

April 12th 2013 NORTH STAR CONTINENTAL GRAND HOTEL, Beijing.China

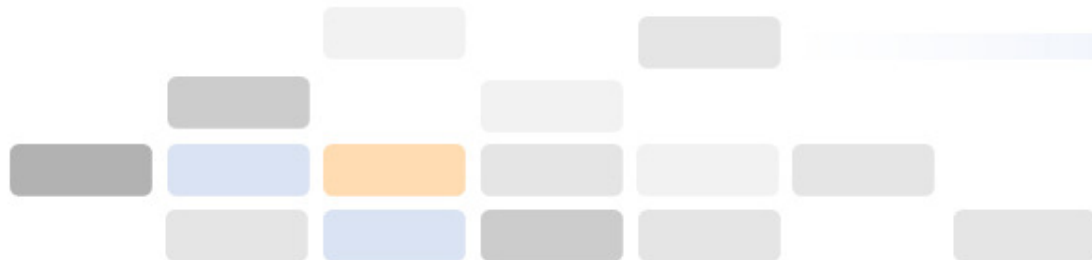
41st Meeting of the APEC Expert Group on Energy Efficiency & Conservation (EGEE&C 41)

EGEE&C project submissions for 2013

Green Building Overview of China

ZHANG SHICONG

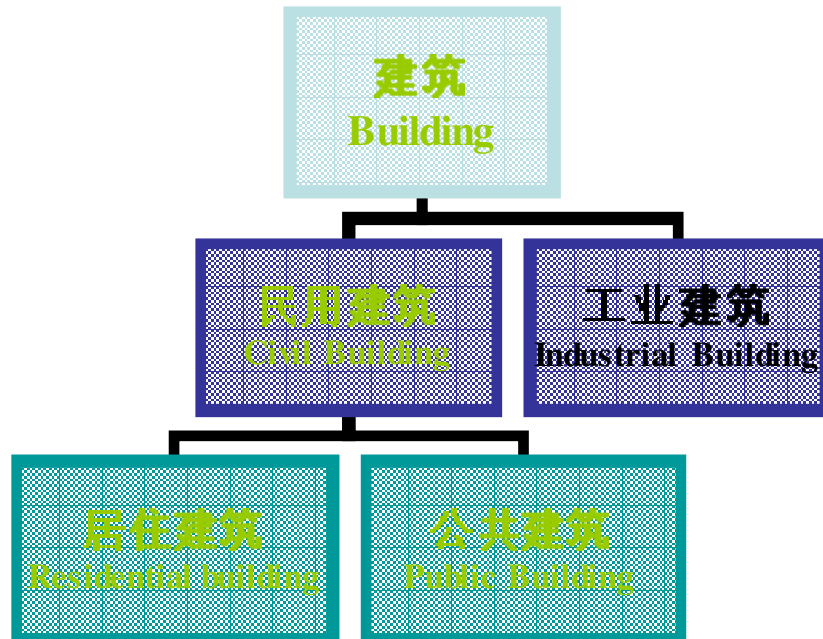
China Academy of Building Research



Contents

- China Building Energy Codes & Standards Overview
- International Building Energy Codes & Standards Comparison Research
- Green Building Standards and Incentive Policies
- Round table discussion in APEC-Green Building Codes Workshop

Building Classification



- Building includes Civil Building and Industrial Building
- Civil Building includes Residential Building and Public Building

- Residential Building:
 - House, apartment, dormitory, the residential part in mixing building, nursery, kindergarten, etc.
- Public Building:
 - Office Building
 - Shopping, Finance Building
 - Hotel and place of entertainment
 - Buildings for education, science, culture, Gymnasium and public health services
 - Buildings for communication, post and broadcasting
 - Buildings for transportation (Airport, Train station, etc.)

China Building Energy Codes & Standards

CAC
 中华人民共和国行业标准
JGJ
 JGJ 26 - 2009
 备案号 J 997 - 2009

严寒和寒冷地区居住建筑节能设计标准

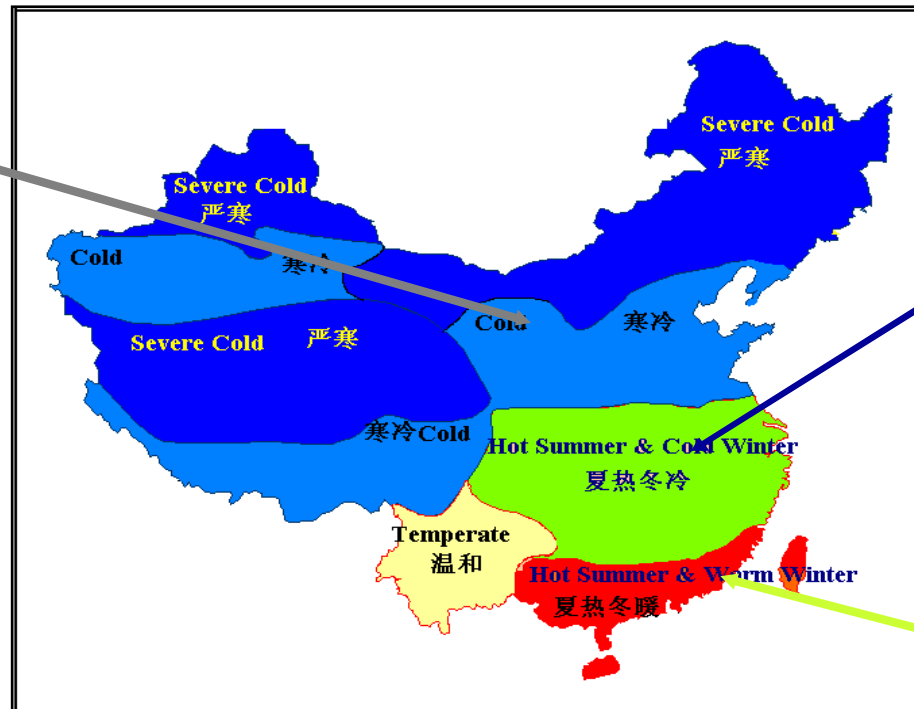
Design standard for energy efficiency of residential buildings in severe cold and cold zones

Latest version.

Implementing on Aug.1st, 2010

2009-03-18 发布 2009-08-01 实施

中华人民共和国住房和城乡建设部 发布



中华人民共和国行业标准

夏热冬冷地区居住建筑节能设计标准

Design Standard for Energy Efficiency of Residential Buildings in the Summer and Cold Water Zone

JGJ 135-2009
2 135-2009

Latest version.

Implementing on Aug.1st, 2010

CAC
 中华人民共和国国家标准
GB
 GB 50189 - 2005

公共建筑节能设计标准

Design standard for energy efficiency of public buildings

Implementing on Jul 1st, 2005;

Under revised

2005-04-04 发布 2005-07-01 实施

中华人民共和国建设部 联合发布
中华人民共和国国家质量监督检验检疫总局

For residential building: Based on climate zone.

For Public building: Not based on climate zone.

中华人民共和国行业标准

夏热冬暖地区居住建筑节能设计标准

Design standard for energy efficiency of residential buildings in hot summer and warm winter zone

JGJ 75-2003
2 75-2003

Implementing on Oct.1st, 2003

Under revised

2003 5. 2

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Background

International:

- Low-carbon and sustainable development
- Building energy efficiency codes upgrade
- Zero-Energy Building.

Domestic:

- Building energy efficiency codes upgrade
- Building energy efficiency VS Cost effective

Comparison economies

International
Organizations



ASHRAE



PNNL



EF China sustainable energy program



CIBSE



BRE



SHASE



REHVA

North American:

- USA

Europe:

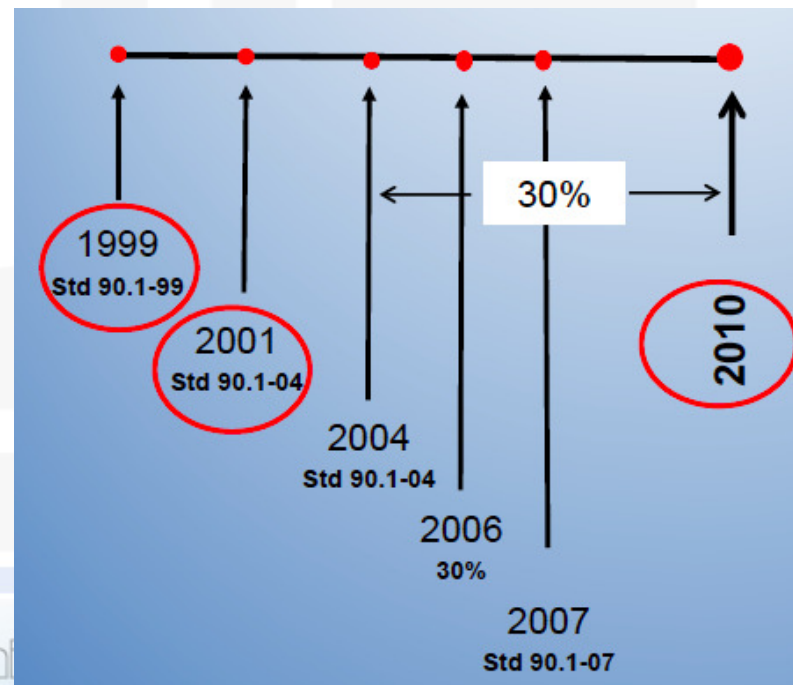
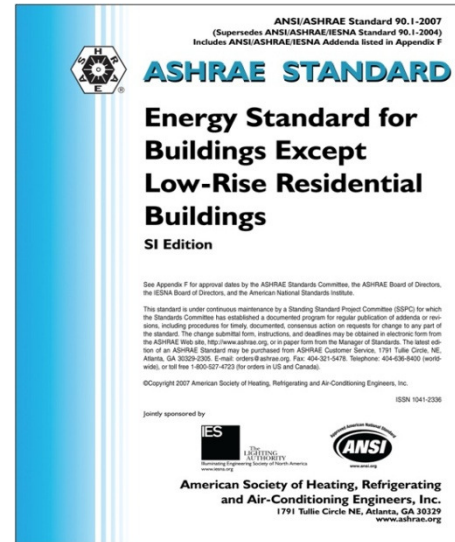
- EPBD
- UK
- Germany
- Denmark

Asia:

- Japan

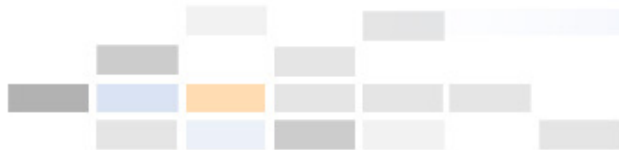
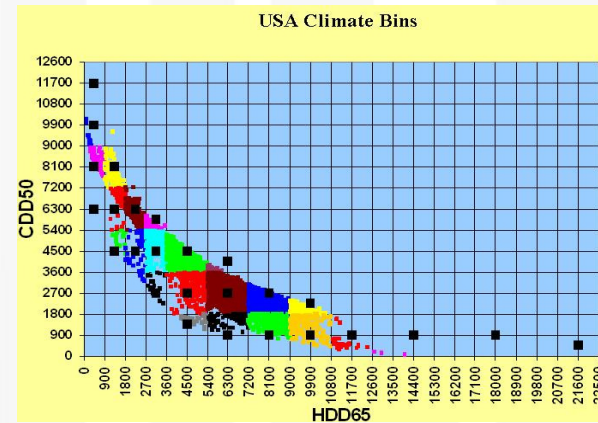
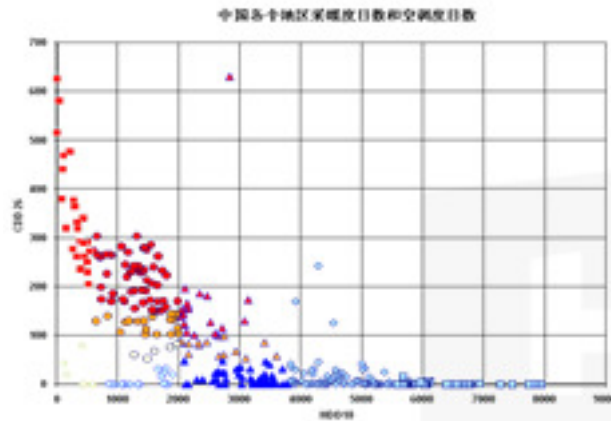
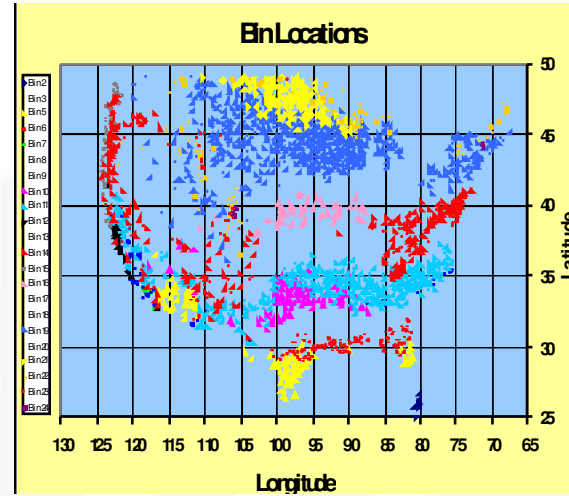
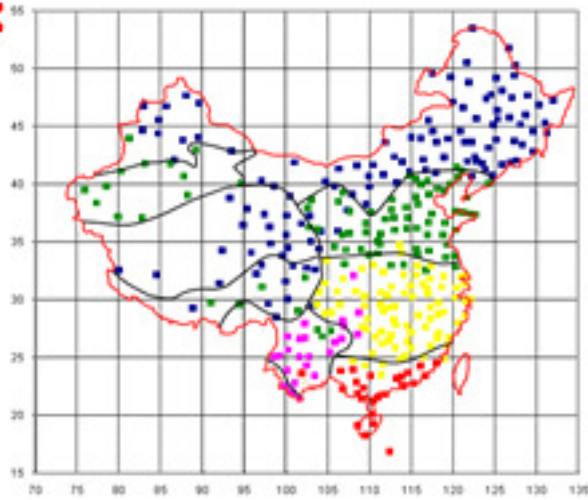
USA:

ASHRAE90.1	IECC系列
90-1975 Energy Conservation in New Building Design	1981: Model Code for Energy Conservation
90A-1980	1983 Model Energy Code
	1986 Model Energy Code
90.1-1989	1989 Model Energy Code
	1992 Model Energy Code
	1993 Model Energy Code
	1995 Model Energy Code
90.1-1999	1998 IECC
	2000 IECC
90.1-2001	2001 IECC
90.1-2004	2003 IECC
90.1-2007	2006 IECC
90.1-2010	2009 IECC






USA:



EU:

- ◆ Energy Performance of Building Directive 2002
- ◆ Energy Performance of Building Directive 2010

Energy Performance of Buildings Directive II



COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 13.11.2008
COM(2008) 780 final
2008/0223 (COD)

Proposal for a

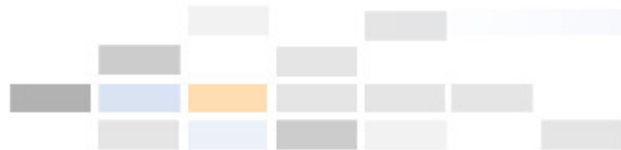
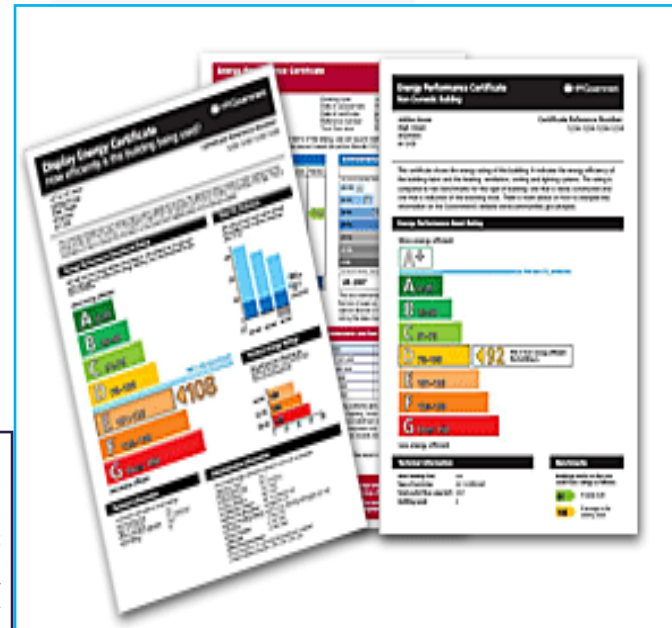
DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on the energy performance of buildings

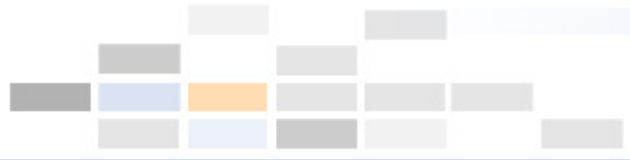
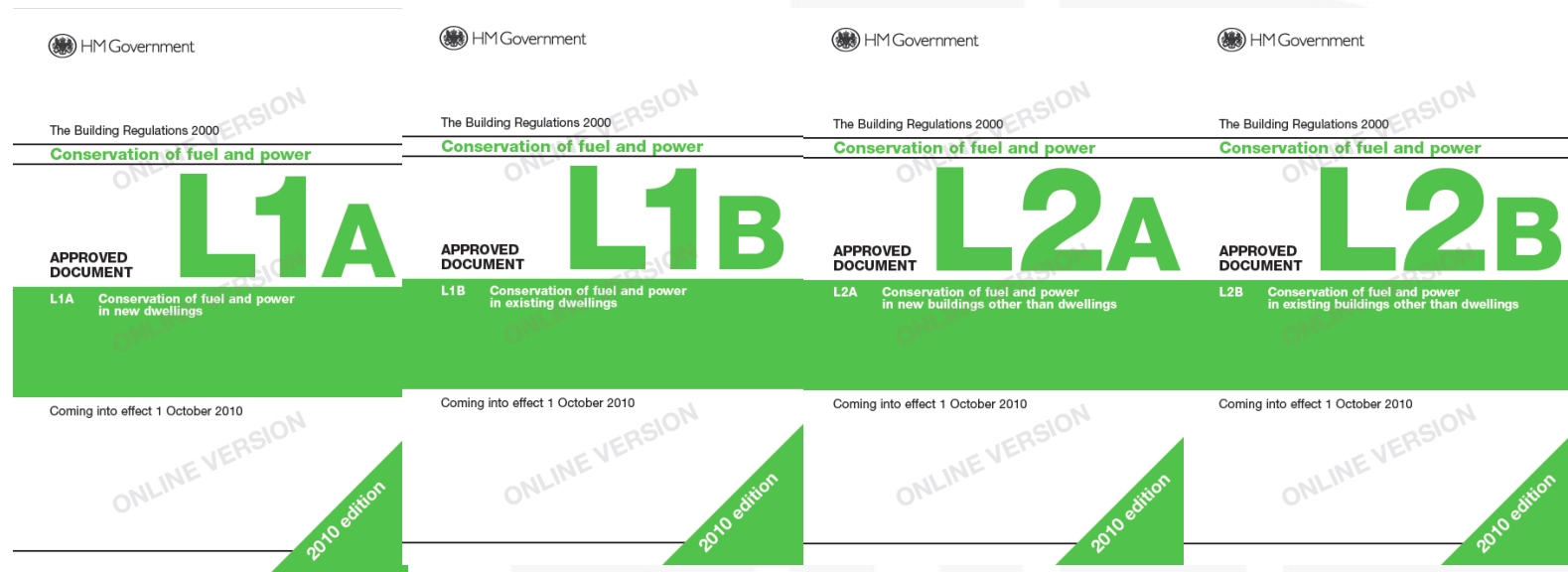
(recast)

1.2. EU policy objectives and the buildings sector

In January 2007, the Commission proposed a comprehensive climate and energy package² containing targets of 20-20-20% reduction of energy consumption and greenhouse gas emissions, and increased share of renewables by 2020. This was endorsed by the 2007 Spring European Council. These targets have been adopted in the light of the mounting scientific evidence of climate change, high energy prices and the growing import energy dependency and its possible geo-political repercussions. The reduction of energy consumption can clearly make a significant contribution to achieving these targets. The buildings sector provides many cost-efficient opportunities for action, while at the same time contributing to the welfare of EU citizens.



UK: BUILDING REGULATIONS-PART L

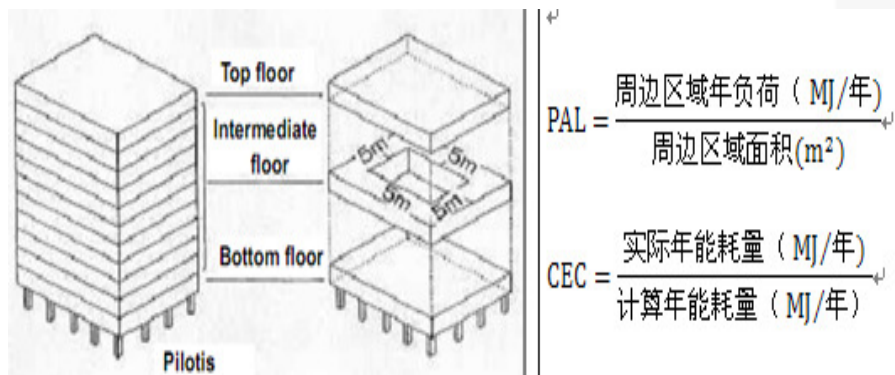


Japan

Criteria for Clients on the Rationalization of Energy Use for Buildings (CCREUB)

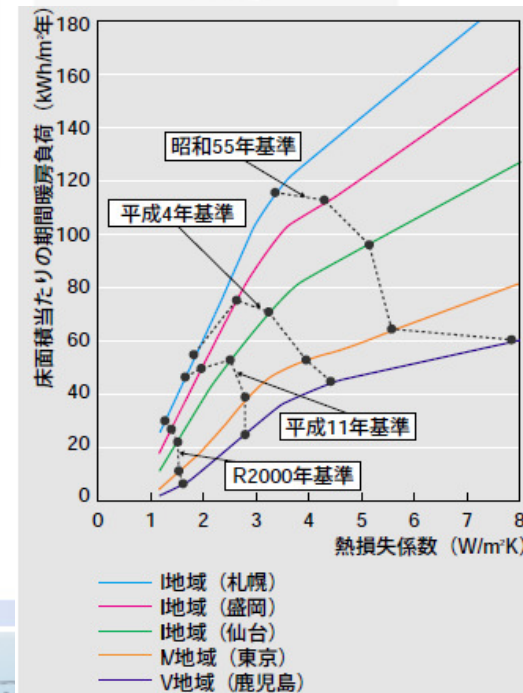
Design and Construction Guidelines on the Rationalization of Energy Use for Houses (DCGREUH)

Criteria for Clients on the Rationalization of Energy Use for Houses (CCREUH)



PAL (Perimeter Annual Load):

CEC (Coefficient of Energy Consumption):



International collaboration

Date	Location	Organization	Meeting TOPIC
August-10	US-ASHRAE headquarter	ASHRAE	China-US building energy efficiency codes and standards workshop
March-11	China-CABR headquarter		China-US building energy efficiency and carbon emission workshop
October-11	UK-BRE headquarter	BRE	China-UK building energy codes and standards seminar
	UK-CIBSE headquarter	CIBSE	China-UK building energy codes and standards seminar
	Belgium, Brussels	REHVA	REHVA Technical Seminar on Buildings Related EU Regulations and Projects
	Belgium, Brussels	European Commission-Directorate-General for Energy.	China-EU Building Energy Policies Workshop
August-12	US.Richland	PNNL	Building Codes
	US.DC	USGBC	LEED V3
	US.DC	USDOE	Federal Energy Management Program
	US.San Fransicio	LBNL	ASHRAE 90.1

Outcome

(1) Research and Comparison on International Building energy codes & Standards



(2) Suggestions to MOHURD

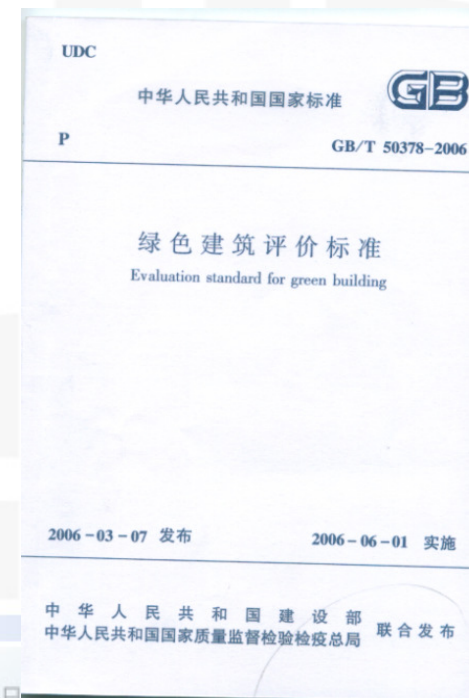
- More clear goal of energy saving
- Mid-long term planning
- Advanced design guide
- More content in the code (eg. Renewable energy)
- More detailed climate zones
- Adjust the calculation baseline according to the situation now

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Green Building

- Certification based on the National Standard
Evaluation Standard for Green Building
 - Management System
 - Technical System
- Feature
- Related Organizations



Under Revising , the new version will be 2013

Green Building

Management system

- 2007, Regulation on green building evaluation ,MOC. (now is MOHURD)
- 2009, Regulation on one star & two star green building evaluation , MOHURD.



Green Building

Technical system

- 2006, National Standard Evaluation standard for green building
- 2007, Specific technical guideline for green building evaluation
- 2008, Additional regulations of Specific technical guideline for green building evaluation (Design part)
- 2009, Additional regulations of Specific technical guideline for green building evaluation (Operation part)



Green Building

Evaluation system

Grade	Basic Requirements	General Requirements						Priority Requirements (Preference)
		Land efficiency	Energy efficiency	Water efficiency	Material efficiency	IAQ	O&M	
		6	10	6	5	6	3	
★	Conform	3	4	3	3	3	1	0
★★	Conform	4	6	4	3	4	2	5
★★★	Conform	5	8	5	4	5	2	8

Green Building



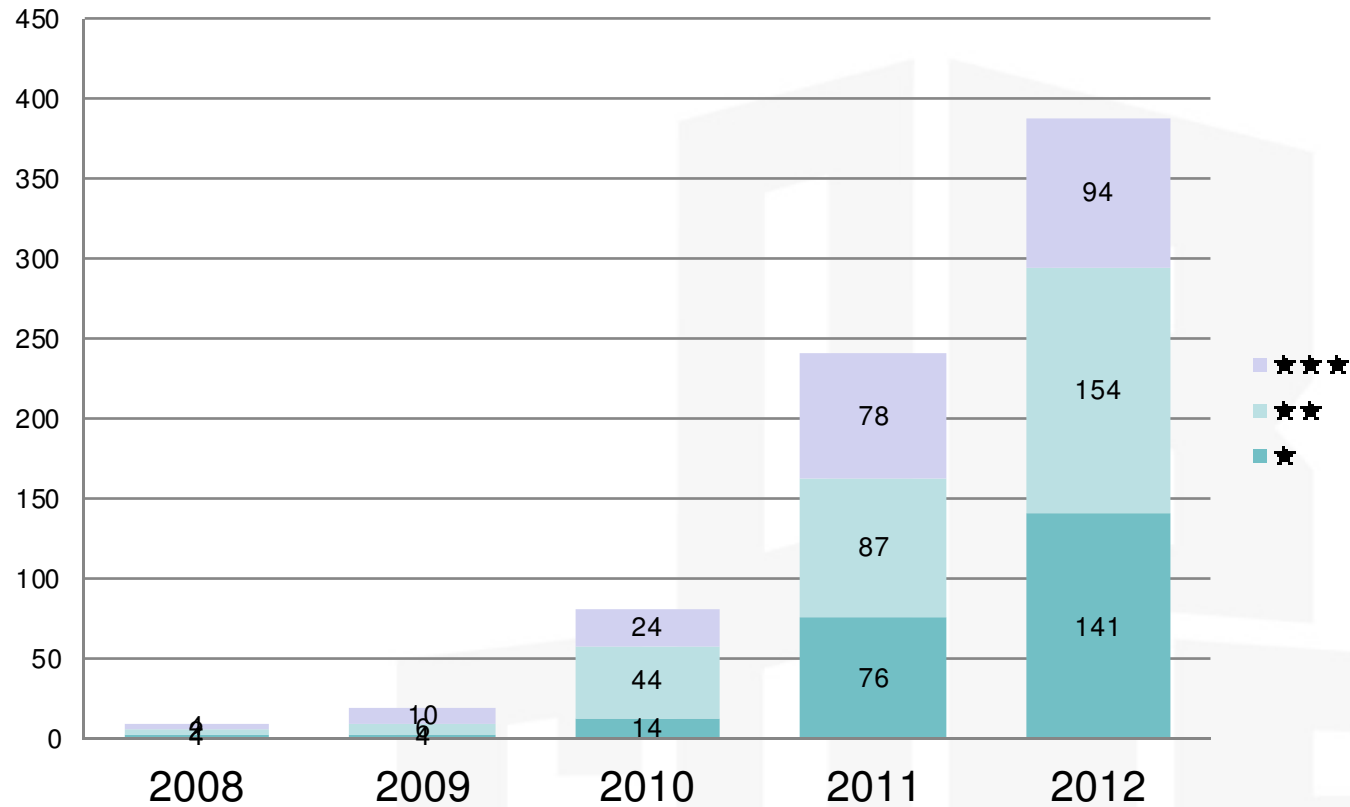
Certification of Green Building Design Label



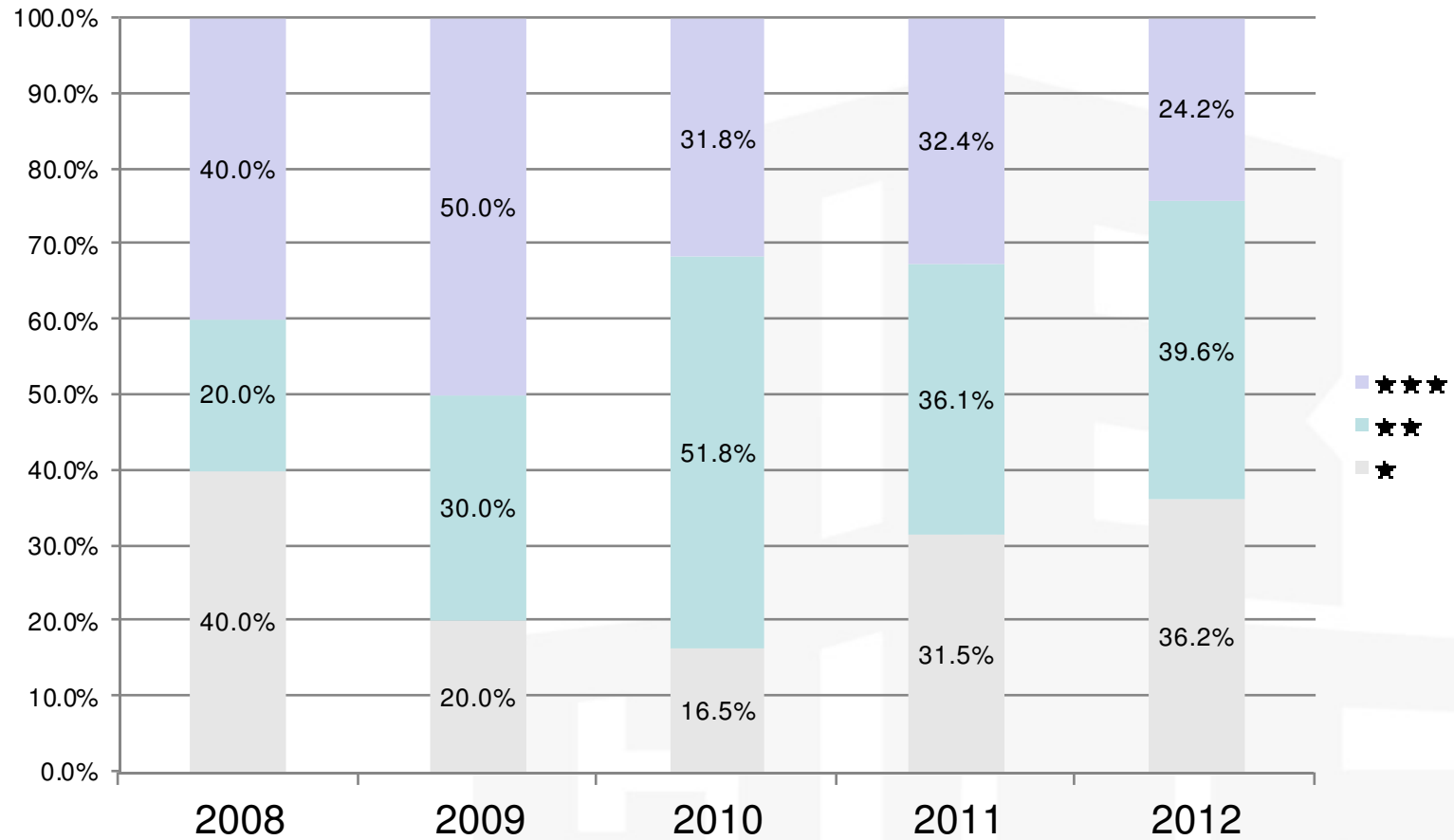
Certification of Green Building Design Label



Green Building

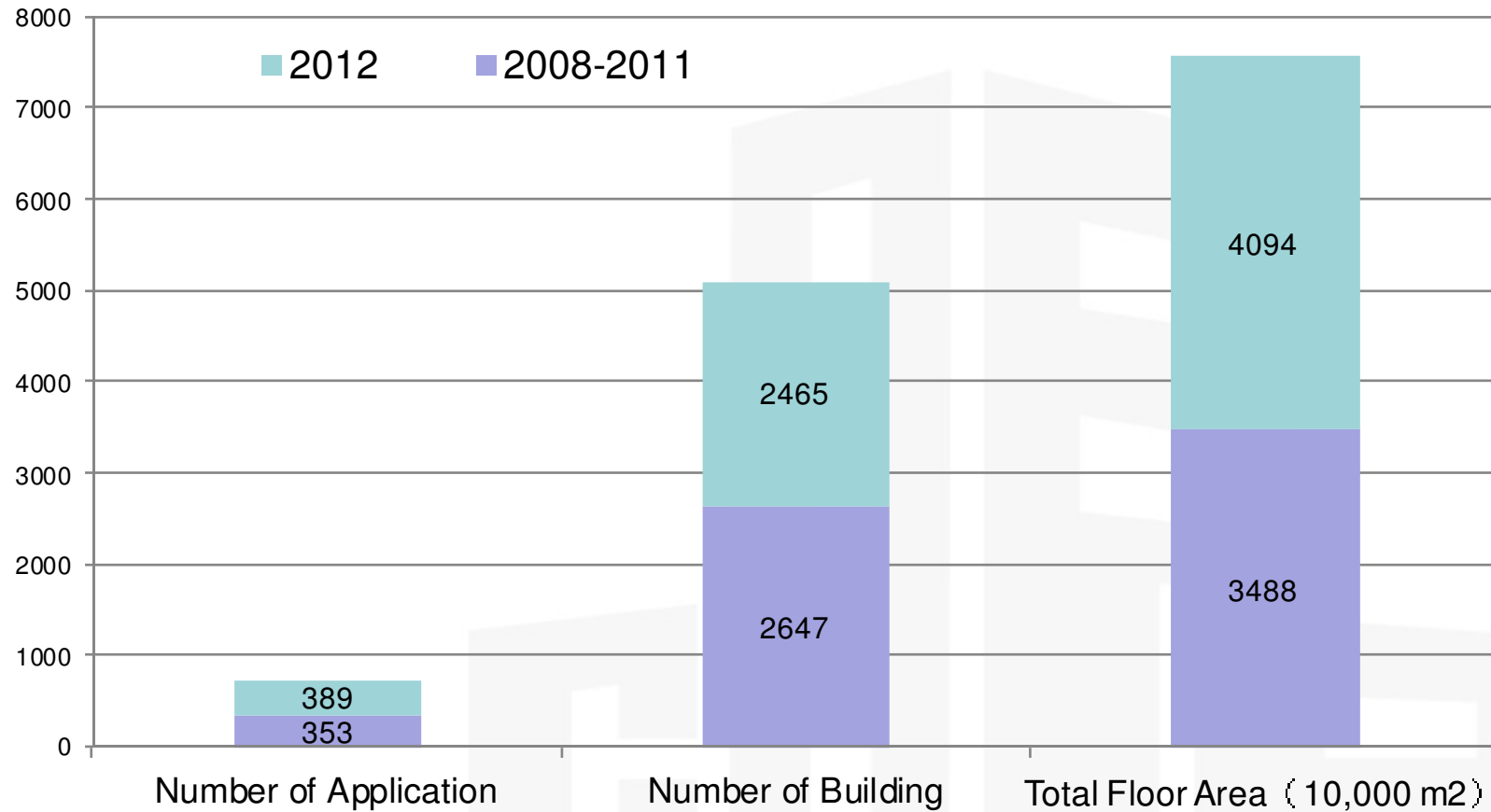


Green Building



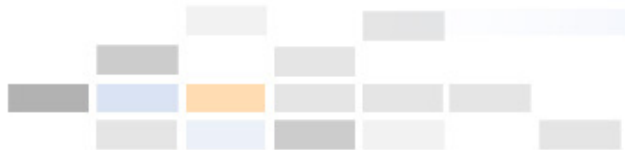
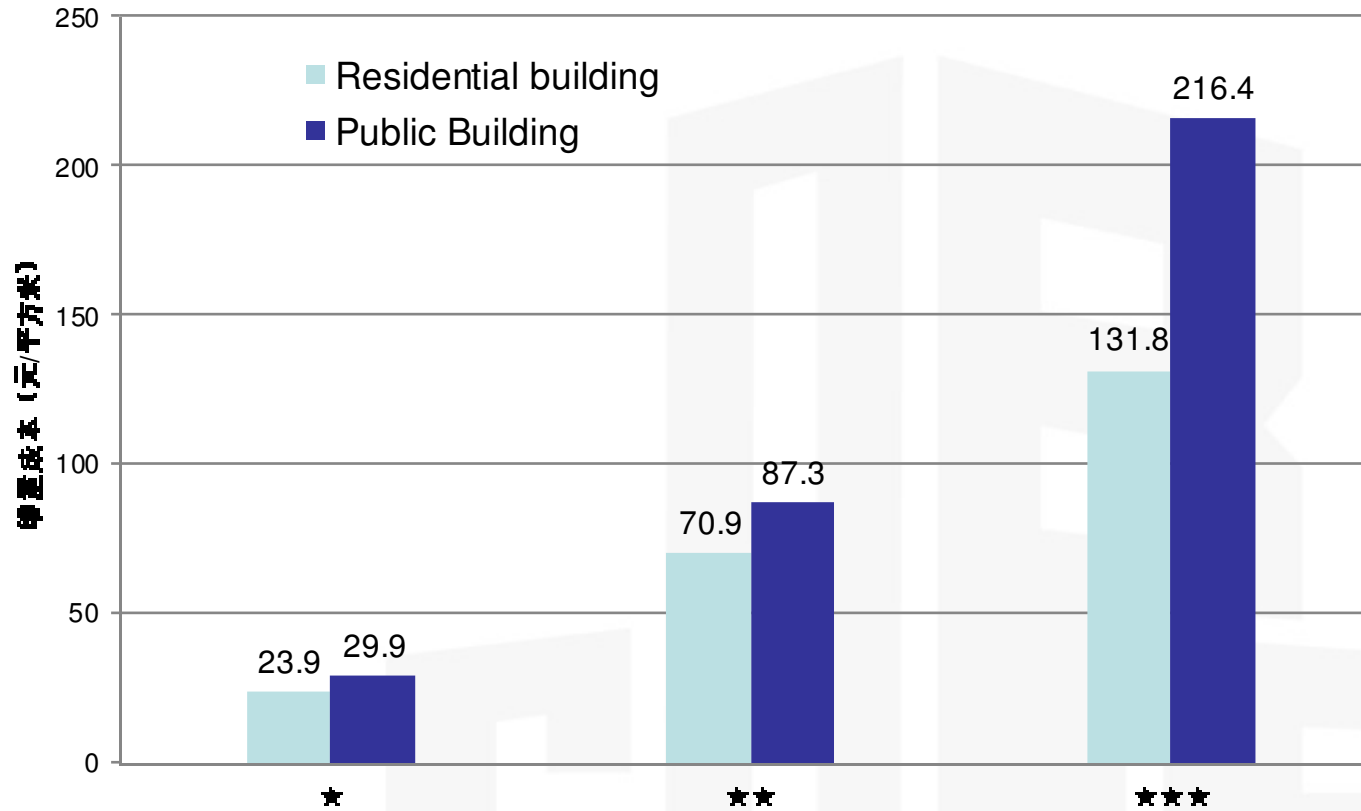


Green Building





Green Building



Incentive Policies of Green Building

Ministry of Science and Technology, 2006.

<National Outline for Medium and Long Term S&T Development 2006-2020>

The key research topics include green building design technology, building energy-saving technology and equipment, building integrated renewable energy devices technology, exquisite construction and green construction technology and equipment, energy-saving and green building materials and building energy-saving technical standard.

Leading by the outline, more than 300 million USD are supporting the R&D of building energy efficiency and green building in the 11th Five Year Plan in China from the central government.

Incentive Policies of Green Building



Nov 2009. Copenhagen.

Carbon emission per GDP intensity
decrease 40% to 45% in 2020
compared with 2005

Incentive Policies of Green Building

Implementing opinions on accelerate Green Building development

2012-167. by Ministry of Finance and Ministry of Housing and Urban-Rural Development

(1) Subsidy: **¥45/(7 USD)** for two-star green building, **¥80/ (13 USD)** for three-star green building.

(large city as Beijing and Shanghai have city-level subsidy besides the central government subsidy)

(2) subsidy for the green ecological district meet the necessary requirements. **The subsidy benchmark is**

¥50,000,000. (8,000,000 USD)



Incentive Policies of Green Building

Green Building Action Plan

2013-No.1. by State Council

Main Objective

- 1 billion m² new green building in 12th Five Year Plan (2011-2015)
- By the end of 2015, 20% of urban building are green building.
- Heat metering and energy efficiency retrofit, 400 million m² in northern cold and severe cold area.
- Residential building energy efficiency retrofit, 50 million m² in hot summer and cold winter area.
- Public building and Intuitional office building retrofit 120 million m².
- Rural area, building retrofit 400,000 units.

Incentive Policies of Green Building

Green Building Action Plan

2013-No.1. by State Council

Three kinds of buildings must comply with green building standards since 2014.

- Invested by the government. including government offices, schools, hospitals, museums, science museums, stadiums;
- Indemnificatory apartment in provincial capital and special cities
- large public buildings which with single building area over 20,000 square meters

including the airport, railway stations, hotels, restaurants, shopping malls, office.

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International collaboration



March 6th 2013 Miraflores Hilton Hotel Lima, Peru
A Joint APEC-ASEAN Workshop
Sharing Experiences in the Design and Implementation
of Green Building Codes



- Factors for success of Code Development
- lessons learned of Code Implementation
- Approaches to compliance of Code Enforcement
- Monitoring and Review Methodology
- Green Elements vs. Green Code
- Existing approaches of Green Measurement

Best Practices: Code Development

Factors for success?

- Transparent process
- Stakeholder inclusion
- Build on existing standards (international, where available)
- Linkage to policy priorities
- Other?

Best Practices: Code Implementation

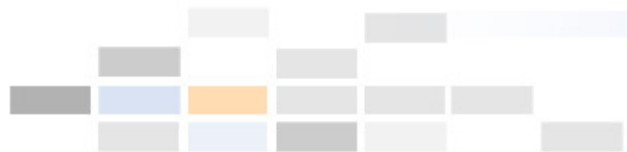
- Planning (staging)
- Communication
- Education
- Integrating lessons learned
- Challenges

Best Practices: Code Enforcement

- Approaches to compliance
- Verification
- Communication/outreach
- Challenges

Best Practices: Monitoring and Review

- Approach
- Tools
- Measurement
- Challenges



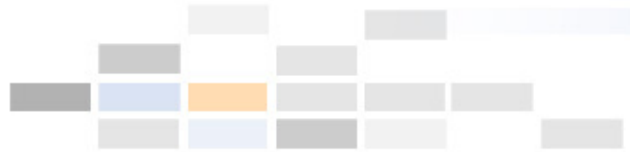
Green Elements vs. Green Code

- Factors driving approach
 - Structural
 - Regulatory/legal
 - Economic
 - Technical (standards)



Green Measurement

- Existing approaches
- Metrics
- Limitations
- Fora for discussion



CONCLUSION

- Mandatory building energy codes have a very positive impact responding to climate change and global warming in building sector. It also work as the most important part of green building.
- Voluntary green building with the financial incentives will growing quickly in the future. In a certain time, some cities could make it implement mandatory.
- Green Building Codes might be a future trend for a single building.
- Building Energy Codes needs more collaboration with Energy Smart Community.



Thank you

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