Innovative Financing for Green Building at the City Level: Public, Private and Multilateral

UNCSD Rio+20
June 17, 2012

JASON HARTKE
Vice President, National Policy
U.S. Green Building Council
jhartke@usgbc.org
Please follow me on the Twitter Machine: @jasonhartke
U.S. Buildings Account for:

- 72% of electricity consumption\(^1\)
- 60% of total non-industrial waste\(^2\)
- 40% of primary energy use\(^3\)
- 39% of CO\(_2\) emissions\(^4\)
- 13.6% of potable water consumption\(^5\)

\(^1\) Environmental Information Administration. EIA Annual Energy Outlook. 2008.
Green Buildings Can Reduce...

ECONOMIC IMPACT: total green construction market

<table>
<thead>
<tr>
<th></th>
<th>GDP</th>
<th>Jobs</th>
<th>Wages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$173 billion</td>
<td>$200 B</td>
<td>2.4 million</td>
</tr>
<tr>
<td></td>
<td>$62 B</td>
<td>$173 B</td>
<td>819,956</td>
</tr>
<tr>
<td></td>
<td>$54 B</td>
<td>$161 B</td>
<td>600,758</td>
</tr>
<tr>
<td></td>
<td>$57 B</td>
<td></td>
<td>1,039,177</td>
</tr>
</tbody>
</table>
$1.2 trillion in savings from EE in buildings by 2020

Reduce emissions by 2030 equal to the Entire U.S. Fleet

WHAT IS THE BUSINESS CASE?

Green building provides substantial financial benefits, making it a clear triple-bottom line win.
Costs and benefits of Green Buildings:

Present value of 20 years of estimated impacts based on study data set collected from recent green buildings

- Increased building cost
- Water savings
- Direct energy savings

Green School

- Additional cost: $0
- Benefit to owner/occupant: $8

Green Office

- Additional cost: $10
- Benefit to owner/occupant: $12

Additional benefits not estimated:

- Productivity and student performance
- Property Value impacts
- Indirect water systems impacts
- Brand
- Operations and Maintenance savings
- Embodied energy savings
Costs and Benefits of Green Buildings: Present value of 20 years of estimated impacts based on study data set and synthesis of relevant research*

<table>
<thead>
<tr>
<th></th>
<th>Green School</th>
<th>Green Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>increased building cost</td>
<td>$4</td>
<td>$10</td>
</tr>
<tr>
<td>health</td>
<td>$2</td>
<td>$8</td>
</tr>
<tr>
<td>water savings</td>
<td>$6</td>
<td>$12</td>
</tr>
<tr>
<td>energy savings</td>
<td>$8</td>
<td>$14</td>
</tr>
<tr>
<td>indirect energy savings</td>
<td>$6</td>
<td>$10</td>
</tr>
<tr>
<td>employment</td>
<td>$4</td>
<td>$6</td>
</tr>
<tr>
<td>emissions</td>
<td>$2</td>
<td>$4</td>
</tr>
</tbody>
</table>

Additional benefits not estimated:
+Productivity and student performance
+Property value impacts
+Indirect water systems impacts
+Brand improvements
+Operations and maintenance savings
+Embodied energy savings

*There is significantly greater uncertainty, and less consensus around methodologies for estimating health and societal benefits.
IT’S NOT ABOUT COST
IT’S ABOUT VALUE
BUILDING VALUE

GREEN CERTIFIED BUILDINGS:

- Capture top market rents
- Increase lease velocity
- Attract Class A tenants
- Safeguard against obsolescence

GREEN CERTIFICATION = INCREASED RENTAL RATES

STUDIES HAVE OBSERVED RENTAL PREMIUMS BETWEEN 3%-6% FOR GREEN CERTIFIED BUILDINGS COMPARED TO SIMILAR NON-CERTIFIED BUILDINGS.

Doing Well by Doing Good? Green Office Buildings by Eichholtz, Kok, and Quigley, Berkely IBER, 2009
GREEN CERTIFICATION = INCREASED OCCUPANCY RATES
STUDIES HAVE FOUND OCCUPANCY PREMIUMS FROM 4% TO 8%

Adobe / Cushman Summary

- 35% electricity reduction
- 41% reduced natural gas
- 22% reduced domestic water
- 76% reduced landscape irrigation
- Up to 87% solid waste diverted
- 26% reduced total pollution
- 22% reduced CO₂ emissions
Adobe Systems/Cushman

$1.4 million spent on 64 separate projects:

- $389,000 in rebates
- $1.2 million in annual savings
- 10-month payback
- 121% return on investment
LEVERAGING SAVINGS TO PAY FOR GREEN UPGRADES
Financing Remains a Stubborn Problem

• Obstacles
  – First cost barrier
  – Owner discounting future value of energy and $ savings
  – Owners don’t want to add debt

• Strategies
  – Amortize loan over longer period
    • Property tax assessments (PACE model)
    • On-bill financing – utilities and/or municipalities
    • EE Mortgage products
  – Public-Private Partnerships
  – Access to low cost money; credit enhancement
    • Buy down interest rate; reduced costs through aggregation
    • Risk reduction – secure/guarantee loans
DRIVING TRANSFORMATION TO ENERGY EFFICIENT BUILDINGS

Innovative Financing for Green Buildings

Innovative Financing for Green Building at the City Level
Public, Private and Multilateral
Clay Nesler  Vice President, Global Energy and Sustainability
POLICIES HELP BRIDGE THE EFFICIENCY GAP

Stakeholders:
- Architect
- Engineer
- Developer
- Owner
- Financer
- Realty Agent
- ESCO
- Institutional
- Awareness
- Technical
- Financial
- Market

Energy Efficient Buildings
ENCON Fund – Revolving Loans – Tax Incentives

ENCON Fund
- Energy Conservation Promotion Fund (ENCON Fund) was financed by a levy of US$0.001/litre on petroleum products.
- Supports all EE/RE promotion activities – R&D, subsidies, soft loans, awareness campaign, capacity building, and the following programs:

Energy Efficiency Revolving Fund
- Provides capital at no cost to Thai banks, which then provide low interest loans to energy efficiency projects.

Tax Incentives
- Exemption of import duties – for equipment related to RE/EE
- Exemption of corporate income tax for 8 years for EE/RE manufacturers or businesses
- Reduction of corporate income tax for business that improve their EE or utilize RE up to 70% of investment costs.
EPC pays for infrastructure improvements from energy savings over time.

- Installation
- Commissioning
- Verification
- Guarantee

Guaranteed savings as investment volume

New, reduced costs with performance contracting

Customer savings

Energy Services Company
- Credit Support
- Technical Expertise
- Standard Contracts

NGO or Development Bank

Private Financial Entity

Building Owner

$
CASE STUDY - SUSTAINABLE MELBOURNE FUND

Environmental Upgrade Finance

GET STARTED

Pillars of a pathway for building-efficiency policy

What?
- Scoping
- Targets
- Priorities

How?
- Action Plan
- Capacity
- Finance

Who?
- Institutions
- Stakeholders
- Governance
BUILDING EFFICIENCY POLICY ASSESSMENT TOOL

Flow of a Policy Workshop

1. Visioning
2. Establish Current Policy Status
3. Assess Policy Importance and Difficulty in Implementation
4. Determine Short and Long-term Priorities
5. Next Steps and Action Planning
BUILDING EFFICIENCY POLICY ASSESSMENT TOOL

Policy Map – Current, Short Term, Long Term

- Building Efficiency Targets
- Building Energy Codes
- Building Energy Performance Disclosure
- Building Rating Systems or Building Certification Programs
- Tax Incentives, Grants or Rebate Programs
- Government Leadership Programs
- Energy Performance Contracting Enablers
- Risk Mitigation
- Data Collection and Baseline Development
- Technical Capacity
  - Building Programs/Workforce
  - Training and Education

1 = No policy planning currently in place
2 = Planning to pilot or implement policy
3 = Piloting the policy on a limited basis
4 = Limited or sub-national level implementation
5 = Comprehensive national level implementation

Current Status, Desired Short Term, Desired Long Term
The Driving Transformation to Energy Efficient Buildings report can be found on the Institute for Building Efficiency website or at:

Tokyo Initiative
To Promote Green Buildings
Create Investment Flow to “Green” Buildings

Clear Target
Shows policy direction and longer term policy commitment

Effective Measures
Cap & Trade
Comprehensive programs

Create vast Investments
in Energy Efficiency Measures and Renewables

Promote Green Buildings
Agenda
1. Tokyo Climate Change Strategy
2. Tokyo Cap-and-Trade Program
3. Green Building Era in Tokyo
   Low Emission Buildings TOP 30 in Tokyo
1. Tokyo Climate Change Strategy
Tokyo Climate Change Strategy
GHG Emission Reduction Target
25% below 2000 levels by 2020
Tokyo Carbon Dioxide Footprint by Sector

CO₂ emissions in TMG area by sector

Inner circle: FY1990 / Total: 54.4 Mt-CO₂
Middle circle: FY2000 / Total: 58.8 Mt-CO₂
Outer circle: FY2008 / Total: 63.3 Mt-CO₂
1 Importance to approach the demand side of energy
As a large energy consumer, Tokyo has a responsibility to reduce emissions from the demand side of energy

2 Importance to reduce emissions from urban facilities (buildings)
Promoting measures in the buildings sector is the key to reduce emissions from urban areas

3 Enable Tokyo to grow in the coming carbon restrain age
Taking advantage of the early shift to a low carbon city to realize sustainable growth of Tokyo
Tokyo Climate Change Strategy Policy Development

**Plans**
- **2000**
- **2005**
- **2006**
- **2008**
- **2010**
- **2012**

**“The 10-yr plan”**
Setting the target

**Climate Change Strategy**
Basic policy for the 10yr project

**TMG environmental master plan**
Setting sectoral targets & programs

**Programs**

**CO₂ Emission Reporting program**
- ● 2002 Start

**Reporting Program for smaller facilities**

**Tokyo Cap & Trade**
- ● 2008 Enact
- ● 2010 Start

**Green Building Program**
- ● 2002 Start
- ● 2005 Revise

**Green Labeling Program for Condominiums**
- ● 2008 Revise

**District Plan for Energy Efficiency**

**Existing buildings**

**New builds**
2. Tokyo Cap-and-Trade Program
The urban cap and trade program to cover commercial sector buildings including office buildings

Target facilities: 1,300 facilities

Facilities with annual energy consumption of 1,500 kl or more (crude oil equivalent)

Approx. 1000 commercial & institutional buildings
Approx. 300 industrial facilities

Covers approx. 40% of commercial & industrial sectors’ emissions
To achieve the Tokyo’s emission reduction target “By 2020 25% reduction from 2000”, the necessary reduction in industry & commercial sector is 17% reduction.

* Current estimation.
The Cap for the 2nd compliance period will be fixed by the end of the 1st compliance period.
Fair allowance allocations

<table>
<thead>
<tr>
<th>Category</th>
<th>Compliance factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>I -1 Commercial buildings, District cooling &amp; heating facilities (plants)</td>
<td>8 %</td>
</tr>
<tr>
<td>I -2 Commercial buildings using EHC</td>
<td>6 %</td>
</tr>
<tr>
<td>II Factories, etc.</td>
<td>6 %</td>
</tr>
<tr>
<td>Top level A facility already achieved high energy efficiency is certified as a: Top Level / Near-top level Facility</td>
<td>1/2 or 3/4 of the compliance factor</td>
</tr>
</tbody>
</table>

Emission Allowance (5yrs) = Base-year emissions - Obligation reductions

Base-year emissions: Average emissions of three consecutive years between 2002 to 2007

Emission Allowance (5yrs) = Base-year emissions - Obligation reductions

Obligation reductions = Base-year emissions × Compliance factor

Emission Allowance (5yrs) = (Base-year emissions - Obligation reductions) × 5 years
Tradable allowance:
Reductions exceeding the obligation
Emission reduction exceeding the yearly obligation is allowed to be traded from the 2nd year.

Creation of Emission Reduction Registry System:
Every Facility has account in a registry

Creation of a MRV system:
Guidelines on MRV
Requirements of verification by a registered verification agency
1. **Emission reductions from small and midsize facilities within the Tokyo area**
   * Emission reductions through energy-saving measures in smaller facilities not covered by the TC&T

2. **Renewable Energy Certificates**
   * Solar energy (heat and power), wind energy, etc.
   * No limit for offsetting

3. **Emission reductions outside the Tokyo area**
   * Sellers will be assumed to be covered under the Tokyo Cap-and-Trade Program, and reduction exceeding the reduction obligation would be counted as offset credit
   * Can only buy up to 1/3 of base year emissions
# Tokyo Cap & Trade:
## Offset Credits Creation

215,000 t-CO2 Offset Credits are expected to be created

<table>
<thead>
<tr>
<th>Offset Credits Types</th>
<th>Number of Application</th>
<th>Projected Reduction Amount (t-CO2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emission reductions from Small and Midsize Facilities</td>
<td>289</td>
<td>54,094</td>
</tr>
<tr>
<td>Renewable Energy Certificates</td>
<td>7</td>
<td>65,000</td>
</tr>
<tr>
<td>Emission reductions Outside the Tokyo area</td>
<td>11</td>
<td>96,317</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>307</strong></td>
<td><strong>215,411</strong></td>
</tr>
</tbody>
</table>

As of September 30, 2011
Penalties for non-compliance

Fines: up to JPY 500,000
Charges: 1.3 times the shortfall
Violation will be published

*Among the other TMG programs, exceptionally high charges*
Overview

Mandatory emission reduction program targeting urban facilities in a cost effective way

+ Targeting EXISTING BUILDINGS
+ Targeting total emissions from a building as a whole
+ Two five-year compliance periods create longer term investment
+ Declining ceiling (cap) encourage early actions
+ Capturing real energy consumptions (emissions)
  > design performance
+ Pursuing the cost effectiveness through the ETS
+ Create investment to smaller buildings retrofit through offset credit
Results of the Operation (FY 2010)

- Provisional results of the first fiscal year
  (1,159 of 1,348 covered facilities)

**Total emissions reductions: 13%**
below base year emissions
Total emissions: 9,763,956 t
Base year emissions: 11,208,596 t

- **64% facilities reduced more than compliance factor**
  (6% or 8%)
26% facilities reduced more than 17%

- **71% facilities expected to fulfill their reduction obligations only through measures in their sites**
By reported reduction plans of each facility

- Research by NIKKEI
  8 million USD is planned to invest
Expansion of the Scheme

Regional Expansion
Saitama Prefecture
► Greater Tokyo Region

Spot Expansions
Through a “Out-side Tokyo Credit scheme

Proposal of the Two-tier Programs
► Overall Japan

Greater Tokyo Region
Regional Economy:
1.5 trillion USD

Global;
Emerging Local Cap and Trade System
3. Green Building Era in Tokyo
TOP30 buildings were selected in line with the policy measures of TMG.

Existing buildings section:
Highly valued in the C&T Program

New building section:
Based on the evaluation of the Green Building Program

## TOP30 Existing Building Section

### Top Level Facility Certification

In the Tokyo Cap-and-Trade Program

<table>
<thead>
<tr>
<th>Assessment category</th>
<th>Required</th>
<th>General</th>
<th>Extra credit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. General Management</strong></td>
<td>23</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Establishment of cooperative structures for energy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>conservation, energy management status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>II. Energy Performance (building Shells and equipments)</strong></td>
<td>26</td>
<td>39</td>
<td>45</td>
</tr>
<tr>
<td>Energy efficiency of air conditioning, lighting, and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>other facilities, equipment efficiency (COP), etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>III. Operations</strong></td>
<td>25</td>
<td>56</td>
<td>9</td>
</tr>
<tr>
<td>Indoor temperature and humidity management, facility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>maintenance and management, etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>228 items</td>
</tr>
</tbody>
</table>
## TOP30 New Building Section

**Assessment of Energy Performance**

**In the Tokyo Green Building Program**

<table>
<thead>
<tr>
<th>Assessment category</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. Heat load resistance of the shell</strong></td>
<td>20% or higher reductions from <strong>PAL standard</strong> (the national standard)</td>
</tr>
<tr>
<td>Heat insulation of walls and windows,</td>
<td></td>
</tr>
<tr>
<td>measures for shielding them from sunlight, etc.</td>
<td></td>
</tr>
<tr>
<td><strong>II. Energy efficient equipments</strong></td>
<td>30% or higher <strong>ERR standard</strong> (aggregation of the national standard)</td>
</tr>
<tr>
<td>Introduction of energy saving measures in the facilities (air conditioning, lightings, ventilation, water heating, and elevators)</td>
<td></td>
</tr>
<tr>
<td><strong>III. Efficient operation systems</strong></td>
<td>Level 2 or higher <strong>ERR standard</strong> (aggregation of the national standard)</td>
</tr>
<tr>
<td>Measurement and energy management system</td>
<td></td>
</tr>
<tr>
<td>for optimal operation</td>
<td></td>
</tr>
<tr>
<td><strong>IV. Use of renewable energy</strong></td>
<td>Amount of renewable energy introduced Ex; <strong>30kW</strong> in the case of <strong>PV</strong></td>
</tr>
<tr>
<td>On-site installation of renewable energy</td>
<td></td>
</tr>
<tr>
<td>including PV and solar heat system</td>
<td></td>
</tr>
</tbody>
</table>
TOP 30 Building List

東京の低炭素ビルTOP30 所在地マップ

EXISTING BUILDING

1. Dentotsu Shiodome Head Office Building
2. Ginza Mitsui Building
3. Hibiya International Building
4. Meiji Yasuda Seimei Building and Meiji Seimei Kan Building
5. Mitsubishi Shoji Building
6. Marunouchi Building
7. Nihonbashi Mitsui Tower
8. Otsuka Corporation Head Office Building
9. Roppongi Hills
10. Sapia Tower
11. Shin-Otemachi Building
12. Sony City
13. Tokyo Midtown
14. Toranomon Towers Office
15. Kokuryu Shiba Koen Building

Alphabetical order

NEW BUILDING

16. Chiyoda Ward Koujimachi Junior High School
17. Fujimi Mirai Kan
18. JP Tower (tentative name)
19. Kasumigaseki Common Gate Central Government Building No.7
20. Kyobashi 3-1 Project (tentative name)
21. Marunouchi 1-4 Project New Building (tentative name)
22. Marunouchi Park Building
23. Shimizu Corporation New Headquarters Construction Project
24. Shopping Center at 1-1 block in the first south area of Musashi-Koganei Station
25. Sony Corporation Sony City Osaka
26. Takenaka Corporation Tokyo Main Office
27. Tokyo Metropolitan Matsuzawa Hospital
28. Toyosu Cubic Garden
29. Obayashi Corporation Technical Research Institute Main Building (Tecno-Station)
Sony City
Sony Corporation

Tokyo Midtown
Mitsui Fudosan Co., Ltd.
East Japan Railway Company
Mitsubishi Estate Co., Ltd.

Roppongi Hills
Mori Building Co., Ltd.
New Building Section

Techno-Station
Obayashi Corporation

JP Tower
Japan Post Network Co., Ltd.
East Japan Railway Company
Mitsubishi Estate Co., Ltd.

Marunouchi Park Building
Mitsubishi Estate Co., Ltd.

New Headquarters Construction Project, Shimizu Corporation
High performance buildings in progress

1. High Performance Shells
2. Energy Efficient Equipments
3. Renewable Energy Use
4. Operations/ Management
   -- Efficient Operation Systems
   -- Tuning, Commissioning
   -- Tennant Participations

Actual Energy Consumption/ Emissions

Low Emission Buildings TOP30

New Buildings

Existing Buildings
Key Message

A clear & bold **Target**
+ **Effective measures**

→ **Create vast investments**
in Energy Efficiency and Renewables

→→ **Low Carbon City**
Create Investment Flow to “Green” Buildings

Clear Target

Create vast **Investments** in Energy Efficiency Measures and Renewables

**Effective Measures**

Promote Green Buildings

Diffusion & Advance in **Technology**
ICF’s Innovative Financing for Green Building at the City Level
Public, Private and Multilateral
June 17, 2012
Daunting Pressures Create an Intense Focus on Green Urban Buildings

Urbanization

While half the world now lives in cities, within 20 years almost three-quarters of the population will live there. 90% of this growth will be in the developing world.

Climate Change

Cities account for about two-thirds of global energy use and 70% of GHG emissions. Yet urbanization, if properly managed, can address sustainability issues through denser, more energy-efficient cities that are climate-resilient and offer a high quality of life.
IFC’s green buildings standard requires 20% less energy, water, and material consumption compared to an equivalent local benchmark. The standard provides a performance assurance to buyers and investors.
EDGE: IFC’s Financial and Advisory Tool to Deliver Green Buildings

• IFC has developed a green buildings certification system for emerging markets.
• EDGE stands for “Excellence in Design for Greater Efficiencies.”
• EDGE reveals technical solutions for going green and captures capital costs and projected operational savings.
• EDGE is a simple, inexpensive, and reliable way to save on utility bills while reducing a project’s carbon footprint.

The EDGE Difference

• EDGE aims to create an international green building standard.
• EDGE has a user-friendly, excel-based interface.
• EDGE is supported by country-specific calculations.
• EDGE can be used by building professionals without the need for expensive green building specialists.
Example of an IFC Green Building Client: Vinte Housing Developer, Mexico

Key Features:
- Homes typically have solar hot-water, water efficient fittings, low-energy light bulbs, and smart meters.

Photo courtesy of Fernando N. Escárcega, Real del Sol-VINTE Project.
Actis has adopted IFC’s mandatory Green Building standards* for all sites and has put in place sustainability guidelines applicable to all of the fund’s property investments.

IFC will continue to provide valuable green building advice and support.

Actis benefited from positioning itself as a “green” fund to attract sustainability-minded investors and diversify its investor base.

Key Features:

• Building over 50% more energy-efficient than peer group in Accra
• Natural light and natural ventilation to minimize energy demand
• Rainwater harvesting
• Overhangs provide shading from intensive solar radiation
• Heat recovery through centralized fresh air system
• Ear-marked to be first Green Star rated building in West Africa

*IFC’s suggested minimum performance for green buildings is based on CO2/energy criterion defined as a green field building that has 20% less energy consumption and/or 20% less CO2 emissions compared to an equivalent benchmark