Ipsos Business Consulting
Build · Compete · Grow

CHINA'S EVOLVING URBAN LANDSCAPE

Urbanisation and the construction industry

August 2013

- 2011: China's urbanisation rate – the proportion of people living in urban areas – exceeded 50% for the first time in 2011.
- 2020: Another 100 million rural citizens will join their urban counterparts fuelling the rise of seven inland megalopolises[1] – cities or a network of clustered cities with a population of more than 10 million – and an expansion of medium and large sized cities across China's inland provinces. Urbanisation will reach 60%.
- 2025: Forecasts put China with 221 cities each with a population over one million, compared with 35 in Europe today.
- This expansion will directly drive demand for construction materials and investment in public infrastructure, forcing government to implement energy efficiency targets and sustainable urban development solutions.
- Local and national leaders will also be confronted with myriad social and economic challenges as a result of this population explosion, including strained social services, environmental degradation and energy insecurity.
- Numerous opportunities will arise in energy-supply infrastructure, mass transit systems, water resource management and green buildings as Beijing seeks viable solutions to upcoming challenges.
- China's future is entwined with urbanisation and will require continued infusion of knowledge and capital from both the private and public sectors.

1. CHINA'S URBANISATION TRENDS

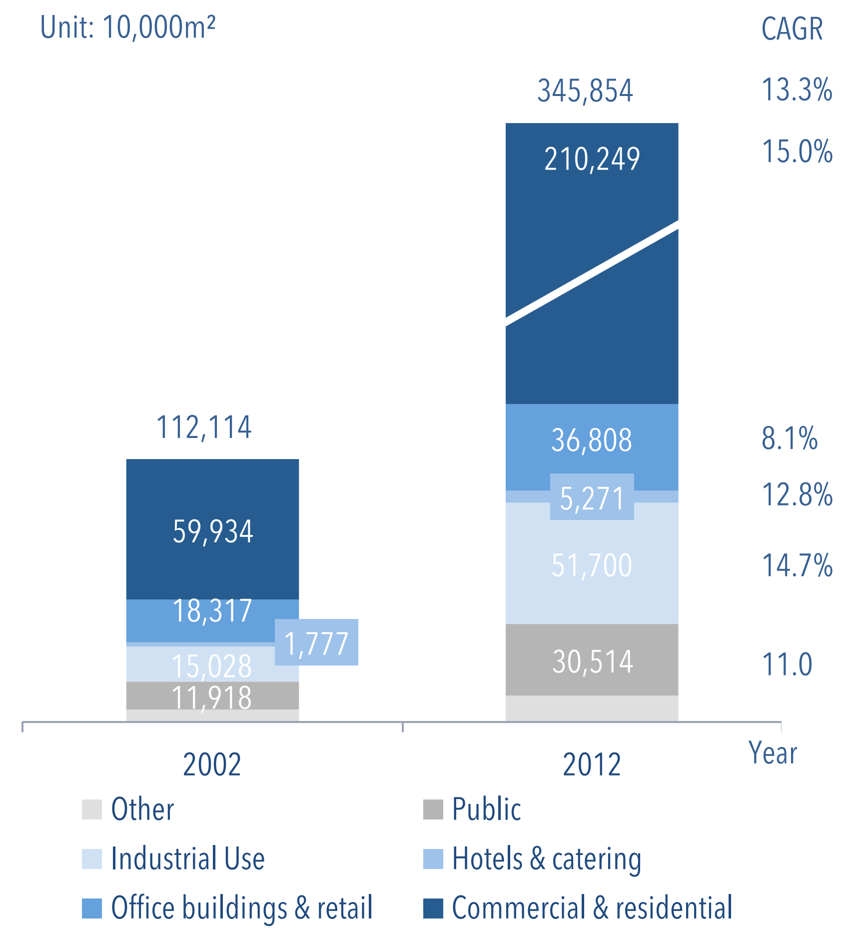
   - THE "BIG PICTURE"

   - RESIDENTIAL MARKET DEVELOPMENT

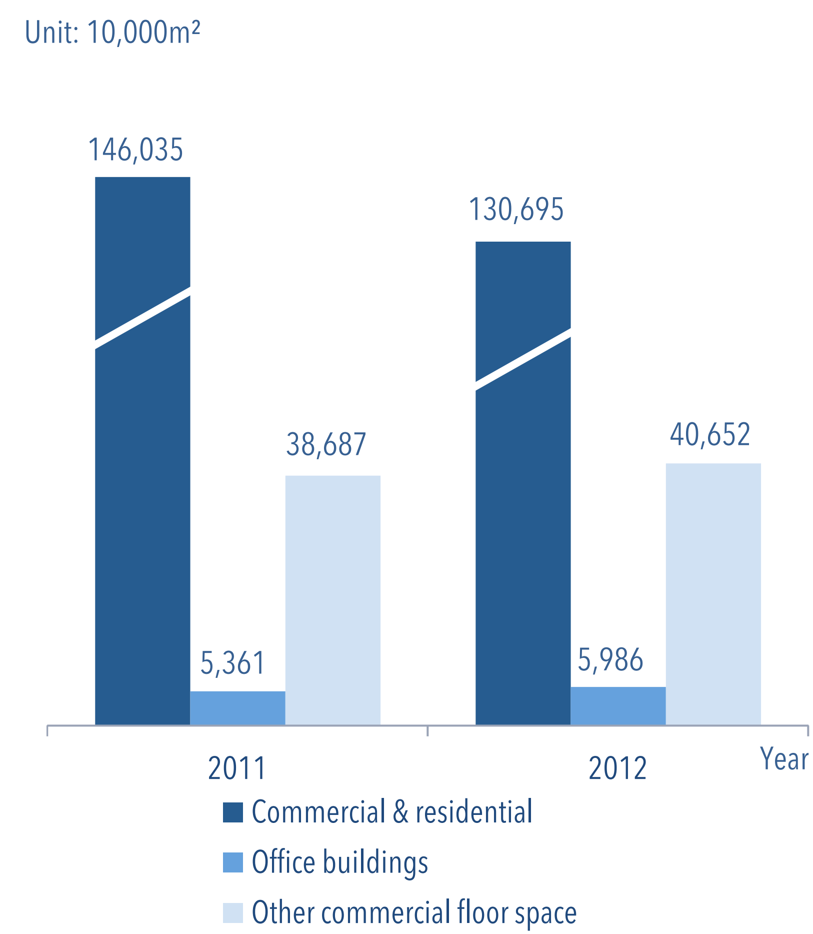
2. GREEN BUILDING SECTOR

CHINA'S CONSTRUCTION INDUSTRY UNDERWENT AN UNPRECEDENTED BOOM DURING THE PAST DECADE WITH CONTINUED URBANISATION SET TO DRIVE FUTURE DEMAND

Completed floor space 2002-12



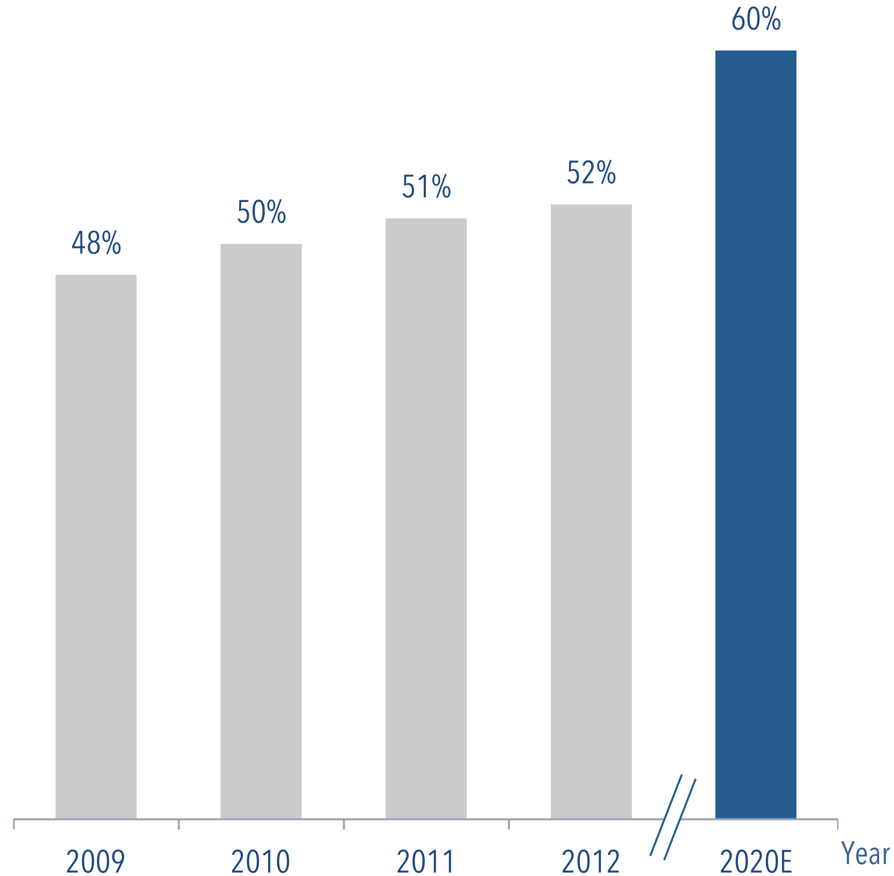
Started floor space 2011-12



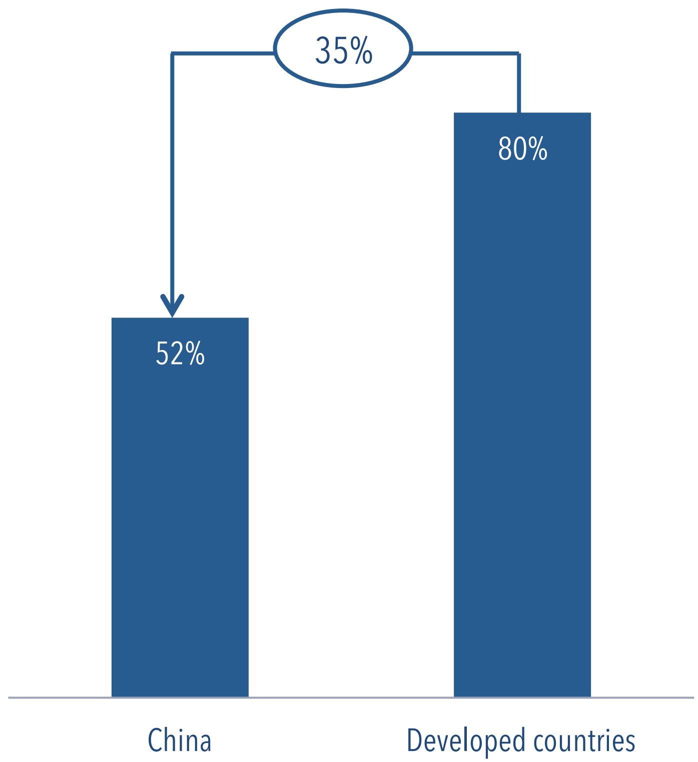
Source: National Bureau of Statistics, Ipsos Business Consulting analysis

URBANISATION IS EXPECTED TO RISE 1% A YEAR CONTRIBUTING TO ANNUAL DEMAND OF 300 MILLION M² OF RESIDENTIAL FLOOR SPACE

Urbanisation rate in China 2009-20E



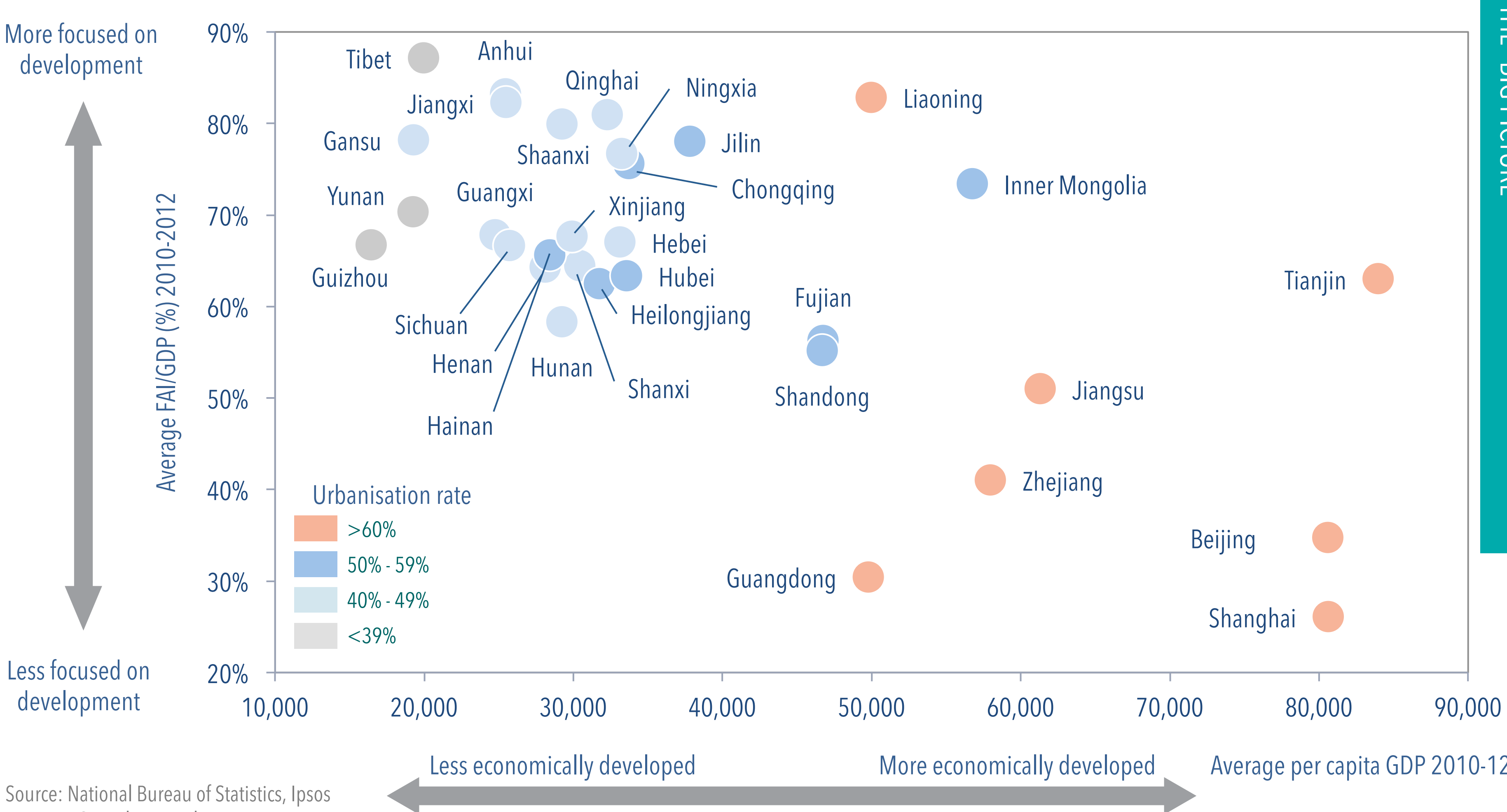
Urbanisation rate of China and developed countries 2012



Source: Dongwu Securities, Yinhe Securities, National Bureau of Statistics, Ipsos Business Consulting analysis

URBANISATION IN LESS-DEVELOPED PROVINCES CONTINUES TO DRIVE INFRASTRUCTURE DEMAND MAKING THEM A PRIORITY FOR FIXED ASSET INVESTMENT

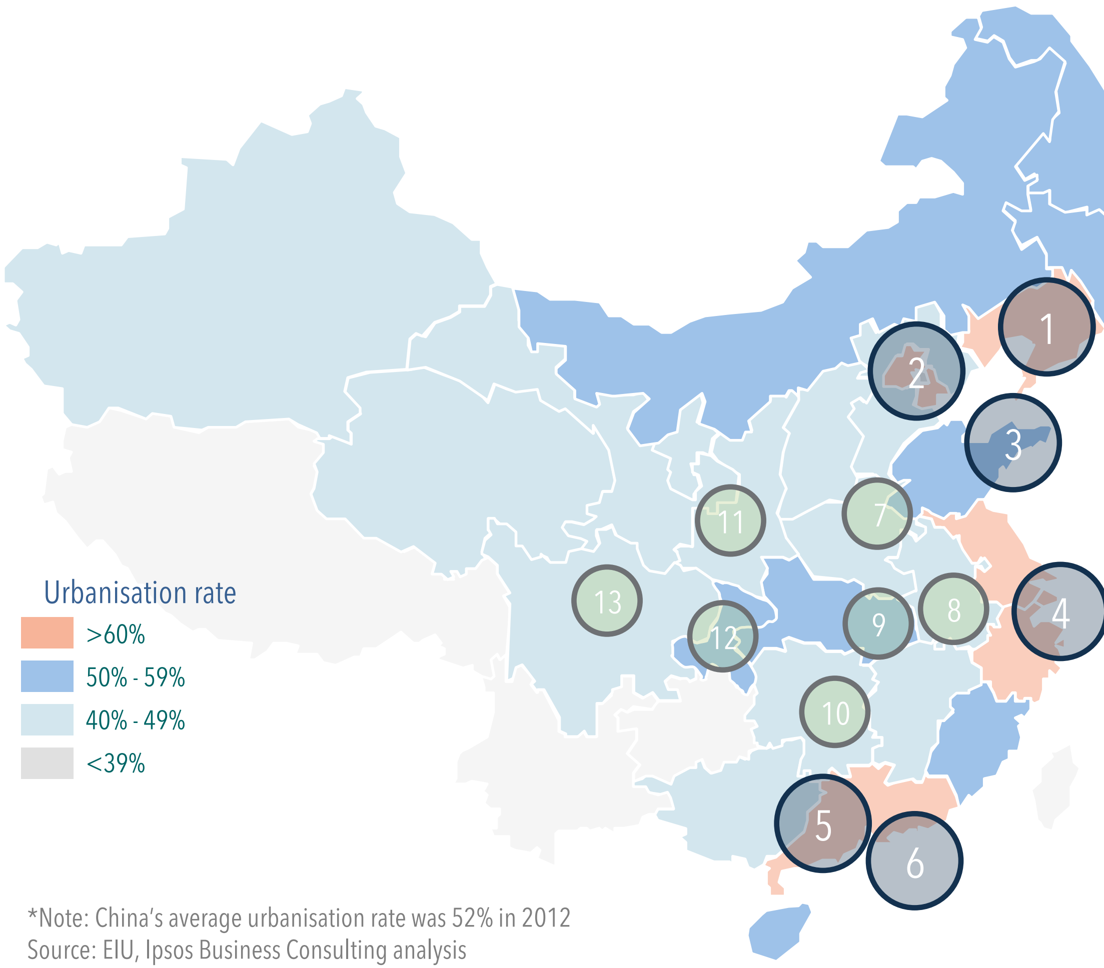
Attractiveness of development: average per capita GDP vs average FAI/GDP ratio (2010-12)



Source: National Bureau of Statistics, Ipsos Business Consulting analysis

SEVEN NEW MEGALOPOLISES – EACH WITH A POPULATION OF MORE THAN 10 MILLION – WILL EMERGE WITHIN THE INNER PROVINCES BY 2020

Current and emerging megalopolises



Urbanisation rate
- >60%
- 50% - 59%
- 40% - 49%
- <39%

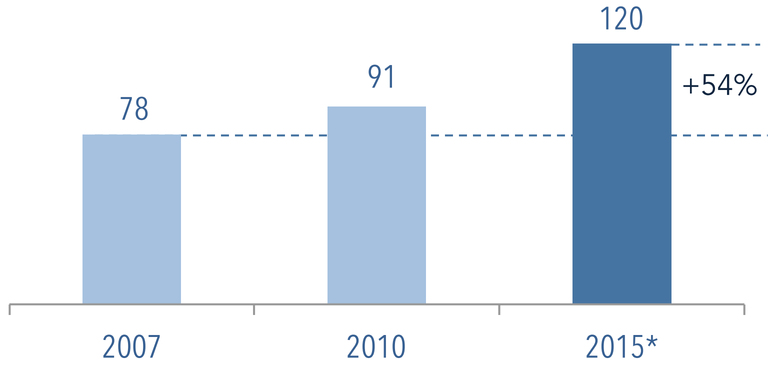
	Population * (million)	GDP** (RMB billion)
1. Greater Shenyang	11.0	668
2. Greater Beijing	23.3	1,900
3. Shandong Peninsula	17.9	1,227
4. Greater Shanghai	18.2	1,787
5. Greater Guangzhou	10.8	1,356
6. Shenzhen	11.1	820
7.Greater Zhengzhou	7.6	162
8. Hefei Economic Circle	7.2	222
9. Wuhan	8.3	389
10. Chang-Zhu-Tan	8.3	320
11. Greater Xi'an	7.9	264
12. Chongqing	9.2	489
13. Chengdu	8.4	313

*2010 estimates, metropolitan area
**2009 figures, metropolitan area

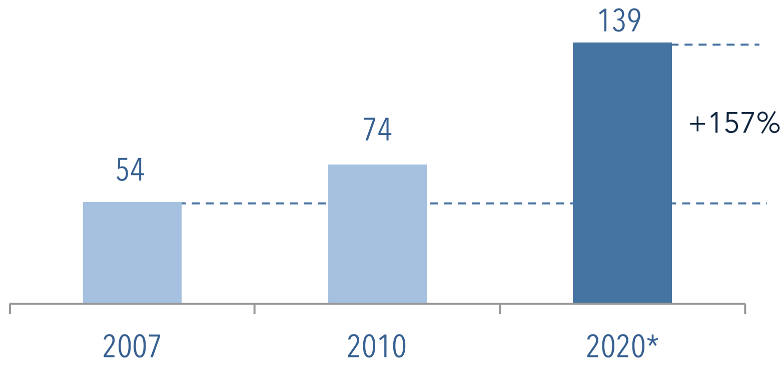
*Note: China's average urbanisation rate was 52% in 2012
Source: EIU, Ipsos Business Consulting analysis

CENTRAL AND LOCAL GOVERNMENT WILL CONTINUE TO INVEST IN INFRASTRUCTURE TO SUPPORT THE NEEDS OF AN INCREASINGLY URBAN POPULATION

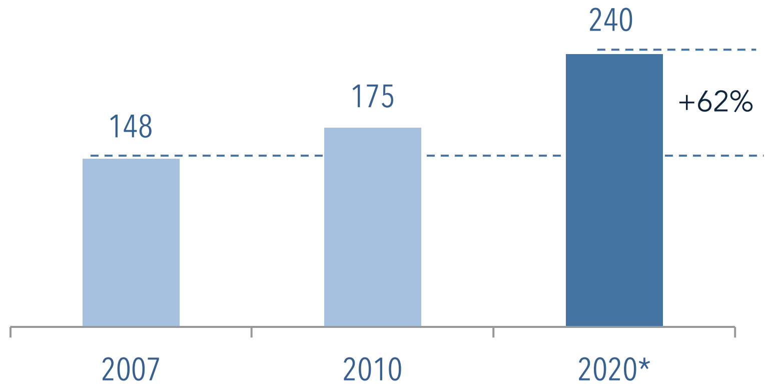
Length of railways (1000km)



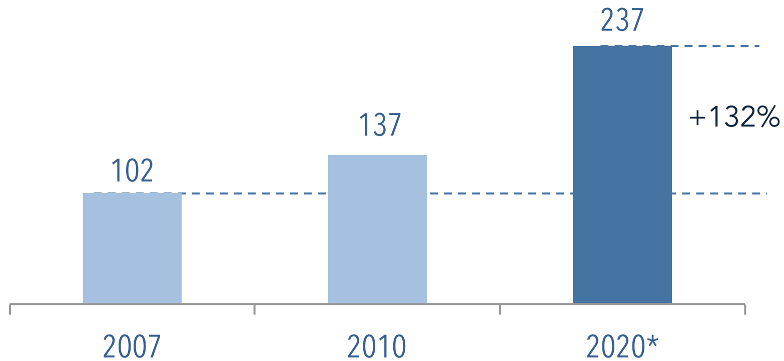
Length of expressways (1000km)



Number of airports



Capacity of container terminals (million TEU)



*Note: Future forecasts represent planned expansion
Source: "Chinese Infrastructure: The Big Picture", McKinsey Quarterly, June 2013

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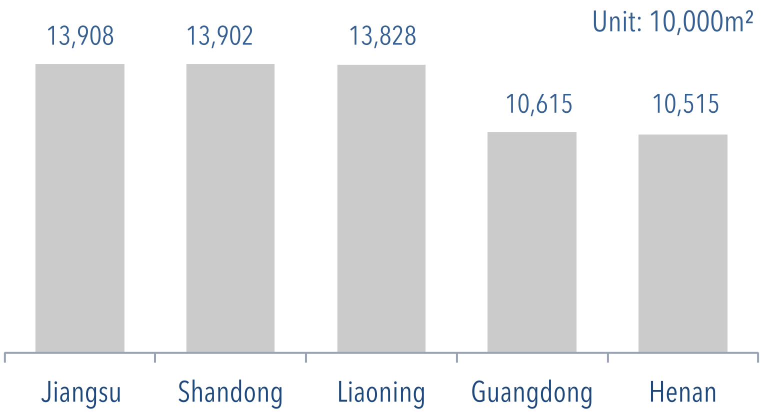
POLICY WILL CONTINUE TO FOCUS ON MANAGING THE EXPANDING RESIDENTIAL HOUSING MARKET TO ENSURE LONG-TERM STABLE GROWTH

Measures	Strengthen house-purchase restrictions	Strengthen house-loan restrictions	Promote property tax reform
Key actions	▪ Ensure house-purchase restrictions cover all regions and are enforced within cities ▪ Apply house-purchase restrictions to both new houses and second-hand houses ▪ Set uniform standards among cities that issue house-purchase restrictions	▪ Implement different housing credit policies according to various situations. In cites with high housing prices, People's Bank of China should increase down-payment ratios and loan interest for second-home purchasers	▪ Expand scale of property tax reform to cover more cities with high housing prices ▪ Strictly impose 20% individual income tax on people who sell self-owned houses
Short-term implications	▪ Negatively affect housing transaction volumes in tier-1 as well as some tier-2 and -3 cities ▪ Rein in housing price increases in tier-1 as well as some tier-2 and -3 cities ▪ Increase housing transaction volumes in most tier-3 and -4 cities		▪ Increase the cost of purchasing second-hand houses, decreasing transaction volumes

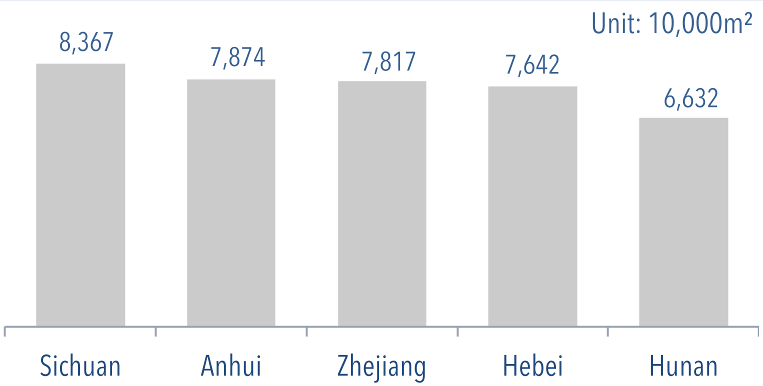
Source: Five New National Policies issued on 1 March 2013, Ipsos Business Consulting analysis

MIGRATION WILL FOCUS ON MID-SIZED CITIES AS URBANISATION BECOMES MORE DISPERSED WITH EASTERN AND SOUTHERN REGIONS DRIVING CONSTRUCTION

Top 5 provinces – newly started residential building floor space 2012

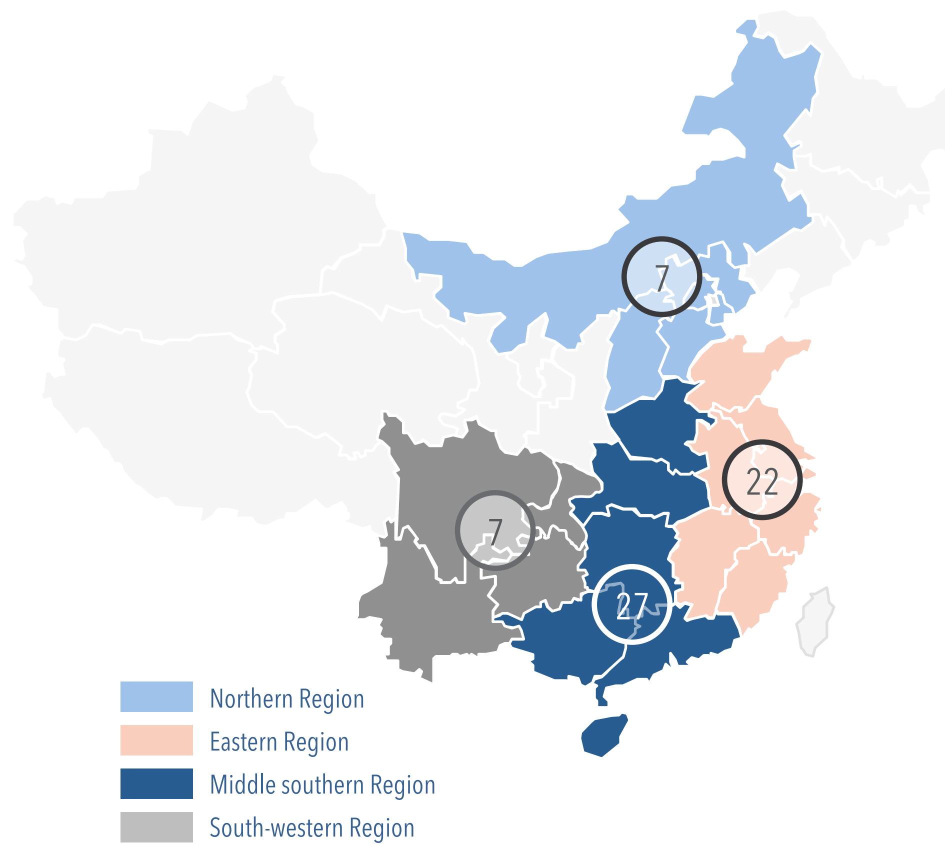


Top 6-10 provinces – newly started residential building floor space 2012



Source: National Bureau of Statistics, EIU, Ipsos Business Consulting analysis

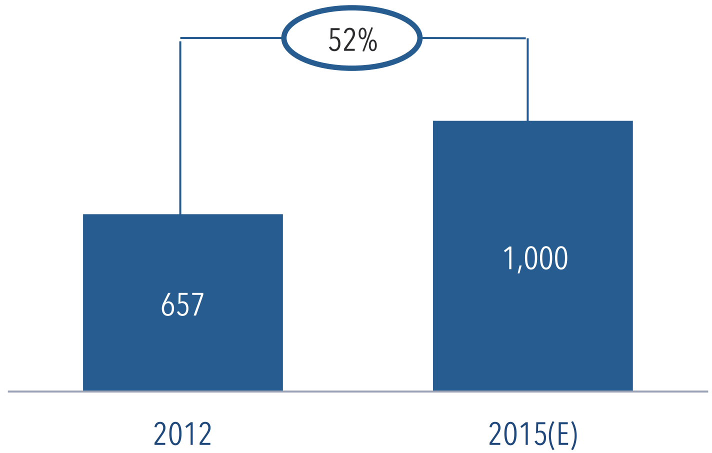
Number of prefecture cities by region exceeding 35m² floor space per person by 2020



Note: Chongqing and Tianjin are included in this analysis

FAST-GROWING PRE-DECORATED HOUSING MARKET, ESPECIALLY IN COASTAL CITIES; MARKET VALUE FORECAST TO TOP 1,000BN YUAN BY 2015

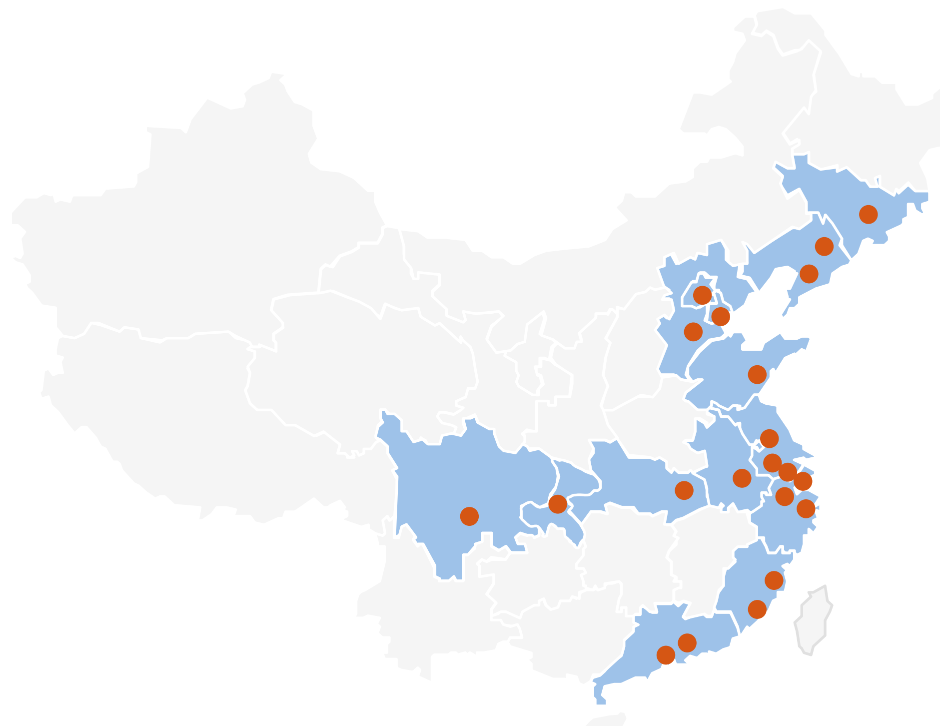
Pre-decorated housing market size forecast (billion yuan)



Drivers of pre-decorated housing market

- **Government**
  - Construction waste reduction
  - Energy demand reduction
- **Developers**
  - Higher profits through higher housing price
  - Enhanced brand image
- **End-users**
  - Cost savings through lower decoration expenditure
  - Convenience

Cities with higher levels of pre-decorated housing activity



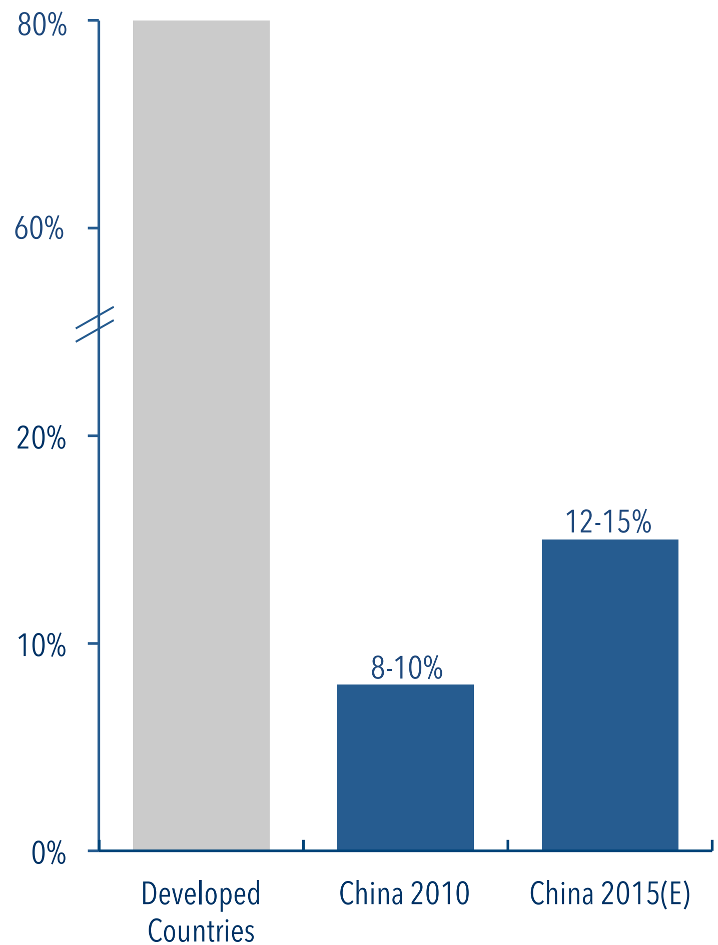
Number of prioritised cities	19

Selection process is based on completed residential housing area, residential housing average price CAGR, top developers coverage and acceptance of pre-decorated housing.

Source: National Business Daily, Ipsos Business Consulting analysis

PRE-DECORATED HOUSING MARKET STILL IN ITS INFANCY; OVERCOMING NEGATIVE CONSUMER PERCEPTIONS IS KEY TO SUCCESS

Pre-decorated houses as share of total housing market in China



Source: National Trust, Ipsos Business Consulting analysis

Hard to control decoration quality

- China's decoration industry is still developing; skill levels and quality remain key issues that must be addressed
- Decoration work is usually outsourced to third parties, developers have been slow to implement effective quality control processes

Low acceptance of pre-decorated houses

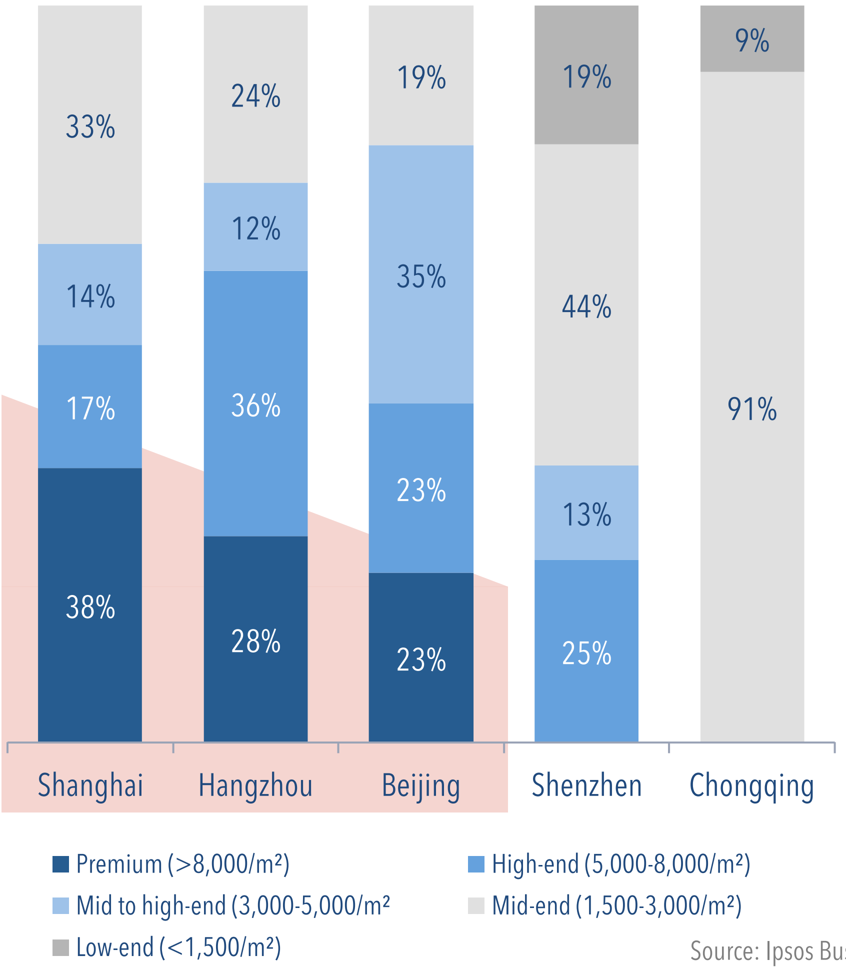
- Most Chinese end-users still prefer to self-decorate due to quality issues
- Personalisation is also a key factor as consumers have more disposable income to spend on interior decoration

Lacking inspection standards for pre-decorated houses

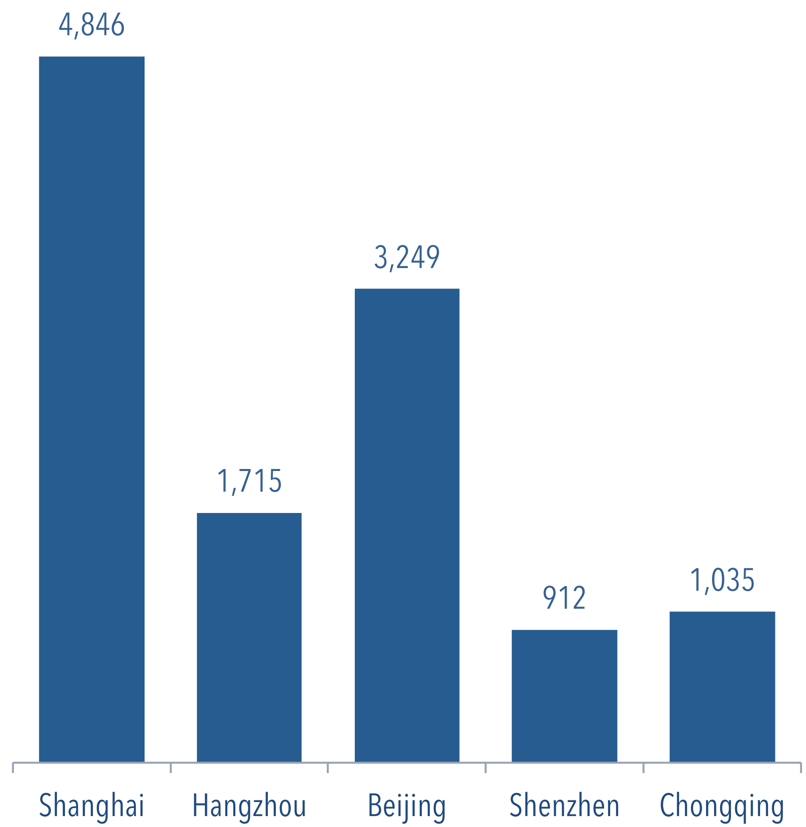
- Lack of clear inspection standards for pre-decorated makes it easy for developers to cut corners by using sub-standard materials and not guaranteeing renovation quality
- High consumer-distrust of developers

PRE-DECORATED HOUSING MOSTLY FOCUSED ON PREMIUM AND HIGH-END HOUSING, PENETRATION IN LOWER-VALUE HOUSING LIMITED DUE TO WEAK CONSUMER ACCEPTANCE

Project segmentation by value for selected cities 2011 (%)

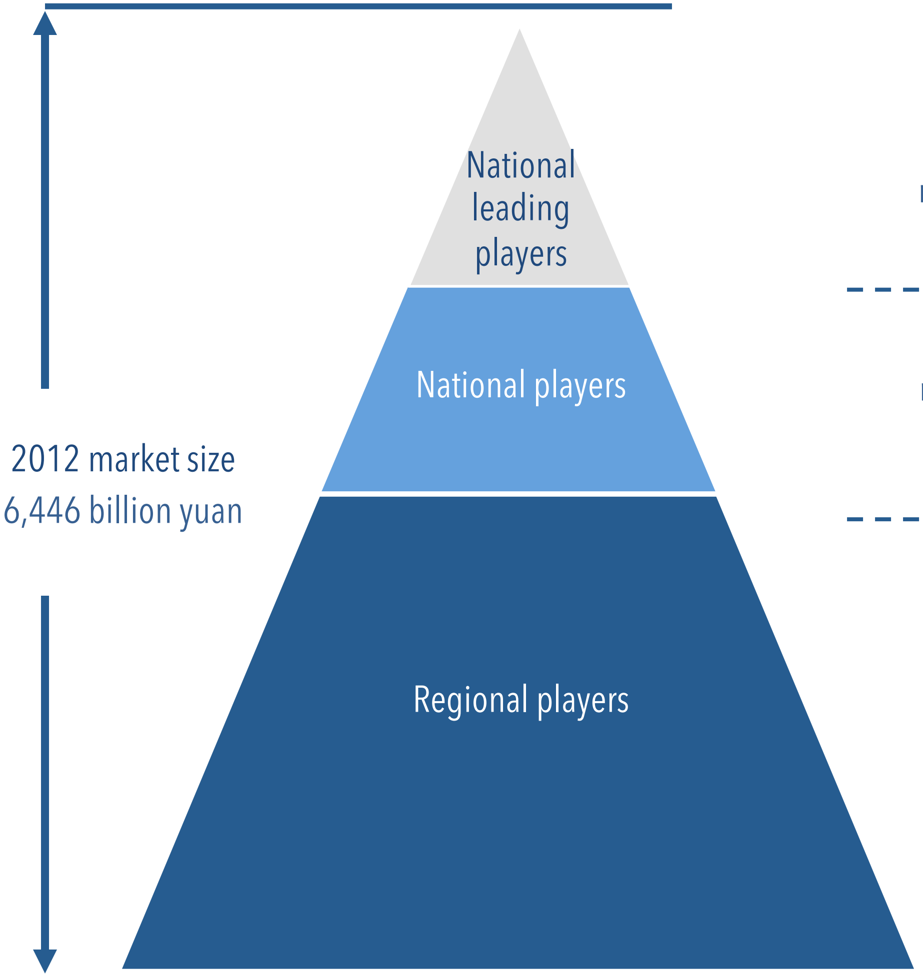


Pre-decorated housing market size in value for selected cities 2011 (million yuan)



Source: Ipsos Business Consulting analysis

CONSOLIDATION OF REAL ESTATE DEVELOPERS WILL BE SLOW IN THE NEAR-TERM WITH 75% OF THE MARKET COVERED BY REGIONAL PLAYERS



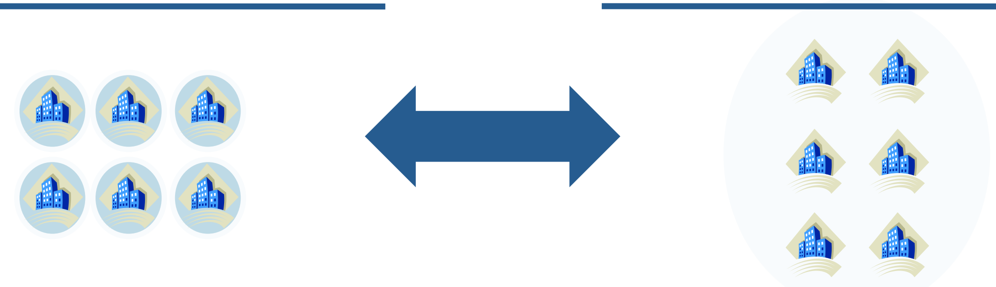
13% market share (by value)

12% market share (by value)

75% market share (by value)

Source: CRIC, Ipsos Business Consulting analysis

PROJECT BASED AND STRATEGIC PURCHASING ARE FOUND IN BOTH REGULAR AND PRE-DECORATED RESIDENTIAL PROJECTS



	Project-based purchasing	Strategic purchasing
General description	▪ Selects suppliers on a project basis	▪ Yearly or long-term supply contracts signed with selected manufacturers
Key features of this type of developers	▪ Inefficient strategic purchasing due to low number of ongoing housing projects ▪ Developer purchases large ticket items, general contractors and sub-contractors purchase construction materials throughout the building phase ▪ For pre-decorated housing, developers generally maintain the right to make final decisions on brands and products used	▪ Signs official partnership contracts with suppliers which they stick to within contract time – agreements are generally not exclusive ▪ Demand volume promised by developers in the contracts is usually significant while unit costs are very low
Timeline for supplier selection	▪ Bidding usually starts several months before completion of main body construction, or within six months of required application	▪ Strategic relationship agreements are effective for one or two years and have to be renewed after expiration
Price comparison	▪ Strategic price is around 10-15% lower than the general project price	

Source: Ipsos Business Consulting analysis

STRATEGIC PURCHASING HAS NOT BECOME A COMMON MODEL IN CHINA; FUTURE PERFORMANCE PROJECTIONS REMAIN UNCLEAR

LOW — Level of strategic purchasing — HIGH

Weaknesses of strategic purchasing

- Reduces flexibility for developers
- Some competitiveness lost once a strategic agreement is signed

Strengths of strategic purchasing

- Efficient use of time and effort, especially for developers with large numbers of pre-decorated housing projects
- Developers can access lowest prices from suppliers due to high quantities

Source: Ipsos Business Consulting analysis

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THE 12TH FIVE YEAR PLAN OUTLINES AMBITIOUS OBJECTIVES TO FURTHER SUPPORT THE GREEN BUILDING MARKET'S DEVELOPMENT

Green buildings

New buildings

- 12th Five Year Plan targets
  - Residential buildings
    - ✓ Northern region and transitional region: 800m m^2 ; at least 95% new buildings should implement new energy-saving standards (65% energy consumption reduction versus existing building stock)
    - ✓ Large cities (such as Beijing and Tianjin) should implement higher energy-saving standards (75% reduction)
    - ✓ New wall materials should account for at least 65% of total wall materials by volume
- Key objective
  - Energy saving. Current building energy consumption accounts for 30% of total society energy consumption, two or three times higher the rate in developed countries

Retro-fit buildings

- 12th Five Year Plan targets
  - Residential buildings
    - ✓ Northern region: 400m m^2
    - ✓ Transitional region: 50m m^2
  - Public buildings
    - ✓ Public buildings: 120m m^2
    - ✓ Energy-saving campus: 50 campuses (estimated floor area is 200,000 m^2)
    - ✓ Build 20 provincial monitoring platform, dynamic-monitor 5,000 buildings
- Key objective
  - Extend lifespans of old buildings. Chinese buildings usually have an average lifespan of 30 years, which is half or quarter the average in developed countries.

Source: 12th Five Year Plan, Building Energy Efficiency Plan, Ipsos Business Consulting analysis

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CENTRAL GOVERNMENT USES ENERGY SERVICE COMPANIES (ESCOS) AS A MAJOR VEHICLE FOR ACHIEVING AMBITIOUS RETRO-FITTING TARGETS

Residential buildings

- **Retro-fitting residential buildings in northern region**

35% of old buildings in China, about 7m households, should be retro-fitted by the end of 2015. Key provinces/cities, such as Jilin and Beijing, should retro-fit at least half of their old buildings by the end of 2013

400m m² × estimated 220 yuan/ m²

=

88bn yuan

Public buildings

- **Retro-fitting public buildings in key cities**

Energy consumption per unit floor area in public buildings in key cities should decrease 20% by the end of 2015, with large public buildings lowering by at least 30%. The public building retro fitting floor area in key cities is minimum 4 million m²

4m m²/ key city × 40 key cities* × estimated 2,500 yuan/ m²*

=

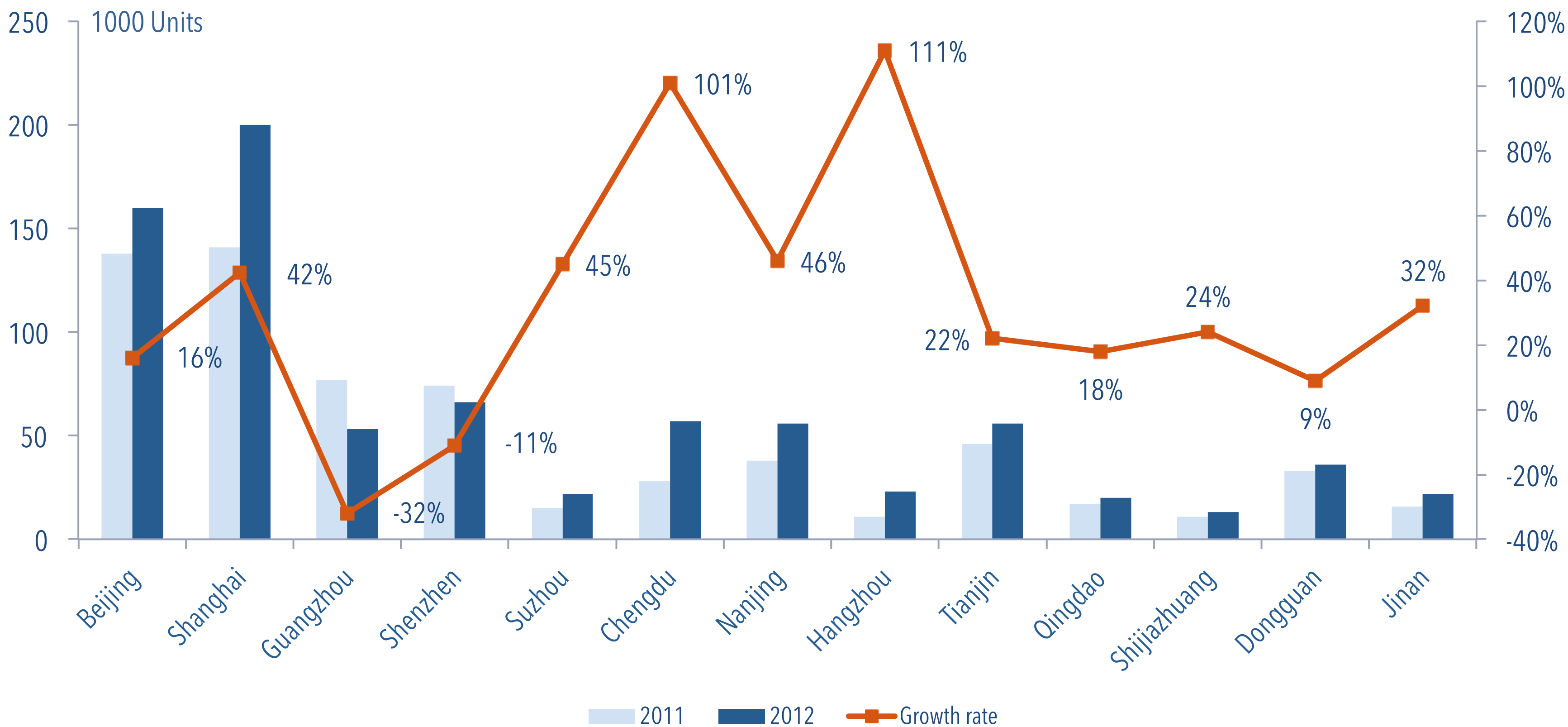
400bn yuan

*Note: 40 key cities are selected through a bidding phase, the exact cities participating in this program could not be confirmed, government will subsidise 20 yuan/ m² for retro-fitting public buildings

Source:Ministry of Housing and Urban Construction notification on promotion of energy efficiency in public buildings, Construction Times, Ipsos Business Consulting analysis

SECOND-HAND HOUSING MARKET IS AN EMERGING DRIVER OF GREEN BUILDING MATERIALS AS HOMEOWNERS INVEST IN QUALITY INDOOR ENVIRONMENTS

Second-hand housing transaction volumes and growth rates for selected cities



- 90% of total transactions by volume take place in key cities such as Shanghai, Beijing, Guangzhou etc.
- Maturing second-hand housing market will see transaction volumes outside of key cities increase

Source: CREIS data, Ipsos Business Consulting analysis

AMBITIOUS ENERGY CONSUMPTION REDUCTION TARGETS WILL DRIVE THE NEW BUILDING MATERIALS AND PRODUCTS MARKET

Product type	Key features	Estimated market size in 2015
Wall materials	Lighter, more durable, thermal-insulated energy-saving, decorative and multifunctional	570bn bricks*
Insulation materials	Thinner, safer, more environment-friendly, energy-efficient, low-density and high-temperature-resistant	10m tonnes*
Waterproof materials	Integrated insulation and waterproofing	1.6bn m^3*
Gypsum plaster board	Fireproof, waterproof, high-strength	3bn m^3*
Coatings	Environment-friendly, weatherproof, self-cleaning	5.5m tonnes*
HVAC	Energy efficient products such as geothermal heat pumps, building heating, cooling and power systems	n/a
Lighting	LED lighting	EUR 6,685bn** (in 2016)

Source: *12th Five Year Plan, New Construction Building Materials Development Plan, **Lighting the way: Perspectives on the global lighting market, Second Edition, McKinsey & Co, Ipsos Business Consulting analysis

DEVELOPMENT OF GREEN BUILDING SECTOR STILL FACES NUMEROUS CHALLENGES FROM ALL ACTORS ALONG THE VALUE CHAIN

Challenges	Description	Responsibility: Go	Dv	De	Ma	Eu
Limited enforcement policies	Lack of standards and guidelines makes it difficult for the government to clearly enforce the development and implementation of new products and solutions	●	◑			
Low customer awareness	Despite customer interest in green building materials, low understanding of products and certifications make it difficult for consumers to differentiate	◑	◑		●	◑
Relatively high costs	Cost of using green construction materials in buildings is 2-14% higher than traditional materials. Developers are wary of trying to pass cost increases on to price sensitive consumers*	◑			●	◑
Limited knowledge	Design professionals and local design institutes lack expertise in green building design and construction teams lack product knowledge hindering use in construction	◑	●	●	◑	
Fragmented market	Many green building materials are difficult to acquire in China. Many are imported making them very expensive, or quality of locally made green building materials is often below international standards making them unsuitable for actual use	◑	◑		●	

● High ◑ Medium

Source: *The China Greentech Report 2011, Ipsos Business Consulting analysis

Go: Government, Dv: Developer, De: Designer, Ma: Manufacturer, Eu: End-user

GREATER EFFORT NEEDED FROM GOVERNMENT, MANUFACTURERS, DEVELOPERS AND END-USERS TO MAKE THE MARKET MORE ATTRACTIVE

Green Material Market Development

1 Government

- Gradually improve policy system and issue more standards to regulate the market
- Extensively educate market to improve awareness of green materials among end-users
- Strengthen market management and eliminate disqualified suppliers

2 Supplier

- Reduce costs through scale production making green materials more affordable
- Promote green materials among developers and end-users to improve awareness
- Design suitable strategy to differentiate from other brands

3 Developer

- Enrich product knowledge of green materials market
- Increase willingness to pay for high-price green materials as a strategy to reduce maintenance costs
- Put more effort into educating end-users to increase acceptance of green materials

4 End user

- Increase awareness of green materials
- Increase willingness to pay more for buildings using green materials

PUBLIC BUILDING RETRO-FITTING CASE STUDY – CHONGQING

Background: Chongqing, Shenzhen, and Tianjin were selected as the first round pilot cities for public building retro-fitting, with each city receiving 80m yuan from central government

Adopt EMC* model and cooperate with leading foreign and local companies

- Signed cooperative memorandum with UTC in Sep 2010 to take advantage its advanced retro-fitting technology
- Cooperated with Tsinghua Tongfang in an EMC model since June 2011 to promote retro-fitting work

Establish good regulatory system

- Issued a series of regulations on project-management, retro-fit technology, energy consumption monitoring, energy audit etc, to promote retro-fitting projects

4 million m^2 public buildings

Establish efficiency management system

- Set up an efficiency management system among municipal departments, ministry of urban-rural development and energy service companies to manage retro-fitting projects
- Cultivated 30 energy service companies to date

*Note: EMC refers to energy management contract

Source: Ipsos Business Consulting analysis

RESIDENTIAL BUILDING RETRO-FITTING CASE STUDY – TANGSHAN "HEBEI NO.1" DEMONSTRATION PROJECT

Background: The project has 135 households and covers 6,135 m2 floor area. After retro-fitting, indoor temperature increased from 15C to 22C while heating energy consumption decreased 40%, saving 10kg coal per square metre and reducing carbon emissions by 28kg.

Before

After

Retro-fit plan

Building No.	515 #	512 #	509 #
Composite thermal insulation system (CTIS)	10cmEPS China CTIS	10cmEPS China CTIS	10cmEPS Germany CTIS
External window	Plastic steel hollow glass casement window	Plastic steel hollow glass casement window	Plastic steel hollow glass casement window (LOW-E)
Roof	14cm PU	14cm XPS	14cm PU
Interior heating system	Single tube leap type, thermostatic valve	Horizontal ring system, thermostatic valve	Vertical double tube system, thermostatic valve
Exterior heating system	Outdoor pipe network, heating station equipment and control system retro-fitting	Outdoor pipe network, heating station equipment and control system retro-fitting	Outdoor pipe network, heating station equipment and control system retro-fitting

Source: MOHURD official website, Ipsos Business Consulting analysis

CONTACT US

Wijaya NG
Head of Consulting, Shanghai
Email: wijaya.ng@ipsos.com

Markus SCHERER
Senior Manager, Shanghai
Email: markus.scherer@ipsos.com

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Email: construction@ipsos.com
Visit: www.ipsosconsulting.com

CONTACT US

YOUR IPSOS CONSTRUCTION CONTACTS

AUSTRALIA

PERTH
Level 1, 1292 Hay Street
West Perth 6005
Perth, Australia
australia.bc@ipsos.com
Telephone 61 (8) 9321 5415

SYDNEY
Level 13, 168 Walker Street
North Sydney 2060
NSW, Australia
australia.bc@ipsos.com
Telephone 61 (2) 9900 5100

GREATER CHINA

BEIJING
12th Floor, Union Plaza
No. 20 Chao Wai Avenue
Chaoyang District, 100020
Beijing, China
china.bc@ipsos.com
Telephone 86 (10) 5219 8899

SHANGHAI
31/F Westgate Mall
1038 West Nanjing Road 200041
Shanghai, China
china.bc@ipsos.com
Telephone 86 (21) 2231 9988

HONG KONG
22/F Leighton Centre
No 77 Leighton Road
Causeway Bay
Hong Kong
hongkong.bc@ipsos.com
Telephone 852 3766 2288

INDIA

MUMBAI
5th, 6th and 7th Floor, Boston House
Suren Road, Andheri (East) 400-093
Mumbai, India
india.bc@ipsos.com
Telephone 91 (22) 6620 8000

NEW DELHI
C-1 First Floor
Green Park Extension
110 016
New Delhi, India
india.bc@ipsos.com
Telephone 91 (11) 4618 3000

INDONESIA

Graha Arda, 3rd Floor
Jl. H.R. Rasuna Said Kav B-6, 12910
Kuningan
Jakarta, Indonesia
indonesia.bc@ipsos.com
Telephone 62 (21) 527 7701

JAPAN

Kamiyacho Central Place
4-3-13, Toranomon
Minato-ku, 105-0001
Tokyo, Japan
japan.bc@ipsos.com
Telephone 81 (3) 6867 8001

KENYA

Acorn House
97 James Gichuru Road, Lavington
P.O. Box 68230
00200 City Square
Nairobi, Kenya
kenya.bc@ipsos.com
Telephone 254 (20) 386 2721-33

MALAYSIA

18th Floor, Menara IGB
No. 2 The Boulevard
Mid Valley City
Lingkaran Syed Putra, 59200
Kuala Lumpur, Malaysia
malaysia.bc@ipsos.com
Telephone 6 (03) 2282 2244

PHILIPPINES

1401-B, One Corporate Centre
Julia Vargas cor. Meralco Ave
Ortigas Center, Pasig City, 1605
Metro Manila, Philippines
philippines.bc@ipsos.com
Telephone 63 (2) 633 3997

SINGAPORE

11 Lorong 3 Toa Payoh
Block B #03-26/27/28
Jackson Square, S319579
Singapore
singapore.bc@ipsos.com
Telephone 65 6333 1511

SOUTH KOREA

12th Floor, Korea Economic
Daily Building, 463 Cheongpa-Ro
Jung-Gu 100-791
Seoul, South Korea
korea.bc@ipsos.com
Telephone 82 (2) 6464 5100

THAILAND

21st and 22nd Floor, Asia Centre
Building
173 Sathorn Road South
Khwaeng Tungmahamek
Khet Sathorn 10120
Bangkok, Thailand
thailand.bc@ipsos.com
Telephone 66 (2) 697 0100

TURKEY

Centrum Is Merkezi Aydinevler No:3
34854 Kuçukyali 3
Istanbul, Turkey
turkey.bc@ipsos.com
Telephone 90 (216) 587 1111

UAE

4th Floor, Office No 403
Al Thuraya Tower 1
P.O. Box 500611
Dubai Media City, UAE
uae.bc@ipsos.com
Telephone 971 (4) 4408 980

UK

Minerva House
5 Montague Close
SE1 9AY
London, United Kingdom
uk.bc@ipsos.com
Telephone 44 (20) 3059 5000

USA

31 Milk Street
Suite 1100
Boston, MA 02109
United States of America
us.bc@ipsos.com
Telephone 1 (617) 526 0000

VIETNAM

Level 9A, Nam A Bank Tower
201-203 CMT8 Street, Ward 4
District 3
HCMC, Vietnam
vietnam.bc@ipsos.com
Telephone 84 (8) 3832 982