



中国建筑科学研究院有限公司
China Academy of Building Research

Webinar on Designing Energy Efficient Buildings in SAARC Region

Development of Green Building in China and Main Technical Standards

中国绿色建筑发展与主要技术标准

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A Brief Introduction of China Academy of Building Research (CABR)



China Academy of Building Research (CABR) was founded in 1953.

CABR is now the largest comprehensive R&D institution in the building industry of China.

A Brief Introduction of China Academy of Building Research (CABR)

Main business:

- (1) Carry out common, basic and public **technical research** to put forward solutions for key technical problems.
- (2) Develop and manage main **technical standards and codes** for building industry of China.
- (3) Exercise **quality supervision and testing** on construction, air-conditioning equipment, solar water heater, elevator, building materials and building energy efficiency.
- (4) Develop new technologies and products** for the market, **provide services** in the fields of design, urban planning, quality inspection of construction engineering and products, R&D and production of new technologies and products, and engineering contracting.



CONTENTS

1、 Overview of Status

2、 Policy Promotion

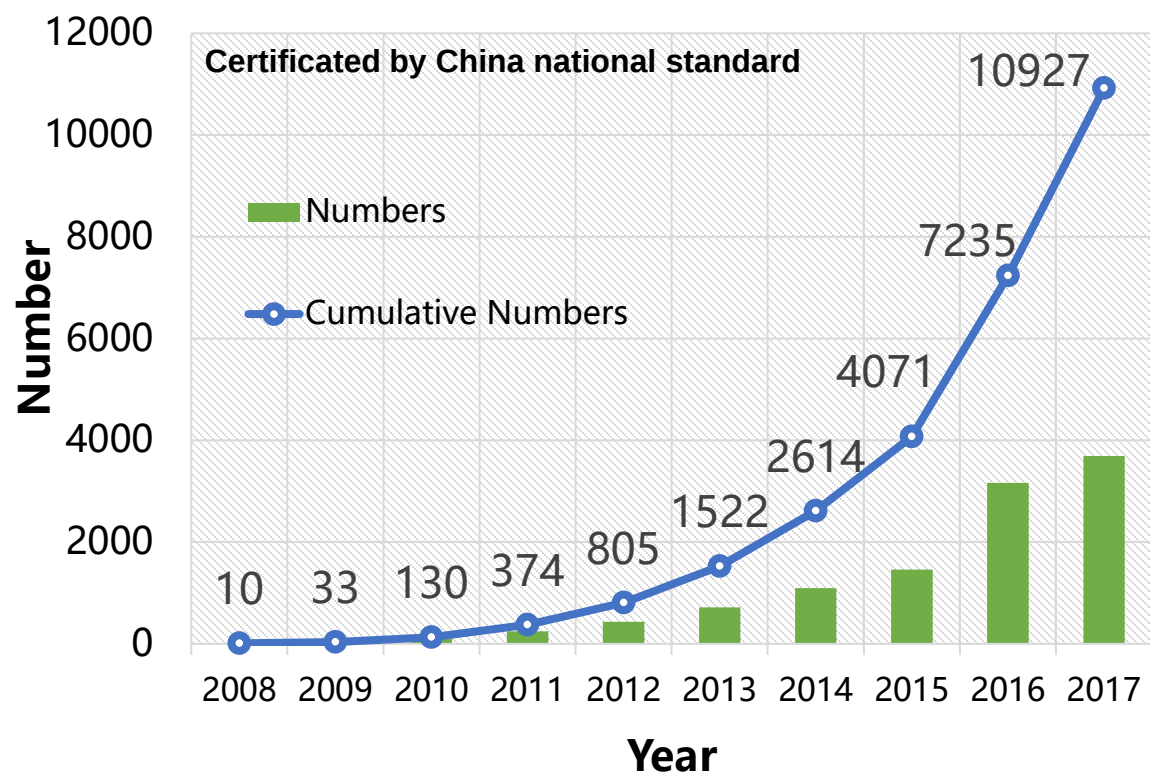
3、 Standard System

4、 Introduction of Latest Standard

5、 Prospect



1、Overview of Status



- In recent years, practice of green building in China is steadily promoting.
- The whole society has gradually improved the concept and understanding of green buildings.
- The number of green buildings goes up rapidly year by year. As of 2017, a total of **10927** green buildings have been certificated, with a area of more than **1 billion m²**.
- As of 2018, the total area of green buildings in China reached **2.5 billion m²**.
- The green buildings account for **56%** within the whole new buildings in 2018.



1、Overview of Status

The benefits of green building represent obviously:

Analyzed from the operation data of 200 green building projects :



Average ratio of energy-saving: **58%**



Average ratio of green space: **38%**



Average ratio of water saving: **15.2%**



Average ration of recyclable materials utilization: **7.7%**

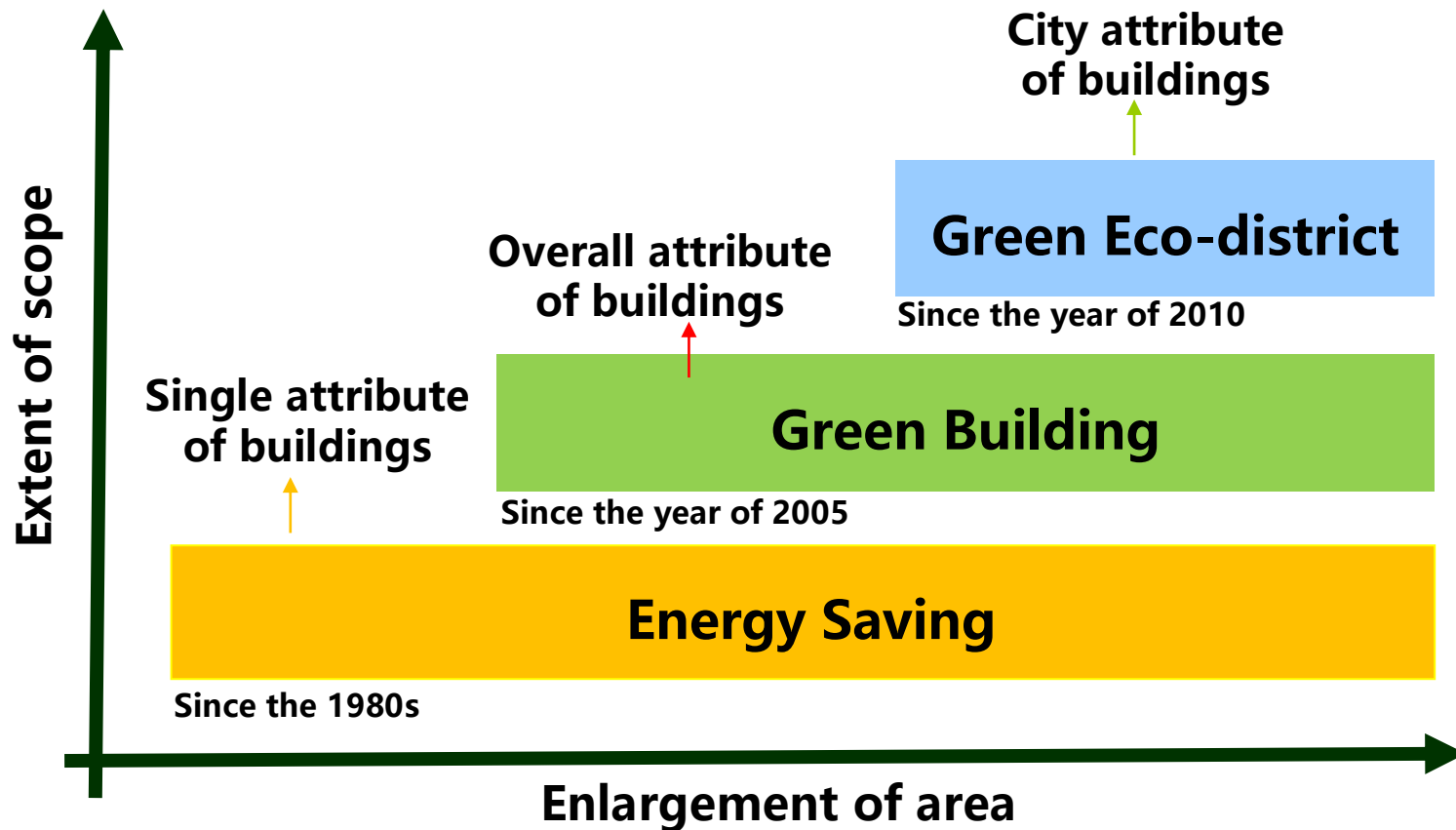


Average CO₂ emission reduction: **28.2 kg/m²**



1、Overview of Status

Upgrade: **Energy Saving-Green Building-Green Eco-district**



- Expand the green development scope from single building to a district.
- The sustainable development covers the buildings and cities.
- Nowadays, almost all the new buildings in China shall meet the requirements of green building.



1、Overview of Status

The promotion of green building in China is a very successful practice.

Why is the development of green building in China so fast and sustainable?

How does the green building development grow?

What has been done to promote the development of green building?

- ✓ The policy support is the driven force.
- ✓ The technical research is the guarantee .
- ✓ The improving standard system is the basic.
- ✓ The certificated projects is the experience source.



CONTENTS

1、 Overview of Status

2、 Policy Promotion

3、 Standard System

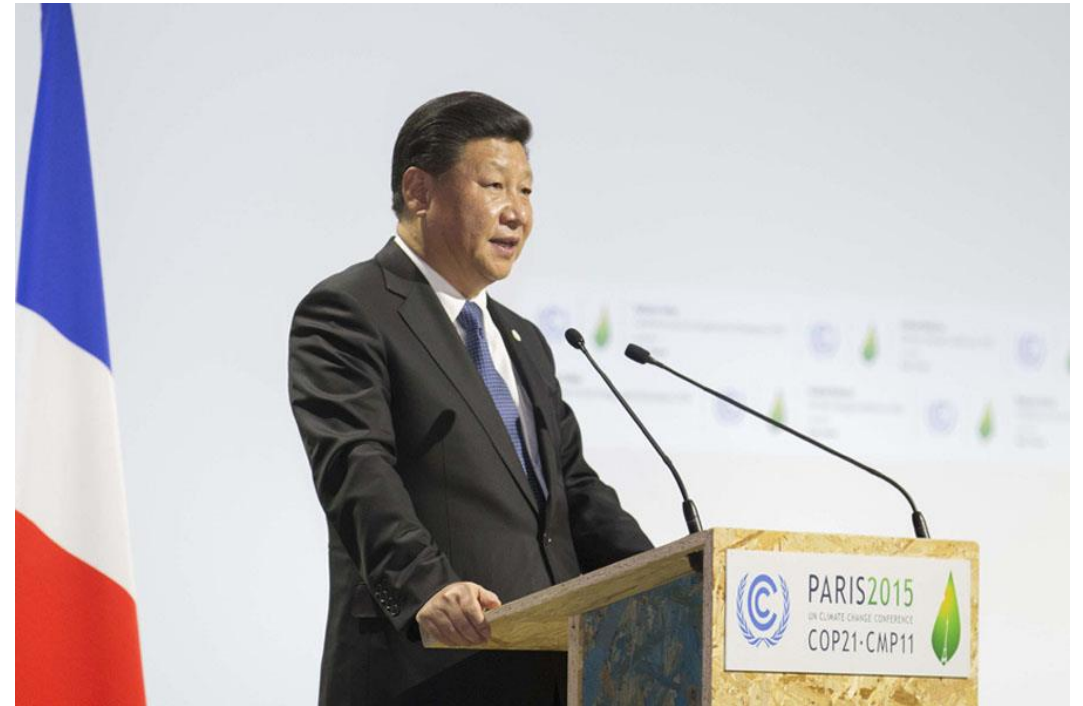
4、 Introduction of Latest Standard

5、 Prospect



2、 Policy Promotion

- Leaders value green development.
- According to the speech delivered by **Chinese President Xi Jinping** in World Climate Change Conference 2015 (COP21), **developing green building** is one of the ways to form a new pattern of the harmony between human and nature.





2、Policy Promotion



- **Green Development** is one of the five development vision of China.
- New Architecture Principle of China: Applicable, Economical, **Green** and Beautiful.



2、Policy Promotion

National Policies

- ◆ 2006.2 《国家中长期科学和技术发展规划纲要（2006-2020年）》（国发〔2006〕6号）
National Mid-term and Long-Term Science and Technology Development Plan(2006-2020)
- ◆ 2012.4 《关于加快推动我国绿色建筑发展的实施意见》（财建〔2012〕167号）
Implementation Suggestions on Accelerating Green Building Development
- ◆ 2012.5 《“十二五”绿色建筑科技发展专项规划》（国科发计〔2012〕692号）
The “Twelfth Five-Year Plan” for Technological Development of Green Building
- ◆ 2013.1 《绿色建筑行动方案》（国办发〔2013〕1号）
Green Building Action Plan
- ◆ 2013.4 《“十二五”绿色建筑和绿色生态城区发展规划》（建科[2013]53号）
Development Plan for Green Building and Green Ecological Urban Areas during the “Twelfth Five-year Plan” Period
- ◆ 2013.12 《关于保障性住房实施绿色建筑行动的通知》（建办[2013]185号）
Notice on Implementing Green Building Action of Security Housing
- ◆ 2014.3 《国家新型城镇化规划（2014-2020年）》
National New-type Urbanization Plan (2014-2020)



2、Policy Promotion

National Policies

- ◆ 2014.6 《能源发展战略行动计划（2014-2020年）》（国办发〔2014〕31号）
Energy Development Strategy Action Plan (2014-2020)
- ◆ 2014.10 《关于在政府投资公益性建筑及大型公共建筑建设中全面推进绿色建筑行动的通知》（建办科[2014]39号）
Notice on Comprehensively Promoting the Green Building Action in Public Service Buildings and Large Public Buildings Construction Invested by the Government
- ◆ 2015.2 《关于开展“十三五”国家重点研发计划优先启动重点研发任务建议征集工作的通知》（国科发资〔2015〕52号）
Notice about Carrying Out the Suggestions Collection Work of the “13th Five-Year Plan” National Important Research Plan Preferentially Starting Important Research Tasks
- ◆ 2016.2 《城市适应气候变化行动方案》（发改气候〔2016〕245号）
Urban Adaptation to Climate Change Action Plan
- ◆ 2016.2 《关于进一步加强城市规划建设管理工作的若干意见》
Several Opinions on Further Strengthening the Urban Planning and Construction Management
- ◆ 2017.3 《建筑节能与绿色建筑发展“十三五”规划》
The 13th Five-Year Plan for Development of Building Energy Conservation and Green Building



2、Policy Promotion

National Policies

□ 《国家中长期科学和技术发展规划纲要（2006-2020年）》中，将“建筑节能与绿色建筑”作为重点领域“城镇化与城市发展”下的优先项目。提出中国绿色建筑发展总体战略目标是以实现国家“十一五”规划约束性指标为契机，促进绿色建筑发展，大力发展节能省地型住宅，通过实现绿色建筑的“四节一环保”推动中国可持续发展。

National Mid-term and Long-Term Science and Technology Development Plan (2006-2020) made “building energy-saving and green building” as the priority project under the important areas of “urbanization and urban development”. We will promote the sustainable development of China through the realization of green building’s “four saving and one environmental protection”.

According to this policy, many technology research projects conducted to promote the development of technologies.



2、Policy Promotion

National Policies

□ 《国家新型城镇化规划（2014-2020年）》中，发展目标中提到绿色建筑比例大幅提高。并明确加快绿色城市发展的途径，包括：实施绿色建筑行动计划；完善绿色建筑标准及认证体系，扩大强制执行范围；大力发展绿色建材；政府投资的公益性建筑、保障性住房和大型公共建筑全面执行绿色建筑标准和认证。

National New-type Urbanization Plan (2014-2020):

Development goals mentioned, the proportion of green building will be greatly increased. And clearly point out the approaches to speed up the development of green city, including:

- To implement the Green Building Action Plan;
- To improve the green building standard and certification system, expand the scope of enforcement;
- To develop the green building material;
- To fully implement green building requirements and certification in the buildings which are invested by government, government-subsidized housing and large-scale public buildings.



2、Policy Promotion

National Policies

- 《建筑节能与绿色建筑发展“十三五”规划》，全面推动绿色建筑发展量质齐升，到2020年城镇新建建筑中绿色建筑面积比重超过50%。十三五期间，获得绿色建筑评价标识项目中，二星级及以上级项目比例超过80%，获得运行标识项目比例超过30%。

The 13th Five-Year Plan for Development of Building Energy Conservation and Green Building:

The **amount** and **quality** of green building to be simultaneously improved. By 2020, the proportion of green building in urban new buildings exceeds 50%. During the 13th Five-year period, the percentage of two-stars and three-stars green buildings exceeds 80%, the percentage of projects which gain Green Building Operation Label ups to 30%.



CONTENTS

1、 Overview of Status

2、 Policy Promotion

3、 Standard System

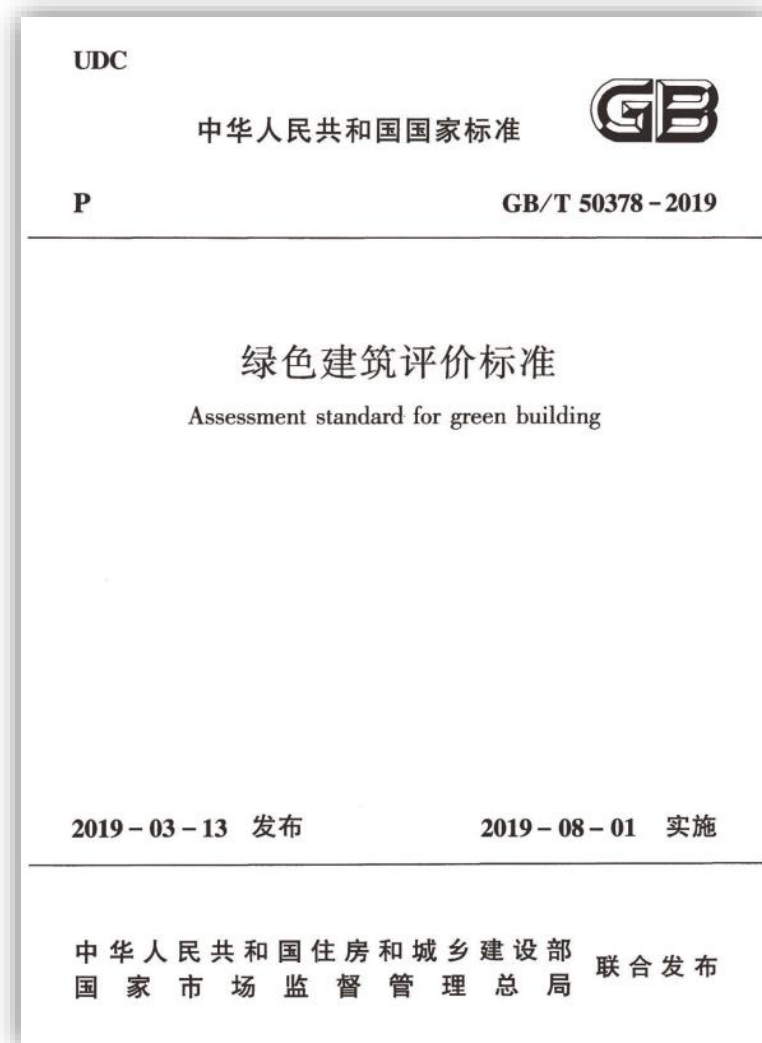
4、 Introduction of Latest Standard

5、 Prospect



3、Standard System

- The definition, assessment index and assessment method of green building are clarified in the national standard **Assessment Standard for Green Building (GB/T 50378)**.
- GB/T 50378 plays a significant role in promoting the development of green building in China.
- Based on GB/T 50378, standard system of green building in China has formed, and goes towards a refined trend.





3、Standard System

Green Building Standard System covers the whole building life cycle

Assessment Stage

- Assessment standard for green building (GB/T 50378)
- Assessment standard for green eco-district(GB/T 51255)
- Assessment standard for green campus(GB/T 51356)

Retrofitting Stage

- Assessment standard for green retrofitting of existing building(GB/T 51141)
- Technical standard for green retrofitting of existing community(JGJ/T 425)

Design Stage

- Code for green design of civil buildings(JGJ/T 229)
- Standard for green performance calculation of civil buildings(JGJ/T 449)

Construction Stage

- Evaluation standard for green construction of building(GB/T 50640)
- Code for green construction of building(GB/T 50905)

Operation Stage

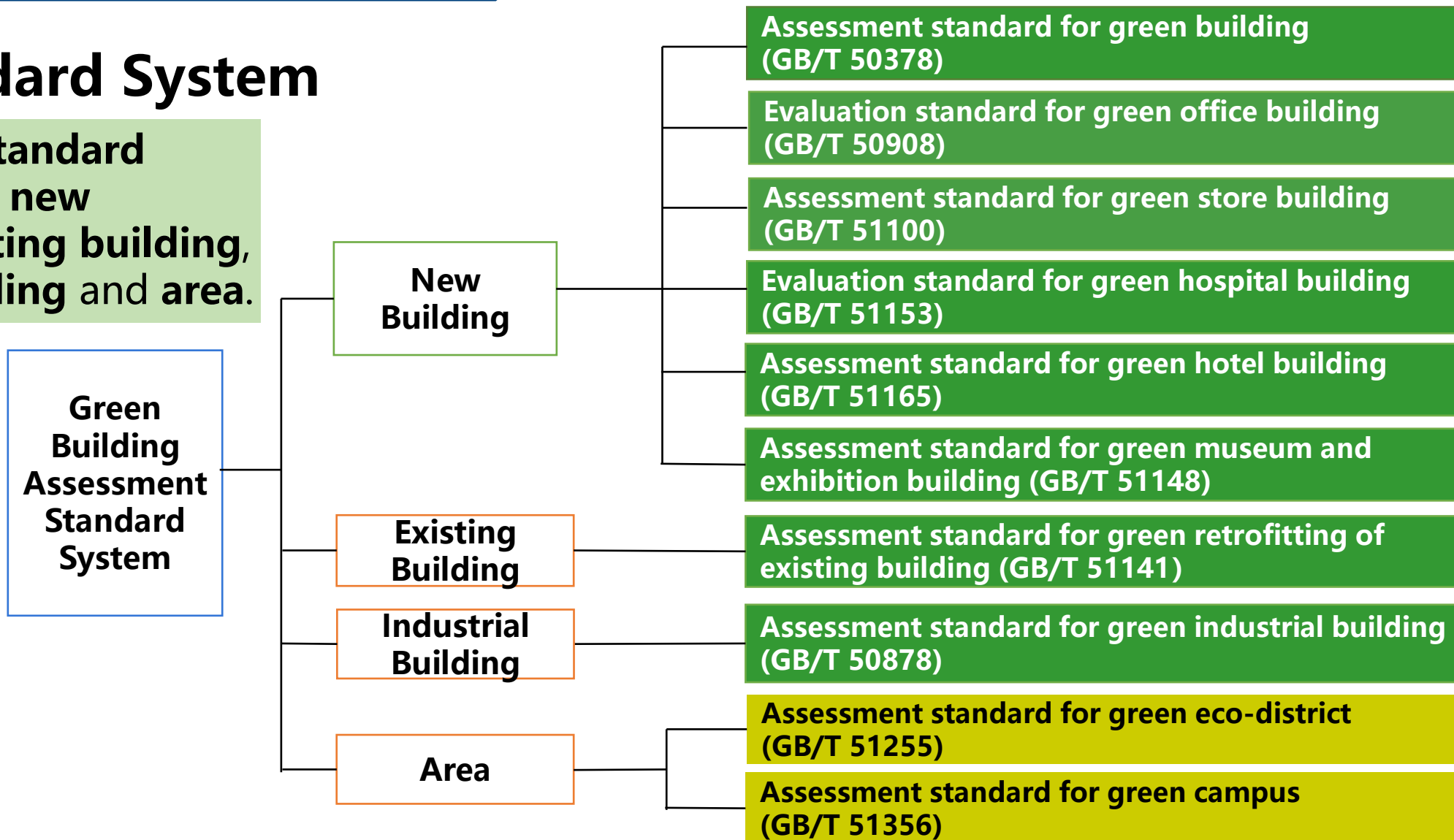
- Technical code for operation and maintenance of green building(JGJ/T 391)
- Standard for test and assessment of green lights(GB/T 51268)





3、Standard System

Assessment standard system covers new building, existing building, industry building and area.





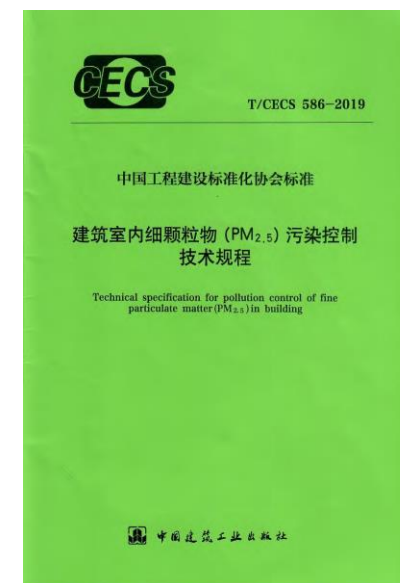
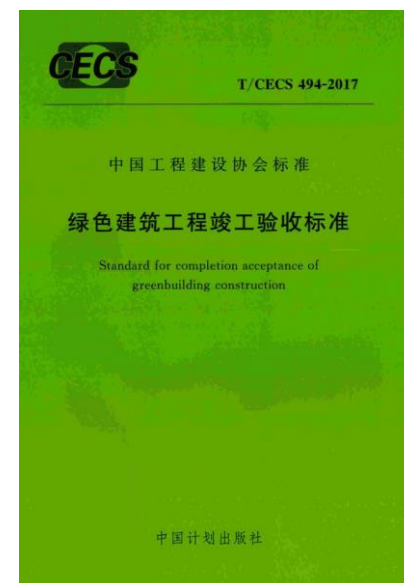
3、Standard System

Local Standards & Group Standards

Local Standards: Different provinces allowed to develop their own standards according to the regional characteristics of cities (climate, economic, development level, etc.).



Group Standards: Academic groups, such as organizations, association and alliance, to be allowed to develop standards to fill the blank of national standards and industry standards.





CONTENTS

1、 Overview of Status

2、 Policy Promotion

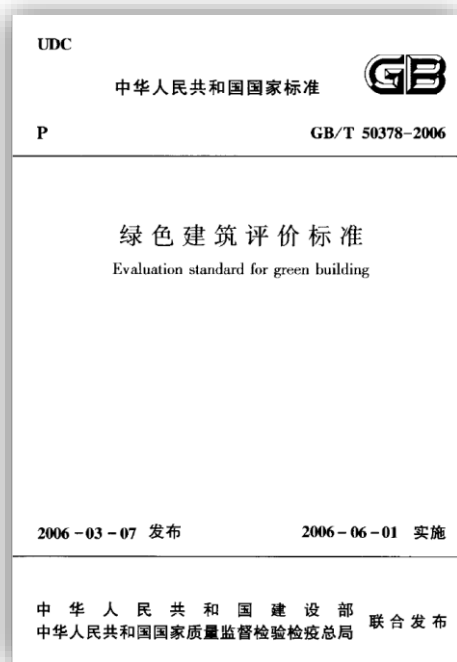
3、 Standard System

4、 Introduction of Latest Standard

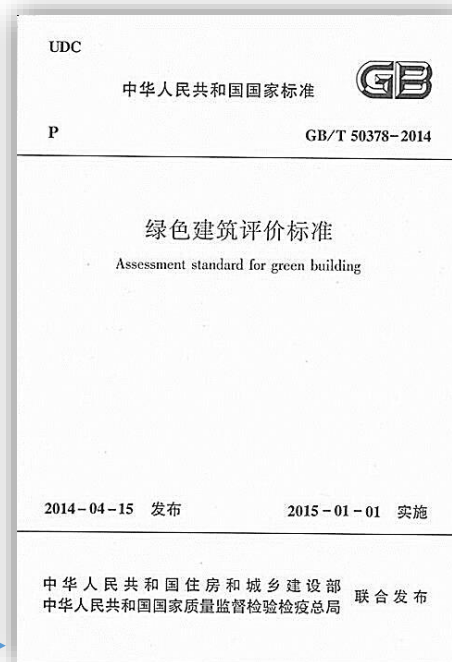
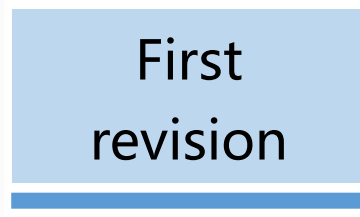
5、 Prospect

4、Introduction of Latest Standard

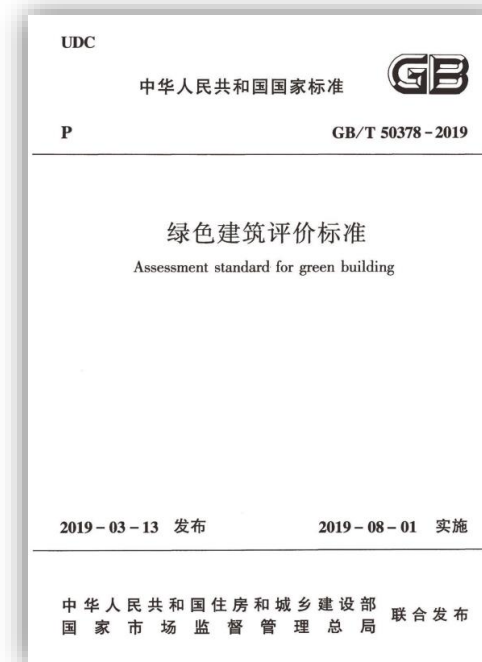
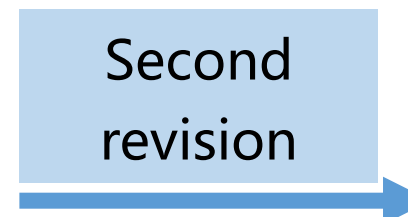
■ Process: “Three versions & Two Revisions” of GB/T 50378



First version
issued in 2006



Second version
issued in 2014



Third version
issued in 2019

4、Introduction of Latest Standard

■ Revision Background

- **New requirements of 19th CPC National Congress:**
 - To meet the people' s ever-growing needs for a better life in the new era.

- **New demands of green building in new era**
 - To follow the new technologies and concepts in building industry
 - To innovate green building assessment technology index system
 - To meet the high quality development demand of green building

4、Introduction of Latest Standard

■ Revision Background

➤ Problems raised in the development process

- More of Design Labels and less of Operational Labels, lack of the actual effects
- People-oriented requirements are not enough, more requirements are required for the performance of building itself (insulation of wall, materials saving, water saving)
- Poor response to the new technologies and concepts under the fast development of building industry
- Perceptible requirements need to improve to let occupants feel the benefits of green building (health, comfort, quality, etc.)



4、Introduction of Latest Standard

■ Revision Highlights

(1) Build an innovative assessment technology index system to meet the people's need for a better life

Establish the core of people-oriented and take the wellbeing of the people as the goal

Before (2006 & 2014 version):

Four saving & one environmental protection

- Landing Saving
- Energy Saving
- Water Saving
- Material Saving
- Environmental Protection



After (2019 version):

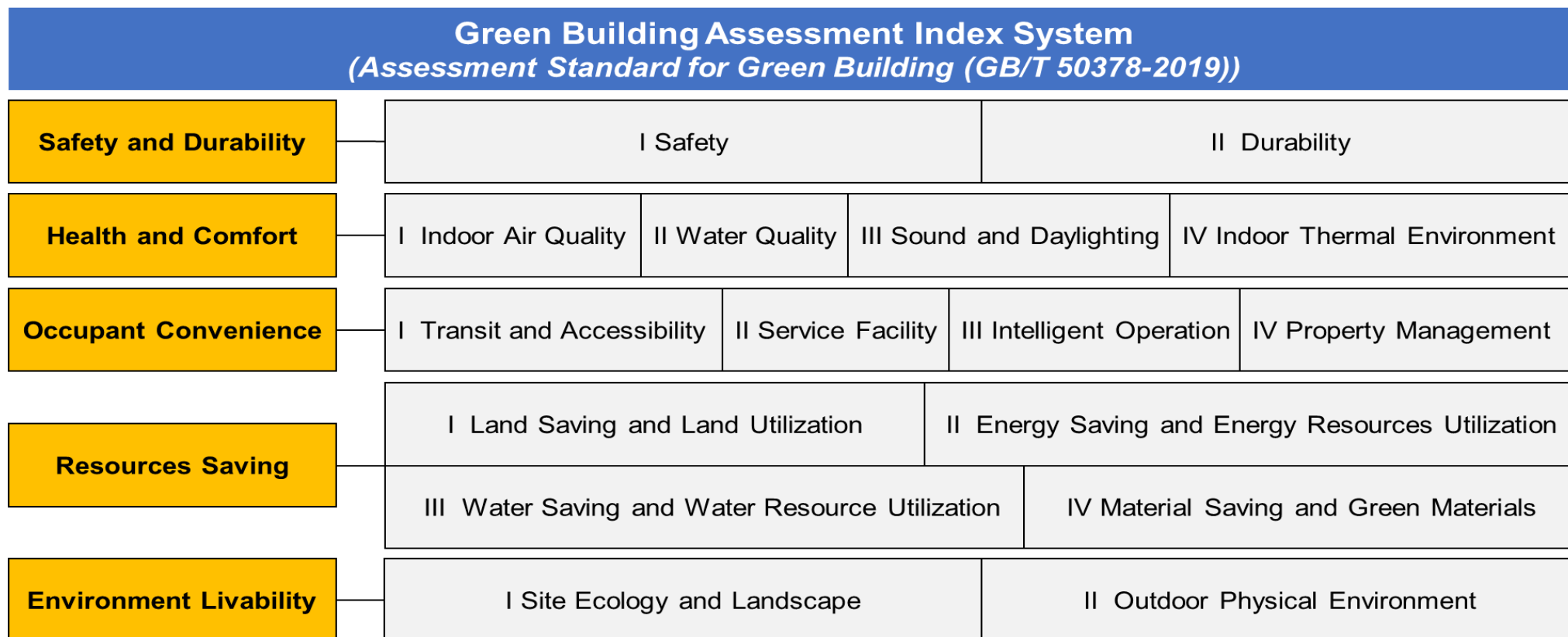
Five performance

安全耐久 Safety and Durability
健康舒适 Health and Comfort
生活便利 Occupancy Convenience
资源节约 Resource Saving
环境宜居 Environment Livability

4、Introduction of Latest Standard

■ Revision Highlights

(1) Build an innovative assessment technology index system to meet the people's need for a better life





4、Introduction of Latest Standard

■ Revision Highlights

(2) Change the assessment stage and emphasize the practical effect

□ 2014 version

Design Assessment: After the review of construction drawing. -----Green Building Design Label.

Operation Assessment: After one year of operation. -----Green Building Label.

□ 2019 version

Assessment of green building can only be allowed when the building project pass the final acceptance.

The Design Assessment is canceled.

The aim of the change is to promote the implementation of green technologies and improve the practical effect.



4、Introduction of Latest Standard

■ Revision Highlights

(3) Add green building grade to promote popularization of green buildings

- **Basic grade**, one - star, two - star, three – star, totally 4 green building grades
 - If all the requirements of “Prerequisite Items” are met, it is “**Basic grade green building**”.
 - The “Prerequisite Items” will write into the mandatory engineering codes of China so as to promote popularization of green buildings and to achieve the goal of “**all the buildings are green**”.



4、Introduction of Latest Standard

■ Revision Highlights

(4) Set four requirements for 1~3 star green building to enhance the green building performance

■ For 1-star, 2-star and 3-star green building:

- ① Set a lowest score for each index;
- ② Shall be fully decorated ;
- ③ Scored 60, 70 and 85 respectively ;
- ④ Meet the additional requirements in the aspects of building envelope thermal performance, sound insulation performance, water saving efficiency, indoor air quality.



CONTENTS

1、 Overview of Status

2、 Policy Promotion

3、 Standard System

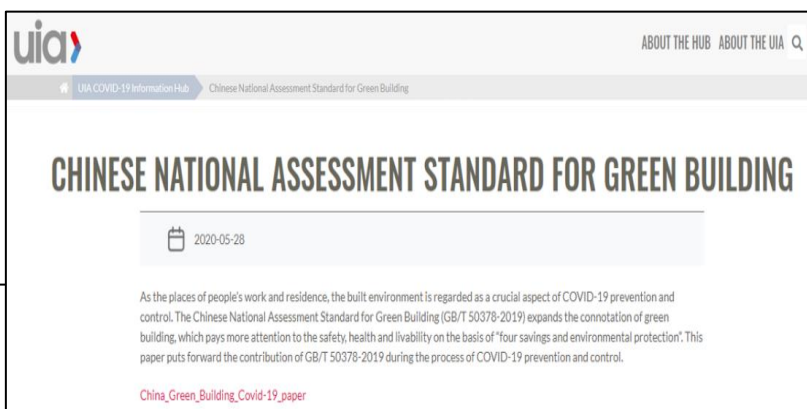
4、 Introduction of Latest Standard

5、 Prospect



5、Prospect

■ The contribution of green buildings in the fight against COVID-19



World Green Building Council(WGBC) and the International Union of Architects (UIA) affirm the contribution of GB/T 50378-2019 in the fight against COVID-19:

- Providing the basic functions for epidemic prevention and control
- Providing convenience and facilities for epidemic prevention and control
- Reducing the risk of infection and preventing cross infection
- Promoting and protecting the health of occupants
- Stabilize work and living environment during the epidemic prevention and control



Home > News & Media > The contribution of green buildings in the fight against COVID-19

The contribution of green buildings in the fight against COVID-19

Monday 23rd March 2020





5、Prospect

■ Development branch of the green building

- **Healthy China** is one of strategies on China' s development.
- **Healthy Building**, which focuses on the health of the people, is one of the ways to response the Healthy China Strategy, as well as one of the development branches on the basis of green building.
- **Assessment standard for healthy building (T/ASC 02)** released in 2016.





Thank you !

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