



The Consideration of Urban Climate in Green Building Standards and Urban Planning Formulations

----A Review in China

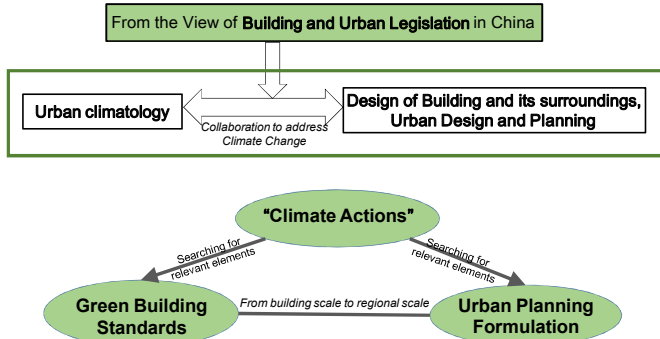


Yuan HUANG*, Fangli CHEN, Wei ZHAO, Jiao YANG

Department of Urban Planning, School of Architecture and Design, Southwest Jiaotong University, China

Introduction

The reports in the recent years from IPCC, UN-HABITA and World Bank have showed the importance of building design, urban and regional planning in addressing Climate Change.



Issued Document	Adaptation to Climate Change	Discussion
<p>*National Strategies for Adaptation to Climate Change* 2013 NDRC Climate (2013)2252</p>	<ul style="list-style-type: none"> - Zoning strategies: urbanized area <ul style="list-style-type: none"> • Classification of Eastern, Central and Western urbanized areas • Rational planning of urban river network, • Improving buildings' layout, mitigating heat island effect. • Improvement of urban drainage waterlogging and layout of flood control and disaster mitigation projects; • Reducing impervious surface, expanding urban greening space and water bodies • Using wetland park for rainwater storage • Determining the drainage paths, reducing waterlogging. 	<ul style="list-style-type: none"> - Attaching great importance to "Adaptation"
<p>*Action Plan on Urban Adaptation to Climate Change* 2016 NDRC Climate (2016)245</p>	<ul style="list-style-type: none"> - Strengthening the leading role of urban planning <ul style="list-style-type: none"> • Considering climate change factors in urban planning • Strengthening planning and layout in the relevant fields - Improving urban buildings' adaptation ability to Climate Change <ul style="list-style-type: none"> • Forward-looking layout on green buildings • Urban renewal and transformation of old residential sectors • Promotion of industrialization of prefabricated buildings - Playing the functions of urban ecological greening <ul style="list-style-type: none"> • Establishing the climate friendly urban eco-system • Playing the role of landscape greening to improve urban microclimate - Protecting urban water safety of the city <ul style="list-style-type: none"> • Promotion of the sponge city's construction • Construction of water-saving city • Construction of scientific urban flood control and drainage system - Establishing the integrated urban disaster risk management system - Pilot and demonstrative projects <ul style="list-style-type: none"> • 30 pilot cities as "Climate Adaptation Cities" 	<ul style="list-style-type: none"> - From "National Strategies" to "Action plan" in details - The Fresh Plan relatively comprehensive from urban planning to risk management - Collaboration with the demonstrative projects of Green Eco-districts

<p>Assessment Standard for Green Eco-district Opinion soliciting draft</p>	<ul style="list-style-type: none"> - Land use <ul style="list-style-type: none"> • Mix development • Planning and arrangement: road network, facilities - Green buildings <ul style="list-style-type: none"> • Resource and "carbon mission" • Energy use of buildings and municipal facilities • Solid waste and material resources - Green traffic <ul style="list-style-type: none"> • "Carbon emission" • Transportation system - Industry and economy <ul style="list-style-type: none"> • Optimization of industrial structure • Green life 	<ul style="list-style-type: none"> - Land use <ul style="list-style-type: none"> • Planning and arrangement: planning greening rate • Buildings' arrangement: optimal orientation & ventilation corridor - Ecological environment <ul style="list-style-type: none"> • Natural ecological environment: biodiversity, green coverage, Ecological green coverage, wetland protection, low impact development • Environmental quality: density of heat island - Green buildings 	<ul style="list-style-type: none"> - Eco district scale: keeping the balance of contents between "mitigation" & "adaptation" - Eco district scale: paying attention on the impact of industrial and economical development
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Climatic Consideration in Urban Planning Formulation

Situation

The classic consideration of urban climate is still the employment of basic metrological data, **no consideration** on climate change incremental factors.

The importance of "mitigation" & "adaptation" is **ignored** in practice level.

Little evidence showing in-depth collaboration local Bureau of Urban Planning with local Meteorology Bureau and Development and Reform Commission on the formulation of urban planning.

Some of the local Bureau have showed their interests in ventilation corridor planning, heat island mitigation, low impact development planning etc. with the **preliminary attempt** on detailed planning formulation.

In the research field, it has been paid **more and more attention** on "Climate Change and Urban Planning", there is the **thematization** trend on *low-carbon planning, ventilation corridor planning, thermal environment amelioration, "sponge city" planning, urban disaster prevention planning.*

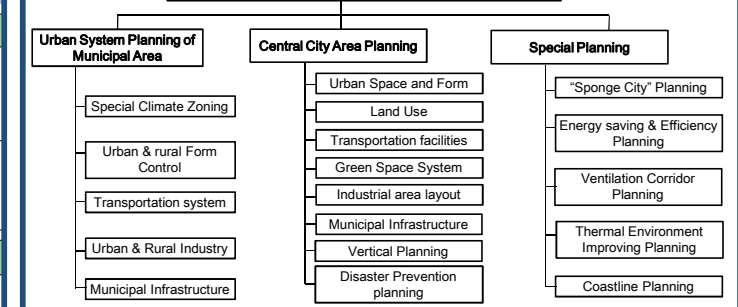
Climatic Consideration in the Representative Green Building Standards

Scale	Standards and Norms	Discussion	
Building & its surrounding	<ul style="list-style-type: none"> - Assessment Standard for Green Building (GB/T50378-2014) - Different Types: Industrial Building, Office, Shop, Hotel, Hospital, Expo, Railway Station etc. (released or draft for approval) - Different Phases: Design, Construction, Operation (released or draft for approval) - Assessment Standard for Green Reconstruction of Existing Building (draft for approval) 	<ul style="list-style-type: none"> - Not a major consideration to address Climate Change - Focusing on the topics of energy and materials saving 	
City Block	<ul style="list-style-type: none"> - Standards for Green Residential Area (CECS377-2014) - Assessment Standards for Green Campus (CSUS/GBC4-2013) 	<ul style="list-style-type: none"> - Climate factors being highly concerned 	
Urban District/ Small Town	<ul style="list-style-type: none"> - Assessment Standard for Green Eco-district (opinion soliciting draft) - Evaluation Standard for Green Small Town (CSUS/GBC 06-2015) 	<ul style="list-style-type: none"> - Appearance of the topics to Climate Change response 	
Standard	Mitigation to Climate Change	Adaptation to Climate Change	Discussion
Assessment Standard for Green Building (GB/T50378-2014)	<ul style="list-style-type: none"> - Optimal land use and outdoor env. • Transportation facilities and services • Facilitation of public services - Energy saving & utilization <ul style="list-style-type: none"> • Heating, ventilation and air conditioning • Building and its envelop • Lighting and electrical appliances - Comprehensive utilization of energy - Materials' saving & utilization <ul style="list-style-type: none"> • Selection of materials - Construction management <ul style="list-style-type: none"> • Environmental protection • Resource conservation 	<ul style="list-style-type: none"> - Optimal land use and outdoor env. • Land use green land • Outdoor environment: wind, heat island • Site design & ecological environment: green rainwater infrastructure, storm water runoff control, reasonable greening 	<ul style="list-style-type: none"> - Building scale: good agreement with climate change targets on energy saving, environment protection, sustainable development etc.
Standards for Green Residential Area (CECS377-2014)	<ul style="list-style-type: none"> - Value of urban area <ul style="list-style-type: none"> • Diversity of residential area: supporting facilities • Utilization of urban facilities: Walking distance - Green traffic <ul style="list-style-type: none"> • Walking, Public and Green traffic - Resource and energy efficiency <ul style="list-style-type: none"> • Energy and Environment Protection • Materials and Resources Reuse - Sustainable management <ul style="list-style-type: none"> • Sustainable quality management: life cycle management, life cycle construction measures 	<ul style="list-style-type: none"> - Integration of construction site <ul style="list-style-type: none"> • Site protection of ecological environment: avoidance of Ecological protection zone, distance to natural green space - Sustainable development of the site: environmental protection of the site, rainwater management - Healthy and comfortable environment <ul style="list-style-type: none"> • Environmental comfort guarantee: heat island effect, green roof, 3D greening 	<ul style="list-style-type: none"> - A high degree of uniformity in "Mitigation" for the 3 scales because of the earlier development on the index system of energy saving and emission reduction in China - From building to district scale, increasing emphasis on "adaptation" - Not unified levels of provisions' structure with "Climate Actions"

"Urban Construction" in the Key Policies of "Climate Actions"

Issued Document	Mitigation to Climate Change	Adaptation to Climate Change	Discussion
<p>*National Program to Address Climate Change* 2007 National Development and Reform Commission (NDRC) of China</p>	<ul style="list-style-type: none"> - Energy Efficiency & energy saving <ul style="list-style-type: none"> • Green building design • Tech. and equip. of building's energy efficiency • Integration Tech. of renewable energy building - Tech. and equip. of green building construction - Energy-saving and green building materials - Energy-saving tech. and standards for building (including existing building) 	<p>?</p>	<ul style="list-style-type: none"> - Little consideration for "Adaptation" - Simple consideration of green building and energy saving tech..
<p>*Scientific and Technological Actions on Climate Change* 2007 14 ministries and commissions of China</p>	<ul style="list-style-type: none"> - Tech. of Building's energy saving and energy efficiency - Integration Tech. of solar building - Land use control - Assessment for the impacts of Climate Change on mega projects 	<p>?</p>	<ul style="list-style-type: none"> - The consideration of land use in addition to energy saving and clean energy.
<p>*National Plan to Address Climate Change (2014-2020)* 2014 NDRC Climate (2014) 2347</p>	<ul style="list-style-type: none"> - Emission control in urban and rural construction - Optimization of urban functional areas' layout - Carbon Emissions Assessment for new district planning - Strengthening the low-carbon construction and management - Development of green buildings - Pilot and demonstration projects <ul style="list-style-type: none"> • Low-carbon city (town) • Low-carbon industrial park • Low-carbon residential community 	<ul style="list-style-type: none"> - Improving urban infrastructure constructions' adaptation capacity - Consideration of Climate Change in urban and rural planning, Climate Change risk assessment for site selection and expansion - Actively response to heat island and waterlogging - Revision of urban flood control and waterlogging standards - Reasonable layout of urban functional areas - Prohibition of the occupation of urban green space, reserving and repairing river network - Encouragement of permeable pavements - Strengthening the construction of rainwater resources utilization facilities - Strengthening the construction of urban lifeline system 	<ul style="list-style-type: none"> - Zoning policies <ul style="list-style-type: none"> • Urbanized area, Agricultural main producing area, Key ecological function area - Taking urban infrastructure construction in the first place for "adaptation" - Formulation of a relatively comprehensive plan in urban construction - Development of the demonstrative projects.

Frame of Urban Master Planning to Address Climate Change



Conclusion & Acknowledgement

Conclusion & Advices

For the formulation of Green Building Standards, qualitative assessment is easier compared with quantitative assessment (e.g. Index for UHI), **operational quantitative indicators** are expected to be developed.

The **incremental factors of (Local) Climate Change** should be better considered in the future formulation of Green Building Standards & Urban Planning..

For the formulation of urban planning, a **global view** to address Climate Change should be established, special planning topics especially on "adaptation" response could be developed.

It is better to **keep pace** with the latest National Plan to address Climate Change for the Revision of Green Building Standards and Urban Planning Formulation.

Acknowledgement

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