

## Initiatives in Products and Services

### Development of Environmentally Friendly Products

NEC focuses on activities to reduce the environmental impact of products over their entire lifecycle from procurement to use and disposal of products by customers. In these activities, we have added the perspectives of "Ecology" (including resource recycling, global warming prevention, and environmental consciousness) and "Compliance" to the conventional perspectives of "Quality," "Cost," and "Delivery."

### Eco Symbol System

Environmentally friendly products, software, and services that meet NEC's environmental standards are certified and registered in three levels.

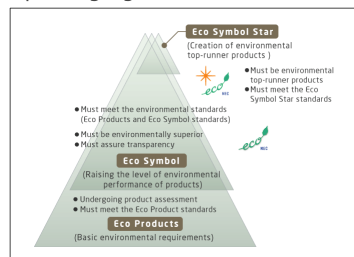
Eco Products are products that are confirmed to have met all of the eco product standards, which are NEC's original basic requirements for protecting and preserving the environment, in product assessments conducted by each division during new product development.

Eco Symbol products are Eco Products that meet the Eco Symbol standard that requires products to be even more environmentally advanced and environmentally friendly.

The Eco Symbol Star is assigned to Eco Symbol products, software and services that are regarded as environmental top-runner products, for example conforming to stringent standards such as reducing CO<sub>2</sub> emissions by 50% compared with conventional products.

In fiscal 2019, 10 items, comprising 8 hardware products and 2 software and services were certified as Eco Symbol Star products.

Products conforming to the standard are affixed with the Eco Symbol Star mark in product catalogs, websites, or on the product packaging.



Eco Symbol System

### Examples of Eco Symbol Star Registrations in Fiscal 2020

#### ● Vehicle Interface Box (E1834-01)

A compact in-vehicle device compatible with the firefighting industry's first "Disaster and Crisis Management Report Service" offered by Michibiki (Quasi-Zenith Satellite System) for transmitting disaster-related and crisis management information.

The capabilities of GPS, sensors, and in-vehicle signals combine to provide precise navigation information to enable fire trucks and ambulances to rapidly arrive at the disaster scene when an emergency call is received. In addition, its compact size (size is significantly smaller and weight significantly less than that of existing devices) has resulted in a 95% reduction in environmental burden per unit.

Highly accurate vehicle location information can be acquired from Michibiki to provide optimal routes to disaster locations, enabling faster response times, which also helps to reduce CO<sub>2</sub>. Its compatibility with the firefighting industry's first disaster and crisis management report service helps to advance firefighting procedures and to maintain high levels of safety.



#### ● SX-Aurora TSUBASA (VE1E Card/Water-cooled Model)

The Vector Engine (VE1E care/water-cooled model executes complicated applications for supercomputers. It has a higher memory bandwidth than previous models for improved real performance and cooling components optimized for each mounting position, which allows double the previous mounting density. Together these features enable a 3% improvement in annual CO<sub>2</sub> emissions compared with previous models, which had already achieved CO<sub>2</sub> emissions reductions of 50% or more.



#### ● Batch-type System Development Platform "System Director Enterprise for Batch"

This tool can be used in batch-type system development projects to automatically generate code and design documents that have conventionally been written manually. In particular, since batch-type systems involve significant typical processing, they include a large number of source lines that can be generated automatically. Furthermore, since the result has a consistent character, it also has improved maintainability.

▶ [Eco Symbol Star Products Standard \(Hard\)](#)

▶ [Eco Symbol Start Standard Products \(Soft\)](#)

▶ [MICHIBIKI Quasi-Zenith Satellite System](#)

▶ [SX-Aurora TSUBASA](#)

▶ [Batch-type System Development Platform "SDE for Batch"](#)

## Green Procurement

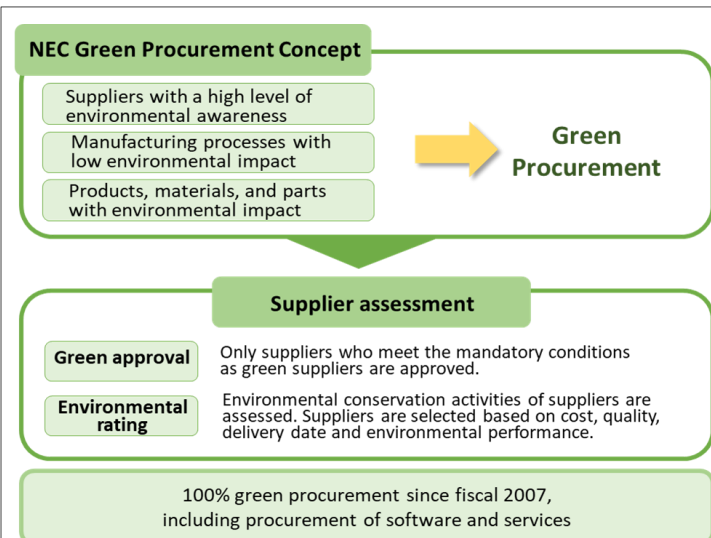
### Green Procurement Policies

NEC is making a Company-wide effort to promote "green procurement," which involves prioritizing procurement of items that are environmentally friendly under the concept of "environmentally conscious suppliers, low-impact manufacturing processes, and low-impact parts and materials." Our objectives are to expand the green product market towards building a recycling-oriented society, promote the development of recycling-oriented products for such a society, and to raise awareness among designers and developers.

As part of our environmental target to convert all NEC products into environmentally sound items, we began a "Green Approval" municipalities system in fiscal 2003, and since fiscal 2007 we have achieved a 100% procurement rate from green approved suppliers.

Furthermore, we adopted an environmental rating system to evaluate and rate suppliers' environmental preservation activities, and we give priority to green approved suppliers who are most proactive in their environmentally sound activities.

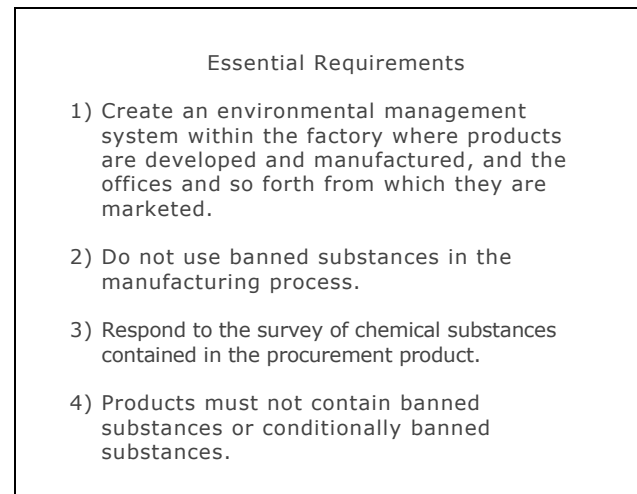
Our supplier evaluation applies not only to materials and parts suppliers, but also to suppliers of intangible products such as software and services.



### Green Procurement Guidelines

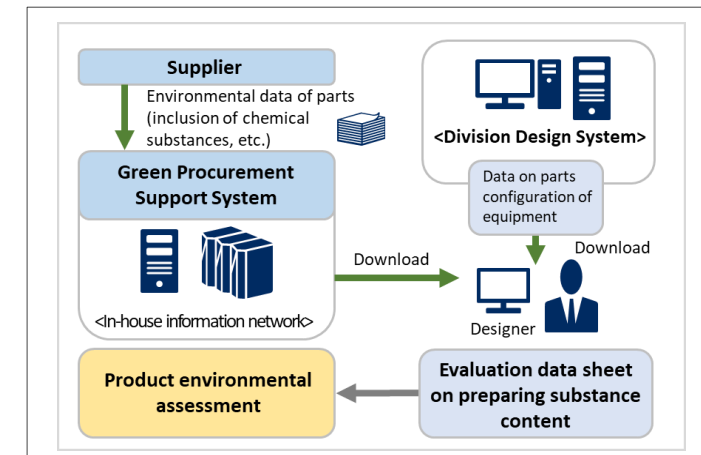
To promote green procurement, NEC has established Green Procurement Guidelines. These guidelines present "essential requirements," the minimum requirements that we ask suppliers to observe for green procurement, and "requests," which we ask suppliers to consider incorporating into their environmental activities.

With regard to the "essential requirements" for suppliers, purchased products that are incorporated in or shipped together with NEC's products must satisfy requirements (1) to (4), while other purchased products such as software, services, pharmaceuticals, gases, and supplies must satisfy requirement (1).



### Green Procurement Support System

Since 1997, NEC has investigated the status of environmental pollutants contained in items purchased from suppliers and managed them by registering them in a Green Procurement Support System (CHEMSIS). Using this database, we ensure that all NEC products comply appropriately to regulations on chemical substances in Japan and overseas, and develop products that have a lower environmental burden.



▶ [Green Procurement Guidelines](#)

## Compliance with Regulations on Chemical Substances Contained in Products

NEC complies with global regulations on chemical substances contained in products, such as the overseas RoHS directive and REACH regulations. To ensure that we comply appropriately with these laws and regulations, NEC is promoting the exchange of information on chemical content through the supply chain and enhancement in the internal structure of information management.

The rational approach to the exchange of information on chemical content is not to introduce individual rules but to employ the common use of chemSHERPA, a scheme for the sharing and exchange of information on the chemicals contained in new products in supply chains compliant with international standard IEC 62474. Such an approach contributes to lessened workloads for both the side providing the information and the side receiving the information. NEC has built a compliance structure using chemSHERPA-CI<sup>\*1</sup> and chemSHERPA-AI<sup>\*2</sup> which are operated by JAMP.<sup>\*3</sup>

\*1: Sheet for entering the information on the chemical substances that are contained in the material or prescription that are to comply with the laws and regulations.

\*2: Sheet for entering information on the chemical substances that are contained in the formed articles that are to comply with the laws and regulations.

\*3: JAMP: Joint Article Management Promotion – consortium

## Complying with the EU Restriction of Hazardous Substances (RoHS) Directive

The EU RoHS Directive bans, in principle, the inclusion of 10 substances, including lead, mercury, and cadmium, in electrical and electronic products. NEC requests its suppliers to comply with the EU RoHS Directive in products that they supply, and conducts surveys to determine whether purchased parts and materials contain any of the banned substances. These efforts ensure that NEC branded products comply with the EU RoHS Directive, in principle.

### <Progress of Replacement>

NEC had already prohibited the inclusion of four phthalic acid compounds in purchased products one year before the enforcement of a law that banned them in July 2019, and has made progress in replacing them.

Lead solder is being replaced with lead-free solder. Pigments and paints have been changed to materials that do not contain lead, cadmium or hexavalent chromium.

Procurement of parts and materials containing PBDE and PBB has been banned since 1997, so other flame retardants are used.

Hexavalent chromium plating in the treatment of steel sheets and plates is being substituted by trivalent chromium plating, organic film, nickel plating and stainless steel.

### <Management of Exceptions>

The EU RoHS Directive includes exceptions where the inclusion of prohibited substances is permitted under certain conditions. These can be used within a legally allowed period, but are required to be definitely replaced at an appropriate time.

NEC manages risks using an internal system called CHEMSIS, which centrally manages information on chemical substances contained in purchased products collected with chemSHERPA-AI, then automatically determines whether contained substances exceed threshold values and the time limit on exemptions. At the same time, we ask suppliers to comply with the end of exemption periods six months in advance.

### <Confirmation by Analysis>

For purchased products that are deemed to be high risk, we obtain analysis data from the supplier and when necessary conduct our own individual analysis to confirm that prohibited substances are not contained in the products. The NEC Group has introduced fluorescent X-ray analysis systems in its production plants to create a system for confirming that certain prohibited substances, such as lead, cadmium, mercury, and hexavalent chromium, are not contained in the products.

## Complying with the EU REACH Regulations

The EU REACH Regulations identify restricted substances that may not be included in products and Substances of Very High Concern (SVHCs), that may be included but require provision of information to product recipients if they exceed a certain threshold value.

NEC uses chemSHERPA-AI to request provision of the above chemical substance information from its suppliers and manages the response information obtained centrally on its internal system, CHEMSIS, to control the presence of restricted substances and SVHCs in excess of threshold values.

## Response to Other Global Regulations

In addition to the EU RoHS Director and EU REACH Regulations, NEC's business divisions all work together with local subsidiaries and relevant industry organizations in Japan and overseas to comply with a globally expanding body of regulations on chemical substances contained in products.

## Resource Recycling

To realize a sustainable society, NEC is conducting initiatives towards comprehensive resource recycling, from production to use and recycling. Our hardware products have been used by many customers. Since these products use a lot of resources, collecting and recycling them will enable us to make effective use of limited resources.

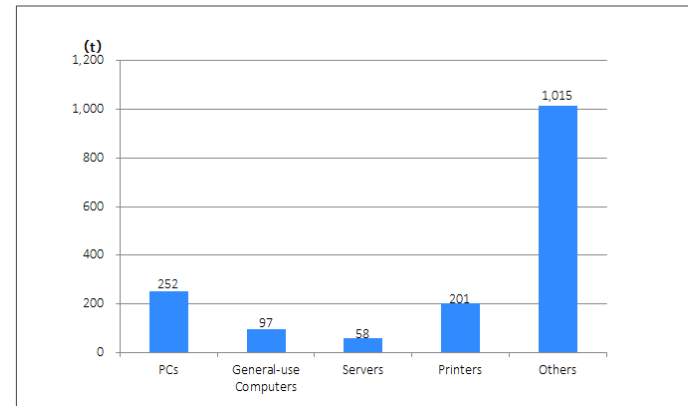


## Collection and Recycling

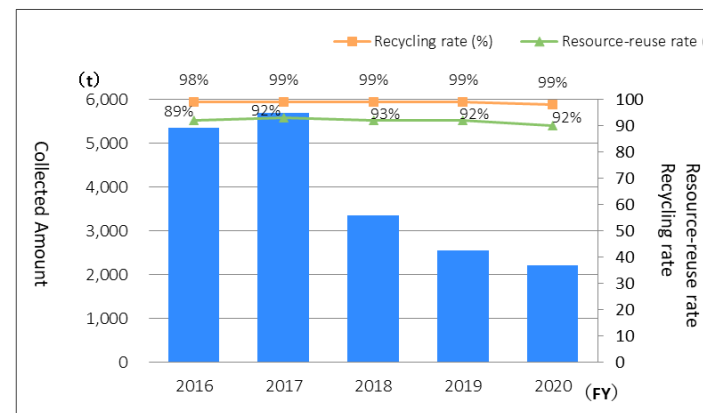
NEC has been collecting used information and telecommunication equipment such as computers from corporate customers since 1969, for reuse and recycling.

In 2001, new provisions in the Law for the Promotion of Effective Utilization of Resources were enacted. These provisions require that used PCs from businesses be collected and recycled. NEC made use of its qualification as a certified processor of industrial waste and began a manufacturer service for the collection of PCs ahead of other manufacturers, right at the time this law was implemented.

Recovery of used information equipment (servers, PCs, printers and other products) from corporate and individual users totaled about 1,627 tons in fiscal 2020, a decrease of about 18% compared with the previous fiscal year. The recycling rate<sup>\*1</sup> in fiscal 2020 was close to 98%, almost unchanged from the previous year. The resource-reuse rate<sup>\*2</sup> defined by the Law for the Promotion of Effective Utilization of Resources was 90%, almost the same as the previous fiscal year. The recycling of plastics and so on will be further encouraged to increase the recycling rate.



Breakdown of Collected and Recycled Products



Collected Amount and Recycling Rate of Used IT Devices

\*1 Recycling rate: The ratio of the weight of reused, material-recycled, and thermal-recycled items to the total weight of the collected IT devices

\*2 Resource-reuse rate: The ratio of the weight of materials that can be used as recycled products (parts reuse) or resources (material recycling) to the total weight of the collected IT devices (defined by the Law for the Promotion of Effective Utilization of Resources)

## Recycling

### Wi-Fi Routers from Resource Reuse

NEC provides rentals of home gateway devices, including Wi-Fi routers and security devices. To reduce waste when rental devices are returned, we are actively engaged in effective resource reuse.

The Kakegawa Plant of NEC's affiliate NEC Platforms is involved in recycling the Wi-Fi routers it has produced back into products. Routers that have exceeded their useful life are collected from customers and the plastics used in the cases are disassembled, crushed, and pelletized, then remolded into Wi-Fi router cases to turn them back into products.

This initiative has been highly regarded outside the company, which has received awards such as the Resource Recycling Technology and Systems award.

### Wi-Fi Router Recycling





## Response to Marine Plastics Issue

Plastic has become a global environmental issue in recent times. Some plastic waste is not processed correctly after use and flows into the environment. Much of the plastic waste from land is blown by the wind or washed downstream by rivers, where it finally enters the ocean. Plastic that is lost in the sea is affected by UV and so forth, eventually being broken down to particles smaller than 5 mm, known as microplastics. These do not degrade, but persist in the ocean for a long time. If this trend continues unchecked, the amount of plastic in the sea is expected to exceed the amount of fish by 2050.

In response to this situation, NEC is working to resolve the marine plastics issue by introducing the use of bioplastics for its products, researching microplastics, and taking action to reduce plastic within the Company.



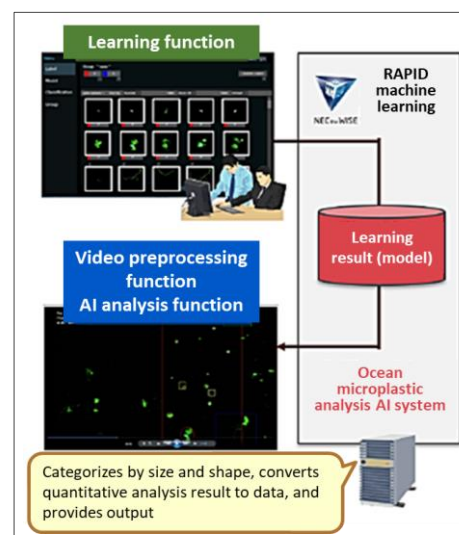
Garbage containing plastic washed ashore from the sea

## Supporting the Development of Microplastic Analysis Technologies

Microplastics not only have an impact on eco systems, there are also concerns regarding their impact on the human body via the food chain. To shed light on the actual status of microplastics in the ocean, there is a need to develop a technology that can efficiently and accurately analyze a large number of samples.

NEC is using ICT to support the development of such a technology by the Japan Agency for Marine-Earth Science and Technology (JAMSTEC). Specifically, we aim to develop a system that uses AI to automatically measure the size of tiny microplastics observed by a fluorescence microscope, classify them by shape and convert the results into data. In trial tests using a prototype system, we have succeeded in converting information about a large quantity of microplastics into data in a short time, proving the validity of the system. In the future, this kind of analysis technology will be established and widespread, helping to advance the project of clarifying the actual state of ocean microplastics. This is expected to lead to concrete environmental pollution risk assessments, examination of emissions regulation, and so forth. Going forward, NEC aims to continue contributing to solutions for the issue of marine plastics using ICT.

Note: The above activities were carried out with support from the Environmental Research and Technology Development Fund (SII-2) of the Environmental Restoration and Conservation Agency



## Internal Measures to Reduce Marine Plastics

At NEC, we encourage each individual employee to change their awareness and take autonomous action regarding the issue of marine plastics.

In October 2019, we changed the refreshments offered on our visitor floor from PET bottled drinks to aluminum canned drinks (except for mineral water).

To address the issue of shopping bags provided at our in-house store, during Environment Month in June 2019 we asked employees to donate eco bags and asked them to share the eco bags to reduce the use of shopping bags in an initiative called "sharing eco bags." This helped to foster awareness within the Company. Through this initiative, we have banned the provision of plastic shopping bags at the counters in our NEC Head Office building and offices in Tamagawa, Fuchu, Abiko, Sagami-hara, and Kansai since January 2020. Following the ban, the number of plastic shopping bags used decreased by around 70% year on year for January-February. Since April we have expanded the ban to cover all Group companies as well.

In addition to banning the provision of plastic shopping bags at the counter, we have also banned the use of plastic drinking straws at café corners inside our stores, and changed to paper muddlers.

## Activities for Sorting and Collecting Trash

Rules for separation of trash differ depending on the local government. NEC has created posters that explain the rules for separation in each business location in a clear, simple manner. These enable individual employees to separate and recycle garbage appropriately.

## NEC's Advanced Technologies

### NeCycle<sup>®</sup>, a Gorgeous and Highly-Functional Cellulose-based Biomaterial

NeCycle<sup>®</sup> is a completely new biomaterial made from inedible biomass as a raw material, and offers the functionality of bioplastic as well as new added value in the form of decorative properties. It has a gorgeous blackness like lacquerware, which was achieved through joint research undertaken with leading Japanese lacquerware artist Dr. Yutaro Shimode. NeCycle<sup>®</sup> can be manufactured by injection molding just like regular plastics, and can also be freely shaped without a coating process to create component shapes that have not been possible with lacquer before.

In October 2019, a "Green Innovation Summit" was held in Japan to discuss disruptive innovations for realizing the concept of "a positive cycle of environment and growth." As part of the event, a "Green Innovation Summit Reception" was held at the Prime Minister's Office, where guests were served with Japanese confectionery on plates made from NeCycle<sup>®</sup>. Since NeCycle<sup>®</sup> will break down just like wood over the long-term if it ends up in the ocean, it was introduced as an example of disruptive innovation that can resolve the issue of marine plastics.



NeCycle