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Building Energy Efficiency: Why Green Buildings are Key to Asia's Future

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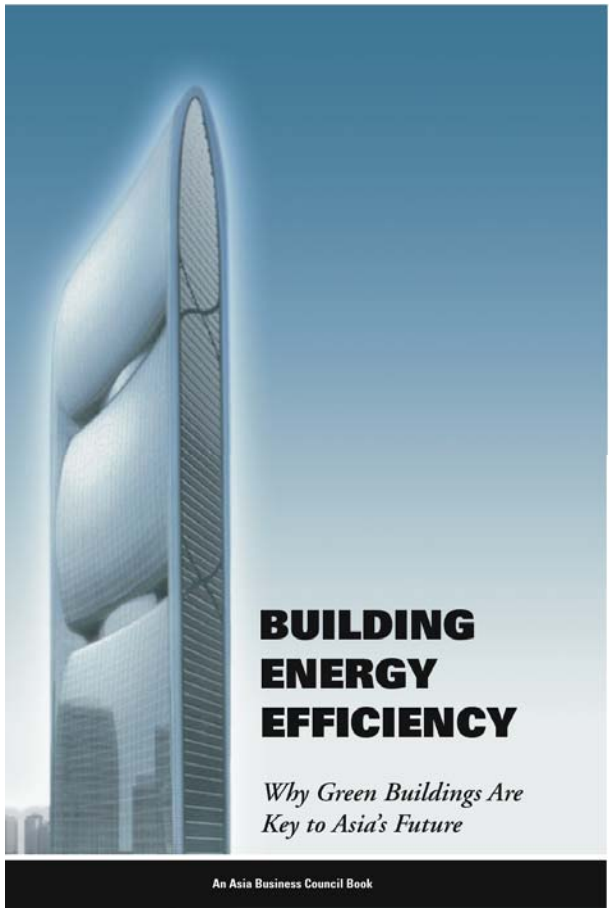

- **Asian Review of Books**
  - "an excellent, comprehensive primer on Asia's green building trend....essential reading for policymakers, architects, developers, business owners, and all those interested in practical solutions to global warming"
- **Chinese edition to be published this Autumn**

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Key Messages

- **The future focus of building energy efficiency will be in Asia, especially China and India**
- **Despite a number of promising recent policies, there are still major challenges**
- **No silver bullet solution – there are many ways for government and business to contribute**
- **Building energy efficiency is a longer term trend that will not go away – those that take early initiative will gain competitiveness**

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Why Buildings Matter

- **Buildings use 30%-plus of all primary energy in the world**
  - 50%-plus when embodied energy such as cement included
  - 18-story modern high rise in Singapore or Hong Kong = 900 cars
- **Buildings last decades**
  - Decisions today have a long-lasting impact on our future energy consumption
- **Efficient buildings enhance energy security and environmental sustainability**
  - More efficient buildings can promote energy security and sustainability without hurting economic growth

"Buildings should put back into the system at least as much energy as they take out" *—World Business Council on Sustainable Development*

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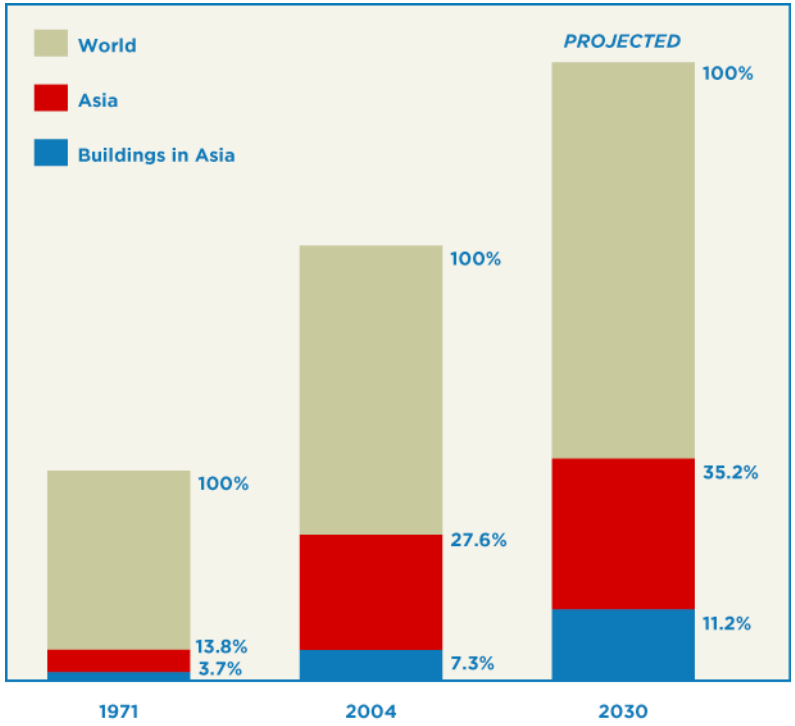
Asia's Challenge

- **Asia's growing share of world energy use**
  - Asia's share of global energy consumption doubled in 30 years
  - Asian buildings' share of world energy consumption growing at similar rates
- **Building boom in China and India:**
  - China: Constructing almost half of the world's new floor space
  - Over 80 percent of the nearly two billion square meters of new buildings constructed each year in China are categorized as high-energy buildings, consuming two to three times more energy per unit of floor space than those in developed countries
  - New construction in China equivalent of two 500-megawatt coal plants per week
  - India: Built area more than doubled from 2000 to 2005

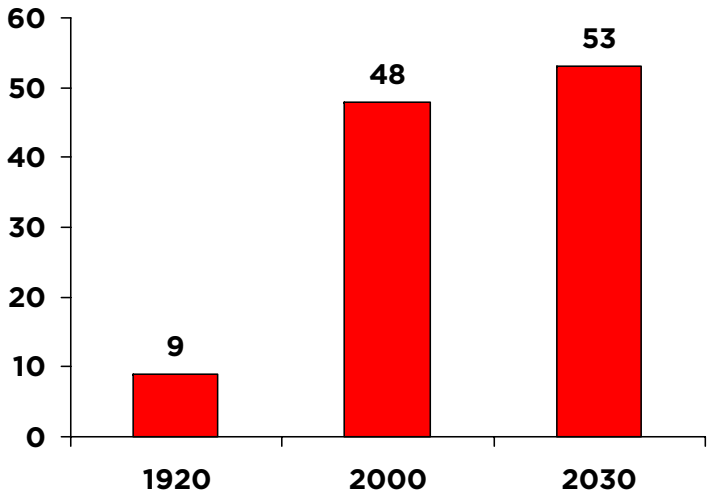
Asia's share of global energy consumption



Building Growth Will be Concentrated in Cities in Asia

- **The growing importance of cities**
  - 2 percent of the world's surface area
  - Responsible for 75 percent of the world's energy consumption
  - By 2030, 60 percent of us will live in them (5 billion people)
  - From 2007 to 2010, electricity use globally will have grown by 37 percent. By 2020 it will have shot up by 76 percent
  - About 70 percent of GHG emissions come from buildings
- **Currently, Asia holds more than half of the world's megacities with more than 10 million people, and that number is rapidly rising. The growth of Asian cities is astounding, with many doubling their population every 15 to 20 years**

Asia's share of global urban population (%)



Source: UNDP "building and climate change" report

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Green Building Opportunities

- **Green buildings can reduce 1.8 billion tons of CO_2 per year, close to 3 times the amount scheduled for reduction under the Kyoto Protocol**
- **Four to six times cheaper to design and build a building correctly in China than to build the electricity plant to heat, cool, and light an inefficient building**
- **Majority of the most cost-effective measures taken to reduce GHG emissions involve building efficiency**

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Worldwide: Energy-Efficient-Building Initiatives

Government Initiatives

- **EU**: Directive on The Energy Performance of Buildings (2003)
- **G8** Gleneagles Program on Building Energy Efficiency (2005), followed by IEA database on building energy efficiency codes and standards
- **European Commission**: Green Building Program (2005)
- **US**: California Building Standards Commission (2008), Austin Solar Rebate Program (2008)
- **Germany**: Renewable Energies Heating Law (2009)

Business - Community Initiatives

- **Standard Chartered Bank** pledged $8-10 billion for building retrofits, alternative, and renewable energy (2007); partnership with the ADB on retrofitting projects in China
- **Clinton Climate Initiative** and six banks promise US$5 billion in finance for retrofits (2007)
- **ASHRAE**: Collaboration with USGBC to develop green building standards; multiple partnerships with businesses like Wal-Mart

All this adds up to clear evidence of a transformation that will change the market practices of the building industry

Leaders in Building Energy Efficiency in Asia

- **Comprehensiveness and sophistication of building energy efficiency policies**
  - Policies in Japan and Singapore
    - Cover most stages of a building's life cycle
    - Target both the suppliers and consumers of buildings
- **Policy implementation**
  - Japan, Korea, Singapore, and Taiwan
    - Codes are now well-accepted
    - Rigorous voluntary programs going beyond the minimums
- **Recent building energy efficiency policies in Asia**
  - Hong Kong: Proposed mandatory building energy efficiency standards-- public consultation completed in 2008
  - Singapore: Green Mark Incentive Scheme requiring new public sector buildings and those undergoing major retrofitting works to be Green Mark certified from April 1, 2007 onward

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Latest developments in China and India

- **Embracing international certification…**
  - 7 developments with LEED Gold certification, including the Olympic Village and Century Prosper Center in Beijing completed in 2008, the first commercial office building in China to achieve LEED Gold certification
  - 8 developments in India with LEED Gold or Platinum certification
- **…while developing national standards and coordinating bodies to adapt to local conditions**
  - India Green Building Council launched LEED India in January 2007
  - China Green Building Council launched in March 2008; China's Ministry of Construction set a new target that energy consumption in new buildings should be 65 percent less than in existing buildings, and the government has established a tax and fees rebate system to help meet this goal

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China: Current Policies

- **Released national climate change assessment in December 2006**
- **Released climate action plan June 2007**
- **Target 20% reduction in energy intensity by 2010**
- **Target 15% renewable energy by 2015**
- **Target reduction of 50-65% in energy consumption in new buildings relative to existing buildings, and a tax and fees rebate system to help meet this goal**
- **New Energy Conservation Law as of April 1, 2008**

China: Policy Challenges & Opportunities

Costs

- **Costs: How to drive down costs of green buildings?**
- **Building Materials: Is the technology there? Is cost dominant? Is there more of a role for government?**
- **Break the myth that green buildings cost more**

Enforcement

- **Enforce existing laws and regulations**
- **Slow start toward energy efficiency: Are local officials listening to Beijing?**

China: More Policy Challenges & Opportunities

Stakeholder Roles

- **Role of government, private sector, civil society?**
- **Developers are key players: Are they doing enough?**
- **Architects, Designers: How to encourage green-building capacity?**
- **ESCOs: What is the market opportunity and what barriers?**
- **Consumers: Provide information, know-how**

Related Industries

- **Polluting industries: E.g. cement; many small players; highly polluting. Is good policy hostage to jobs?**
- **Solar & other renewables: Large sector, listed companies; world-class players. What policies are needed to encourage them?**

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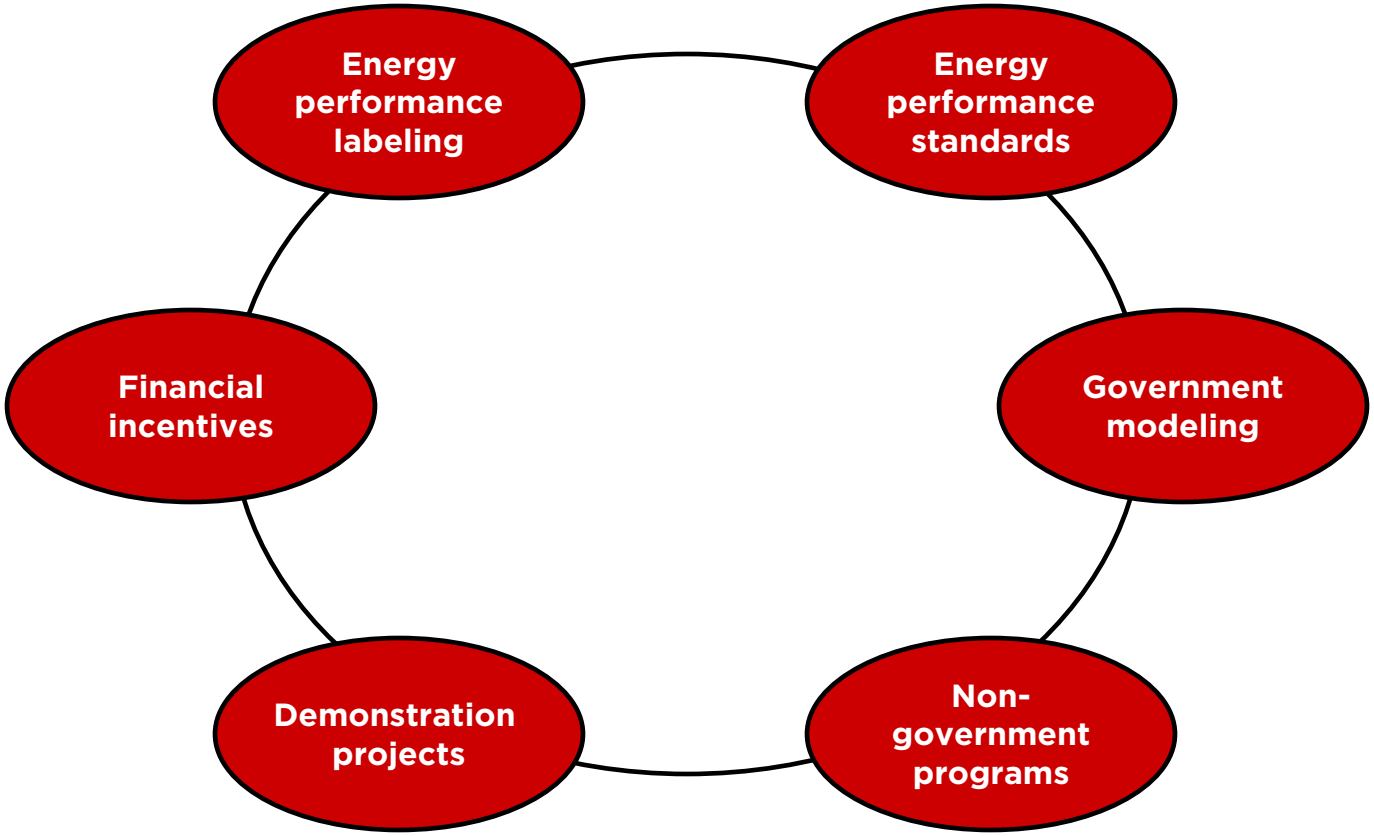
A Broad Set of Policy Solutions for Building and Appliance Energy Efficiency



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Yet Some Myths Still Need to be Dispelled

Myth	Reality
Perception of higher building costs for green	■ Sometimes higher costs (3-5%), falling to 0% with practice ■ Higher rental yields, higher capital values in more developed markets
The benefits of going green cannot be measured	■ Measurement allows tenants and operators to see the tangible benefits of energy efficiency, e.g., electricity use ■ Energy standards have produced actual energy-efficiency improvements (e.g., in California)
Energy costs are low (when it is subsidized)	■ Cheap energy is wasted energy ■ Inefficient buildings require more power plants: this will needlessly undermine energy security and the costs to the environment and the economy are significant and long-lasting

Green Buildings in Asia: Public-Private Initiatives

Common characteristics

- **Integrated design–building components like building envelope, HVAC, lighting, etc. work together to save energy**
- **Passive design–uses natural energy flow to maintain comfort**
- **Powered by clean energy**

China: Agenda 21 Demonstration Energy-Efficient Office Building

Japan: Itoman City Hall

India: CII-Godrej Green Business Center

South Korea: Kolon R&D Institute of Technology Building

Green Buildings in Asia: Commercial and Residential Developments

Energy saving strategies

- Green building features for water and energy savings, waste recycling, improved indoor air quality
- Building retrofitting, e.g., upgrade building automation system
- Operational changes, e.g., reschedule and reduce electrical loads
- Tenant conservation, e.g., switch off lighting/AC

China: TaiGe Serviced Apartments

Indonesia: Plaza BII Building

Singapore: Keppel Land's The Tresor

Hong Kong: City Plaza III & IV

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New Green Buildings in Asia Emphasize Renewable Energy Use and Design

Recently completed/planned green buildings in Asia

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The Future of Cities: Eco-Cities

Shanghai, China: Dongtan eco-city (expected 2010)

- Zero-GHG emissions transportation system
- Starting point 50,000 residents
- Self-sufficiency in producing and delivering energy and water
- Maximize public, green space with minimal occupation of land
- Compact design with proximity to public transportation to reduce car use

Japan: Eco model cities (designated 2008)

- 6 designated eco cities: Yokohama, Kitakyushu, Toyama, Obihiro, Minamata and Shimokawa
- Halve emissions by 2050
- Real estate tax reductions for eco-friendly houses

Abu Dhabi, UAE: Masdar eco-city (expected 2016)

- 20 miles outside of Abu Dhabi
- Zero-carbon, zero-waste, car-free desert oasis that can house 1,500 businesses and 50,000 residents
- Key features include wind-powered turbines, a system of city-cooling, gray-water canals, and a non-polluting light-rail system

Source: Foster & Partners, Arup

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Conclusions

- **Buildings have a profound impact on energy security and climate change**
- **Unlike the U.S. and Europe, industry in Asia has left initiatives largely to government**
- **Governments are becoming more proactive, with a range of policy responses designed to improve building energy efficiency**
- **However, it is becoming clear that change requires collaboration. Businesses have an opportunity to take a leadership role, one that makes good business sense and meets sustainability needs**