | 144                               |
| Apartments     | 150 L/person-day| 20 person        | 3                                   | 365                     | 1095                              |
| Road Square    | 0.2 L/person-day| 40000 m²         | 4                                   | 24                      | 192                               |
| Total          |                 |                  |                                     |                         | 1623                              |

**Table 12.** Water Consumption.

| Water Consumption (m³) | Conversion Factor | Standard Coal (tce) |
|------------------------|-------------------|---------------------|
| 1623                   | 0.0857            | 139.1               |

The water consumption of this project is equivalent to 139.1tce.

3.6.4. Comprehensive Energy Consumption of The Project. Based on the calculations, the following table shows the annual combined energy consumption of the project:

**Table 13.** Annual combined energy consumption of the project.

| Energy Category     | Annual Energy Consumption (tce) |
|---------------------|---------------------------------|
| Electrical Power    | 811.8                           |
| Heating Usage       | 57                              |
| Domestic Water      | 139.1                           |
| Total               | 1007.9                          |

The comprehensive energy consumption of the project is equivalent to 1007.9tce, and the energy consumption per unit area is 23.7kgece/m².

4. Project Conclusions

The selection of water, electricity, and heating for the project is reasonable and compatible with the surrounding supply conditions, and the green construction energy conservation measures are comprehensive, reasonable, and feasible. The preparation depth of the project green construction energy-saving assessment report meets the requirements of the Interim Measures for Assessment and Review of Green Construction Energy Saving in Fixed Asset Investment Projects, focusing on energy supply, energy consumption, and energy efficiency levels, and the analysis is based on reliable grounds. In the next phase of work, the calculation indexes should be taken in strict accordance with the green building energy efficiency standards.

This article analyzes and elaborates the green building energy-saving plan of the public building project. Through analysis and evaluation of the building energy-saving plan of the project, it has important practical significance for the rational use of energy, the improvement of energy efficiency, and the promotion of industrial structure adjustment and industrial upgrading.
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