

# Product-related Initiatives for the Environment

The TEL Group strives to reduce the impact of its products on the environment through various improvements, such as reducing energy requirements during the usage phase of a product's lifecycle, which is the stage when most of the environmental impact occurs, and minimizing the use of regulated chemical substances.

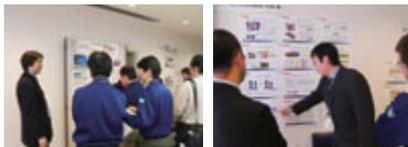
## Initiative for Products with Less Environmental Impact during Use

### Approach to Reducing the Environmental Impact of Our Products

We believe it is important to promote environmentally conscious designs, as we have clearly stated in the TEL Group "Credo and Principles on Environmental Preservation." We give top priority to the provision of energy-saving equipment and to reducing or finding alternatives for the regulated chemical substances contained in our product's.

### Organizations for Reducing Environmental Impact

Two working groups are in place to promote our efforts to reduce the environmental impact of our products: the Chemical Substances Steering Team and the Product Working Team. The former team works to reduce or substitute the use of chemical substances subject to applicable regulations in our equipment parts and components. The latter, established under the Environmental Steering Committee, has developed a roadmap for each business unit to reduce its environmental impact. In preparing the roadmap, the business units were required to address the following mandatory items: reducing energy requirements in their products, addressing chemical substance-related matters, reducing the number of parts and processes required, reducing the use of processing gases and liquid chemicals, and improving the environmental performance of existing equipment. In addition, they were encouraged to cover voluntary items such as reducing the number of processes required for equipment installation. Progress toward achieving the defined goals is being reviewed under the Group's medium- to long-term plans. In addition, in January 2009, the TEL Group held its 11th Technology Exchange Conference at the Tokyo Electron Nirasaki Arts Hall, which included seven presentations on environmental technologies. A poster area was also set up at the conference to enable the divisions and departments to engage in a lively exchange of ideas and information.



Tokyo Electron Group Internal Technology Forum

### Energy-saving Measures for Products

We are examining measures to reduce the energy that our products consume when used and have set the five following targets: (1) Reduce energy used by the product itself; (2) Reduce energy used by peripheral devices; (3)

Manage the product in an energy-saving manner; (4) Reduce energy used by the clean room; and (5) Manage the clean room in an energy-saving manner (planned operation and proper management). The energy-saving management of the clean room necessarily involves our cooperation with customers and facility manufacturers. Such close cooperation will allow us to further reduce the energy consumed by our products during their use phase. In addition, we are advancing the policy of accurately gauging the amount of energy consumption of devices that use electricity, water, dry air, cooling water, and exhaust heat, as well as supplementary devices (e.g. vacuum pumps and cooling equipment), by employing the SEMI S23\* guidelines.

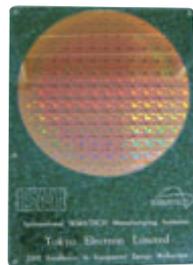
\*SEMI S23: A guideline for energy conservation for semiconductor production equipment issued by the Semiconductor Equipment and Materials International (SEMI), an international industry organization of semiconductor/FPD production equipment and material manufacturers

### Environmental Roadmap Items for Each Division

1. Reducing the energy requirements in our products
2. Addressing matters related to chemical substances
3. Reducing the number of parts and processes required
4. Reducing the use of processing gases and liquid chemicals
5. Improving the environmental performance of existing equipment

### ISMI Energy Conservation Award

At the Energy Conservation Workshop held on October 20, 2008 in Austin, Texas, under the sponsorship of the International SEMATECH Manufacturing Initiative (ISMI), TEL received the 2008 ISMI Award for Excellence in Equipment Energy Reduction. The ISMI consists of 14 leading semiconductor manufacturers from Japan, the U.S., Europe, and Asia; and its mission is to improve the productivity of semiconductor manufacturing. Receiving the Excellence Award recognizes TEL's efforts with regard to energy conservation for its products and serves to motivate further efforts in this area.

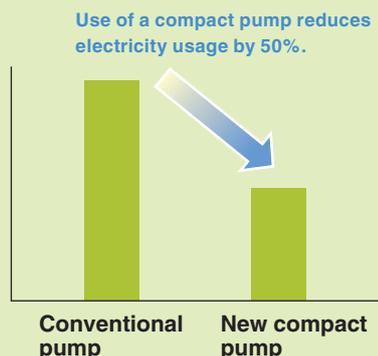


ISMI Award for Excellence in Equipment Energy Reduction

### Initiative for Single Wafer Deposition System

A single-wafer deposition system is a device that uses heat and plasma to form metal or barrier films. The system utilizes chemical vapor deposition (CVD) to deposit and form thin films. It uses a vacuum pump to maintain a vacuum state inside its chamber. We were able to reduce the pump size to an optimal level by rethinking the entire vacuum-pumping system. As a result, the electricity used by the pump itself was significantly reduced. Furthermore, the reduction in pump size lowered the space requirement, decreasing the amount of resources required, which in turn reduced cost and improved productivity through a shorter exhaust time.

#### Improvement in Single Wafer Deposition System Trias™



### Improvements in Cleaning Systems

With regard to cleaning systems, TEL is implementing measures to reduce VOC\* emissions, which are considered one of the most important issues in the semiconductor industry and are tightly regulated under Japan's Air Pollution Control Law. IPA (isopropyl alcohol), which is used in cleaning systems, is a volatile organic solvent. A large volume of IPA is used, and because of its high volatility, its concentration level in the exhaust discharged tends to be high. In order to deal with this issue, TEL installed an IPA scrubber that sprays pure water, refrigerated cooling water, or tower-cooled cooling water, thereby reducing the IPA concentration in the exhaust.

\*VOC (Volatile Organic Compounds): A major cause of photochemical oxidants and suspended particulate matter, thought to cause pollution and damage health.

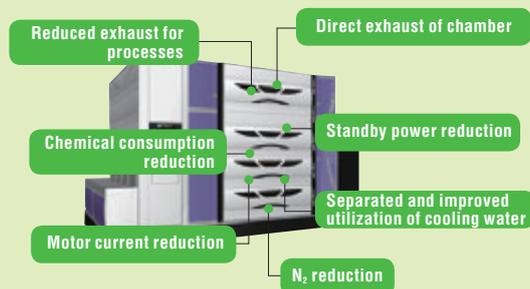
#### Reduction in the IPA concentration in the exhaust



### Improvements in Coater/Developer

For its coater/developer, TEL is taking actions to reduce the environmental impact from the systems that have already been delivered to customers. Targeting the CLEAN TRACK™ LITHIUS™ Series released in 2004, TEL is offering customers a package of six enhancements (including direct exhaust of chamber, standby power reduction, separated and improved utilization of cooling water, N<sub>2</sub> reduction, and motor current reduction) as a LITHIUS Environmental Program. We are also examining ways to cut the volume of resist and developing solution used and also reduce exhaust for processes. Our estimate shows that implementing all these measures would reduce the energy consumption by approximately 15%. We are also looking to expand these enhancements to include other systems, and are working on a VOC-reduction program.

#### LITHIUS environmental program



## Initiatives Related to Regulated Chemical Substances in Products

### Reducing the Use of Regulated Chemical Substances in Equipment

Against the backdrop of growing concerns over the impact that harmful substances contained in parts and materials have on the environment and ecosystems, many countries are working to regulate the use of such substances in automobiles and electrical products. The TEL Group is also promoting measures to reduce the amount of regulated chemical substances contained in its products. One of the best-known regulations on chemical substances is Europe's RoHS Directive<sup>1</sup>, which came into effect in July 2006. Although semiconductor and FPD production equipment is currently exempt from the directive, we are taking proactive measures to comply with it. We have already met all of the requirements for China RoHS<sup>2</sup>, which was issued in March 2007 and applies to TEL's products.

In order to meet regulatory requirements in a prompt manner, we established the Chemical Substances Steering Team, made up of representatives from TEL's headquarters and manufacturing subsidiaries. The team shares necessary information and investigates the use of regulated chemical substances in our products, in cooperation with our suppliers, and also promotes alternatives to replace regulated chemical substances. In addition, the team uses a dedicated database to manage the chemical substances contained in units and the parts used in our products. In FY2007, we voluntarily developed a timetable to phase out the use of the regulated substances used in our products (excluding certain products). We had been scheduled to begin shipping and increasing products containing fewer regulated chemical substances in stages from the second half of FY2009, with 98.5% or more of the products' constituent parts meeting the EU RoHS standards.

<sup>1</sup> RoHS: Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment

<sup>2</sup> China RoHS: Officially name is "Management Methods for the Prevention and Control of Pollution from Electronics Information Products"

### Chemical Substances to be Reduced

#### First Priority

Cadmium	Pigments, stabilizers, and resins
Hexavalent chromium	Chrome plating
Lead	Solders, paints, electrical wire coating, and free-cutting metal
Mercury	Batteries and fluorescent lamps
PBBs	Resin parts
PBDEs	Resin parts

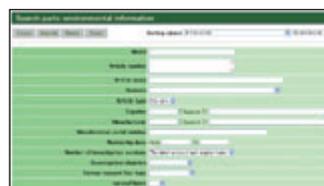
#### Second Priority

Substances designated as Level A substances in JIG\* (We have already implemented measures for many of these substances)

\* The Joint Industry Guide for Material Composition Declaration for Electronic Products (JIG) was prepared by Japanese, American and European private trade associations. The Guide lists the chemical substances for which conservation measures should be implemented. It classifies the substances into Level A and Level B: 16 substances are listed as Level A substances, including cadmium, hexavalent chromium, lead, mercury, PBBs, and PBDEs. More than 400 substances are listed as Level B substances.

### System to Reduce the Use of Regulated Chemical Substances

The TEL Group operates a chemical substances management system that can be used to register and view information on the use of chemical substances according to individual parts. This system allows us to check with ease whether parts to be used in our products contain regulated chemical substances or not, and control the manufacture or shipment of products containing chemical substances regulated by the EU/China RoHS and other law.



Dedicated database screen

### Activities to Reduce the Use of Other Chemical Substances

With regard to chemical substances, most nations have begun to implement the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)<sup>1</sup> based on a recommendation from the United Nations. In order to comply with this system, the TEL Group has begun to obtain the chemical substance safety information (e.g., MSDS) classified and created according to the GHS and has made it available within the Group, and has also begun distributing labels for chemical substance containers.

In Europe, companies will be increasingly required to fulfill their responsibilities as manufacturers and follow the principle of taking precautions, under such regulations as REACH<sup>2</sup> (which mandates evaluation, registration, authorization, and restriction of safety information on almost all chemical substances sold on the market), the new Batteries Directives<sup>3</sup> and the PFOS<sup>4</sup> Directives. All of the TEL Group departments are making concerted efforts to comply with these regulations, from those departments engaged in product development, design and manufacture to procurement, quality assurance, and environmental and safety performance. We will also explore optimal management of chemical substances by participating in the activities of JAMP<sup>5</sup> and other forums.

<sup>1</sup> GHS: A globally harmonized system related to classification and labeling of chemicals, which provides globally standardized rules by harmonizing various countries' classification standards in terms of harmfulness and toxicity of chemicals, labeling standards, and MSDS details.

<sup>2</sup> REACH: Stands for "Registration, Evaluation, Authorization and Restriction of Chemicals"; it is a set of rules related to the registration, evaluation, authorization, and restriction of SVHC (Substances of Very High Concern) in particular. Manufacturers are required to provide information on the SVHC contained in their products, as well as information to ensure the safe use of their products.

<sup>3</sup> The EU's new Batteries Directive: Regulates the disposal of batteries that are collected from used electronic and electric devices in compliance with WEEE. It also requires labeling with a designated recycling mark to facilitate collection and recycling.

<sup>4</sup> Perfluorooctanesulfonic acid (PFOS) has the property of being water-repellent and waterproof and is used in resist, metal coating, and grease oil. The EU's directive, which came into effect on June 27, 2008, prohibits the use of PFOS in quantities larger than those designated (with some exceptions). In Japan, a revision in the Chemical Substances Examination and Regulation Law will place a total ban on the use of PFOS (resists and other products are exempt from the law with some restrictions).

<sup>5</sup> JAMP: Joint Article Management Promotion-consortium

## Logistics-related Initiatives

### Approach to Environmental-friendly Logistics

In terms of logistics-related environmental initiatives, we set up the Logistics Working Team under the Environmental Steering committee, and the relevant divisions and departments have created action plans and are implementing them.

In April 2006, Japan's Act Concerning the Rational Use of Energy was revised and regulations on logistics were strengthened, with the aim of reducing global warming. Accordingly, there is now greater demand for reducing the environmental impact of logistics operations. In response, the TEL Group has been actively reducing the environmental impact caused by the transport of its products. For example, we are making a modal shift\* for domestic and overseas transport and adopting packaging methods with less environmental impact.

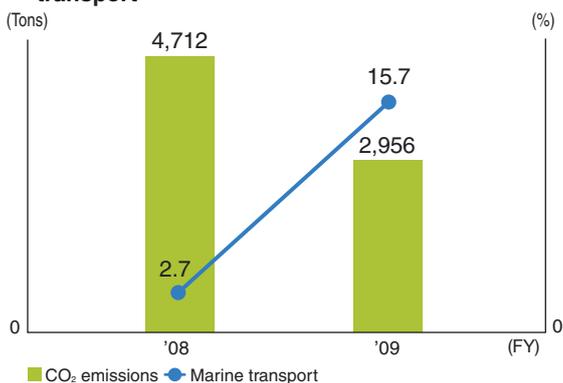
CO<sub>2</sub> emissions from the TEL Group's logistics activities were estimated to account for 6% of the total CO<sub>2</sub> emissions in the lifecycle of our products in FY2008, which is still a significant amount. We will continue to promote measures to reduce emissions in order to achieve our environmental commitments.

\*Modal shift: A shift in the mode of transportation (e.g. switching from conventional freight transportation by truck or aircraft to marine and rail transportation)

### Environmental Impact from Product Transportation

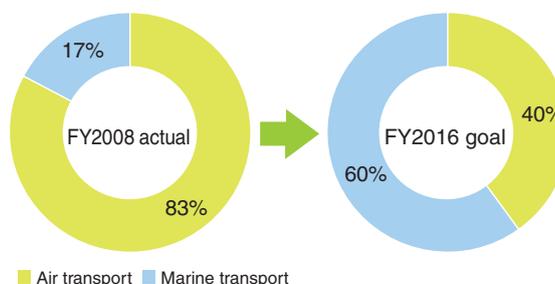
In FY2009, TEL transported 16.91 million ton-km of freight in Japan (on a non-consolidated basis), resulting in 2,956 tons of CO<sub>2</sub> emissions. In FY2009, marine transport accounted for 15.7% of the total freight volume, which was a significant jump from FY2008. Some of the contributing factors behind this increase included the use of new shipping routes and an increased use of ships for transporting FPD production equipment, which is particularly heavy. We estimate that this modal shift helped reduce CO<sub>2</sub> emissions from our logistics activities by 430 tons.

### CO<sub>2</sub> emissions from logistics operations in Japan and trends in the percentage of marine transport



We also estimate that our export-related logistics activities emitted approximately 140,000 tons of CO<sub>2</sub> in FY2008 and 30,000 tons in FY2009. In FY2009, reductions in our total sales volume, coupled with an increase in the percentage of FPD production equipment, most of which uses marine transport, led to a sharp reduction in our CO<sub>2</sub> emissions. We estimate that increasing marine transport to 60% of our total transport needs would enable us to meet our goal; and therefore we plan to suggest to our customers that they switch to marine transport and also plan to optimize packaging methods.

### Percentage of overseas shipments that uses marine transport (%)



### Green Packaging

Products of the TEL Group are precision machines, which means that they require special packaging to maintain their precise and clean condition. We use wooden frames and steel-reinforced corrugated cardboard as packaging materials. As a measure to reduce the resources used in packaging, we have begun using reusable corrugated cardboard boxes when shipping large parts to customers inside Japan. After the parts are delivered to customers, the reusable packaging materials are returned to us for reuse. We also collect casters used for moving products and bring them back to our plants for reuse, thereby reducing resource usage.



Reusable corrugated cardboard packaging