

Product-related Initiatives for the Environment

● Reducing the Impact of Our Products on the Environment

Our Approach

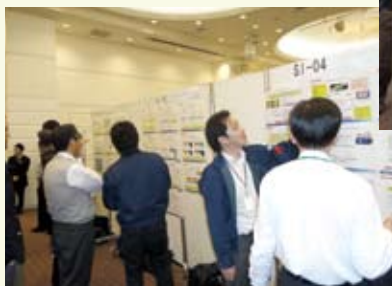
The TEL Group believes it is important to promote environmentally conscious product designs within its business activities, as is clearly stated in the environmental commitment. We give top priority to supplying energy-saving equipment and to reducing or finding alternatives to the regulated chemical substances contained in our products.

TEL Organizations for Reducing Environmental Impact

Two working groups, the Chemical Substances Steering Team and the Product Working Team, have been established to promote the TEL Group's efforts to reduce the environmental impact of its products. The Chemical Substances Steering Team works to reduce or substitute the use of regulated chemical substances in our equipment parts and components. The Product Working Team has developed and started to implement roadmaps to reduce the environmental impact of each of our products. In preparing these roadmaps, TEL business units were required to address the following mandatory items: reducing equipment energy requirements, addressing chemical substance-related matters, reducing the number of parts and processing steps required, reducing the use of processing gases and liquid chemicals, and improving the environmental performance of existing equipment. The progress of these initiatives is monitored as part of the Group-wide mid- to long-term plan.

■ Environmental Roadmap

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



Energy-saving Measures for Products

Our technology development efforts to reduce product energy consumption focus on the following five areas:

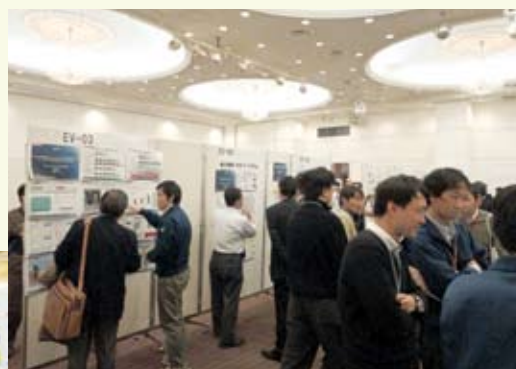
- (1) Reducing the energy used by the product itself
- (2) Reducing the energy along with supplementary devices
- (3) Managing the product in an energy-saving manner
- (4) Reducing the energy used in the clean room¹
- (5) Managing the clean room in an energy-saving manner (planned operation and proper management).

Energy-saving management of the clean room involves our cooperation with customers and facility manufacturers. We will work to further reduce the energy consumption of our products in close cooperation with these partners. In addition, as one measure to reduce device energy consumption, we are working to more accurately measure the amounts of energy consumed by 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 following the SEMI S23² guidelines.

¹ Clean room: A room in which dust floating in the air is controlled at or below a defined cleanliness level and in which the temperature/humidity is maintained at a specific level. Dust can easily cause defects in precision machinery or cause errors in operation, and so clean environments are vital to ensuring that the machinery operates correctly.
² SEMI S23: Guidelines for energy conservation for semiconductor production equipment issued by Semiconductor Equipment and Materials International (SEMI), an international industry organization for semiconductor/FPD production equipment and material manufacturers.

Technology Symposium

Following on from fiscal 2010, in February 2011, the TEL Group held its 13th Technology Symposium. Presentations were made on environmental technologies and a poster area was also set up, enabling TEL divisions and departments to engage in a lively exchange of ideas and information.



The 13th TEL Group Technology Symposium

TEL is working hard to reduce the impact of its products on the environment by making them more energy efficient and curbing the use of hazardous substances. In addition, TEL is also striving to reduce the environmental impact of logistics by promoting modal shifts and creating innovative packaging methods.

Developed Silicon Dioxide Film Formation Process at Room Temperature – TELINDY PLUS™

The Thermal Processing System Business Unit (TPS BU) has developed a process for forming silicon dioxide films for double patterning³ at room temperature. In conventional processes, a temperature of several hundred degrees is required in order to break down gases and promote a vapor phase reaction, but this newly developed process takes place at room temperature through techniques such as selecting the source gas and generating radicals⁴ of oxidized species using plasma. This process has yielded the following results.

1. Reduced Number of Process Steps:

This process makes it possible to form film atop a highly heat-susceptible resist and achieve miniaturization using double patterning, which curbs the use of energy and other utilities.

2. Reduced Environmental Impact from Film Formation:

Because heat is not required when forming the film, this process reduces the environmental impact from energy usage, heat emissions and cooling water by 48% in CO₂ equivalent.

3. Reduced Size of Equipment:

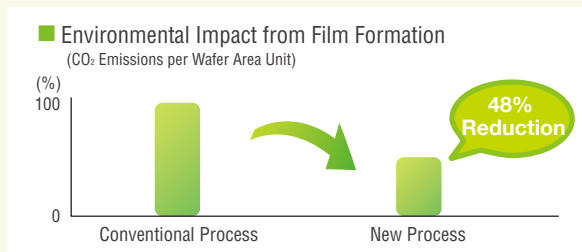
Because no heater is required to apply heat to the wafer, this process is able to reduce the number of parts by 30% and surface area by 39%.



TELINDY PLUS

³ Double Patterning: One type of miniaturization process.

⁴ Generating radicals: Describes one type of atom configuration where a single electron orbits around the atomic nucleus in the outer shell, where normally electrons orbit in a pair.



Certas WING™ – Reducing Environmental Impacts through Dry Cleaning and High Throughput

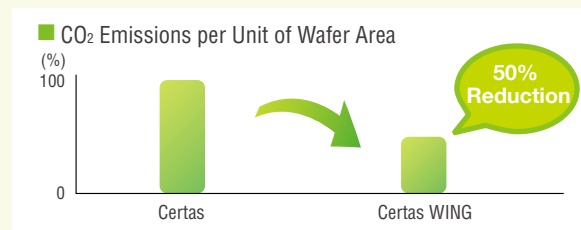
Certas WING is a gas chemical etching device that is able to etch and clean the surface of wafers without the use of a liquid cleaning agent. The completely dry process unit, compared to liquid cleaning units, does not require chemical solutions, eliminates costly waste liquid processing equipment and

streamlines maintenance. In addition, Certas WING can process two wafers in the chamber simultaneously, which increases throughput⁵ two-fold over the previous Certas™ model and reduces CO₂ emissions per unit of wafer area by approximately 50%.



Certas WING

⁵ Throughput: Processing capacity per unit of time.



Reducing Etching Equipment Energy Consumption Packaged Solution – UNITY™ IIe

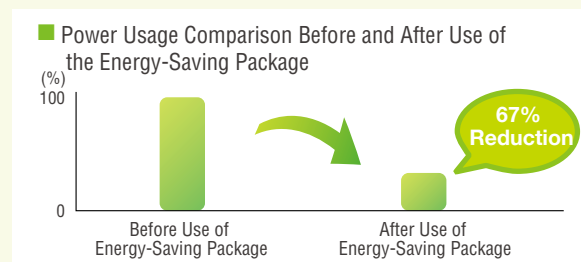
The Field Solutions Business Unit (FS BU) is working to reduce the environmental impact of existing devices already delivered to customers.

We have worked together with the component manufacturer to develop and propose a solution that combines a software program and a low energy consumption dry pump. The software program shuts down the dry pump used in the etching system⁶ when not in use, or facilitates intermittent operations when in use. By employing this packaged solution, our customers can reduce energy consumption from their existing equipment by up to 67%, while the environmental impact when the device is in use, including power, can also be cut by 88% in CO₂ equivalent.



UNITY IIe

⁶ Etching System: Refers to the etching machine and peripheral equipment, such as the chiller for the coolant in the etching device and the pump needed to maintain a vacuum within the chamber.



Measures against Regulated Chemical Substances

Tokyo Electron Group Policy

1. We will quickly supply products that are in compliance with the laws and regulations of countries in which our customers operate.
2. We will set our own standards and continue to make efforts to reduce the use of regulated chemical substances in our equipment.

Taking Initiative to Reduce the Use of Regulated Chemical Substances in Equipment

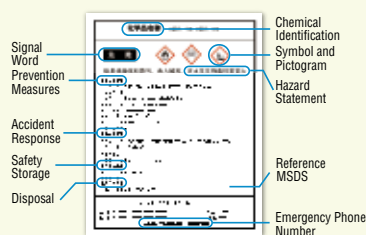
The EU's RoHS,¹ which took effect in July 2006, is widely known as a set of standards regulating the use of hazardous chemicals. The TEL Group is committed to meeting RoHS standards regarding the use of lead, mercury, cadmium, hexavalent chromium, poly-brominated bi-phenals (PBB) and poly-brominated diphenylethers (PBDE), as well as voluntarily reducing these six substances in equipment not subject to these standards. In addition, we work with our suppliers to promote the use of alternative products that meet stringent reduction standards for regulated chemical substances, while we also use a dedicated database to manage the chemical substances contained in components and the parts used in our products. From the second half of fiscal 2009, we began shipping equipment containing fewer regulated chemical substances, which we define as products containing 98.5% or more parts that meet the EU RoHS standards.

¹ RoHS: Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment.

Complying with the Chemical Substance Laws and Regulations in Countries and Regions Where Our Customers Operate

1. We provide equipment in full compliance with China's version of RoHS enacted in March 2007, which covers our products as well. China's RoHS, like the EU's RoHS, regulates the use of lead, mercury, cadmium, hexavalent chromium, PBB and PBDE and requires that necessary information be provided to customers.
2. Countries around the world have begun to implement GHS² based on the recommendation of the United Nations. The TEL Group provides its customers with safety information on chemical substances covered by the GHS using material safety data sheets (MSDS) and other means, and affixes labels to containers of chemical substances to display the necessary safety information. The example below shows a label in compliance with China's GHS standards.

² GHS (Globally Harmonized System of Classification and Labeling of Chemicals): A system agreed upon by the United Nations that is intended to harmonize and integrate various countries' classification standards for chemical harmfulness and toxicity, labeling and MSDS details.



Label in Compliance with China's GHS Standards

3. Europe has instituted REACH standards,³ which require safety information be provided in case of exposure regarding a product containing more than 0.1% in chemical substances of significant very high concern (SVHC), as well as CLP⁴ standards, which has a broader scope than GHS. In compliance with these standards, we investigate the presence of those chemical substances designated as SVHC and provide the safety information when necessary.

³ REACH (Registration, Evaluation, Authorization and Restriction of Chemicals): A set of regulations pertaining to the registration, evaluation, authorization and restriction of chemicals. For products containing SVHC (Substances of Very High Concern) in particular, manufacturers are required to provide information on the SVHC content of their products as well as information to ensure the safe use of the products.

⁴ CLP (EC No 1972/2008 Regulation on Classification, Labeling and Packaging of Substances and Mixtures): EU regulations concerning the classification, labeling, and packaging of chemicals and mixtures.

4. As for the Battery Directive⁵ enacted by the EU and Taiwan, we confirm whether applicable batteries are used inside each unit and take the necessary measures to be in compliance with these regulations. We are also examining how to build a framework that will enable us to fully comply with these regulations from the very bottom of the supply chain.

⁵ Battery Directive: A set of regulations on the registration, evaluation, approval and restrictions of chemical substances in batteries that requires information be provided on the nature of chemical substances used and safe handling instructions whenever a SVHC is included in a product.

Future Plans

1. We will modify and enhance our existing internal chemical substance management system.
2. We will further increase the shipment ratio of equipment containing reduced amounts of regulated chemical substances.
3. We will effectively utilize the framework of the Joint Article Management Promotion-consortium (JAMP) and broaden our collaboration with customers and suppliers to promote more rational and accurate measures against regulated chemical substances.
4. We will work to establish and strengthen systems in compliance with applicable laws and regulations not only at our plants in Japan but overseas as well, and we will also begin to supply equipment containing fewer regulated chemical substances from our overseas plants. In addition, we will strengthen initiatives through stepping up collaboration with the TEL Group's locally incorporated subsidiaries overseas and by enhancing internal systems.

Approaches to Reducing the Environmental Impact of Logistics

TEL's Environmental Approach to Logistics

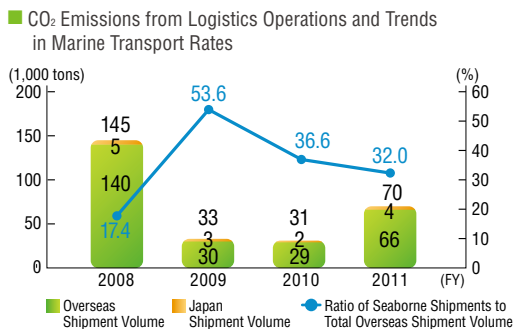
The TEL Group has established a Logistics Working Team and relevant divisions and departments have created and are implementing action plans.

In April 2006, Japan's Act Concerning the Rational Use of Energy was revised and regulations concerning 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 promoting a modal shift⁶ for domestic and overseas transport and adopting packaging methods with less environmental impact. We will continue these active measures in logistics in order to fulfill our environmental commitment.

Reducing the Environmental Impact Stemming from Logistics

For shipments within the Group and product shipments to customers, we calculate and monitor the regulated scope of CO₂ emissions under the Act Concerning the Rational Use of Energy for logistics in Japan and for overseas logistics. As part of our environmental commitment, we are aiming to halve CO₂ emissions per ton-kilometer resulting from overseas shipments, compared to fiscal 2008 levels, by fiscal 2015 (see page 15).

In fiscal 2011, our CO₂ emissions rose significantly in both Japan and overseas. This can be attributed to the rise in production and shipment volume buoyed by an increase in sales. However, thanks to our efforts to actively promote a modal shift,



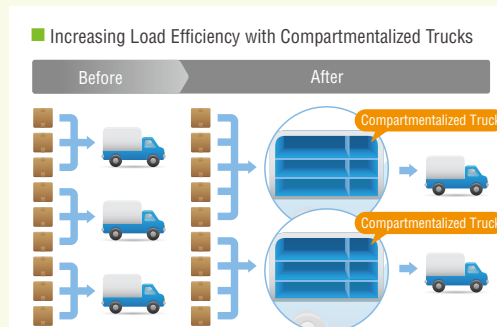
we were able to reduce CO₂ emissions in our logistic operations in Japan by approximately 130 tons in fiscal 2011.

We used seaborne shipping in 32% of our exports to overseas markets in fiscal 2011. We have calculated that once we are able to lift this ratio to 50%, and further promote local procurement, we will be able to achieve our environmental target for this segment. Progress in our modal shift has meant that we use seaborne shipping for all FPD production equipment and semiconductor production equipment to our customers in South Korea and parts of Europe and North America. We have also started to shift over to seaborne shipping for some of our customers in China and Taiwan. In order to make the change from airborne to seaborne shipping easier, we are working to reduce production lead time to ensure there is no impact on the final delivery even if we use seaborne shipping.

Green Packaging

Most of the TEL Group's products are precision machinery, which means they require special packaging to maintain precision and maintain a clean condition. We use special wooden frames and corrugated cardboard as packaging materials. As a way to reduce the resources used for packaging, we have begun using reusable corrugated cardboard boxes when shipping large parts to customers inside Japan.

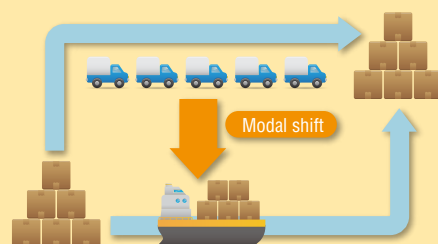
The FPD Business Unit (FPD BU) uses compartmentalized trucks for shipments within Japan to help reduce the use of packaging materials, compared to conventional methods, and increase load efficiency. As a result, we were able to reduce our fleet of trucks by more than 30%.



TOPICS

Promoting a Modal Shift in Japan

Because TEL Group products are precision machinery that require special shipping methods, in the past we used to ship these individually using trucks. However, after examining alternative shipping methods together with marine shipping companies and other transport providers, we began to ship products with less of an environmental impact using seaborne freight, beginning in May 2007. Currently, we are using five shipping routes, and we estimate that we have been able to reduce our cumulative CO₂ emissions by 650 tons. Moving forward, we stand firmly committed to proactively working to further reduce our CO₂ emissions during the transport of our products.



⁶ 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, which have a lower impact on the environment).