Topics

Super Eco-Factories & Offices

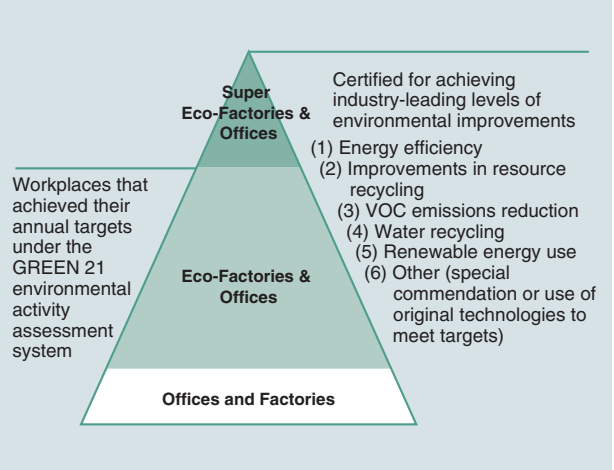
Pursuit of Reduced Environmental Burden in Business Activities

Hitachi introduced its Super Eco-Factories & Offices program in the fiscal year 2006. The program assesses and certifies workplaces that undertake advanced measures proactively and take account of the environment at a high level. The basis of the program is the GREEN 21 system for assessing workplaces based on criteria such as the content of their environmental action plans and the extent to which its targets are achieved. GREEN 21 makes quantitative assessments of 55 items in eight categories, including "eco-management" and "eco-mind." Under the system, workplaces that achieve their annual targets are designated as "Eco-Factories & Offices" to encourage activity.

Also, workplaces that pass in-house criteria for reducing the burden on the environment are certified as "Super Eco-Factories & Offices." The criteria are: (1) energy efficiency, (2) improvements in resource recycling, (3) VOC (volatile organic compound) emissions reduction, (4) water recycling, (5) renewable energy use, and (6) other (special commendation or use of original technologies to meet targets). To receive certification, workplaces must satisfy at least two of these criteria which are set at industry-leading levels (three or more in the case of new sites). For example, satisfying the criterion (1) mentioned above requires a workplace to improve its energy use efficiency by six times the 1% per year improvement specified as the obligation to make an effort contained in the Energy Conservation Law*. To date, 23 sites in Japan and 12 sites overseas (35 sites in total) have achieved Super Eco-Factories & Offices certification.

Although similar assessment systems are being adopted by other companies, Hitachi is seeking to use GREEN 21 to raise the minimum acceptable level of activity throughout the group while at the same time using its Super Eco-Factories & Offices program to foster "top runners" and raise the overall level of activity. In line with its Third Environmental Action Plan which commences in the fiscal year 2011, Hitachi also intends to proceed with its Eco-Factories & Offices Select program in which the assessment criteria for certification are set at an even higher level.

* Law Concerning the Rational Use of Energy



Assessment Criteria for Super Eco-Factories & Offices

Assessment criteria for each category

(1) Action plan for environmental management, environmental accounting, risk management, legal compliance
(2) Environmental training for staff (general training, specialist training, auditor training)
(3) Ecodesign, Eco-Products, management of harmful chemical substances in products
(4) Green procurement, green purchasing
(5) Eco-Products business strategy that provides way forward to next generation, sustainable business
(6) Workplace energy efficiency, environmental measures in transport
(7) Waste disposal reduction, management of chemical substances
(8) Provision of information to stakeholders, communication, global citizenship activities

FY: fiscal year GP: green point

Results for GREEN 21 Criteria

Super Eco-Factories & Offices 1

Narashino Division, Hitachi Industrial Equipment Systems Co., Ltd.

Use of Own Energy-efficient Products to Cut CO_2 Emissions

The Narashino Division of Hitachi Industrial Equipment Systems Co., Ltd. has succeeded in making improvements at its factory such as saving energy and reducing CO_2 (carbon dioxide) emissions by using energy-efficient products that are developed and manufactured within the company. Through measures that include installing highly efficient amorphous transformers (one of the company's main products), inverter control of production equipment, and a power monitoring system, the company succeeded in cutting CO_2 emissions by 427 t/year in the fiscal year 2010.

The electric motors that drive the factory equipment account for the largest part of the electricity consumed at the site. However, the site has succeeded in minimizing power consumption through measures that include installing highly efficient motors made within the company and use of inverters for optimum control. This has included upgrading the air compressors that produce the compressed air used to power some production machinery to inverter-controlled models capable of operating with low power consumption. They are also seeking to make full use of their own energy-efficient products to save energy at the factory including replacing the transformers used for electrical conversion with highly efficient amorphous transformers with low energy losses. Meanwhile, they are paying close attention to detail to find ways of reducing power consumption, including the installation of a monitoring system that provides visual access to information about electricity use at the site.

At the new Motor Drive Factory plant completed in March 2009, in addition to installing energy saving products such as amorphous transformers and inverter-controlled air compressors, they also introduced new environmental technologies such as fitting double glazing with superior insulation performance in the factory windows. With features that include an ice thermal storage system for air conditioning which uses nighttime electricity and the use of lighting fitted with sensors for detecting when people are present, the factory is a leading example even among plants that have earned Super Eco-Factory certification.

Utilization of Unused Energy and Energy from Natural Sources

Hitachi Industrial Equipment Systems' microhydro energy recovery system* utilizes otherwise unused energy, generating small quantities of hydroelectricity from the energy in the water that flows through factory plumbing. Generators (with a maximum capacity of 1.5 kW) are fitted in the factory piping at Narashino Division to provide a little of the electricity consumed by the plant. The site also uses photovoltaic power generation, with the current system having a maximum capacity of 130 kW which is used on site to augment the power purchased from its electricity supplier.

Active Promotion of Modal Shifts at Other Sites

Meanwhile, to reduce the burden placed on the environment when products are shipped, Narashino Division has been undertaking a "modal shift" since 2005 whereby it is switching its transport of motors to distribution centers around Japan from truck to rail haulage. This has resulted in 37% of the motors sent more than 500 km from the site using rail transport, saving about 400 t of CO_2 emissions annually. The site is also implementing its own efficiency measures to accompany this shift to rail transport, including the installation of machinery that allows dual-level packing to improve the loading efficiency of containers. The company is also deploying the know-how associated with this modal shift at other sites to achieve greater use of rail transport.

* Winner of the Chairperson's Award, Eco-Products Awards Steering Committee in the Eco-Products Category of The 5th Eco-Products Awards.

Certification criteria

- Improvements in energy use efficiency
- Reduce proportion of waste sent to landfill.
- Winning of notable environmental awards or other environmental activities

Super Eco-Factories & Offices 2

Hitachi Elevator (Shanghai) Co., Ltd.

Factory Designed for Environment from Construction Stage

Hitachi Elevator (Shanghai) Co., Ltd. is one of Hitachi's Chinese production sites for elevators, escalators, and other lifting machinery. With an annual production capacity of around 10,000 units, the site is a model factory which has satisfied the Super Eco-Factory criteria since its construction in 2007 and is rigorous about conducting its manufacturing operations in a way that reduces the burden on the environment.

For use of recycled water, for example, the site installed an advanced water treatment plant that combines techniques such as chemical treatment and filtering. Waste water from the production process is collected, treated, and then reused in the plant or for domestic uses such as toilets or watering the site's trees. The plant uses water-soluble paints that have minimal impact on the environment to reduce the volume of VOCs (volatile organic compounds) released into the atmosphere when products are painted and has also installed activated carbon adsorption equipment with an adsorption efficiency of approximately 98% to reduce VOCs from oil-based paints. To counter global warming, the air conditioning in the site's showroom uses ground heat and the buildings are fitted with large windows to minimize power consumption by taking maximum advantage of natural lighting.

Certification criteria

- Improvements in energy use efficiency
- Winning of notable environmental awards or other environmental activities

Super Eco-Factories & Offices 3

Takasago Plant, Hitachi Cable, Ltd.

Clean Room Air Conditioning Energy Saving

At its Takasago Plant, Hitachi Cable, Ltd. has had considerable success at saving energy in the clean rooms that are the key facilities for producing the company's semiconductor-related materials. The fact that clean room air conditioning requires three to four times the energy of conventional air conditioning makes it an important target for energy savings. The load on air conditioning is high in summer and lower in spring and fall. Accordingly, the company set out to save energy in its clean rooms by developing its own automatic control system which controls how many of the cooling units to operate at any particular time based on the time of year. This has reduced CO_2 emissions by around 760 t annually (a saving of about 30%) compared to before the upgrade*.

The control system which was developed by the plant itself uses a PLC (programmable logic controller) and performs "coordinated on/off control" which minimizes the number of operating cooling units while maintaining the temperature which is a critical parameter on the semiconductor factory floor. The system won the "2008 Bureau Chief's Prize" from the Kanto Bureau of Economy, Trade and Industry at the fiscal year 2008 National Conference on Best Practice in Energy Conservation run by The Energy Conservation Center, Japan.

The company also intends to take advantage of its control know-how for saving electricity in clean rooms to start a business offering support in this area to other semiconductor plants and similar facilities.

* Reduction in power consumption during the fiscal year 2008 (compared to previous fiscal year) of 2,280 MW•h converted to equivalent CO_2 emissions.

Certification criteria

- Improvements in energy use efficiency
- Winning of notable environmental awards or other environmental activities

Super Eco-Factories & Offices 4

Onuma Works, Hitachi Engineering & Services Co., Ltd.

On-site Installation of Wind and Photovoltaic Power Generation

The Onuma Works of Hitachi Engineering & Services Co., Ltd. produces generators and other essential social infrastructure equipment. Compared to other Super Eco-Factories, a feature of Onuma Works is its use of renewable energy. It installed a 600-kW wind power generation system in 2006 and a refurbishment of its Energy Solution Center design building in 2007 succeeded in reducing power consumption by 33%. This was achieved by using ice thermal storage and building frame thermal storage to save energy on air conditioning by making efficient use of nighttime electricity as well as utilizing photovoltaic power generation and minimizing energy consumption through the use of heat-absorbing glass and waste heat exchangers.

The plant is also pursuing advanced initiatives in the field of environmental technology including trialing a small-scale smart grid combining storage batteries with a GCS (grid control system) with the aim of verifying the practicality of cutting peak demand and smoothing fluctuations in the power drawn from the grid.

Certification criteria

· Use of renewable energy
· Winning of notable environmental awards or other environmental activities

Super Eco-Factories & Offices 5

East Building, Hitachi System Plaza Shin-Kawasaki

Progress toward Free Addressing and Paperless Eco-Office

A typical example of measures for reducing the burden imposed on the environment by offices can be found in the Eco-Office initiative at the East Building of Hitachi System Plaza Shin-Kawasaki. The site is a center for a number of IT (information technology) departments engaged in the planning and sales of information and communication equipment and has been certified as a Super Eco-Office in recognition of its success in introducing new working practices. Because sales staff frequently go out to visit customers and therefore spend a low proportion of their time at their desks, the office has abandoned allocated seating and instead adopted hot desking (called “free addressing” in Japan). This change succeeded in reducing the area required to accommodate staff by about 30% and also cut use of electricity for lighting.

The painstaking conversion of documents to electronic formats and adoption of paperless practices is another feature of the site. Through practices such as viewing documents on laptop PCs (personal computers) when needed and utilizing projectors, large screens, and other display equipment in meetings they have succeeded in eliminating the use of paper documents for filing and cut the overall quantity of paper used in the building.

Certification criteria

· Reduction in proportion of waste sent to landfill
· Winning of notable environmental awards or other environmental activities