Development of Eco-efficiency Indicators Regarding Products

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ABSTRACT

In Japan, some leading industries and companies have started to apply the eco-efficiency concept in their business decision-making and/or communication tools with stakeholders. Although still experimental, eco-efficiency indicators are considered to be applicable at the sectoral/corporate level and at a product level. In this paper, I first describe eco-efficiency indicators of corporate activities at a company level and at a product level or for which there are multi-attribute evaluation items. Second, I present an overview of Project Factor X (supported by the Ministry of Economy, Trade and Industry of Japan and coordinated by the Japan Environmental Management Association for Industry), which is an eco-efficiency indicator project that deals mainly with electronics, chemical, metal and construction materials and ICT services. Finally, I introduce one of the project activities, an eco-efficiency indicator handbook that has been issued recently and describe developing methodologies and steps in the development of eco-efficiency concept in Japanese industries.

The Project Factor X has been examining the establishment of common standards, keeping in mind the fact that the diversity of existing indicators should not be lost, and working toward the development of de-facto standards. If the project is successful, the indicators are set to become powerful tools that will enhance the competitiveness of environmentally conscious and valuable products in global markets and will also prove useful for purchasers and consumers. Several analyses have been conducted through the project: the principles of a product related to eco-efficiency, the practices of a product to improve its performance, and the company’s performance with regard to impacts on the environment and the value. The observation of a variety of implementation of eco-efficiency concept in Japanese industries is carried out.

In the early 2004, the Project Factor X has published a handbook about detailed calculation of the eco-efficiency indicators of products for the first time. The intention is to enhance the concept and apply it to the practical sustainability in the practical manner by the project group's quantitative evaluation. The handbookbook presents the methodological aspects and the selection of appropriate eco-efficiency indicators to help companies contribute to sustainability, as well as how the data can be used in the analysis. Economic value (sales, prices, profit, etc.) cannot be always appropriate as the evaluation items. Product function needs to be evaluated when the eco-efficiency concept is adopted for sustainable product evaluation.

Status on eco-efficiency indicators in Japan

The indicators have been so far mainly used as decision making/evaluation tools within companies, intending to give incentives for improvement and to serve as the driving forces. But recently the companies start to use the indicators as communication tools with outside. Their purpose is to demonstrate and capitalize on the competitive performance of the products and bring the concept of the eco-efficiency into the market. Such indicators can be conclusive and recently the companies start to use the indicators as communication tools with outside.

Project Goals and Scopes;

1. To provide quantified environmental information as a single or several integrated numbers
2. To provide comparability across a wide range of industry sectors, companies, and products
3. To accelerate sustainability development of business segments

Project Factor X in Japan

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1. To provide quantified environmental information as a single or several integrated numbers
2. To provide comparability across a wide range of industry sectors, companies, and products
3. To accelerate sustainability development of business segments
4. To serve analytical foundation as political tools
5. To link quantified evaluation provided by the factor with D'Eco and Eco label, or other environmental management tools, and promote them

Release of “Eco-efficiency Indicator Handbook for Products” in 2004

Objective;

The “Eco-efficiency” and “factor” concepts were proposed about ten years ago, but the definition of indicator and the study and application of the formulae and other specific methods has barely begun in Japan. These concepts are at the early stage in a sense, when companies where they have already been introduced are working to increase their staff’s understanding of them and encourage their staff to apply them to their activities. But interest in the concept of eco-efficiency that aims to lower environmental impact and increase value is growing steadily as a concept essential for corporate management. This handbook responds to this growing interest by introducing outlines of the significance of the eco-efficiency and factor concepts and of the benefits of their application by explaining practical application methods. The targeted readers are both ordinary business sector, http://www.jemai.or.jp/english/eco-efficiency/

CONCLUSIONS

It seems that methods for devising company-level eco-efficiency indicators are similar to each other. However, the boundaries for quantifying the emissions of CO2, for instance, are not universally agreed on. It is possible that comparisions are to be made in the future, then standards or consensus with regard to methods are required. What kinds of data and what boundaries should be used are critical issues. At a product level, the existing eco-efficiency indicators cover the same issues. There are still many unresolved challenges concerning eco-efficiency and Factor, but it is important to know they have just begun. These challenges will not be overcome quickly. There are various indicators are being developed for both business sectors. http://www.jemai.or.jp/english/eco-efficiency/

Table 1 Example of Eco-efficiency indicator (environmental impact)

<table>
<thead>
<tr>
<th>Major items</th>
<th>Examples of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental impacts</td>
<td>Resource consumption</td>
</tr>
<tr>
<td></td>
<td>Energy consumption</td>
</tr>
<tr>
<td>Output</td>
<td>Quantity of outputs</td>
</tr>
<tr>
<td></td>
<td>Quality of output substances harmful to the ozone layer</td>
</tr>
<tr>
<td></td>
<td>Quantity of output of greenhouse gases</td>
</tr>
<tr>
<td></td>
<td>Acidification coefficient</td>
</tr>
<tr>
<td></td>
<td>Waste material</td>
</tr>
</tbody>
</table>

Table 2 Comparison of existing eco-efficiency indicators for product

<table>
<thead>
<tr>
<th>Denominator</th>
<th>Numerator</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource consumption</td>
<td>Resource consumption</td>
<td>Mitsubishi (Panasonic)</td>
</tr>
<tr>
<td>Toxity (chemical use)</td>
<td></td>
<td>Hachi</td>
</tr>
<tr>
<td>Life cycle (not applied)</td>
<td></td>
<td>Fujitsu</td>
</tr>
<tr>
<td>Life cycle (not applied)</td>
<td></td>
<td>Mitsubishi</td>
</tr>
<tr>
<td>Life cycle (not applied)</td>
<td></td>
<td>Home electronics</td>
</tr>
</tbody>
</table>

Table 3 Results of examining various products Factor

| Product | Nominator of E.E. | Denominator of E.E. | Year of evaluation | Factor | Factor 
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Table top</td>
<td>1.000</td>
<td>1.000</td>
<td>2002</td>
<td>1.000</td>
</tr>
<tr>
<td>PC</td>
<td>0.267</td>
<td>0.267</td>
<td>2001</td>
<td>0.267</td>
</tr>
<tr>
<td>Fridge</td>
<td>0.131</td>
<td>0.131</td>
<td>2001</td>
<td>0.131</td>
</tr>
<tr>
<td>TV</td>
<td>0.391</td>
<td>0.391</td>
<td>2001</td>
<td>0.391</td>
</tr>
</tbody>
</table>

The handbook points out the way of effective use, adding explanation that Factor concept originally had a global perspective, but it is a concept that can be applied to products. When it is applied effectively, it assists the progress in efforts to lower the environmental impacts while increasing value.

Effective Use

1. Incentives for planners and developers
2. Driving force beyond the creation of eco-products
3. Communication tools for responding to customer’s requests for environmental product information

Thorough experiences, the handbook suggests some principles for applying eco-efficiency and Factor;

Principle for applying eco-efficiency and Factor

1. Clarify definition of eco-efficiency and disclose
2. Select items of eco-efficiency to ensure transparency and reliability
3. Clarify the definition of Factor
4. Clarify the baseline year or the product model name that is yardstick when disclosing Factor
5. Clarify the definition of Factor that discloses eco-efficiency calculation data for both numerator and denominator

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