Japan Partnership for Circular Economy

J4CE

JAPAN PARTNERSHIP FOR CIRCULAR ECONOMY

Initiatives on the Circular Economy by Japanese Companies

Noteworthy Cases

Vol. 2 | 2022 Edition

Introduction

The Japan Partnership for Circular Economy (J4CE) was founded on 2 March 2021 by the Japanese Ministry of the Environment (MOE), Ministry of Economy, Trade and Industry (METI), and Japan Business Federation (Keidanren). J4CE works to strengthen public-private partnerships to further foster understanding of the circular economy among a wide range of stakeholders, including companies in Japan, and promote initiatives in response to the accelerating global trend toward a circular economy.

The launch of J4CE attracted wide attention and more than 150 companies and industrial organisations joined J4CE as of September 2022. Approximately 160 cases and initiatives have been submitted by participating companies and organisations, and all these cases are introduced on the J4CE website. In September 2021, we selected 28 especially noteworthy cases and initiatives, and published a brochure entitled "Noteworthy Cases 2021 Edition". We were also actively involved in international outreach by distributing the brochure at a side event of COP26.

According to the UNEP International Resource Panel (IRP), the extraction and processing of natural resources into materials, fuels and food accounts for about half of all global GHG emissions (excluding climate impacts related to land use). In light of this, when preparing the 2022 edition of the "Noteworthy Cases", we selected cases related to decarbonisation and resource recycling in diverse industries, based on the recognition that promoting the circular economy is also important for advancing decarbonisation.

We hope that the cases will make it widely known inside and outside Japan, that Japanese companies are promoting the circular economy through their excellent technologies, ideas and collaborations, and help promote the circular economy in Japan and around the world by further disseminating these efforts.

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Noteworthy Area 1

Steel

Nippon Steel Corporation

Case 01 Steel is a Sustainable Material

Steel has many advantages; it is strong and easy to work with. As such, steel has been used in a wide range of applications and is well recognised as being an outstanding material when building the infrastructure for a society, a material that supports people's lives and overall economic development.

Steel is a very familiar material to us, and has become something that we cannot live without. Steel has been part of society's journey up to now and will continue to be so in the future.

Steel can easily be separated from other materials and can be endlessly recycled without deterioration in quality — quite a unique characteristic. Steel is a perfect material for recycling as it can be reborn into all kinds of steel products after the end of its product life.

Steel is made from pig iron, which is produced by reducing iron ore, a natural resource, through coking coal. After steel is consumed as a material, it is accumulated in society, collected as scrap, and recycled into steel again.

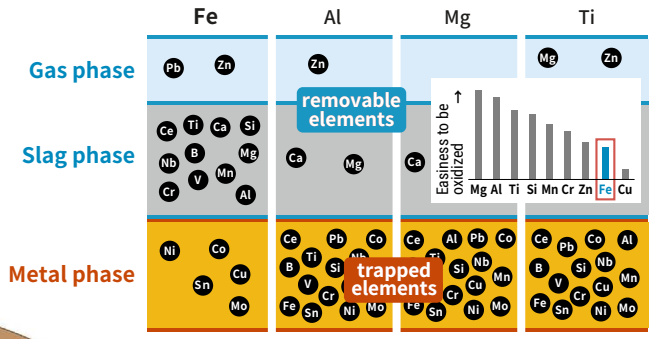
In 2021, global steel production came to 1.83 billion tonnes (demand side), while 1.57 billion tonnes of pig iron and direct reduction iron as well as 0.49 billion tonnes of scrap were used (supply side).

The balance of 2.3 billion tonnes of steel is mainly recycled within the steelmaking and processing process, and only a small amount is discharged outside the steelmaking process without being recycled.

When recycling metals, it is important to sort and remove other metal elements. In case of steel, most of the impurities in scrap can be removed as gas or slag by oxygen blowing because it is harder to oxidise steel than other metal elements contained as impurities in scrap.

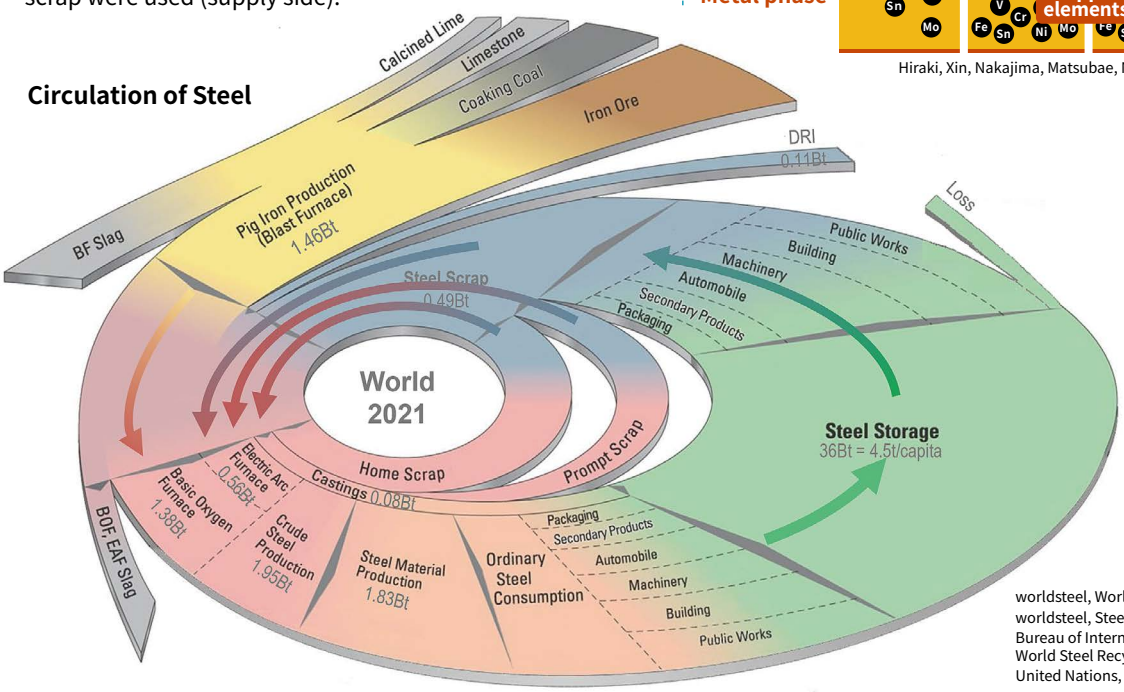
Impurities such as copper cannot be removed by oxidisation can also be removed by magnetic sorting.

It is these characteristics that make steel such a sustainable material that can be reborn into new steel products over and over again.



Hiraki, Xin, Nakajima, Matsubae, Nakamura and Nagasaka (2012)

Circulation of Steel



worldsteel, World Steel in Figures 2022
worldsteel, Steel Statistical Yearbook 2021
Bureau of International Recycling:
World Steel Recycling in Figures 2017–2021
United Nations, World Population Prospects 2019

Case 02 Effective Use of Steel Slag

In the steelmaking process, about 600 kg of by-products are generated to produce 1 tonne of steel. Steel slag makes up the majority of the by-products, and most of this is fully utilised. Steel slag is broadly categorized into blast furnace slag, about 70% of which is used for blast furnace cement, and steelmaking slag which is used for diverse applications including roadbeds, materials for civil engineering, ground improvement materials, marine environment improvement materials, and fertilizers.

The improvement of the marine environment using steel slag is expected to contribute to the conservation of biodiversity, protect the ocean's richness, and be an effective climate change measure by fixing carbon dioxide (blue carbon). Specifically, steel slag enables making effective use of soft dredged soil to create a shallow area where seaweed can grow, or to artificially produce iron humus, which is generated in forest soils by mixing with humus substance from waste wood and is to be supplied to water areas where seaweed growth is desired.

Installation of Calcia modified material

Installation of Vivary™ units
(Photo by Shibuya Diving Industry)

Demonstration in Mashike Town, Hokkaido

Panasonic Corporation

Case 03 Building a Recycling Scheme for Scrap Iron

Jointly with Tokyo Steel Co., Ltd., we started a recycling scheme for scrap iron in July 2013. We recover scrap iron from used home appliances and Tokyo Steel makes it into steel sheets. We then purchase the sheets back as material for our products.

In FY2020, the amount of scrap iron for Tokyo Steel reached over 2,600 tonnes, and the recycled steel is being used in our products, including washing machines and ceiling materials for housing.

PETEC•PETECK

Supply high quality scrap iron recovered from home appliances

Tokyo Steel

Add supplied scrap iron to the electric steel plate manufacturing process

Completed electric steel plates

Panasonic

Processing electric steel plates
(Photos: Lightweight ceiling materials by Panasonic Homes)

Noteworthy Area 2

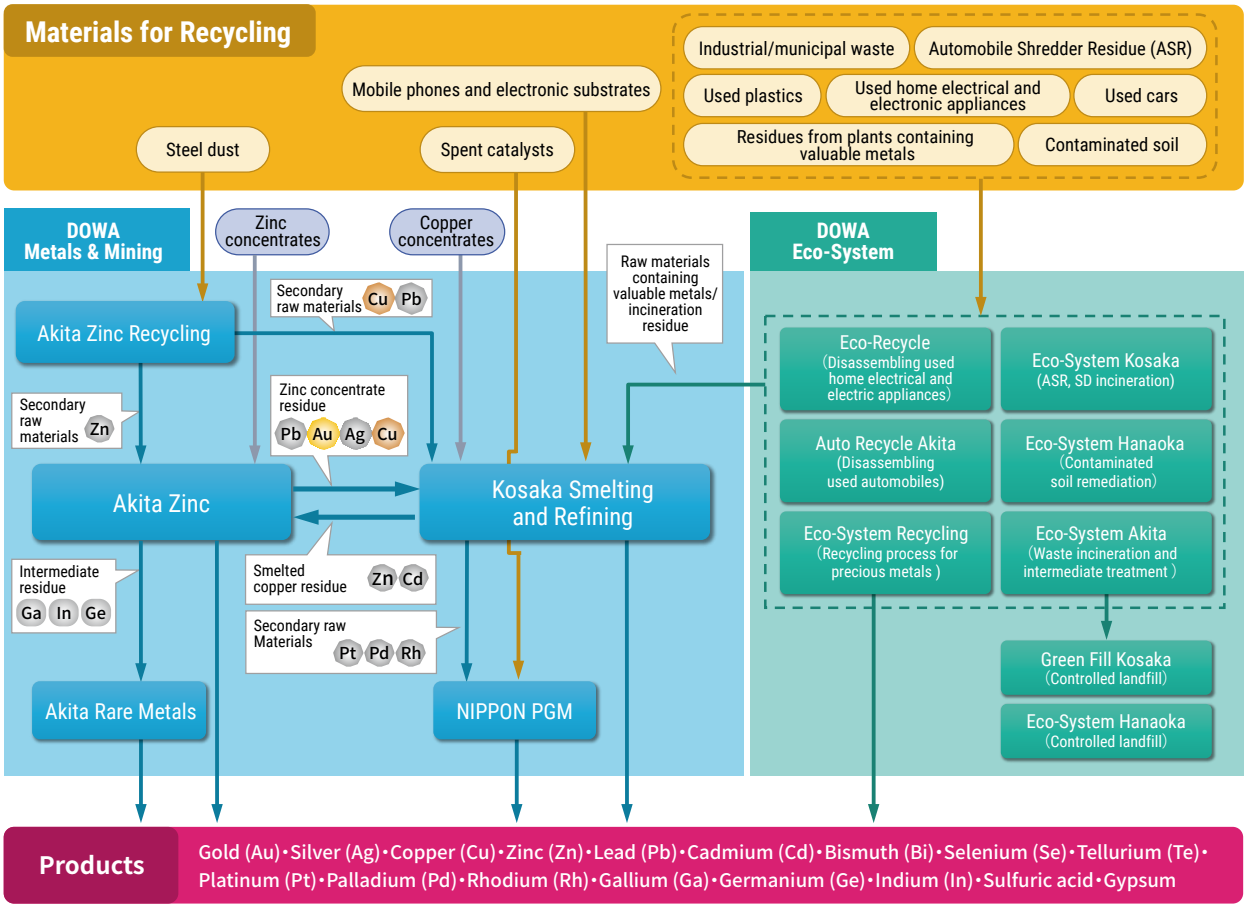
Non-Ferrous Metals

DOWA HOLDINGS CO., LTD.

Case 04 Recovering Various Types of Valuable Metals Using a Large-scale Smelting and Recycling Complex

Our company has a long history of mining and smelting, and we have, established a complex function based on mutual processing of residues with Akita Zinc and Kosaka Smelting & Refining. We use advanced technologies to recover around 20 types of valuable metals, including rare metals, which are contained in minute quantities in ores, as well as gold, silver, copper and zinc from raw materials. At present, we also apply these technologies to recycle metals from scrap materials, including discarded electronic substrates and smartphones generated on the market, steel dust, incineration residues generated at our group's waste incineration plant, as well as discarded electronic substrates, from our household appliance recycling plants.

DOWA Smelting and Recycling Complex



JX Nippon Mining & Metals Corporation

Case 05 Processing of Recycled Materials in the Copper Smelting and Refining Business

Our company is a pioneer in nonferrous metal recycling business in Japan, and since the 1980s, we have been processing copper ore and recycled raw materials (waste electronic devices and materials recovered from their manufacturing processes that contain valuable metals) at our copper smelting facilities. This process recovers and refines copper, precious metals, and rare metals, which are then supplied to the market as ingots, semiconductor materials, and other advanced materials.

Copper smelting is a process that does not need much fossil fuel to melt copper ore as it uses the heat from the oxidation reaction of the copper ore itself to separate the contained metals. Recent technological developments have contributed to further improving the efficiency of the heat reaction, so that the reaction heat can be effectively utilised, thereby increasing the recycling ratio of raw materials from various kinds of waste products. This will enable a significant reduction in energy consumption and CO_2 emissions from the perspective of product life cycle.

Green Hybrid Smelting at Saganoseki smelting plant

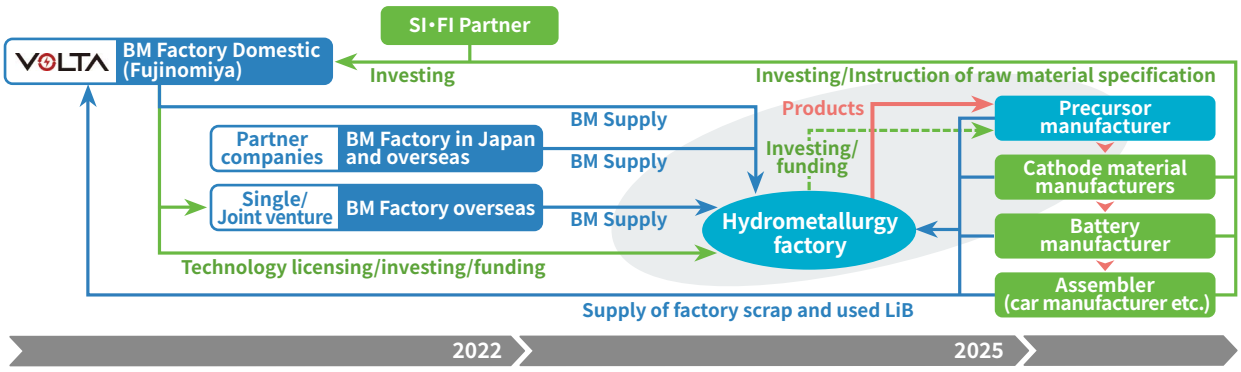
- **Pursuing the most optimised balance of mine development and recycling for realizing sustainable society**
- **Efficient recycling process by utilising heat of oxidation from copper concentrates**

ENVIPRO HOLDINGS Inc.

Case 06 Closed Loop Recycle of Lithium-ion Batteries (LiBs)

In January 2018, we established VOLTA Corporation, an operating company for recycling rechargeable batteries such as lithium-ion batteries and nickel-metal hydride batteries. In anticipation of the future disposal of large quantities of automotive batteries, the company is currently collecting consumer batteries and defective cells generated from battery manufacturers. The main recovered resources are black mass (BM), which is concentrated cobalt and nickel, copper, aluminum, and carbon. We are working to increase capacity and upgrade of resource recovery.

Closed Loop Recycling Model of Lithium-ion Batteries



Noteworthy Area 3

Cement

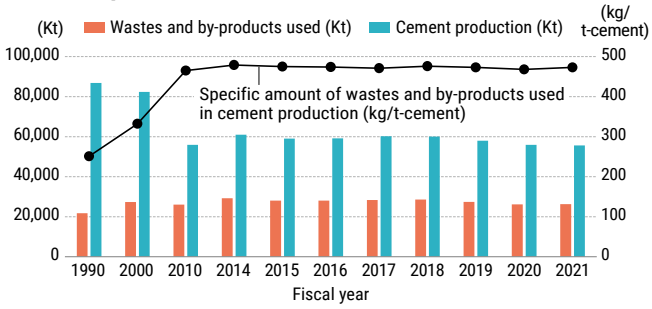
TAIHEIYO CEMENT CORPORATION

Case 07 Waste Utilisation by Cement Industry

The cement industry plays a major role in building a "recycling-oriented society" by supplying basic materials for concrete, which is essential for social and disaster prevention infrastructure, and by effectively utilising waste and by-products to produce cement, thereby reducing the amount for final disposal. The cement industry uses approximately 26 million tonnes of waste and by-products annually, or about 468 kg per tonne of cement. Waste plastics, more than half of which are difficult to recycle by material and chemical methods, can be utilised as thermal energy in the cement industry, contributing to the reduction of energy-derived CO_2 emissions.

Our company's cement plants disposed of a large amount of disaster waste after the Great East Japan Earthquake, contributing to disaster waste disposal in the disaster area.

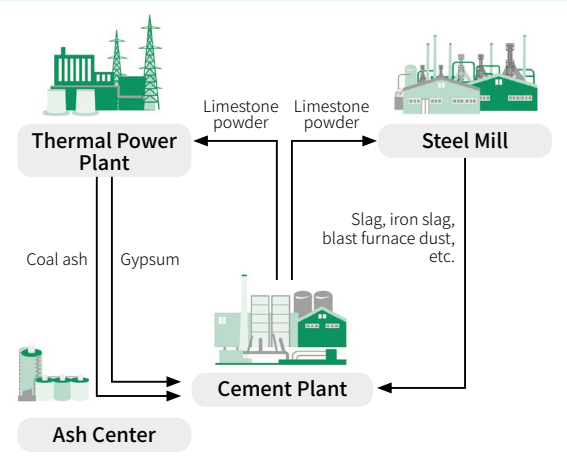
The transition of wastes and by-products used in cement production



Resource Circulation in Industry

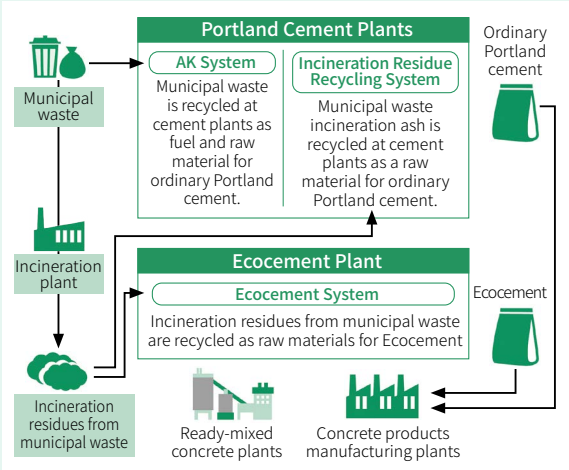
Coal ash generated from coal-fired power plants is used as a substitute for clay, one of the raw materials for cement. We supply limestone powder as a remover for sulfur oxides generated by coal combustion, and the by-product gypsum produced in the process is also effectively used as a raw material for cement.

We supply limestone and quicklime used in the refining process to remove impurities from iron ore at steel mills, and use the slag and other by-products generated after refining as raw materials and mixing materials.



Resource Circulation in Local Societies

We are promoting three systems for resource circulation: (1) the "Incineration Residue Recycling System," which recycles municipal solid waste incineration ash (bottom ash and fly ash) as a raw material for ordinary cement; (2) the "AK System," which recycles household and commercial waste through a biodegradation reaction (fermentation) using a refuse recycling kiln, and recycles it as raw material and energy at existing cement plants; and (3) the "Eco-cement" production system, which uses more than 500 kg of municipal solid waste incineration ash per tonne of cement, to promote resource recycling in local societies.



Case 08 Recycling of Lithium-ion Batteries

We are working with Matsuda Sangyo Co., Ltd. to recycle large lithium-ion batteries for automotive and stationary applications.

After disassembling the parts of the battery pack that can be easily disassembled in advance, the module itself, which is difficult to disassemble or crush as it is, is detoxified by roasting the flammable electrolyte inside the battery without oxidising the metal that makes up the battery.

After that, various metals and electrode materials are separated by crushing and sorting, and the residue that cannot be recovered as a resource is effectively utilised in the cement manufacturing process through heat recovery.

\The world's first ! /
LiB Recycling System
Utilizing cement manufacturing process

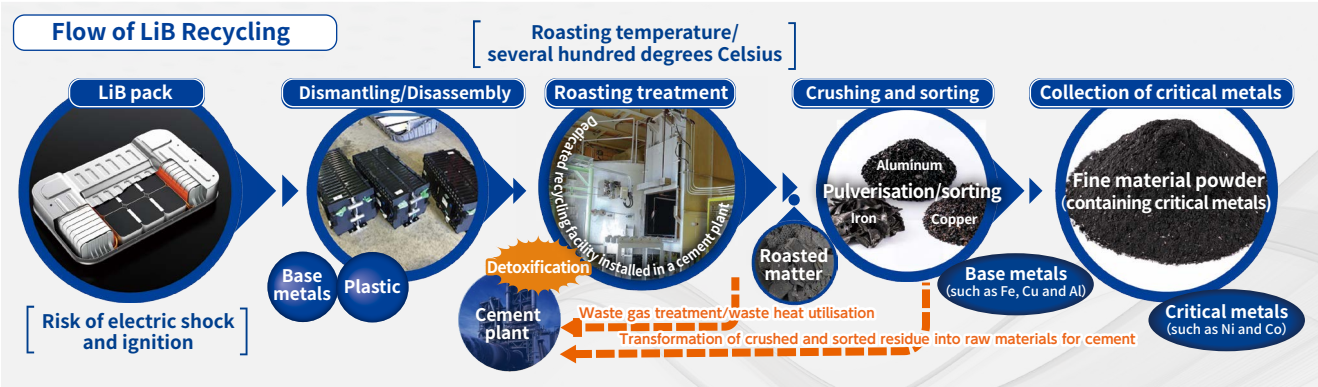
The LiB recycling system, jointly developed by Taiheiyo Cement and Matsuda Sangyo Co., Ltd., realises energy saving and advanced recycling by installing a roasting facility inside the cement plant. The system that capitalizes on the characteristics of the cement industry was introduced at Tsuruga Cement Co., Ltd.

Items other than large LiBs that can be recycled by roasting

Metal-containing resins, small products that contain LiB, metal scraps with oil adhesion, etc.

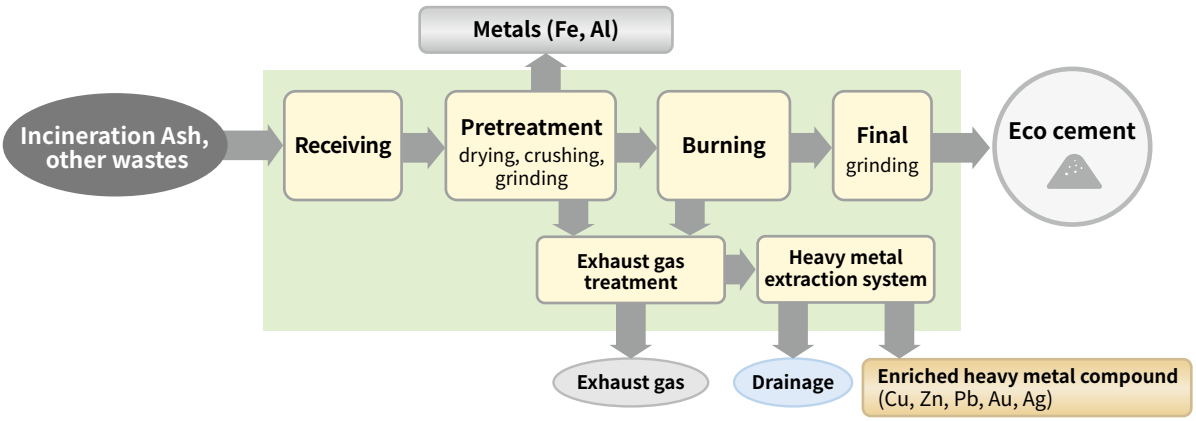
3R educe euse ecycle

FY2016
Received the Award for Resources Recirculation Technologies and Systems
Rare Metal Recycling Award
Demonstration project for cobalt recovery from lithium-ion batteries utilising cement process
Taiheiyo Cement Corporation/ Matsuda Sangyo Co., Ltd.



Case 09 Recovery and Recycle System for Precious Metals in Municipal Solid Waste Incineration Residue

The Eco-cement system is a cement production process that, unlike the existing cement plant acceptance process, can utilise more than 50% of cement raw materials, such as municipal solid waste incineration residues. This system is characterised by efficient recovery of metals contained in very small amounts in the incineration residue. Metals from the incineration residue are heated to over 1,350°C in the rotary kiln, and after being vaporised into gas, heavy metals such as copper, zinc, lead, etc., as well as precious metals such as gold and silver, can be recovered in the wet process heavy metal recovery system.



Noteworthy Area 4

Paper and Woody Resources

Nippon Paper Industries Co., Ltd.

Case 10 Production and Circulation of Woody Resources

Paper and paperboard products have long been an excellent field of resource recycling, with the recovery and utilisation of waste paper being promoted. In recent years, paper and biomass materials have also been attracting attention, requiring more up-to-date approaches in solving social and environmental issues such as climate change and marine plastic litter.

The Nippon Paper Group is working to expand the three circulations of “forest resources”, “woody resources”, and “paper product recycling” by taking advantage of the characteristics of woody resources, which are the foundation of our business operations, in order to simultaneously achieve corporate growth and contribute to a circular society. By balancing these three circulation, we are making multifaceted contributions toward building a recycling-oriented society and solving social environmental issues, such as climate change.

Biodiversity-conscious sustainable afforestation activities are the starting point of a cycle that absorbs CO_2 and fixes carbon as well as continuously generating forest resources. We manage about 160,000 hectares of our own forests in Japan and overseas, improving our afforestation techniques and supplying highly productive “elite trees” to support the regeneration of the domestic forestry industry. We are expanding the “circulation of woody resource” by using the woody resources we generate not only for paper but also for the development of new biomass materials such as cellulose nanofibres. We are also working to reduce greenhouse gas emissions by actively utilising black liquor, a byproduct of pulp production, and biomass fuels during manufacturing.

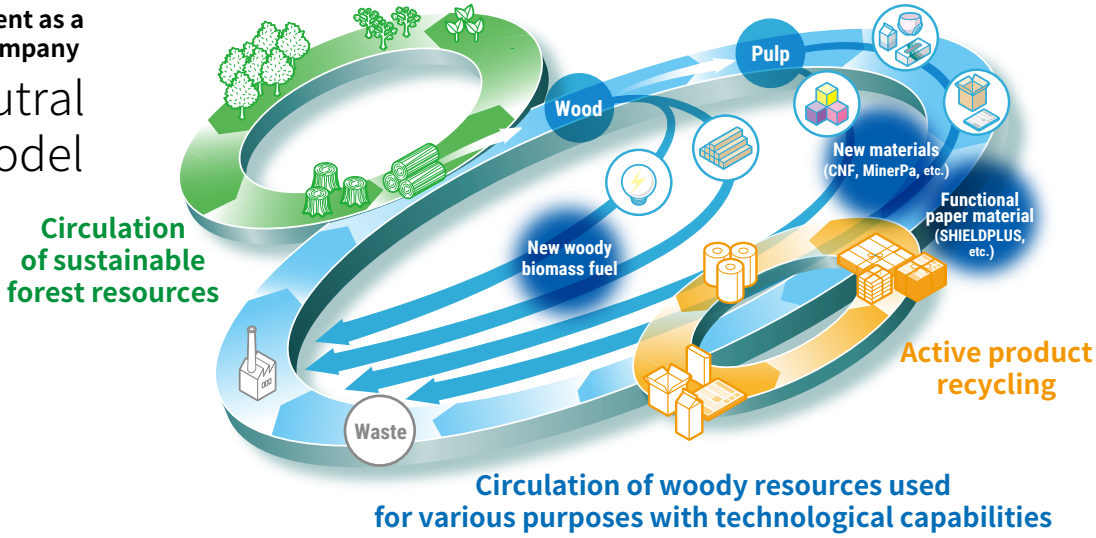
The use of waste paper and paperboard has been progressing, and our group also uses approximately 55% of waste paper and pulp as raw materials for paper products. However, paper containers, the use of which is expanding in order to substitute plastic, are rarely collected and utilised, except for paper carton products. In order to expand the use of these recyclable materials, we are working to build a recycling system with a target of using 12,000 tonnes of unused waste paper per year by 2030. Biomass materials play a role in storing carbon in products even while they are in use. By recycling various biomass materials and products, including paper, we can store carbon even longer and help mitigate climate change.

Breakdown of main raw materials*1

*1 Consolidated Group companies in Japan
*2 Includes purchased wastepaper pulp

Business Development as a General Biomass Company

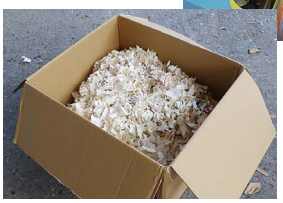
Carbon-Neutral Business Model



Case 11 Initiatives for Resource Recycling Business – Promote Recycling of Used Paper Containers –

From April 2021, with the support of Hamamatsu City, Hamamatsu Green Wave Co., Ltd., Ecolife Hamamatsu, a non-profit organisation, and Nippon Paper Industries Co., Ltd. started collecting paper ice cream cups, paper yogurt cups, and paper cups used by households in the city. Collection boxes were set up at the Eco-Hama environmental awareness facility at the West Hamamatsu City Cleaning Plant to deposit washed and dried paper cups. The collected items are recycled as raw materials for papermaking at our Soka Mill, as a demonstration of a new recycling business.

Conventionally, most paper used as food containers is incinerated as municipal waste due to stain and odor problems. With increased recycling awareness among consumers and thanks to our recycling technology, paper can be reused as a resource by taking advantage of its inherent recyclability, reducing the amount of incinerated waste and contributing to carbon fixation as a wood resource.



Case 12 Development of New Biomass Material – Cellulose Nanofibre –

Cellulose nanofibre (hereafter CNF) is a cutting-edge biomass material produced by finely unraveling the fibres that make up wood to the nano-level. Because CNF is derived from plant fibres, it has a low environmental impact in terms of production and disposal. Taking advantage of its properties such as thickening, water retention, formability, and dispersibility, it is being mass-produced and increasingly adopted as a functional additive in the food and cosmetics fields.

As for its use in industry, collaborative research with Tohoku University in 2021 discovered that CNF has electricity storage properties, leading to the world's first successful verification of LED lighting outside of academic testing. A prototype is planned to be displayed at the Osaka Expo in 2025.

NEBA Forestry Union, Nagano Prefecture

Case 13 Towels Made from Japanese Cedar

If we could get people to use wood more.... With this in mind, we made cloth and towels from wood. The raw material was 50-year-old Neba cedar. The cedar is turned into chips, converted into cellulose, made into Japanese paper, cut into thin strips, and made into yarn, which is then turned into cloth. No modern technology is used in this process, but rather the ancient Japanese techniques of "washi" paper and yarn twisting are utilised in all processes. No synthetic fibres are used at all, and even the product tags are made from wooden cloth. When buried in the ground, the towels are decomposed by microorganisms in about one month, depending on the environment.

Noteworthy Area 5

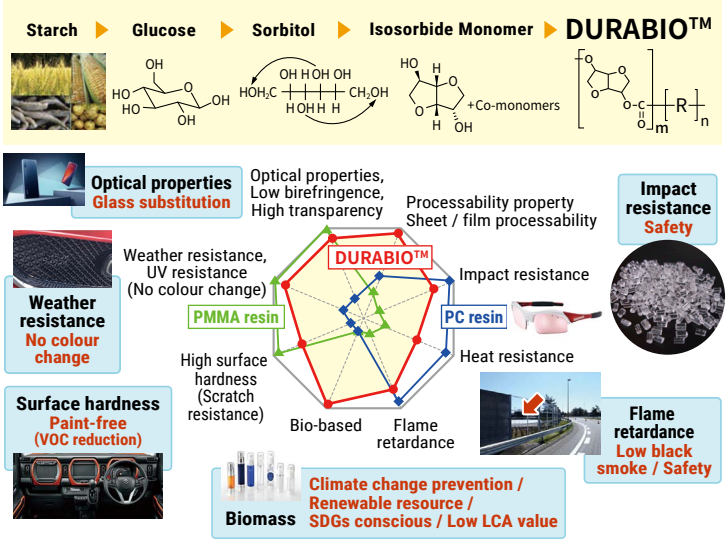
Bioplastics

Bioplastics include biomass plastics made from renewable organic resources such as plants, and biodegradable plastics, which eventually decompose into carbon dioxide and water under certain conditions through the action of microorganisms that are abundant in nature.

Mitsubishi Chemical Corporation

Case 14 Renewable Plant-based Engineering Bioplastic "DURABIO"

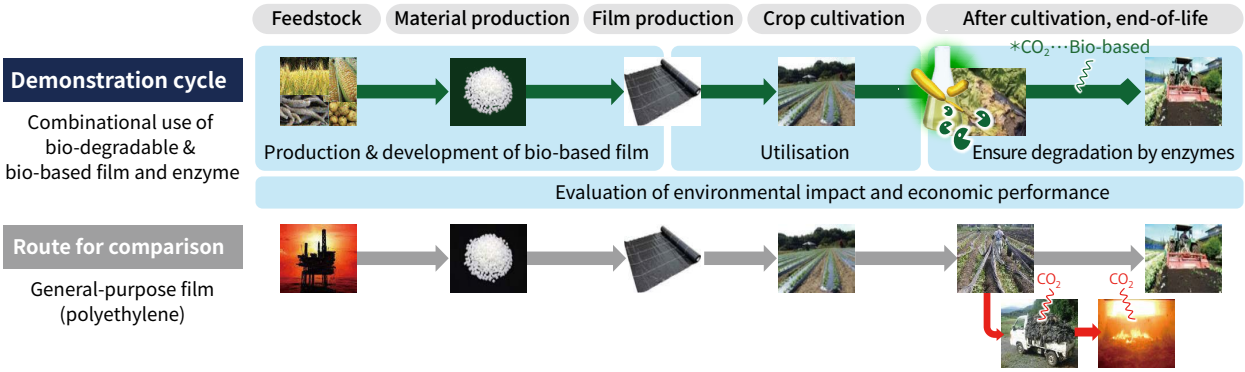
"DURABIO" is a transparent bio-based engineering plastic derived mainly from plant-based isosorbide. It has excellent performance in terms of impact resistance, heat resistance, and weather resistance. It is used as a substitute for glass in applications that require high strength and durability and long-term transparency. It also has excellent colouring capability, and smoothness and colour can be achieved simply by blending with pigments. In addition, its hard and scratch-resistant surface eliminates the need for painting processes, thus its use is expanding to automobile interior and exterior design parts, smartphone housings, lighting covers, and decorative containers for cosmetics.



Case 15 Bio-based and Biodegradable Plastic "BioPBS™" for Agriculture Film

We are working to expand the use of agricultural films, which can eliminate the need for disposal after use, to more crops and regions. This will be an application that can maximise the benefits of BioPBS™, a biodegradable, bio-based plastic.

Mitsubishi Chemical Agri-Dream Corporation develops new films at lower cost, with the cooperation of the National Agriculture and Food Research Organization, Tokyo University of Agriculture and Technology, Kanagawa Agricultural Technology Center, Ibaraki Agricultural Comprehensive Center, and Yamanashi Agricultural Technology Center to develop methods to control degradation and monitoring, while demonstrating their effectiveness in agriculture.



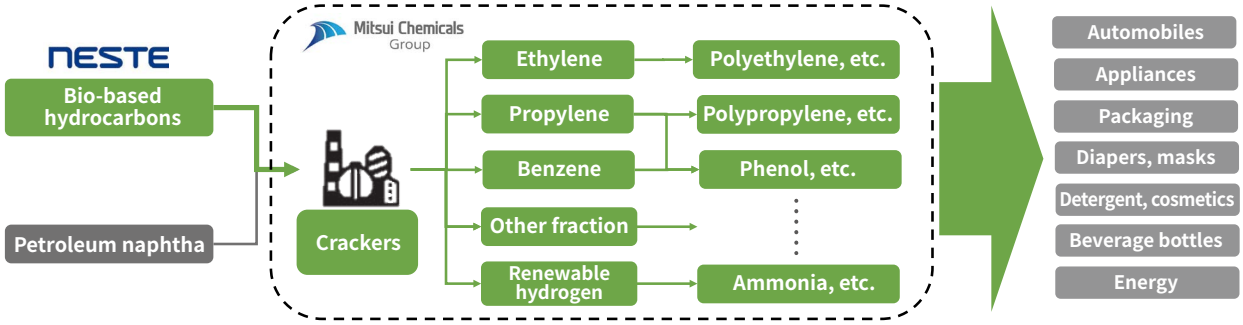
*Photos are for reference only

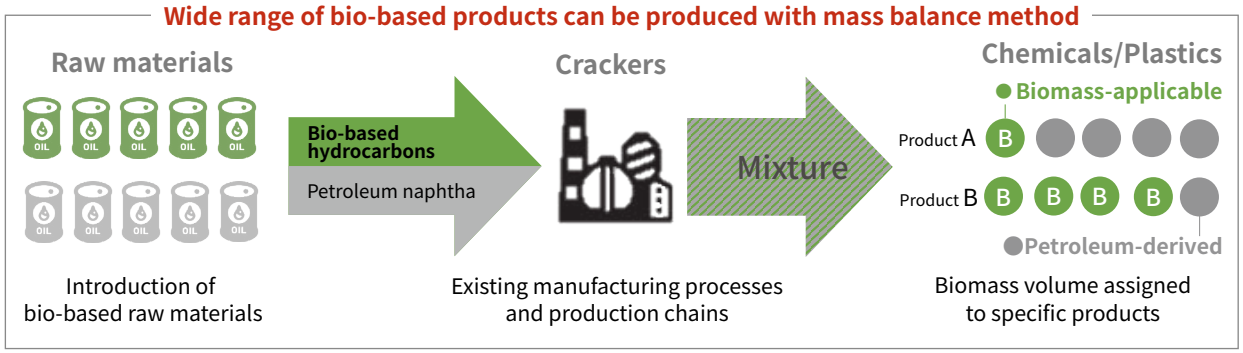
Mitsui Chemicals, Inc.

Case 16 Renewable Plastics from 100% Bio-based Hydrocarbons

Biomass naphtha produced from vegetable oil waste and oil residue is fed into an ethylene plant (cracker plant) as feedstock to produce basic biomass feedstock such as ethylene, propylene, C4 fraction, and benzene. This is the first of its kind in Japan. The quality of the biomass derivatives (biomass chemicals and biomass polymers) is equivalent to that of existing products, since basic chemicals such as phenol and polyolefins such as polyethylene and polypropylene are produced from these basic biomass raw materials.

This process has obtained ISCC certification (International Sustainability and Carbon Certification) for mass balance method.





NISSIN FOODS HOLDINGS CO., LTD.

Case 17 Eco-friendly Package "Biomass ECO CUP"

We are promoting conversion to "Biomass ECO CUP" partially made of biomass plastic as packaging for "Nissin CUP NOODLES".

Noodle cups were made of polystyrene (PS) foam when the product was first launched. In 2008, we switched to the "ECO CUP" made of laminated paper to significantly reduce the amount of plastic, and in December 2019, we began switching to "Biomass ECO CUP," which was replaced with bio-based plastic as part of its packaging. The switchover for all "Nissin CUP NOODLES" was completed in fiscal 2021. By achieving a biomass level of 81%, the amount of petroleum-based plastic used has been almost halved compared to the conventional "ECO CUP". CO_2 emissions are reduced by approximately 16% over the life cycle.

Noteworthy Area 6

Collection and Recycling of Plastic

Asahi Kasei Corporation

Case 18 Blockchain-based Digital Platform for Plastic Traceability

Asahi Kasei is developing a digital platform for plastic resource circulation. Aiming to establish a digital platform to ensure traceability of recycled plastic using blockchain technology, a prototype was developed and a demonstration trial was conducted. To raise awareness of recycling and encourage recycling behaviour, the prototype displays history information of products using recycled plastic as well as recording recycling activity by consumers (Fig. 1).

In the trial, it was clear that consumers as well as business operators are interested in the recycling rate and history information of a product, and that this could become one of the criteria for consumers to purchase a product with confidence. The trial also confirmed that recording and visualisation of recyclable waste recovery would improve consumer awareness and action on recycling.

In 2022, we are planning to collaborate with the major convenience store FamilyMart and launch a campaign to collect PET bottles via in-store collection boxes (Fig. 2).

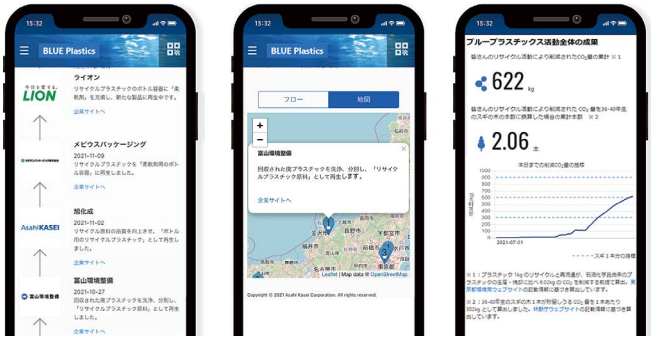


Fig. 1 Screenshots of the prototype app displaying background information of the recycling process (left), with information displayed visually on a map (middle) and consumer action on recycling (right).

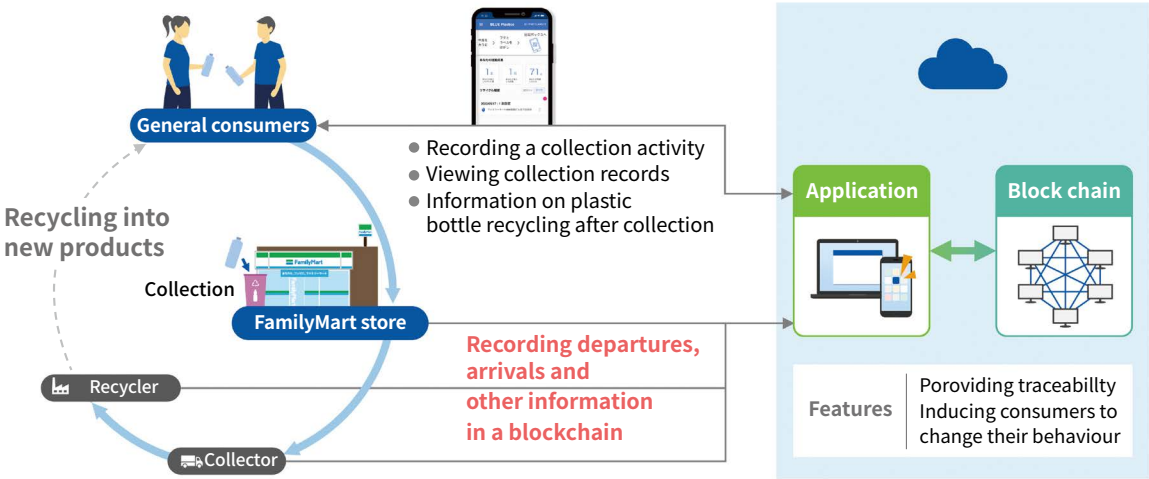


Fig. 2 Campaign to collect PET bottles in collaboration with a convenience store planned in 2022.

Japan Soft Drink Association (JSDA)

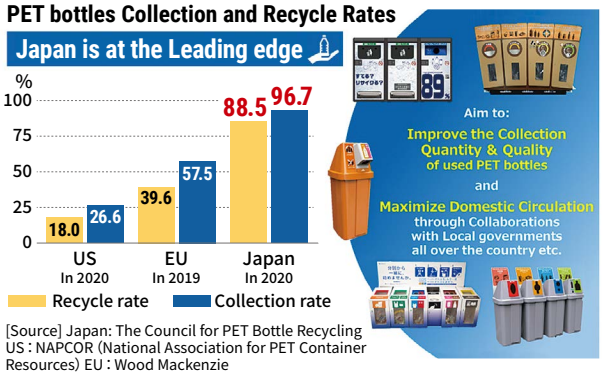
Case 19 Collection of used PET Bottles and Educative Activities for Bottle-to-Bottle Closed Loop Recycling

Japan is quite advanced when it comes to segregated collection of PET bottles from households and offices. Various collection points are available at retailers and vending machine sites as well. PET bottle collection rate is 96.7%, the recycle rate is 88.5% (both in 2020, vs sales volume), which is much higher than rates in the US or EU.

Further improvement of the quantity and quality of used PET bottle collection is essential to promote bottle-to-bottle closed loop recycling. To achieve that, the entire beverage industry in Japan works to collaborate with local governments in various areas and with companies in different industries. JSDA is aiming to collect higher quality used PET bottles free from foreign materials and leftover liquid by conducting research and public awareness campaigns using dedicated collection equipment and newly designed recycling boxes next to vending machines.

These practices contribute to the circular economy, and help to achieve carbon neutrality.

PET bottles Collection and Recycle Rates



[Source] Japan: The Council for PET Bottle Recycling US : NAPCOR (National Association for PET Container Resources) EU : Wood Mackenzie

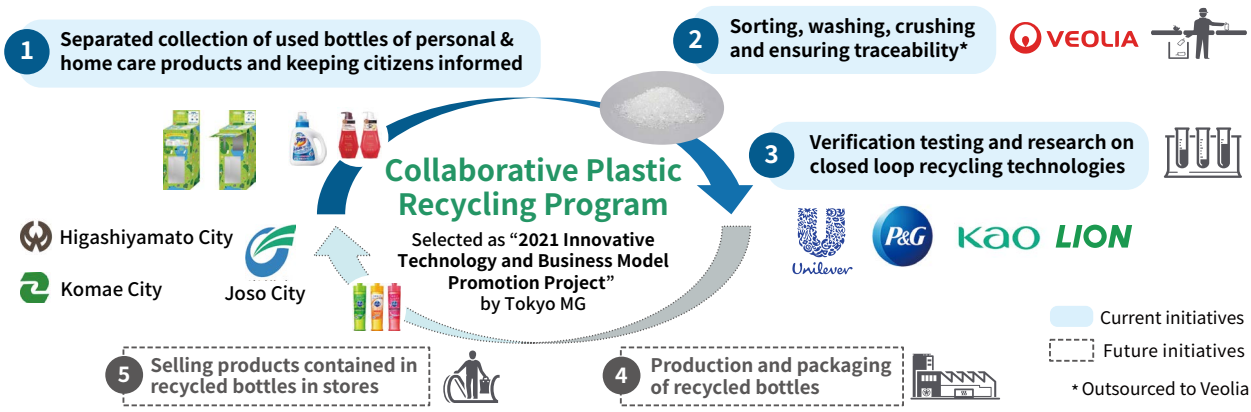
Veolia Japan Group | Unilever Japan | Kao Corporation | The Procter & Gamble Company of Japan Limited | Lion Corporation

Case 20 Collaborative Plastic Recycling Programme Promoted by Consumers, Local Governments and Companies

"A Collaborative Plastic Recycling Programme" for collecting and recycling used bottles was launched by Unilever Japan and Kao Corporation in cooperation with Higashi-Yamato City, Tokyo, and the recycler, Veolia Japan Group. Other participants in the programme are the Procter & Gamble Company of Japan Limited and Lion Corporation.

Collection boxes were set up at 10 locations in Higashi-Yamato City to collect used containers. The programme will also be launched in Joso City and Komae City. The programme has been selected as an "Innovative Technology and Business Model Promotion Project" by Tokyo Metropolitan Government, and is currently being verified for efficiency gains and changes in consumer behaviour through visualisation of the collection status. In addition, we are verifying and researching closed loop recycling technologies and aiming to establish guidelines on common containers for daily items that can be used across all companies and industries.

Making New Bottles from Used Bottles Collaboration by consumers, local governments and companies



Noteworthy Area 7

Recycling Technologies (Home Appliances, Plastic, Textile)

Association for Electric Home Appliances

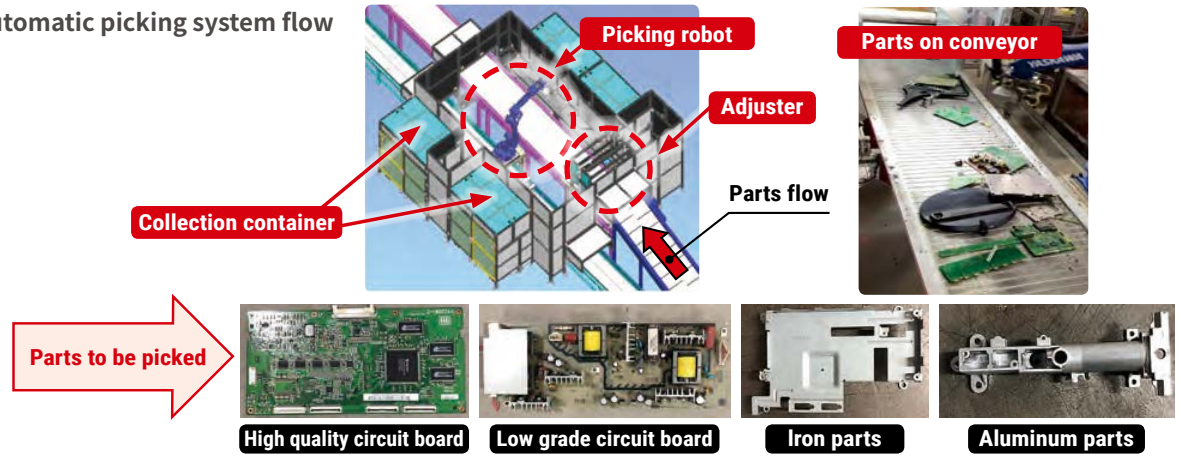
Case 21 Automatic Picking System Using AI (Artificial Intelligence)

Home appliance recycling plants have so far carried out manual sorting of dismantled parts, but AI image recognition automatically distinguishes dismantled parts by type and picks them up automatically.

Installation of AI picking on a flat-screen TV dismantling line
(Panasonic Eco Technology Center Co., Ltd.)

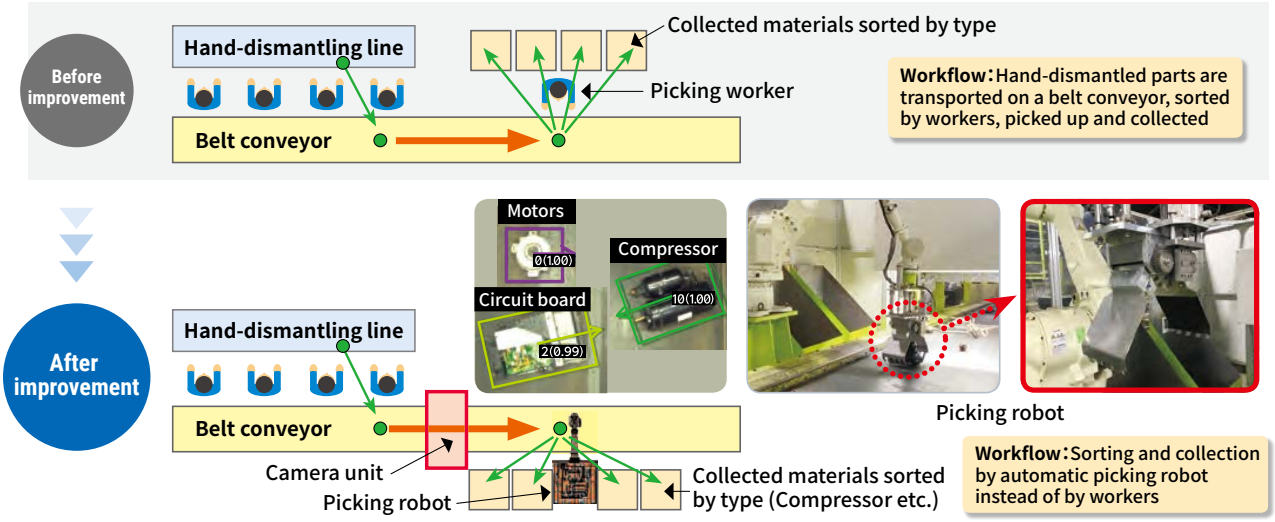
On the flat-panel TV dismantling line, with the introduction of AI, about 3,000 correct images of the four most-collected parts were registered in advance, making it possible to distinguish them with a recognition rate of about 95%. From there, the articulated robot can pick up with a probability of about 98%.

Automatic picking system flow



Installation of AI picking on an air conditioner outdoor unit dismantling line
(Chubu Eco Technology Corporation)

On the dismantling line for external air conditioners, parts of different sizes and shapes, such as compressors, circuit boards, motors and transformers, are picked up with a probability of approximately 98%, thereby reducing the burden on workers, especially for lifting heavy parts.



Sony Group Corporation

Case 22 SORPLAS™, Sony's Proprietary Flame-retardant Recycled Plastic with up to 99% Recycled Material Utilisation Rate

SORPLAS™ (Sustainable Oriented Recycled Plastic) is an original high-quality flame-retardant recycled polycarbonate resin. Despite being a recycled material, it is applicable for appearance surfaces as it maintains excellent gloss. It is possible to provide SORPLAS with various capabilities such as high rigidity, impact resistance and high flame retardancy utilising proven technology that blends additives.

One technical feature of "SORPLAS" is that the amount of flame-retardant additive is extremely small. Sony developed an original high-performance sulfur-based flame-retardant, which is essential for SORPLAS. While conventional flame retardants require an amount around 10% to be effective, only an extremely small amount of this original flame-retardant is required to achieve durability, flame-retardancy and recyclability. Due to this advantage, groundbreaking levels of recycled material content can come true, up to 99%. The effective utilisation of SORPLAS has been shown to reduce CO_2 emissions in product manufacturing by up to 80%.*

Sony first used SORPLAS in its products in 2011 and has incorporated it into a wide variety of Sony Group's products including selected models for BRAVIA® TV, Xperia™ smartphones, full-frame interchangeable lens digital cameras and video cameras.

* In the case of SORPLAS in the BRAVIA LCD TV KDL-40EX52H. Based on Sony's calculations, assuming plastic manufacturing (including shipping)

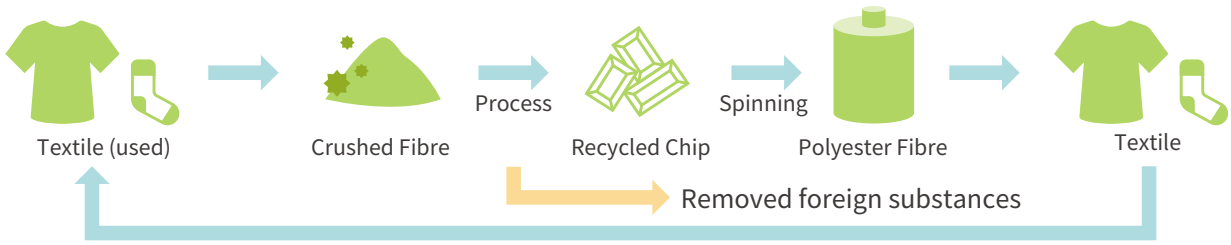
"SORPLAS" is a trademark of Sony Group Corporation

Teijin Ltd. | JGC HOLDINGS CORPORATION | ITOCHU Corporation

Case 23 Chemical Recycling Technology of Polyester

Teijin has been involved in chemical recycling of PET to PET and fibre to fibre since around 2000. Teijin is a pioneering chemical recycling technology for producing polyester fibres from discarded textile in a large-scale plant. Compared with material recycling, this technology has an advantage for dye stuff and impurities removal. At the same time, the technology enables achievement of closed-loop production of all polyester products not only for textile fibres, but also for films and bottles. In collaboration with JGC, which operates a global engineering business, and ITOCHU, which has an extensive network in the textile industry, we aim to recycle polyester within the textile industry by developing and licensing the technology domestically and internationally, and by establishing a recovery system.

Chemical recycle (Teijin method)



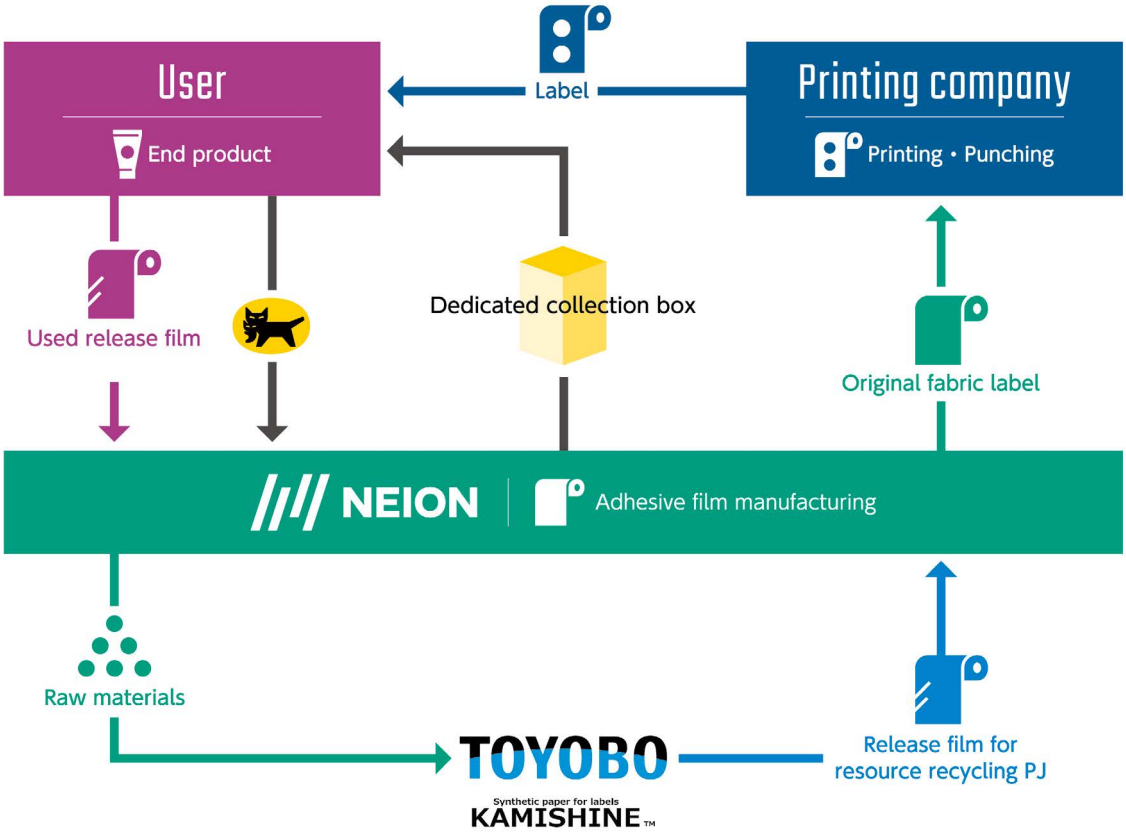
Noteworthy Area 8

Formulating a Recycling Loop (Plastic, Food Waste)

NEION Film Coatings Corp. | TOYOBO CO., LTD. | Shionogi Pharma Co., Ltd. | TOPPAN INFOMEDIA CO., LTD. | Mitsui Bussan Chemicals Co., Ltd.

Case 24 Closed-Loop Recycling of Label Release Film

Adhesive labels are used across a variety of industries and business categories. The adhesive label results in discarding of release film in the manufacturing and attaching process, up to the amount of 116 million square meters per month in the entire domestic manufacturing industry, and most of these are disposed or incinerated. This project is an environmentally friendly initiative to replace release film with recycled PET film (exclusive recycling film), which is collected after use and recycled into the same exclusive recycling film through material recycling, thereby reducing release film waste to zero. The used release film that was previously disposed of as industrial waste can now be purchased as a valuable resource, reducing waste and CO_2 emissions.



AEON Co., Ltd. | DAIEI KANKYO Co., Ltd. | AEON AGRI CREATE CO., LTD. | AEON RETAIL Co., Ltd. | The Daiei Inc.

Case 25 Self-Contained Food Recycling Loop

We have established a "food recycling loop," in which food waste generated at our stores is composted or converted into animal feed for local use. The number of stores in this loop is approximately 290 stores in 11 locations across Japan. Since 2015, we have implemented "AEON integrated" closed recycling loop, whereby compost has been used on AEON farms and the farm products have been sold at our stores.

For example, in Hyogo prefecture, DAIEI KANKYO composts food waste generated from 120 stores such as AEON and Daiei, then AEON AGRI CREATE grows agricultural products using the compost on its own Miki Satowaki Farm, and the grown vegetables are sold at our stores. In 2020, 4476 tonnes of food waste were collected, 186 tonnes of compost were produced, and. 289 tonnes of agricultural products were shipped from Miki Satowaki Farm.

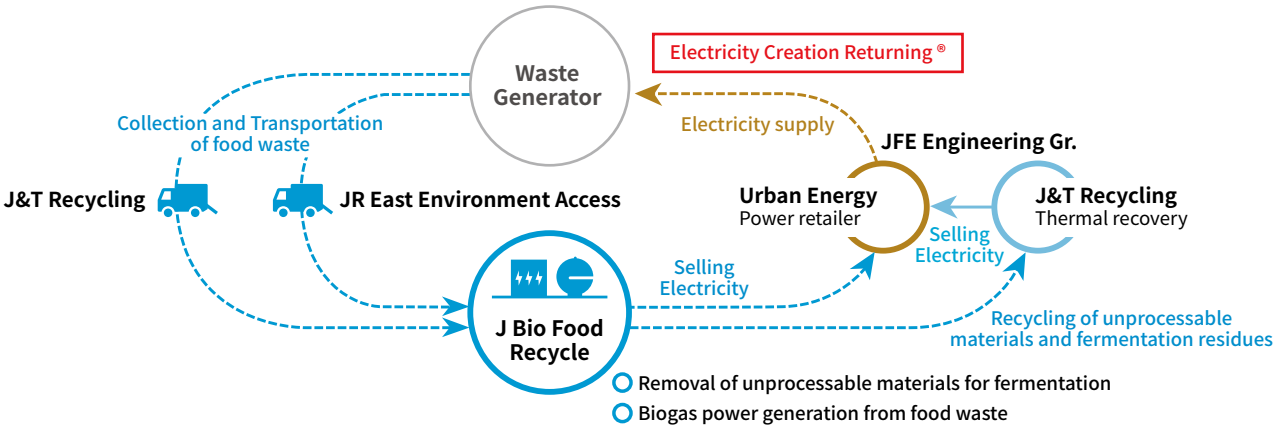
Aeon's Self-Contained Food Recycling Loop

JFE Engineering Corp. | J&T Recycling Corp. | Urban Energy Corp. | East Japan Railway Company | JR East Environment Access Co., Ltd. | J Bio Food Recycle Corp.

Case 26 Yokohama Food Recycle Project

J Bio Food Recycle was established jointly by the East Japan Railway Group, which disposes of about 50 tonnes of food waste each day in the Tokyo area, and JFE Engineering Group, which has a track record in construction of biogas power plants with methane fermentation technology and waste treatment technology. The aim of this project is to increase food waste recycling and reduce CO_2 emissions.

Collaborating with Urban Energy, electricity equivalent to the waste consigned for disposal by the emitting company to J Bio Food Recycling is returned to the emitting company at a discounted rate. This returning profit system through electricity is the first recycling loop in Japan.



See J4CE Website for detail initiatives
j4ce.env.go.jp/en

J4CE
JAPAN PARTNERSHIP
FOR CIRCULAR ECONOMY

Founding organisations

環境省
Ministry of the Environment

METI
Ministry of Economy, Trade and Industry

Keidanren
Japan Business Federation

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IGES
Institute for Global
Environmental Strategies