



Developments of Green Building Standards in China



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ABSTRACT

There are 17 green building standards (including those under development) at country level and another 50 or more at provincial level in China. Based on background and status overview of green building standards, problems are analyzed. It is followed by a systemic scheme for green building standard system, which includes 3 layers of basic, general and specialized standards, and its development planning as well. Some suggestions are proposed for green building standards development in this paper.

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1. Introduction

China has explicitly stated the green building construction during the current Five-Year Plan from 2011 to 2015 [1]. Required by the State Council in the working scheme of energy saving and emission reduction [2], China's Green Building Action Plan has been launched in January, 2013 [3]. Besides the action target of constructing green buildings of 1 billion square meter floor area and making 20% of new construction building projects compliance with green building standards by 2015, the Action Plan addresses establishment and improvement of green building standard system.

Compared to building energy efficiency standards [4–6] and building energy code [7], research on green building standard is insufficient in China. The authors who proposed some revision suggestions on the Chinese national standard *Evaluation Standard for Green Building* (GB/T50378-2006) in previous paper [8], are going to focus on Chinese green building standard system in this paper, by reviewing current status and then proposing a systemic scheme.

2. Overview on green building standards

2.1. Background

According to Standardization Law of the People's Republic of China [9], the department of standardization administration under the State Council is in charge of the unified administration of

standardization throughout the country. That makes the government playing a key role on standards. For now, the department is the General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ). The law also states different application scopes of four types of standards, namely national standard, trade standard, local standard (or provincial standard) and enterprise standard. The difference between national standard and trade standard is that, national standard is formulated by the AQSIQ, whilst trade standard is formulated by competent departments or administrative authorities under the State Council and reported to AQSIQ for the record. Besides, a trade standard may be upgraded to a national standard, and hence became annulled on publication of the national standard. All national and local standards are distinguished by the letters 'GB' and 'DB' in front of the standard numbers, respectively. But the letters in front of the numbers of trade standards vary with the trade (or sector). For example, the letters 'JGJ' indicate the standards for the trade (or sector) of civil buildings.

In the implementation regulation of the law [10], standards of some special categories, including hygienic, engineering, environment and military, are formulated by other departments other than AQSIQ. Currently, the departments formulating hygienic standard, engineering standard and environmental standard is National Health and Family Planning Commission (NHFPC), Ministry of Housing and Urban-Rural Development (MOHURD) and Ministry of Environmental Protection (MEP), respectively. Apart from these special categories, all other standards are usually called as product standards. Administrative authorities of these standards of different categories are as shown in Table 1.

In addition, note that a Chinese standard could be either mandatory or voluntary, according to the law. In some sense, the mandatory standards are more likely to be regulations or codes.

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Table 1
Administrative authorities of national and trade standards of different categories.

Scope	Product standards	Hygienic standards	Engineering standards	Environment standards
National	AQSIQ	NHFPC	MOHURD	MEP
Trade	Competent administrative authorities	NHFPC, MOA, etc.	MOHURD, MWR, CEC, MOT, etc.	MEP

Note: MOA is Ministry of Agriculture, MWR is Ministry of Water Resources, CEC is China Electricity Council and MOT is Ministry of Transport.

There might be some mandatory provisions in a standard as well, although other provisions in the standards are voluntary. The standards with all provisions voluntary are distinguished by adding a letter 'T' in front of their standard numbers. For example, the number of *Evaluation Standard for Green Building* is GB/T50378, indicating all provisions voluntary in it.

Aside from those product standards related to building material, equipment and fittings, engineering standards have the closest relationship with green building. Engineering standards covers about 15 sectors, such as urban and rural planning, municipal infrastructure, civil building, industrial building, hydraulic, electrical power, port & waterway, highway, railway and so on. MOHURD is fully in charge of standardization administration in the first 3 engineering sectors, which are all concerned with green buildings.

2.2. Current status

All Chinese standards (including some approved normative documents) for green building except enterprise standard are summarized in Tables 2 and 3. There are 17 national and trade standards (including those under development), and more than 50 local standards (including those under development).

The features of current Chinese standards for green building could be deduced as follows:

- A majority of standards are for green building evaluation. As several standards got developed and issued in recent 2 years, evaluation standards cover almost all lifecycle stages of all types of building in all regions. In terms of lifecycle stage, the standard GB/T50378 applies to both design and operation stage, GB/T50640 applies to construction stage, and *Evaluation Standard*

Table 2
National and trade standards for green building.

Title and number (if possible)	Scope	Category	Enforcement date	Note
<i>Evaluation Standard for Green Building</i> (GB/T50378-2006)	National	Engineering	1st June, 2006	Design or operation stage evaluation of all buildings
<i>Evaluation Standard for Green Construction of Building</i> (GB/T50640-2010)	National	Engineering	1st October, 2011	Specific stage evaluation
<i>Evaluation Standard for Green Refurbishment of Existing Building</i>	National	Engineering	Under development	Specific stage evaluation
<i>Evaluation Standard for Green Industrial Building</i> (GB/T50878-2013)	National	Engineering	1st March, 2014	Specific building evaluation
<i>Evaluation Standard for Green Industrial Building of Tobacco Industry</i> (YC/T396-2011)	Trade	Product	15th July, 2011	Specific building evaluation
<i>Evaluation Standard for Green Office Building</i> (GB/T50908-2013)	National	Engineering	1st May, 2014	Specific building evaluation
<i>Evaluation Standard for Green Store Building</i>	National	Engineering	Under approval	Specific building evaluation
<i>Evaluation Standard for Green Hospital Building</i>	National	Engineering	Under approval	Specific building evaluation
<i>Evaluation Standard for Green Hotel Building</i>	National	Engineering	Under development	Specific building evaluation
<i>Green Hotels</i> (GB/T21084-2007)	National	Product	1st March, 2008	Partial correlation
<i>Evaluation Standard for Green Exhibition Building</i>	National	Engineering	Under development	Specific building evaluation
<i>Evaluation Standard for Green Railway Station</i>	Trade	Engineering	Under development	Specific building evaluation
<i>Evaluation Standard for Green Campus</i>	National	Engineering	Under development	Specific building evaluation
<i>Evaluation Standard for Green Eco-District</i>	National	Engineering	Under development	Specific building evaluation
<i>Code for Green Design of Civil Buildings</i> (JGJ/T229-2010)	Trade	Engineering	1st October, 2011	For building design
<i>Code for Green Construction of Building</i>	National	Engineering	Under development	For building construction
<i>Code for Operation and Maintenance of Green Building</i>	National	Engineering	Under development	For building O&M

for *Green Refurbishment of Existing Building* will apply to refurbishment or retrofit stage. In terms of building type, there are standards for factories, offices, retails, hospitals, hotels, expo halls, railway stations, and school campus, respectively. In terms of regions, about three quarters of provincial-level regions (including provinces, municipalities, autonomous regions and Special Administrative Regions) already have local standards, and some others are developing their own standards.

- Except for the trade standard YC/T396 and local evaluation standard in Guangxi DB45/T567, almost all standards are engineering standards. Besides evaluation standards, there are codes or specifications for design, construction and operation of green building as well. As the administrative authority of engineering standards, and also one of the major drafting and executive departments of Green Building Action Plan, MOHURD has an inalienable duty to formulate relevant standards to ensure and steer green building development.
- Almost all standards, regardless their title is standard, code or specification, are voluntary. The exceptions are *Evaluation Standard for Green Building for Sino-Singapore Tianjin Eco-City* (DB29-192-2009), which is the only one mandatory among all evaluation standards, *Green Building Design Standard for Sino-Singapore Tianjin Eco-City* (DB29-194-2009), *Technical Specification of Green Building Construction in Tianjin* (DB29-201-2010), *Management Specification of Green Construction in Beijing* (DB11/513-2008) and *Design Standard of Green Building in Beijing* (DB11/938-2012). In Sino-Singapore Tianjin Eco-City, all buildings should be green buildings and meet all prerequisite provisions in local evaluation standard.
- Among all these standards, the standard GB/T50378 is the first issued one and the most popular one. Since its issue in 2006, about 10 national and trade standards and about 30 local standards for green building evaluation have been developed or are being developed on its basis. The new version of this standard, GB/T50378-2014, will come into force on 1st January, 2015.

2.3. Problems

Although standards R&D work for green building has achieved obvious progress in recent years, many problems still exist. Most

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