

Taisei Corporation's Green Purchasing Initiatives

Introduction

Taisei Corporation's management policy is to "create a lively environment for people," and this serves as the basis for its commitment to quality, safety, and environmental protection as the major prerequisites for company profits. The firm's response to environmental issues is of great concern to the management of Taisei Corporation. In October 1997, Taisei Corporation established its own standards for purchases of products such as consumables and office supplies, which marked the beginning of a company-wide green purchasing initiative that included switching exclusively to copy paper made from 100% recycled fiber content not exceeding 70% brightness. With the enactment of Japan's Green Purchasing Law in 2001, Taisei began in earnest to implement green procurement of construction materials and other initiatives aimed at reducing the overall environmental impact of activities ranging from the design to construction and operation of buildings.

1. Environmental Management and Green Purchasing

Taisei Corporation's environmental initiatives began in earnest in 1992, when it established a company-wide Global Environmental Committee featuring a cross-organizational structure. The issue of reducing the overall environmental impact from construction activity has become a major challenge for the construction industry as a whole, with construction waste said to account for one-fifth of Japan's industrial waste and construction activity (including all stages from production and transportation of construction material to operation of the constructed buildings) responsible for one-third of all industrial CO₂ emissions. Taisei Corporation is engaged in various company-wide initiatives aimed at reducing the environmental impact of its activities, including the acquisition of ISO 14001 certification between 1997 and 1999, which resulted in ISO 14001 certification for two divisions and all of its branch offices. In addition, the firm also regularly revises and expands its Environmental Policy and the Taisei Agenda, which outlines its annual plans and targets for environmental protection.

The current Taisei Agenda 2002 specifies 14 targets covering 6 areas of activity, and further specifies midterm targets to be achieved by 2004. In the area of promoting environmental protection during the construction stage, the current Agenda establishes a target of increasing the number of items for green procurement and increasing the procurement ratio for Eco materials to 17% in FY2002. As a midterm target, the current Agenda specifies a target of further increasing the firm's procurement ratio for Eco materials to 25% by FY2004.

2. Green Procurement Initiatives

A. Green Procurement Guidelines

Taisei Corporation began its green procurement initiatives in 1997, when it first specified portland blast furnace cement and electric furnace steel as Eco materials in an effort to reduce the environmental impact of large volume materials. Prior to the expected enactment of Japan's Green Purchasing Law, Taisei Corporation established a working group to review green procurement issues in 2000, which called on the participation of its design, technology development, civil engineering, and building construction departments. Once established, the working group set out to study green procurement initiatives for company-wide deployment.

Following the enactment of the Green Purchasing Law in 2001, Taisei Corporation formulated its own Green Procurement Guidelines that same year. In its original form, the Guidelines specified 24 items designated for green procurement, including 11 items specified by the Japanese government and 13 items identified by Taisei Corporation. In 2002, the number of green procurement items was expanded to cover 40 categories of major construction materials. The expanded list of green procurement items includes additional items specified by the Japanese government as well as new categories for fixtures and equipment, which consume large amounts of energy during their operation. For the selection of green procurement items, Taisei Corporation relies on a variety of resources including product information published by the Japan Federation of Construction Contractors, the database of government-specified green procurement items and the online Green Purchasing Information Plaza site maintained by the Green Purchasing Network (GPN), an organization devoted to the promotion of green purchasing.

As a result of its green procurement initiatives, Taisei Corporation's procurement ratio for Eco materials increased from 9.5% in 1999 to 17.8% in 2001. Forms used in construction account for a significant portion of Taisei's green procurements by value, and the firm is promoting a transition to the use of alternative forms that do not utilize conventional tropical timber. Taisei Corporation successfully increased its green procurement ratio for construction forms from 27.3% in 2000 to 32% in 2001, in improvement of close to 5%. The major items used by Taisei Corporation consist of cement, concrete, aggregates, gypsum board, steel and forms, which together account for approximately 90% of the firm's overall procurements by value. Taisei Corporation recognizes that the green procurement ratio for these major items must be increased in order to achieve its future targets for green procurement.

Green Procurement Guidelines (FY2002)

Purpose

Taisei Corporation is committed to fulfilling its obligation to the community and society to build a sustainable society, by promoting the use of construction materials and construction methods that reduce the impact on the environment during the design, construction, operation, and demolition of building structures. These environmental initiatives shall be implemented in accordance with the Taisei Environmental Policy, which includes a commitment to "protect and create a better environment." Taisei Corporation shall specifically focus on proposals to conserve energy and resources at the planning and design stage and to reducing the environmental impact at the construction stage, through initiatives designed to eliminate environmental pollution, reduce construction by-products, and promote recycling.

Selection of Green Procurement Materials

Taisei is committed to utilizing recycled materials, as well as making use of construction materials and construction methods with less environmental impact. Items for green procurement must satisfy the following criteria:

1. Does not contain hazardous substances exceeding permissible levels
2. Used in significant volume
3. Satisfies quality and durability requirements
4. Satisfies cost requirements

Materials for green procurement must comply with the following environmental selection criteria, with priority given to materials that satisfy the largest number of criteria.

Selection Criteria

Materials for green procurement must achieve a minimum score of 3 points, based on the following scoring system for comparison with conventional products.

1. Lifecycle CO₂ emission factor* (Lower: 1, Same: 0, Higher: -1)

2. Conservation of resources or energy (Better: 1, Same: 0, Worse: -1)
3. Generation of construction by-products, measured by volume (Lower: 1, Same: 0, Higher: -1)
4. Use of recycled materials (Higher: 1, Lower: 0, None: -1)
5. Acquisition of ISO 14001 certification (Yes: 1, No: 0)
 - * “Lifecycle CO₂ emission factor” refers to the amount of CO₂ emission during the lifecycle of a building from construction through to operation and demolition. The lifecycle CO₂ emission factor allows for a building to be evaluated according to its environmental impact, as defined by its contribution to global warming.

Procedures

Materials for green procurement are chosen on an annual basis based on discussions between relevant departments and the working group to review green procurement issues, which draws on the participation of the design, technology development, civil engineering, and building construction departments of Taisei Corporation. The Global Environmental Committee is responsible for approving the materials selected through this process, and shall subsequently notify the relevant departments of the decisions of the Committee.

1. Design departments meet with clients and hold discussions with construction material procurement departments and departments relevant to civil engineering. Based on these discussions, design departments propose the use of green procurement items by indicating the materials on design drawings.
 2. Purchasing and procurement departments procure Eco materials that satisfy the time frame and cost requirements.
 3. Construction departments hold discussions with construction material procurement departments and departments relevant to civil engineering. Based on these discussions, construction departments propose the adoption of green procurement items to either the client or designer(s) of a construction project, where the construction project was designed by a firm other than Taisei Corporation. Priority shall be given to separate guidelines, such as those described below, where they exist.
 - Green procurement items outlined in specifications from a public agency
 - Construction based on green procurement guidelines produced by the client
 - Other guidelines similar to the guidelines stated above
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B. Promoting Green Procurement from Design Stage

Initiatives designed to promote green procurement of construction materials must include efforts to actively incorporate Eco materials from the design stage. Taisei Corporation has adopted its “Eco Sheet” environmental design checklist, which plays a major role in Taisei’s efforts to promote green procurement. The Eco Sheet checklist covers 179 environmental factors organized under six categories, and describes issues such as consideration for the surrounding environment, resource conservation, resource circulation, and Eco materials. The Eco Sheet is used as a practical checklist to evaluate the environmental consciousness of a project during its design stage. The environmental factors contained in the Eco Sheet checklist are prescribed in such a way that project designers must check each design-related item prescribed in Taisei’s Green Procurement Guidelines, thus ensuring that green procurement is incorporated at the design stage. The Eco Sheet checklist includes recommended environmental planning indexes (see the table below) for specific building applications such as hospitals, hotels and apartment dwellings, using values based on past data collected by the firm. By using the Eco Sheet checklist to manage environmental planning ratios and implementation ratios in its designs, Taisei is able to successfully promote environmental consciousness at the subsequent construction stage.

Eco Sheet Procedures (Excerpt)

1. With the exception of the seven environmental factors listed under the category of “Determining Local and Lot Characteristics,” apply the following scoring method to all 172 environmental factors, in order to arrive at the Planning Score for each environmental factor and the Overall Planning Score (sum of each Planning Score).
 - Emphasized during planning stage: 2 points
 - Included at planning stage: 1 point
 2. Use the following scoring method to calculate the Implementation Score for each environmental factor and the Overall Implementation Score (sum of each Implementation Score):
 - Implemented as planned: Planning Score x 1.0
 - Only partially implemented: Planning Score x 0.5
 - Not implemented: Planning Score x 0
 3. Use the following equations to calculate the Planning Ratio, Implementation Ratio, and Achievement Index:
 - Planning Ratio = 100 x (Overall Planning Score/Recommended Environmental Planning Index)
 - Implementation Ratio = 100 x (Overall Implementation Score/Overall Planning Score)
 - Achievement Index = 100 x (Planning Ratio/Implementation Ratio)
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Recommended Environmental Planning Indexes for 2002

	New construction, extension	Renovation/repair
Hospital, hotel	52	34
Office, condominium	48	31
School, factory, research lab	42	27
Restaurant or retail store	36	23
Shopping center, parking area	27	18
Other	42	27

The Taisei Agenda 2002 also sets quantitative targets for the firm according to ISO 14001. The current Agenda includes over 65 targets for environmentally conscious design to be achieved during 2002, and over 70 midterm targets to be achieved by 2004. Efforts to promote green procurement also help the firm to reach its quantitative targets according to ISO 14001. Furthermore, green procurement is promoted as part of the firm’s Environmental Management System (EMS) under ISO 14001.

Efforts to promote green procurement must also include the involvement of suppliers and clients. Taisei Corporation is attempting to increase its ratio of environmentally conscious projects by using its Eco Sheet checklist to accurately gauge the environmental needs of its clients and actively propose the use of proprietary environmental technology at the sales stage. As a result of these initiatives, Taisei Corporation is able to assist building owners in the establishment of environmental management systems and to increase their understanding of green procurement efforts. The Eco Sheet checklist developed by Taisei as a result of its ISO 14001 certification can also be used by outside architectural firms to conduct detailed evaluations of environmental factors at the planning and design stage. By expanding the use of its Eco Sheet checklist in this manner, Taisei can effectively increase its green procurement ratio for projects designed by other companies, which currently account for 70% of Taisei’s construction activity. These and other initiatives are designed to help Taisei Corporation expand its green procurement efforts. The firm exceeded its goal of achieving a green procurement ratio of more than 17% in 2001, reaching 17.8%. The firm is now working to achieve its midterm target of 25% green procurement by 2004.

C. Environmental Data Management System (E-DAM)

Leading construction firms such as Taisei Corporation possess numerous project sites located throughout Japan, which can hinder efforts to promote green procurement and complicate attempts to measure overall green procurement performance. In order to address these issues, Taisei Corporation developed its Environmental Data Management System (E-DAM), which allows for management of green procurement performance so that Taisei's head office and branch offices can comprehensively manage the firm's environmental data and construction waste. At the project site, employees use the E-DAM system's forms to enter performance data covering project aspects such as treatment and processing results for construction waste, recycling results, and green procurement amounts. This environmental data is then centrally managed by the head office and branch offices of Taisei Corporation using the E-DAM system. In the two years since its adoption, the E-DAM system has given Taisei Corporation the ability to easily ascertain its green procurement ratio, and has dramatically improved the firm's ability to manage its initiatives for environmental conservation.

Taisei Corporation plans to further expand its green procurement initiatives at its branches and project sites by adopting a system that will allow branches and project sites to compare their green purchasing performance.

3. Green Purchasing Initiatives

A. Green Purchasing Standards for the Workplace

Taisei Corporation is also displaying a long-term commitment to green purchasing within the workplace, beginning with the formulation of its own standards for consumable and office supply purchases in 1997. From the outset of its green purchasing initiatives, the firm established relatively strict standards for office paper purchases, by specifying the purchase of office paper that is made from 100% recycled fiber content and does not exceed 70% brightness. Furthermore, Taisei set out to accomplish a company-wide, one-time conversion to using recycled office paper in all its operations, irrespective of the application or workplace. In order to ensure a successful transition, Taisei Corporation sought to gain the acceptance of its employees at the workplace level by using posters outlining the benefits and reasons for converting to recycled office paper. The effort to convert to recycled office paper was further aided by the support of key individuals in each of the departments within the firm. The success of Taisei's one-time conversion to recycled office paper also helped to raise the level of environmental awareness within the company and gain recognition for green procurement as an important environmental initiative.

In June of 2001, Taisei Corporation established its Green Purchasing Standards for the Workplace, which cover six product categories including paper products ranging from stationery and office supplies to copy paper and computer paper. The Standards specify that Taisei's employees give priority to the purchase of products listed in the Green Purchasing Network database, and to products with environmental labeling such as Eco marks, Green marks, and self-declared environmental labeling. The guidelines established by the Green Purchasing Network were used as a starting point in formulating Taisei's standards.

Green Purchasing Standards for the Workplace (June 2001)

In order to reduce the impact on the environment, the following products are recommended for purchases of products used in the workplace:

- a. Products containing the Wood-free Paper mark, Eco mark, Green mark or Recyclable Milk Carton mark.
- b. Products containing self-declared environmental labeling established by the manufacturer.
- c. Products listed in the GPN database published by the Green Purchasing Network.

1. Stationery and office supplies (including ball-point pens, post-its, paper cups, and envelopes for in-house use)
 - Contains a high proportion of recycled content
 - Capable of refilling/replenishment (for consumables)
 - Is designed and manufactured for ease of recycling and sorting of waste
 - Includes a content listing
 - Does not release hazardous substances during incineration or disposal
 2. Office paper (including copy paper, printer paper, and fax paper)
 - Contains 100% recycled fiber content
 - Does not exceed 70% brightness
 3. Continuous-form paper (including 10- and 11-inch continuous form paper and A4-size perforated continuous-form paper)
 - Contains no less than 70% recycled fiber content
 - Does not exceed 70% brightness
 4. Printed paper (including pamphlets, leaflets, and posters)
 - Contains a high proportion of recycled fibers
 - Uses a minimum of paper coating
 - Does not utilize plastic coating or other process that make recycling difficult
 5. Furnishings (including desks, chairs, and cabinets)
 - Utilizes a high proportion of recycled materials
 - Has a low rate of formaldehyde emission
 - Is designed for ease of disassembly after useful life, and for subsequent recycling of raw materials and parts/components
 - Includes after-sales service to enable long-term use
 6. Office equipment (including copiers, printers, fax machines, and scanners)
 - Contains international Energy Star labeling
 - Consumes less power during use
 - Has a higher energy consumption efficiency rating in accordance with Japan's Energy Conservation Law
 - Has a reduced power standby or shutoff mode triggered automatically after an idle period of non-use (not applicable to fax machines)
 - Is designed for ease of disassembly after useful life, and for subsequent recycling of raw materials and parts/components
 - Has a suitable program for recovery and recycling of used toner cartridges
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B. System for Green Purchasing Implementation and Management

In 1997, Taisei Corporation created a system that would allow its purchasing personnel to easily implement green purchasing at its many project sites located throughout Japan. However, according to the staff responsible for deploying this system, the firm faced major obstacles during the initial operation of the system. In its earliest phases, the department responsible for developing the system prepared a product database with approximately 100 items for green procurement, and subsequently implemented the system at Taisei's head office, with plans to gradually expand the system to the firm's branch offices and project sites.

During this initial phase of development, the department in charge of the system undertook the task of manually evaluating over 10,000 purchases made by the head office of Taisei Corporation, in order to track the volume and amount of green purchases being made. The resulting data served as the basis for Taisei to objectively measure its green purchasing performance and to further identify obstacles and targets for improving its green purchasing initiatives. Presently, the firm is using an electronic purchasing system for office supplies used in the workplace, and is striving to expand its green product database as well as increase its efficiency in tracking green purchasing performance. From an outside perspective, it would appear that Taisei's initial experience in adopting green purchasing practices at the workplace level had a positive effect on increasing the level of awareness about green purchasing within the company.

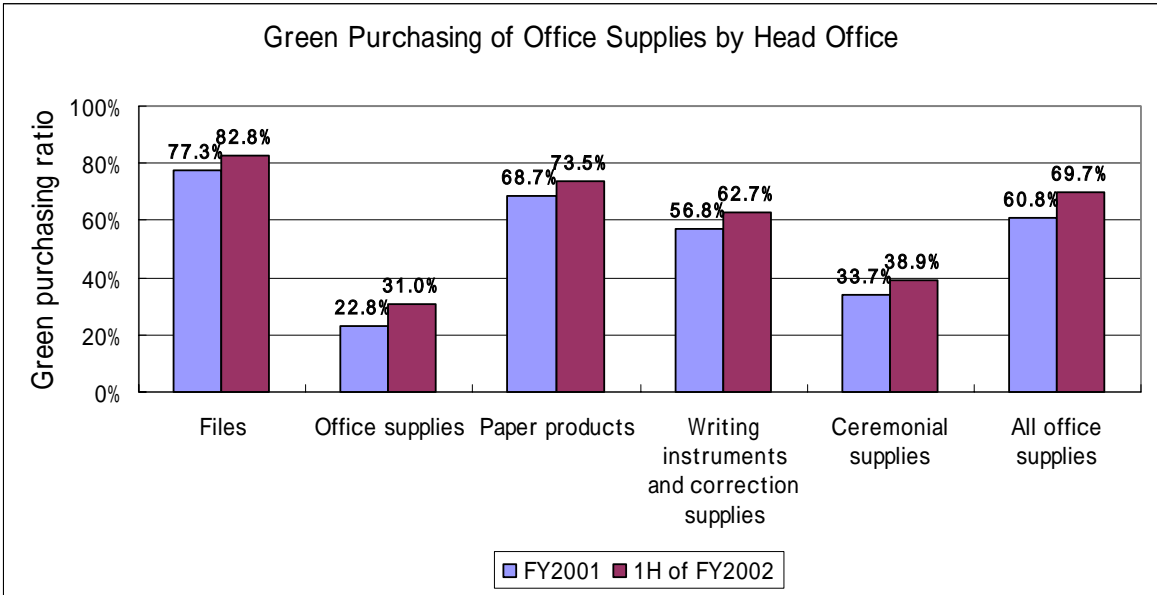
Overview of Green Purchasing Initiatives for the Workplace in 2001

Scope: Headquarters of Taisei Corporation
 Management target: Green purchasing ratio
 Persons in charge: To be selected by green purchasing coordinators within each department (or other manageable unit)

Summary of Tasks:

1. Implement purchasing according to the Green Purchasing Standards for the Workplace.
2. If green purchasing is not possible, purchase products that can be easily sorted or easily disposed, wherever possible.
3. The Environmental Management Dept. shall forward a quarterly "Green Purchasing Ratio Report" to the General Affairs Section of the General Affairs Dept.

Taisei Corporation manages its green purchasing performance based on the firm's green purchasing ratio, which is calculated as a percentage of its overall purchases. In the major category of purchases for the workplace, green purchases accounted for nearly 70% of its head office purchases during the first and second quarters of FY2002, as shown in the graph below. The latest figure does not fully reflect the progress made by Taisei Corporation, as the adoption of a new purchasing system necessitated changes to the items and tabulation methods used to calculate the green procurement ratio. The most recent data therefore reflects the inclusion of new categories such as metal products like safes and other items.



The green purchasing system deployed by Taisei Corporation allows the firm to manage its green

purchasing ratio, which is summarized by department and published on its corporate Intranet on a quarterly basis. In addition, environmental system managers — department managers, and green purchasing coordinators in charge of actual product purchasing — hold meetings on a regular basis, in order to compare department performance and discuss ways of improving green purchasing performance. The meetings encourage participants to actively share information in an effort to further promote green purchasing. Presently, Taisei's green purchasing system has been expanded on a group-wide basis for use at branch offices and affiliates. Green purchasing coordinators are also being appointed at the branch office level in an effort to promote green purchasing. Some branch offices have utilized the educational materials and product selection guidelines provided by the Global Environment Department to create an "Eco Office Supplies Catalog" specific to their branch, listing products known to comply with Japan's Green Purchasing Law.

4. Recycling and Other Initiatives to Reduce Environmental Impact

According to trial calculations made by Taisei Corporation, the adoption of specific environmental initiatives can achieve as much as a 20% reduction in CO₂ emissions during a building's lifecycle from construction to operation and demolition, when directly compared with conventional designs. The initiatives identified by Taisei Corporation are: (1) conservation of resources and use of recycled materials at the design stage of a building; (2) sorting of waste, recycling, and reduction of packaging at the construction stage; and (3) the adoption of various energy conservation systems at the building operation stage.

A. Zero Emission Initiatives

Due to a dramatic decrease in the capacity of Japan's final disposal sites for industrial waste, Taisei Corporation is involved in long-term "zero emission" initiatives designed to minimize the final disposal of waste by the firm. These initiatives are aimed at achieving a final disposal ratio of no more than 10% in metropolitan areas and less than 20% in non-metropolitan areas. Furthermore, in an effort to reduce construction waste, Taisei has achieved a 92% recycling rate for construction waste by undertaking the following initiatives for the delivery of materials to project sites:

- (1) Use of pre-cut building materials, in order to reduce cutting waste and increase delivery efficiency
- (2) Use of reduced packaging for building materials and equipment/furnishings, in order to increase delivery efficiency
- (3) Sorting and recovery of cutting waste, for recycling by the manufacturer
- (4) Crushing of concrete from demolition, for recycling use in road base
- (5) Sorting and recovery of other construction waste, for recycling at plants, using intermediate treatment firms

B. Case Study: Reuse of Excavated Soil Using Environmental Data Management System (E-DAM)

Taisei Corporation supplied approximately 19,500 m³ of surplus soil for the reclamation of two park areas, using soil excavated from four separate construction sites. The use of Taisei's E-DAM system allowed it to share information and identify nearby work sites where soil could be brought in over a shorter delivery distance than was originally planned, thus producing less CO₂ emissions. As a result, the delivery distance for each dump truck was shortened by an average of 40 km per trip over 3,250 trips (calculated based on the use of 10 ton dump trucks).

5. Employee Education

In addition to promoting green purchasing practices, Taisei Corporation is involved in various educational initiatives to implement environmental education and share up-to-date environmental information with its employees, with the goal of increasing the level of environmental awareness among each employee. The major educational initiatives pursued by Taisei Corporation are outlined below, and are primarily supported by the efforts of the Global Environment Department.

- (1) Global Environment Award to recognize groups, project sites, or subcontractors that have undertaken initiatives to reduce the impact on the environment
- (2) Creation of an Environmental Management Dept. information site as part of the firm's corporate Intranet. The site serves as central source of environmental information within the company.
- (3) Inclusion of environmental articles in its "Taisei" corporate newsletter, covering a wide range of topics from environmental initiatives to environmental technology
- (4) Annual creation of a corporate environmental poster, to coincide with the designated Environment Month occurring every June to enhance environmental awareness among employees
- (5) Subsidies for acquisition of environmental qualifications and participation in environmental education by employees
- (6) Implementation of regular environmental education for its subcontractors

6. Future Initiatives to Promote Green Purchasing

Taisei Corporation has made steady progress in its efforts to promote the green procurement of construction materials and green purchasing for the workplace, and is focusing on the following areas of environmental activity in order to expand its green purchasing initiatives:

- To gather accurate information regarding Eco materials that are difficult to select due to variations in cost and quality, and to increase the green procurement rate for these materials
- To further promote green purchasing within the product categories outlined in the purchasing guidelines of the Green Purchasing Network (including the guidelines for hotels/accommodation recently set)
- To further strengthen the commitment for green procurement at branch offices and project sites where green procurement is impeded as a result of past business customs or business relationships.
- To ascertain the status of environmental conservation initiatives undertaken by its subcontractors and suppliers

The construction industry as a whole continues to face a variety of issues related to the quality and cost of Eco materials used for construction, and the task of reducing the impact on the environment represents a major challenge for the industry as a whole. As part of the construction industry, Taisei Corporation is actively working to promote green procurement and green purchasing as part of its overall effort to reduce the impact on the environment, through initiatives aimed at reducing construction waste and CO₂ emissions.