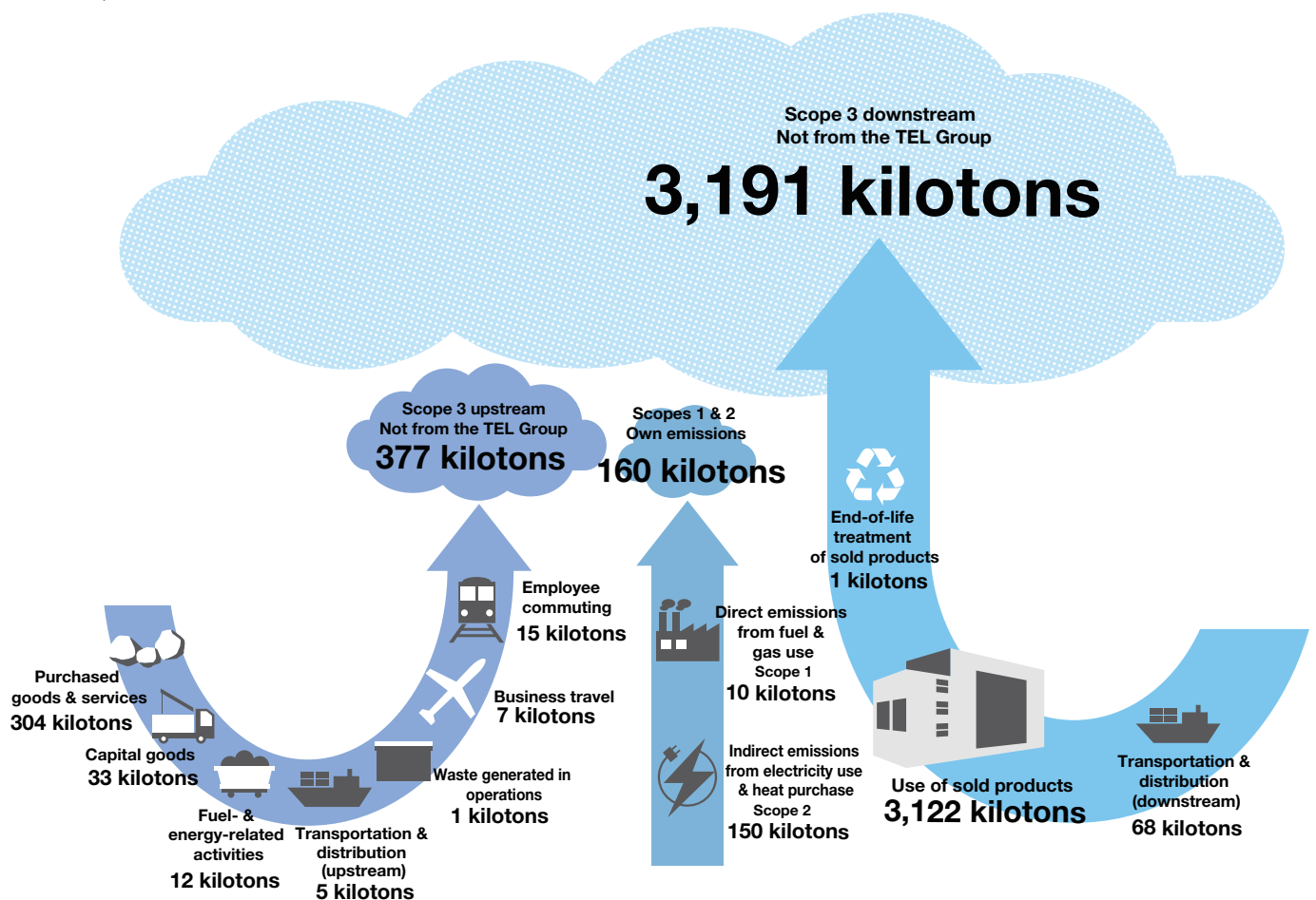


Environment

The TEL Group aims to solve environmental issues through our leading-edge technology and services under slogan of “Technology for Eco Life.” We strive to contribute to the establishment of a sustainable society by reducing the Group’s impact on the consumption of resources, on biodiversity and on climate change by taking actions that both directly and indirectly contribute to the protection and conservation of the environment.

CO₂ Emissions across the Value Chain

With the recent trend among businesses toward measuring and controlling not only their direct greenhouse gas (GHG) emissions but also CO₂ emissions across their value chains (linkages for providing products and services to customers; chains of activities such as procurement, development, production, sales and services), the TEL Group measures these emissions in compliance with international GHG accounting standards, the GHG Protocol.



The GHG Protocol categorizes GHG emissions across the value chains into three scopes:

- Scope 1: Direct GHG emissions from use of fuel and gas owned or controlled by the company
- Scope 2: Indirect GHG emissions from use of electricity, steam and heat purchased by the company
- Scope 3: Emissions from corporate value chains excluding scopes 1 and 2, such as product transportation, employee business travel, and major outsourced production processes

Scope 3 is divided into upstream activities, which include emissions associated with purchased or procured products and services, and downstream activities, which include emissions associated with sold products and services.

The TEL Group’s direct emissions associated with fuel and gas use (scope 1) and emissions from electricity use and heat purchase (scope 2) add up to 160 kilotons, or about 4% of the total. Indirect emissions (scope 3), which are not from the TEL Group, total 3,568 kilotons, or about 96%. In particular, use of sold products, which is one of the 10 categories related to the TEL Group, makes up 84% at 3,122 kilotons. Therefore, the TEL Group is stepping up efforts to reduce CO₂ emissions, including reducing the energy consumption of equipment and peripheral devices, ensuring the effective operation of equipment systems, and promoting the energy-saving operation of customers’ factories, and will continue its initiatives to reduce environmental impacts for the development of a sustainable society.

Environmental Management

Environmental activity promotion framework

In order to promote environmental activities across the Group, Tokyo Electron has established the EHS Promotion Center at its headquarters. Executives of Group companies appoint members of the Product Environment Value Meeting, the Product Environment Compliance Meeting, and the Operation Environment Value Meeting, all of which carry out activities to achieve environmental goals. Meanwhile, the biannual EHS Meeting checks the progress toward the environmental goals for continued improvement.

Since 1997, the TEL Group has been working to obtain certification for the ISO 14001 environmental management standard, primarily at its manufacturing subsidiaries. Currently, eight locations are certified and we will continue to acquire and maintain the certification.

As a result of checking and maintaining compliance with environmental laws, emission standards, and other voluntary standards, the TEL Group was not involved in any environmental incidents or accidents, was not found to be in violation of any environmental law, and was not subject to any related legal proceedings in fiscal year 2015.

Environmental education

Recognizing the importance of complying with environmental laws and regulations and reducing environmental burdens, we established an education program for working-level managerial personnel in fiscal year 2015. We held lectures on the importance of manufacturing environmentally friendly products—explaining related environmental laws and regulations, statutory procedures, and penalties contained in them—and how to save energy when using products, as well as how to save resources and recycle. Three hundred and thirty people took the course. In fiscal year 2016, we will launch the program at seven locations outside Japan and provide web-based education in order to reach more participants.

Biodiversity

Business activities of the TEL Group do impact biodiversity while also benefitting from it. Based on our recognition of this, we are making efforts to conserve biodiversity and improve the related framework.

The goal of biodiversity conservation activities in fiscal year 2015 was to hold ecosystem tours at least twice at plants and offices in Japan. The Yamanashi Plant held a lecture on biomimicry, in which participants observed how the owl's powder down repels water and learned about the various properties of spider silk. Observing nature in this way provided participants with opportunities to find helpful hints for their own daily operations. CO₂ emissions from these programs and the related travel were carbon offset¹.

We will continue activities for biodiversity conservation.

¹ Carbon offset: The making of a monetary investment in an activity elsewhere that abates greenhouse gas emissions to compensate in whole or in part for GHG emissions from one's own activities.

EHS promotion framework



Number of participants in design for the environment program

330 persons

The design for the environment program was established to provide customers with products that are compliant with laws and regulations and designed to reduce environmental impact. In fiscal year 2015, 330 persons participated in the program.



Ecosystem tour

Topics <Environmental Debriefing>

Since 2009, the Tohoku Plant has invited its neighbors (representatives of community associations) as well as representatives of the local business, government and academic communities to its Environmental Debriefing for the Local Community to exchange opinions and deepen mutual understanding. The environmental and social commitment is explained, goals and achievements of the TEL Group are reported and a tour of plant facilities and production lines is provided. As of fiscal year 2015, a total of 137 people have participated in the debriefings.



Product Initiatives

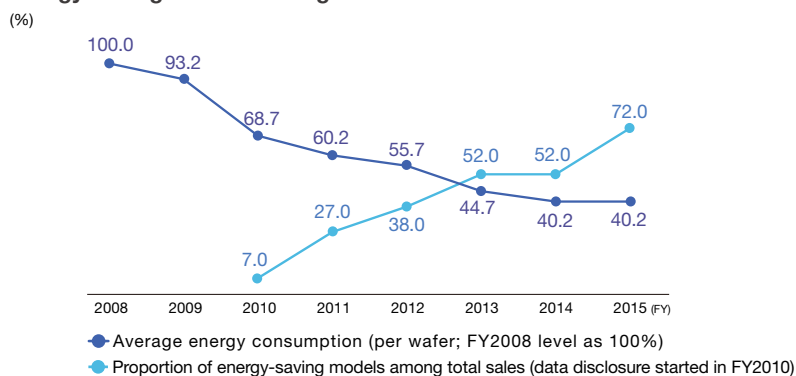
Initiatives to prevent global warming

Based on life cycle assessment, the TEL Group is lowering the energy consumption of its products to reduce the environmental impact of product use at the premises of its customers. In fiscal year 2014, the TEL Group achieved a 50% reduction in energy consumption by its major products (per wafer; compared to fiscal year 2008). For total energy assessment, the TEL Group assessed electricity, water, nitrogen, dry air, and exhaust in electricity equivalents (compliant with SEMI S23 guidelines). With a reduction in the energy consumption of products, the percentage of energy-saving models¹ as a proportion of total sales increased to 72% in fiscal year 2015.

In this fiscal year, the TEL Group set the goal of reducing energy and pure water consumption by 10% from the fiscal year 2014 level by fiscal year 2019. To that end, we will promote environmentally friendly manufacturing with the development of new technologies for further reduction of energy, water and chemical substances as well as with proactive measures against greenhouse gases.

¹ Based on in-house standards

Average energy consumption of products and proportion of energy-saving models among total sales



Initiatives to reduce environmental impact of products

Equipment category	Product	Major initiative	Major reduction				
			Electricity	Water	N ₂	Dry air	Exhaust
Thermal processing system	TELINDY™ PE	Introducing an energy-saving heater	◎		○		
Plasma etch system	Tactras™ Vigus™	Improving high-frequency power efficiency Operating sleeping mode of a chiller	◎	○	○	○	○
Coater/developers	CLEAN TRACK™ LITHIUS Pro™ Z	Improving productivity with high throughput	○	○	○	○	○
Single wafer metallization system	Triase™ EX-II™ TiN	Lowering temperature process Improving productivity with high throughput	◎			○	○
Single wafer plasma treatment system	Triase™ SPAi	Not using a chiller Optimizing the exhaust system	◎	○	○		
Single wafer cleaning system	CELLESTA™ -i	Improving productivity with high throughput	○		○		○
Gas chemical etch system	Certas LEAGA™	Improving productivity with high throughput	◎	○	○	○	
Scrubber system	NS300Z	Improving productivity with high throughput		◎	○		○
Wafer prober	Precio™ series	Reducing dry air with dew point monitoring	○		◎		

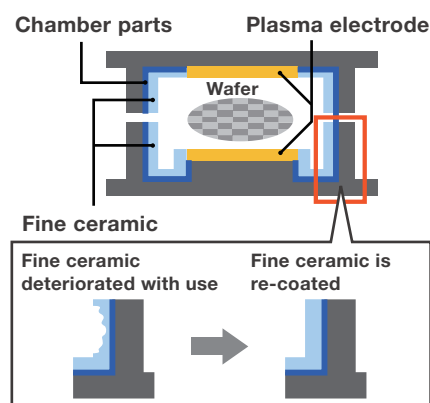
Initiatives to reduce waste

The TEL Group is making proactive efforts to reduce waste generated by its products. Etch systems require periodic replacements of thermal or other parts inside the chamber, as they deteriorate due to continuous plasma processing. The TEL Group has made it possible to use deteriorated chamber parts repeatedly by re-coating them with fine ceramic, which minimizes waste generation and reduces costs.

Major energy-saving models



Chamber overview



Initiatives for chemicals contained in products

For the manufacturing of environmentally friendly products, the TEL Group has built a system for managing chemical substances contained in products. We collect information about the laws and regulations of every country at an early stage to take appropriate actions for legal compliance. For example, when any substance of very high concern (SVHC) is present in our products at 0.1% or higher, we submit the information as required by the REACH¹ regulation. We also provide chemical safety data sheets ((M)SDS) in accordance with the GHS² regulations.

In addition to legal compliance, we also set our own standards to reduce chemical substances. Although TEL Group products are not subject to the EU RoHS³ Directive, we have implemented measures to manufacture equipment that is at least 98.5% composed of substances that meet the directive since 2006. As a result, nearly all of our products now comply with the directive. Furthermore, to become more effectively compliant with regulations, including the EU RoHS Directive, REACH, and the China RoHS, we started a survey with our suppliers in Japan on chemicals contained in products based on the JAMP AIS⁴ in April 2015.

We will continue to promptly identify and appropriately respond to all laws and regulations in every country, thereby promoting our global efforts to reduce harmful chemical substances.

¹ REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals. A regulation pertaining to the registration, evaluation, authorization and restriction of chemicals.

² GHS: Globally Harmonized System of Classification and Labelling of Chemicals.

³ RoHS: Restriction of the use of certain Hazardous Substances in electrical and electronic equipment. The RoHS Directive restricts the presence of lead, mercury, hexavalent chromium, polybrominated biphenyls (PBB), polybrominated diphenyl ethers (PBDE), and cadmium in electrical and electronic products exported to Europe.

⁴ JAMP AIS: Article Information Sheet (AIS) promoted by the Joint Article Management Promotion-consortium (JAMP). This sheet is used to deliver basic information on regulated chemical substances.

Logistics initiatives

To reduce environmental impacts caused by the transportation of products, the TEL Group is promoting modal shift⁵ for domestic and overseas transport and adopting packaging methods with a smaller environmental footprint. In fiscal year 2015, we achieved reduction in both CO₂ emissions and costs by improving the load factor of trucks with the introduction of shelved trolleys. The trolleys have been used for the shipment of FPD production equipment, to the shipping of semiconductor production equipment.

In fiscal year 2015, CO₂ emissions associated with domestic and international product logistics increased to 73 kilotons, up about 35% from fiscal year 2014. The share of marine transportation used for exports decreased by 11 points from fiscal year 2014 to 31%. This is because shipment of semiconductor production equipment by air increased from the fiscal year 2014 level.

We are committed to continuing efforts to reduce environmental impacts.

⁵ Modal shift: A shift in the mode of transportation. Specifically, switching from conventional freight transportation by truck or aircraft to means that have a lower impact on the environment, such as marine and rail.

Topics <Global Cooperation with Industrial Organizations>

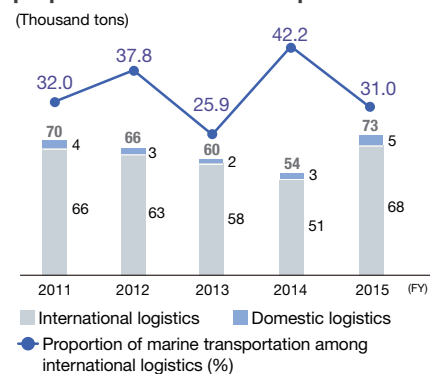
Since the 1990s, the TEL Group has been proactive in its global cooperation with industrial organizations in the areas of EHS and CSR. At SEMI⁶, we serve as a member of a meeting that manages EHS activities and participate in commissions on environmental and safety laws and regulations to introduce energy-saving, resource-saving, and safety activities and promote standardization. At SEMICON Japan, an industrial exhibition, held in December 2014, we organized a sustainable forum as a central coordinator and introduced Japanese companies' technologies and products related to environmental safety to representatives of SEMI Taiwan.

⁶ SEMI: A global industry association of companies that provide production equipment, materials and services for semiconductors, flat panel displays (FPDs), nano technology, micro-electromechanical systems (MEMS), photovoltaic power generation, and other related technologies.

JAMP AIS survey with suppliers in Japan started in

April 2015

CO₂ emissions from logistics and the proportion of marine transportation



Plant and Office Initiatives

Initiatives to prevent global warming

At the TEL Group, each plant and office sets the goal of reducing energy consumption by at least 1% year on year based on a metric of its own choosing. Initiatives to achieve the goals include energy-saving operation of clean rooms, optimum temperature settings for office cooling and heating, and introduction of equipment with leading-edge energy-saving efficiency.

Photovoltaic power generation systems have been adopted at some plants and offices in and outside Japan and the renewable energy they generated in fiscal year 2015 totaled 4,559 MWh, enough to power about 1,260 homes¹. Meanwhile, Tokyo Electron U.S. Holdings, Inc., which has purchased green electricity since 2001, purchased 2,405 MWh of green electricity in fiscal year 2015.

With these efforts, 11 of the 12 TEL plants in and outside Japan that set their goals achieved them in fiscal year 2015. Group-wide power consumption in fiscal year 2015 was 274 GWh, down 7% year on year, and CO₂ emissions from energy consumption² was 160 kilotons, up about 2% year on year. Using the same emission factor for electricity consumption for fiscal year 2011, CO₂ emissions per unit of energy consumed in Japan in fiscal year 2015 decreased by 9.5% from fiscal year 2011.

¹ Based on the assumption that the electricity consumption of one home is 3,600 kWh/year

² For the emission factor for electricity consumption in Japan in fiscal year 2015, we used adjusted emission factors for individual electric power providers. For the emission factor for electricity consumption overseas, we used estimated factors calculated by the Federation of Electric Power Companies of Japan based on values published by the International Energy Agency (IEA).

● Example of initiatives

The Koshi Plant, one of our manufacturing sites, uses a turbo refrigerator to cool water and a heat recovery chiller. In fiscal year 2015, the plant replaced these types of heat source equipment with high energy consumption with equipment with high energy efficiency, consequently halving its energy consumption. It is estimated that the replacement cost will be recovered within five years.

Initiatives to reduce water consumption

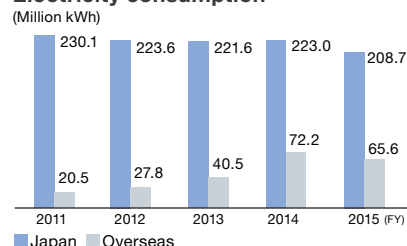
The TEL Group has set a goal of keeping water consumption at the same level or below that of fiscal year 2012 based on the basic metric set by each plant. In fiscal year 2015, we achieved 10 out of the 15 goals set at our plants in Japan and overseas. Continued efforts to achieve these goals include installing water-saving devices, watering grass with rainwater, and ensuring intermittent operation of cafeteria faucets. Consequently, we reduced water consumption by approximately 1% year on year to 1,043,000 m³ in Japan. Outside Japan, water consumption totaled 503,000 m³ in fiscal year 2015, down 18% from 613,000 m³ in fiscal year 2014, when water consumption at four newly acquired companies was added.

● Example of initiatives

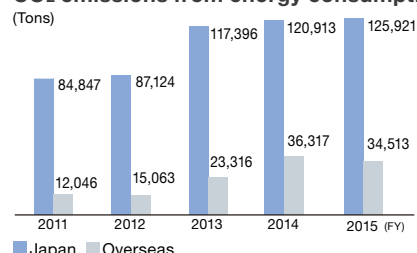
Combustion-type detoxifying apparatuses that render exhaust from semiconductor production equipment harmless use a large amount of water. The Hosaka Plant, which used to treat all such water as effluent, put in place a mechanism to separate usable water and return it to the apparatuses for reuse, reducing water consumption by 70%. Wastewater above TEL's own effluent standard¹, which is stricter than statutory standards, is properly processed at effluent treatment facilities before being discharged to rivers. It is estimated that the renovation cost will be recovered within one and a half years.

	Fluoride	pH
¹ Own standard		
Water Pollution Control Act	8.0 mg/L or lower	5.8–8.6
Yamanashi Prefecture Pollution Control Ordinance	1.0 mg/L or lower	5.8–8.6
Hosaka Plant's Own Standard	0.8 mg/L or lower	6.0–8.4

Electricity consumption

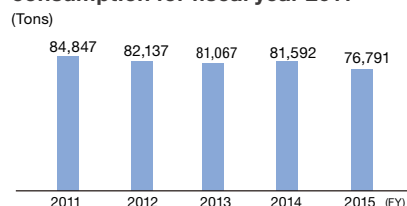


CO₂ emissions from energy consumption

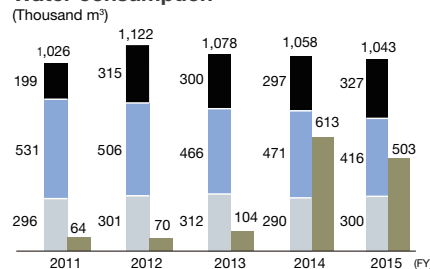


* CO₂ emissions in fiscal year 2012 totaled 87,124 tons minus a 50,000-ton reduction brought about through the use of a domestic clean development mechanism (the mechanism for CO₂ emissions reduction that allows small and medium-sized businesses to receive funding and technology from large businesses and trade the reduced amount of emissions as emission credits)

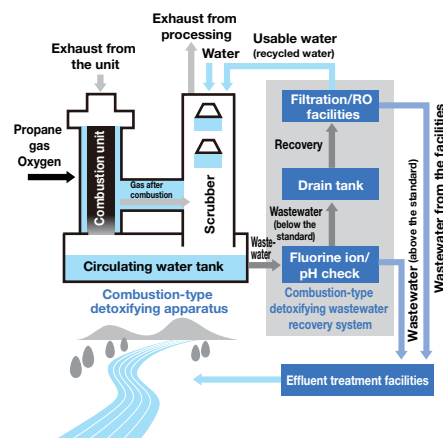
CO₂ emissions in Japan with the same emission factor for electricity consumption for fiscal year 2011



Water consumption



Legend: Industrial water in Japan (light blue), Tap water in Japan (dark blue), Groundwater in Japan (black), Overseas use (grey)

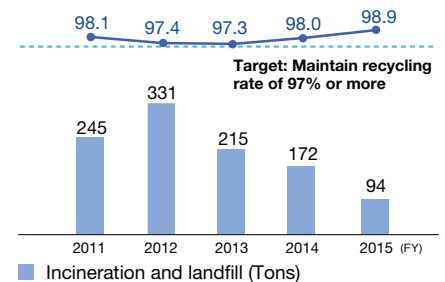


Initiatives to reduce waste

The TEL Group is reducing waste, which includes collecting waste by type and changing production processes to those that do not generate waste, while recycling as much generated waste as possible and disposing of the remaining non-recyclable waste in an appropriate manner. In fiscal year 2015, the amount of incinerated and landfill waste generated by the TEL Group was 94 tons, down 45% from fiscal year 2014. Having defined a plant or office where incinerated and landfill waste makes up less than 2% of its total waste as a zero emission plant/office, the TEL Group achieved zero emissions at all Group plants in Japan in fiscal year 2015. With these initiatives, the recycling rate¹ at plants in Japan in fiscal year 2015 was 98.9%, achieving the goal of maintaining a recycling rate of 97% or more in Japan for nine consecutive years since fiscal year 2007. Also, in fiscal year 2015, the recycling rate at TEL Group plants and offices outside Japan improved from the previous year to 88.2%.

¹ Recycling rate: Recycled amount / Amount of waste generated × 100

Recycling rate and generation of incinerated and landfill waste (Japan)

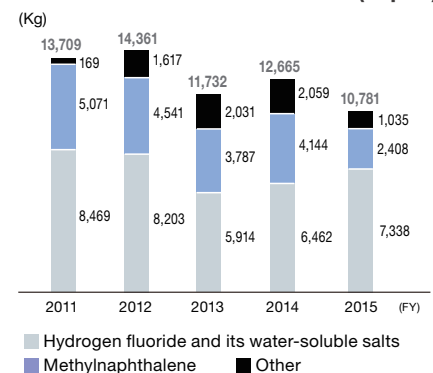


Management of chemical substances

At the TEL Group, we use chemical substances mainly in the development and manufacturing phases of our products. We consistently monitor and manage the use and discharge amounts of chemical substances regulated under the Japanese PRTR² law. Additionally, whenever we introduce a new chemical substance or change how an existing substance is used, we check for environmental, health and safety risks, and take the necessary measures before adopting the new substance or method. We also make sure to properly dispose of hazardous substances after use through either specialist waste disposal contractors or using our in-house processing equipment.

² PRTR: Pollutant Release and Transfer Register. A system under which the use of chemical substances that may be hazardous to human health and the ecosystem, their release into the environment, and their transfer (contained in waste) off the original business premises are identified, tabulated and disclosed.

Volume of PRTR Class I designated chemical substances handled (Japan)



Green Procurement

The TEL Group, in cooperation with our suppliers, is promoting initiatives to reduce its environmental impact. We developed the Guideline for Green Procurement in 2001 and revised it in 2012. In order to monitor and reduce environmental impacts of our suppliers, we have conducted green procurement surveys of our key suppliers since fiscal year 2014. Our questionnaire survey in fiscal year 2015 focused on the three areas of environmental initiatives at plants and offices, environmental compliance of products, and environmental initiatives for products. We aggregated the survey data to understand the various situations across our supply chains and analyzed the outcome of our efforts to reduce environmental impacts. We also evaluated the survey findings on a six-point scale, finding improvement in 46% of the suppliers, and provided the suppliers with feedback accordingly. Based on these results, we will continue to work with our suppliers on environmental activities.

Environmental impact by suppliers (Fiscal year 2015 survey results)

	Use/emissions
CO ₂ emissions	303 kilotons
Water consumption	3,029,000 m ³
Total waste generated	42 kilotons
Recycled waste	22 kilotons

Topics <Recognized as a Green Choice patron by Austin Energy>

In April 2015, the Tokyo Electron US Holdings, Inc. (TEH) Austin site was recognized by Austin Energy as a Green Choice Program patron for purchasing wind-generated renewable energy that accounted for 20% of the total electricity consumption at TEH. In the photo, Austin Mayor, Steve Adler (right) presents the recognition plaque to Tom Campbell, Director of Support Services for TEH.

