Product-related Initiatives for the Environment

TEL's efforts to reduce the environmental burden of our products use a variety of approaches, including life cycle assessment (LCA) and lowering the power requirements of clean rooms.

Reducing the Environmental Burden of Products

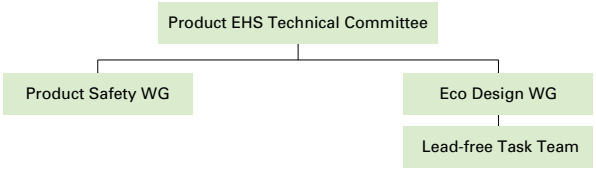
TEL has examined the life cycle environmental burden imposed by the products we manufacture and sell. The life cycle includes the manufacture of our products, their operation and disposal. We determined that operation is the stage at which our equipment has the most severe environmental burden. Therefore, we are giving highest priority to reducing the burden at that stage and are pursuing several avenues for accomplishing that. In addition to the effort to eliminate toxic substances from the raw materials we use, we are approaching the goal of environment-friendliness from every possible angle, including reduction of energy consumption throughout our customers' clean rooms.

Organizations for Reducing Environmental Burden

TEL has established an Eco Design Working Group (WG) under the Product EHS Technical Committee to pursue the reduction of environmental burden as measured by lower energy consumption and lower resource usage. Each of our Business Units (BU) and divisions has compiled LCA data on the new products. The pictures they have developed of those products are quite instructive and will help to direct programs to improve those products and the course of development of our next generation of products. We have also instituted a task team to direct our reduction of lead content. They have been charged with the goal of a completely lead-free product line in 2006. We have also notified our suppliers of specific targets for green procurement, in order to decrease the environmental burden of our raw materials.

Requests from customers for better performance in the environmental, health and safety fields have grown in recent years. It is more and more important to incorporate the concepts of EHS in the initial stages of development and design of each product. This is called "Design for EHS." The globalization of our business activities is also driving us to adapt our products to the requirements of different countries' laws and regulations. We will continue our proactive Design for EHS initiative in order to meet this challenge.

Organization for Promoting Product EHS



Efforts in LCA

As part of our activities to reduce environmental burden, TEL employs LCA to make an objective assessment of that burden imposed by our equipment. The LCA data we have amassed for our products and ways in which we have applied the data in design have elevated TEL to the role of a leader in LCA in our industry.

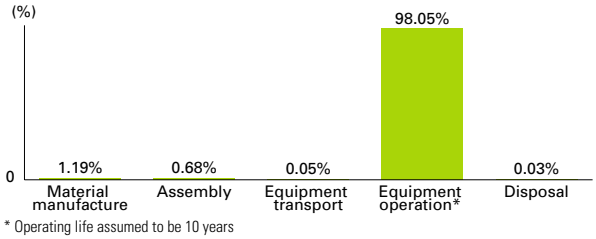
Example of LCA

An LCA of one of our main products, the Telius™ plasma etch system, showed that 98% of the total CO_2 released during the life of the equipment was generated during equipment operation. The operation stage also accounts for about 50% of its total gas emissions and 30% of total energy usage. Subsequently, it was found that replacing the conventional etching gas with one of a lower global warming coefficient, would reduce CO_2 emissions by 70% from the original volume. Nevertheless, the substitute etching gas is both toxic and flammable. Besides the dangers it poses during use, it must be detoxified, which increases costs, and special precautions must be taken in handling it.

* Plasma Etch System: This uses a plasma to etch (remove) a thin film from the surface of the wafer, following the pattern of the desired circuit.

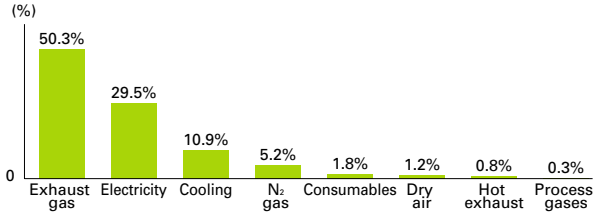
Telius

Distribution of CO_2 Emissions as Found by LCA



* Operating life assumed to be 10 years

Details of Environmental Burden during Operation (CO_2 Equivalent)

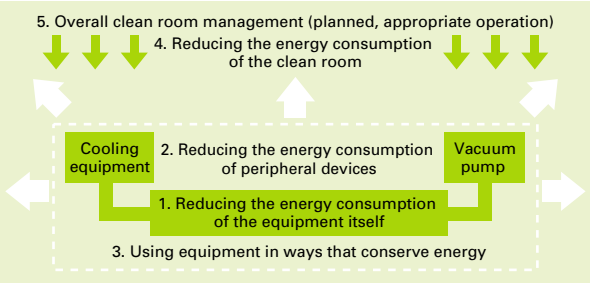


Approach to Reducing Energy Consumption during Operation- Initiatives in the Clean Room -

Reducing the energy consumed during operation of our equipment is one of the most important issues facing TEL. It is also important for our customers and for the entire industry, with the Kyoto Protocol in force as of February 2005.

TEL sees five strategies for reducing energy consumption during equipment operation: (1) Reducing the energy consumption of the equipment itself, (2) reducing the energy consumption of peripheral devices, (3) using equipment in ways that conserve energy, (4) reducing the energy consumption of the clean room, and (5) overall clean room management (planned, appropriate operation). These strategies will be reflected in future technological development. In addition, cooperating with customers and equipment makers is absolutely essential in order to realize clean rooms that operate with better energy efficiency, and therefore TEL looks forward to cultivating close three-way ties to roll back energy consumption during equipment use.

Approach to Reducing Energy Consumption during Operation



Example of Energy-conserving Operation of Semiconductor Production Equipment

Energy consumption by the semiconductor production equipment manufactured and sold by TEL can be lessened by shortening the cycle times*1. Let us take the ALPHA(α)-8SE thermal processing system*2 for example. We set a goal of a 20% reduction in cycle time between 1997 and 2002. The time required in 1997 was 279 minutes (for a standard 150 nm process of dichlorosilane-SiN); after many improvements, this was lowered to 165 minutes in 2002, a considerable reduction. The actual improvements are listed below.

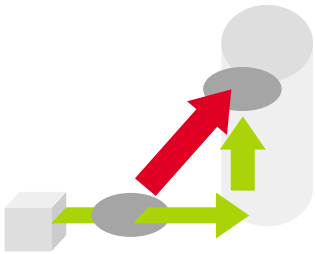
ALPHA(α)–8SE

*1 Cycle time: The time required to treat a wafer

*2 Thermal processing system: A system which produces oxidized layers, nitrided layers, etc. on a wafer

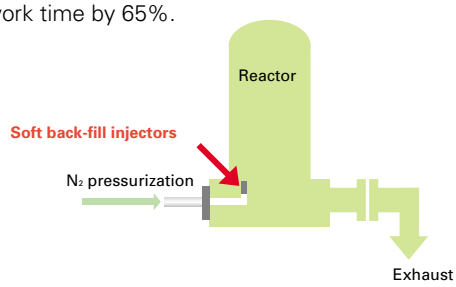
Speeding up the wafer transfer

The mechanism, which used to move in the horizontal and vertical directions independently, was re-designed, resulting in a 15% reduction in wafer transport time.



Faster re-pressurizing to ambient pressure

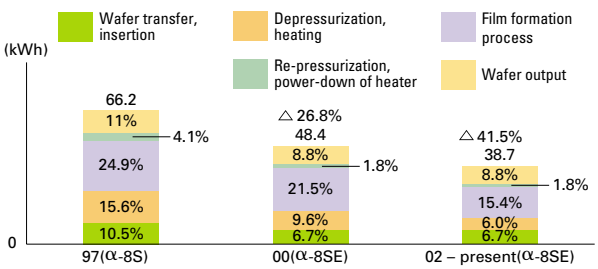
Formerly, the de-pressurized interior of the reactor was returned to ordinary atmospheric pressure by injection of nitrogen over a relatively long time, in order to minimize travel of particles (specks of dust and wastes). Recently, however, we have installed soft back-fill injectors (nozzles with multiple holes), which allow rapid pressurization with nitrogen without picking up particles. This has shortened work time by 65%.



Reducing the electricity consumed by reducing cycle times

In addition to the techniques mentioned above, we have upgraded control of the heaters. The energy consumed for a single cycle has been reduced 41% from the 1997 level. These technologies are being used in current 300mm wafer processing systems.

Progress in Reducing Energy Consumed during a Single Wafer Cycle



Product-related Initiatives for the Environment

Lead-free Initiative

The nations of the European Union (EU) are committed by the WEEE*1 and RoHS*2 Directives to eliminate lead, mercury, cadmium and other toxic metals and materials from consumer electric products by June 2006. Semiconductor production equipment is not included under the scope of either directive, but TEL has instituted a program to eliminate lead on its own initiative. It has formed a task team of representatives from Group companies, BUs and Divisions to promote the introduction of lead-free solder. The team investigated issues at suppliers, technological aspects of lead-free solder, and manufacturing processes in FY 2005. They are still pursuing these activities with the goal of initiating lead-free production in January 2006; currently, we have training courses in lead-free solder at TEL and suppliers' facilities.

*1 WEEE:Waste Electrical and Electronic Equipment

*2 RoHS:Restriction of the use of certain Hazardous Substances in electrical and electronic equipment

Lead-free Implementation Plan

Targets	FY 2004				FY 2005				FY 2006				FY 2007	
	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct	Jan	Apr	Jul
Formation of Lead-free Task Team, start of its activities														
Policy announcements (to suppliers)														
Consideration of technology and materials to be adopted														
Supplier survey, cooperation and action plan														
Study of measures with OEM makers														
Assessment of board and module units														
Assessment of combined boards and modules														
Production preparation														
Production								To be implemented after 2006						

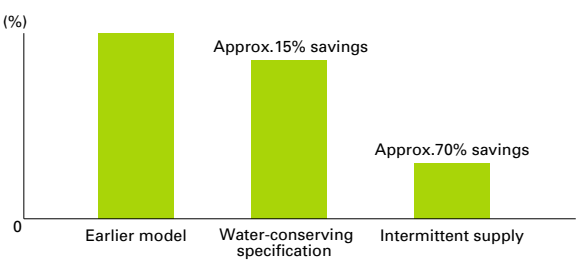
Topics

Approach to reducing environmental burden in new products

TEL is reducing the environmental burden in each type of equipment it produces, as appropriate for the environmental characteristics of the equipment. The auto wet station, one of our main products, uses a large volume of pure water during the processes to remove dust and contamination adhering to the wafer surface. Reducing this consumption was one of the goals during the development of the new auto wet station EXPEDIUS. A new water-saving specification has been set for the supply flow during stand-by, which reduces water consumption by 15% compared to the previous model. Next, a valve was added to the pure water supply line to provide intermittent supply, and this allowed a 70% reduction compared to earlier models. Other new features we are working on at present are control of exhaust air during standby (to reduce the load on the air conditioner of the clean room), shortening of the cleaning time with pure water, and cleaning with a lower-power unit.

EXPEDIUS

Reducing pure water usage during stand-by



Green Procurement

Examining the burden of the components and raw materials making up the product is an integral part of the effort to reduce the environmental burden of our products. TEL obtains the materials and components for our main products, our semiconductor and FPD production equipment, from outside vendors. In order to reduce our products' environmental burden, therefore, we follow our own Green Procurement Guideline* and purchase raw materials and components preferentially from suppliers who are aggressive in reducing their products' environmental burden. In the future, we intend to procure materials only from suppliers who meet certain environmental standards.

* Green Procurement Guideline: A TEL document setting standards and targets for chemicals, energy conservation, packaging, resource conservation, recycling and information disclosure.

Green Procurement Action Plan

Theme	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
Green procurement for equipment and parts					
Supplier surveys and guidance in improving environmental management	Survey/ Improvement guidance	Survey/ Improvement guidance	Survey/ Improvement guidance	Survey/ Improvement guidance	Survey/ Improvement guidance
Reviewing supplier relationships	Reviewing supplier relationships				
Compose lists of materials prohibited from use in products	List composition				
Collect data and request cooperation on materials prohibited from use in products	Data collection/Establish master parts registration				
Substitute for parts containing prohibited materials	Promote designs that do not use materials prohibited from use in products				

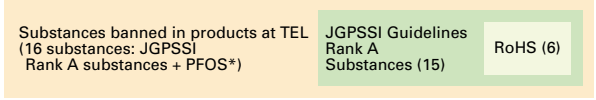
Clarifying Materials Prohibited or to be Reduced in Products

TEL has formulated Group-wide guidelines banning or reducing amounts of 16 toxic chemicals in our products. In the guidelines published by JGPSSI*1, 15 of the banned chemicals are designated as "Rank A"*2. Six are also listed for regulation under the RoHS Directive. In FY 2005 we stepped up green procurement. Part of this effort was a survey based on JGPSSI's survey form which we sent to our suppliers, addressing toxic substances in their raw materials and components. Our policy states that we shall survey new materials and components as they are adopted. We will register the survey results in a central component database shared throughout the Group and construct a system which will allow component searches and show how much of each substance of concern is contained in a component when it is ordered.

*1 JGPSSI (Japan Green Procurement Survey Standardization Initiative): An association which oversees green procurement initiatives.

*2 Rank A: A group of substances which have been designated as banned, permitted in limited amounts, or whose content must be reported, when used in products, by Japanese or other national or international law.

Substances Banned from Use in Products



* PFOS: Perfluorooctane sulfonate. This is an intermediate product used as a raw material to synthesize other substances.

Topics

Introducing shared logistics

Tokyo Electron Kyushu Ltd.'s coater/developer business has instituted a program to increase efficiency by sharing logistics and has decreased its environmental burden as a result. Its loading efficiency used to be rather low, because it was using different commercial transporters for each supplier, sometimes forcing transporters to wait when there were overlapping ship-out schedules.

Since 1999, the company has been using a new mode of logistics in which two transport companies are combined into a team. One of the companies is designated as the representative, and all transportation duties have been contracted out. The transporters use wide trucks exclusively for shipping TEL products, which eases loading and unloading. Currently, about 30 of our suppliers participate in this logistics system. This has enabled us to establish a just-in-time system, which provides supplies that we need, when we need them, and in exactly the volume that we need.

Outline of shared logistics