Assessing the effectiveness of Reporting System of the Eco-friendly Building Planning

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What is “Eco-friendly Building Plan System”? 

- reporting system used by local governments, based on ordinances or guidelines
- The aim is to encourage builders to take eco-friendly measures when building or renovating buildings above a certain size.
- limiting thermal burden of buildings, promoting the use of natural energies, improving the efficiencies of equipment and systems, and efficient operation of the buildings.
Research objectives

- Identify local bodies that introduced the system
- Analyze characteristics of the introduced systems
- Assess the operational effectiveness
- Identify options for improvement
(1) Research methods and focusing points

- Ordinance analysis + Interviews & surveys

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<td>• policy officials’ thoughts on system’s effectiveness</td>
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<td>• etc.</td>
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paper DL URL: http://criepi.denken.or.jp/jp/kenkikaku/report/detail/Y09025.html
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<th>建築物計画書制度（※1）</th>
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<td>制度の概要</td>
<td>新築・増築</td>
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<tr>
<td>調査・検査の拒否、妨害、忌避</td>
<td>利罰</td>
<td>○</td>
</tr>
</tbody>
</table>

※1 2009年末までの条例内容
※2 東京都では、2010年1月1日より導入、最低基準遵守義務を導入
※3 特定緑化建築物が対象
Surveys To obtain information on operation of the system

<table>
<thead>
<tr>
<th>Survey targets</th>
<th>Survey scale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Questionnaire survey</strong> (conducted: 6–22 January 2010, method of collection: e-mail to departments in charge, all 21 local government bodies which had adopted the system at the time of my survey and had a 100 percent reply ratio)</td>
<td>21 local bodies</td>
</tr>
<tr>
<td><strong>Telephone survey</strong> (Survey content: no. of notifications in FY2008, guidance on content of notification, whether advice was given/content of advice, operational issues)</td>
<td>17 local bodies</td>
</tr>
<tr>
<td><strong>Direct hearing survey</strong> (Survey content: measures to improve notification ratio, measures to improve standards compliance rate, state of linkage btw. departments, system operation issues)</td>
<td>6 local bodies, 1 business</td>
</tr>
</tbody>
</table>
RESULTS
(2-1) Current status of system introduction

- By 2012, 28 local bodies, broken down as 13 prefectures and 15 designated cities, had introduced the system.
- This accounts for more than 40 percent of the total of 65 prefectures and designated cities in Japan.
- And among those 28 bodies, 90 percent use CASBEE as the assessment criteria (except Tokyo Met. Gov’t and Nagano Prefecture).
(2-2) Current status of system introduction

- At the time, 18 bodies, set the notification requirement at a floor area of 2,000 square meters or over.
- 3 bodies ⇒ 5,000 or over
- 1 bodies (Tokyo) ⇒ 10,000 or over.
  - since 2010 they have expanded the subjected buildings to 5000 square meters.
- 1,514 notifications had been submitted by 2008
(3-1) Essential elements of the Eco-friendly Building Plan System

- Common elements observed in 21 local bodies:
  => Self-assessment + Reporting + Disclosure

① Self-assessment by the builders

② Assessment reporting to local gov’ts = legal obligation (false notification or refusal to submit notification resulting in announcement of violation or a fine)

③ Public disclosure of reported assessment results by local gov’ts
  • Posting on local government website
  • Inspection by dept. in charge of policy
Eco-friendly Building Plan System

Self-assessment
(Self-assessment based on CASBEE sheets)

Reporting
(Notification using form prescribed by local government)

Information Reporting
- Results of notification posted on the Internet
- Disclosure of name/address of builder or architect

Business operators, etc.
Promotion of voluntary actions
- Low evaluation = negative impact on builder or architect’s image

Creation of market to evaluate environmental performance
- Increase demand for buildings with good environmental performance
- Promote building materials technology

Enlightenment of public towards environment
- Deepen awareness and understanding of buildings’ environmental performance
(3-2) different perceptions in the Eco-friendly Building Planning System

- Local governments and builders have different perceptions of whether this system is a regulatory system or not.
- Local governments’ perception: this system does not make it mandatory for builders to introduce specific measures.
- Builders’ perception: the system requires the builder to prepare a document and submit a notification, and provides for penalties such as announcement of a violation or payment of a fine in the case of refusal to submit report.
• Comprehensive Assessment System for Built Environment Efficiency

• the assessment criteria used by over 90 percent of local bodies.

• It is provided free of charge as an Excel file to individuals and local government bodies.

Source: http://www.jetro.org/documents/green_innov/Takashi_Akimoto_Presentation.pdf
2-2 Assessment results of Major Categories (radar chart)

- Q2 Quality of Service
- Q1 Indoor Environment
- Q3 Outdoor Environment on Site
- LR1 Energy
- LR2 Resources & Materials
- LR3 Off-site Environment

Source: http://www.jetro.org/documents/green_innov/Takashi_Akimoto_Presentation.pdf
2-4 Assessment results of Medium-level categories (bar charts)

**Q Environmental Quality**

- **Q1 Indoor Environment**
  - Score of Q1: 3.5
  - Noise & Acoustics: 3.0
  - Thermal Comfort: 3.9
  - Lighting & Illumination: 3.6
  - Air Quality: 3.4

- **Q2 Quality of Service**
  - Score of Q2: 3.0
  - Service Ability: 3.4
  - Durability & Reliability: 2.9
  - Flexibility & Adaptability: 2.6

- **Q3 Outdoor Environment on Site**
  - Score of Q3: 3.4
  - Preservation & Creation of Biodiversity: 4.0
  - Townscape & Landscape: 3.0
  - Local Characteristics & Outdoor Amenities: 0.6

**LR Environmental Load Reduction**

- **LR1 Energy**
  - Score of LR1: 3.4
  - Building Thermal Load: 3.0
  - Natural Energy Utilization: 3.0
  - Efficiency in Building Service System: 4.0
  - Efficient Operation: 3.5

- **LR2 Resources & Materials**
  - Score of LR2: 3.1
  - Water Resources: 3.2
  - Reduction of Non Renewable Material use: 3.0
  - Materials with Low Health Risks: 3.1

- **LR3 Off-site Environment**
  - Score of LR3: 3.5
  - Global Warming: 4.0
  - Local environment: 3.5
  - Surrounding Environment: 3.0

Source: http://www.jetro.org/documents/green_innov/Takashi_Akimoto_Presentation.pdf
BEE = 1.4

BEE = \frac{\text{Quality}}{\text{Load}}

= \frac{(Q_1 + Q_2 + Q_3)}{(L_1 + L_2 + L_3)}

= \frac{59}{41} = 1.4

Source: http://www.jetro.org/documents/green_innov/Takashi_Akimoto_Presentation.pdf
ライフサイクルCO2計算シート（標準計算用）

1. 建設に係るCO2排出量

| 事務所 | 1.00 | 13.85 | 13.85 | 13.85 | 3.0 | 13.85 | 3.0 | 13.85 |
| 学校 | 0.00 | 12.66 | 12.66 | 12.66 | 3.0 | 12.66 | 3.0 | 12.66 |
| 物販店 | 0.00 | 24.24 | 24.24 | 24.24 | 3.0 | 24.24 | 3.0 | 24.24 |
| 飲食店 | 0.00 | 24.24 | 24.24 | 24.24 | 3.0 | 24.24 | 3.0 | 24.24 |
| 集会所 | 0.00 | 13.47 | 13.47 | 13.47 | 3.0 | 13.47 | 3.0 | 13.47 |
| 工場 | 0.00 | 22.71 | 22.71 | 22.71 | 3.0 | 22.71 | 3.0 | 22.71 |
| 病院 | 0.00 | 13.24 | 13.24 | 13.24 | 3.0 | 13.24 | 3.0 | 13.24 |
| ホテル | 0.00 | 13.85 | 13.85 | 13.85 | 3.0 | 13.85 | 3.0 | 13.85 |
| 集合住宅 | 0.00 | 21.94 | 11.07 | 7.47 | 3.0 | 21.94 | 3.0 | 21.94 |

| 評価対象 | 13.85 |
| 参照値 | 0 |

2. 修繕・更新・解体に係るCO2排出量

| 事務所 | 1.00 | 20.67 | 20.67 | 20.67 | 3.0 | 20.67 | 3.0 | 20.67 |
| 学校 | 0.00 | 17.14 | 17.14 | 17.14 | 3.0 | 17.14 | 3.0 | 17.14 |
| 物販店 | 0.00 | 13.85 | 13.85 | 13.85 | 3.0 | 13.85 | 3.0 | 13.85 |
| 飲食店 | 0.00 | 13.85 | 13.85 | 13.85 | 3.0 | 13.85 | 3.0 | 13.85 |
| 集会所 | 0.00 | 18.04 | 18.04 | 18.04 | 3.0 | 18.04 | 3.0 | 18.04 |
| 工場 | 0.00 | 14.27 | 14.27 | 14.27 | 3.0 | 14.27 | 3.0 | 14.27 |
| 病院 | 0.00 | 18.80 | 18.80 | 18.80 | 3.0 | 18.80 | 3.0 | 18.80 |
| ホテル | 0.00 | 18.80 | 18.80 | 18.80 | 3.0 | 18.80 | 3.0 | 18.80 |
| 集合住宅 | 0.00 | 14.10 | 15.09 | 16.23 | 3.0 | 14.10 | 3.0 | 14.10 |

| 合計 | 20.67 |

3. 運用時のエネルギーに係るCO2排出量

| 建築物の取組み（②） | kWh/年 | 排出係数 | 減減量 | 参照値（①） |
| 太陽光発電の発電量 | 0 | 0.418 | 0.00 | 80.12 | 85.09 |

4. ライフサイクルCO2の計算（標準計算）

| 事務所 | 13.85 |
| 学校 | 13.85 |
| 物販店 | 20.67 |
| 飲食店 | 20.67 |
| 集会所 | 20.67 |
| 工場 | 20.67 |
| 病院 | 20.67 |
| ホテル | 20.67 |
| 集合住宅 | 20.67 |

| 合計 | 114.64 |

Source: http://www.jetro.org/documents/green_innov/Takashi_Akimoto_Presentation.pdf
This chart indicates rough estimate of lifecycle CO2 emission from subject building compared with that from reference building.

Source: http://www.jetro.org/documents/green_innov/Takashi_Akimoto_Presentation.pdf
(4-1) Challenges with the system observed through ordinance analysis

- First, since this system is ordinance-based, they have no legal authority under ordinances to stop Building Certification applications.

- Most local bodies only require the building plan to be submitted after a Building Certification application has been approved, this means that administrative guidance cannot be carried out either.

- None of the local bodies conduct inspections to confirm whether construction work conforms to the contents of the notification.
(4-2) Challenges on system operation

- No local bodies have statistical data on reporting rate
  - 14 bodies, or slightly under 70 percent, answered “less than 90 percent” or “no figures available.”

- No sufficient incentives to promote introduction
  - 9 of the local bodies had no such measures.

<table>
<thead>
<tr>
<th>届出率</th>
<th>団体数</th>
<th>向上策の内容</th>
<th>団体数</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>1</td>
<td>①金利優遇</td>
<td>5</td>
</tr>
<tr>
<td>95%以上</td>
<td>4</td>
<td>②表彰制度</td>
<td>2</td>
</tr>
<tr>
<td>90%以上</td>
<td>2</td>
<td>③認証制度</td>
<td>1</td>
</tr>
<tr>
<td>90%未満</td>
<td>8</td>
<td>④総合設計制度とのリンク</td>
<td>9</td>
</tr>
<tr>
<td>未把握</td>
<td>6</td>
<td>⑤特に対策を講じていない</td>
<td>9</td>
</tr>
</tbody>
</table>
(4-3) Challenges for identifying and improving reporting rates

- Identifying reporting rate
  ① Department in charge differs depending on local body (environmental dept., construction dept., urban planning dept., etc.)
  ② Difficult to link ordinance with Building Certification application procedure
  ③ Link with private building certification companies

- Improving reporting (compliance) rates
  ① Financial difficulties, lack of personnel
  ② Link with Building Certification application procedure
(4-4) Significance of this system

- Initial policy needed for development of various policies
  - Comparative low cost of administration
  - Comparatively low burden on builders
  - Accumulation of basic information and know-how needed for policymaking
(5) Ways to guarantee effectiveness

① Link with process prior to Building Certification application (Adopted by 10 bodies)
   - The reporting system is positioned as an adjustment procedure prior to the application for building certification, and at the stage of this prior adjustment procedure, the builder can be notified of the purpose of the eco-friendly building plan system and the documents that should be submitted, to ensure that the notification is complete.

② Link with overall design system (Adopted by 9 bodies)
   - This link means that when it is judged that a building plan is sufficiently eco-friendly, the overall design system is used, which relaxes the plot ratio and absolute height restrictions.
Building environmental performance labeling system (Tokyo, Saitama, Kawasaki, Osaka, Yokohama, etc.)
④ Building environmental performance labeling system

- advertising for buildings for sale must carry this clear, easy to understand labeling describing a building’s environmental performance.

- Sales advertising takes place 6 months before the building is completed; when a sales contract is signed, the labeling system is expected to make the builder legally responsible for delivering a building that conforms to the label.

- If the completed building is found to differ in its environmental performance, the builder may be responsible under civil law and the real estate vendor may be liable to administrative sanctions or criminal charges.
Specified builders are under obligation to include environmental performance labeling in ads for sale of condominiums or properties for rent (effective 2010) in buildings larger than 10,000 m².

Specially-designated large-scale builders are under obligation to provide an energy-saving performance assessment certificate upon transfer or lease of buildings above a certain size (effective in 2010).

Business operators, etc.
Promotion of voluntary actions

Creation of market to evaluate environmental performance
→ Improvement in building’s property value

Enlightenment of public towards environment

Self-assessment

Notification

Public announcement
→ Environmental performance labeling system
→ Energy-saving performance assessment system
→ Energy saving labeling system

Building design stage

Building transaction stage

Public announcement

Business operators, etc.
Promotion of voluntary actions

Creation of market to evaluate environmental performance
→ Improvement in building’s property value

Enlightenment of public towards environment

Self-assessment

Notification

Public announcement
→ Environmental performance labeling system
→ Energy-saving performance assessment system
→ Energy saving labeling system

Building design stage

Building transaction stage
Thank you very much for your kind attention!