# Management of Waste and Scrap Materials

The company recognizes the impacts of environmental contamination and safety of stakeholders through negative impacts stemming from the company's business processes throughout the entire supply chain such as raw material transportation, production and product distribution, and the company gives importance to and strictly and continuously follows the laws and recommendations of licensing agencies, and the company adheres to the 3Rs waste management principle of reduce, reuse and recycle in line with domestic and international practice guidelines in order to minimize environmental impacts from waste disposal and minimize the quantity of waste sent for disposal while seeking opportunities to reuse waste in the most beneficial manner according to the principles of the circular economy and striving toward achieving zero landfilling of waste from production processes. Thus, the company developed the 3Rs waste management concept into the 5Rs concept and 7Rs concept as follows:

### Reject

Reject use of non-environmentally-friendly materials or chemicals in work.

### Recovery

Recover valuable resources in waste for reutilization such as by extracting precious metals from spent catalysts for use in other industries, of which the company was able to extract approximately 134.96 tons.

### Rethink

Rethink every area to consider utilization before discarding or disposing such as by having in place a plan to inspect and sort suitable lubrication oil for quality improvement instead of disposal.

### Repurpose

Repurpose used materials to recover value through other uses such as by transforming used wooden pallets into plant shelves inside project areas.

The aforementioned principles demonstrate that Bangchak gives importance to reduction of waste impacts across the entire supply chain, starting with good raw material section. Consequently, the company was able to reduce waste in the production process at the source. In addition to producing by product from production. Additionally, the company has in place a good management system for reducing waste and storing waste from business operations effectively without it spilling into the environment, and the company collected waste-related data through the waste transportation document invoice system, which enabled the company to inspect the quantity of waste entering the disposal process from the origin to the place of disposal. At the same time, waste management and handling at the destination starts with having a process to procure licensed disposers that meet legal standards and selecting disposal processes that first and foremost strive toward promoting the circular economy, and the company also inspects the places of business of waste disposers each year in order to check and control actions according to standards.

Bangchak's oil refineries are certified according to the Standard for Zero Waste to Landfill by the Department of Industry, which began serving as a certifier since 2021 and has continued to do so ever since. In addition to giving importance to industrial waste, Bangchak is also expanding to achieve zero office waste to landfill through activities and projects under the 5Rs principle such as the following:

Public Relations and Promotion of Conscience about Proper Waste Disposal The company engages in public relations through 5S or project activities to campaign for correct sorting and disposal of waste, discontinuation of use of foam boxes and reduction of use of office paper, etc.

Klong Ma Lot 5 Baht Project Employees buying food at the cafeteria were instructed to bring their own food boxes rather than using plastic containers to allow employees to choose the amount of rice they want while reducing food waste.

Hop Pha Ma Laek Khong Project Employees were instructed to bring unused uniforms and bags that were still in good condition to donate for further use by underprivileged people.

Lang Kha Khiao Project UHT beverage boxes were sorted and recycled into roof panels to assist disaster-stricken people. The project has been ongoing since 2019.


Khaya Kamphra Project Waste with suitable properties is sorted and turned into fuel to produce electricity rather than landfilling. The project shows that the refineries do not only control the refinery areas but also care about municipal waste.


**Office Paper Waste Management Project** The project was launched in 2020 through cooperation with the Thailand Responsible Business Network to sort office paper waste for exchange with new A4 paper. In 2022, the company was able to gather 3,650 kilograms of discarded office paper to exchange with 77 reams of new paper.

In 2022, because the refinery business effectively operated according to the 5Rs principle, the amount of waste was effectively reduced, thus allowing up to 99.99% of all industrial waste created to be used. Moreover, the company additionally reported information on the quantity of office waste to expand the scope of waste management to be more comprehensive.

## Strategies

- Manage waste according to the 5Rs principle.
- Comply with related laws.

## Goals for 2022

- Zero waste send to landfill for disposal.
- Continually increase waste management control in line with the 5Rs principle.

## 2022 Performance

### Amount of Industrial Waste in 2022

**Hazardous Waste**
1,584.44 tons — 91.61%

**Non-hazardous Waste**
145.20 tons — 8.39%

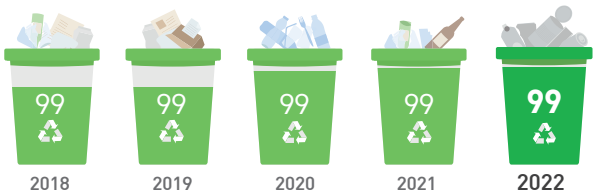
### Amount of Office Waste in 2022

**Hazardous Waste**
0.15 tons — 0.27%

**Non-hazardous Waste**
55.17 tons — 99.73%

The amount of waste disposed by incineration without energy recovery (excluding recycled or reused waste or incineration for energy recovery) was **0.11** tons, without landfilling.

### Total Industrial Waste Management According to the 5Rs Principle (%)




The company managed industrial waste according to the 5Rs principle, whereby 99.99% of the total amount of waste created was utilized.

## Goals for 2025

**Zero** industrial waste for landfill.

**Zero** tons of industrial waste disposed by incineration without energy recovery (excluding recycled waste, reused waste and energy-recovered waste).

Waste generation intensity control effort successfully reducing industrial waste production per production unit by **3%** from normal business operations in 2025 when compared to the 2015 base year.

## Circular Economy

Bangchak operates business according to the BCG Economy model covering 3 main economic areas, namely, bio-economy to focus on making worthwhile use of resources through utilization of technologies and innovations to process agricultural produce in to high-value bio-based products, circular economy to focus on making worthwhile use of resources, raw materials and products, and green economy to strive to resolve environmental problems and reduce impacts in a sustainable manner. These concepts are used to operate business in order to create value and sustainability for the company and all stakeholders. Accordingly, the company applies the circular economy concept in business according to the following practice guidelines:

1. Enhance resource utilization effectiveness while reducing risk from future shortages of natural resources.
2. Minimize environmental impacts in line with sustainable production and consumption goals.

## Company Goals

1. Develop innovations according to the circular economy guidelines for worthwhile use of resources to promote sustainable consumption.
2. Support reuse of single-use plastic in the Song To Kla Mai Project for biodegradable cups of Inthanin coffee shops to subsequently return them to the land.

## 2022 Performance

Bangchak recognizes and gives importance to the management of plastic that cannot be fully recycled. Thus, the company uses environmentally-friendly renewable materials instead of plastic by using biodegradable plastic cups or bio cups and by developing new plant-based drinking lids (ready-to-drink lids that require no straws) that can degrade naturally for the Inthanin coffee shop business, which is a non-oil business of the company. The goal of this is to reduce plastic problems and reiterate the company's eco brand or friendliness to the environment. This project has been ongoing since 2019 and continues up to the present.

The Inthanin coffee shop business is a leader of coffee shops that use PLA bio packaging (polylactic acid) through use of plant-based lids and coffee cups that are fully bio-degradable and contribute to mitigating plastic waste problems and waste disposal pollution. As a result, the coffee shop brand became the number 1 brand of ASEAN in terms of bioplastic use. Moreover, the company collaborated with the Royal Forest Department in the "Kaeo Pho Kla" project by transforming used Inthanin coffee cups into containers for cultivating saplings instead of black plastic bags in order to reduce waste and contribute to increasing green spaces. With the driving mechanism of the "Kaeo Pho Kla" project requiring a large amount of bioplastic cups, Inthanin received cooperation from customers in collecting cups and exchanging them for discounts and in the cup delivery process. Accordingly, the company gained excellent cooperation from Vandapac Co., Ltd. that supported the company with collection teams to transfer the cups to warehouses and the warehouses (Integrated Logistics Services Co., Ltd. or ILS) gave logistics support for every Inthanin coffee shop nationwide to collect the cups for delivery to the Royal Forest Department. In addition, the Royal Forest Department (Seedling Production Section, Forest Planting Promotion Office) supported the reuse of single-use plastic to pass on seedlings from Inthanin's biodegradable cups into the land. Finally, franchisees, especially those searching for investment and landlords supported the company by choosing to open a coffee shop brand that uses biodegradable materials and has projects to make use of materials and provide a good option for environmentally-conscious people. Hence, Inthanin's "Kaeo Pho Kla" project truly contributed to the circular economy through the cooperation of the value chain.

## Goals for 2024

Bangchak's BSGF will start operating business by constructing sustainable aviation fuel (SAF) production units from used cooking oil in the vicinity of Bangchak's oil refineries. These production units are expected to commence operation by around the end of 2024 with an initial production capacity of 1,000,000 liters per day. This will be sustainable aviation fuel that every airline worldwide can use as a substitute right away without any impact on their engines, thereby contributing to reduction of greenhouse gas emissions in the airline industry by around 80,000 tons of carbon dioxide equivalents per year (compared with the greenhouse gas emissions of the airline industry today).

The SAF product from used cooking oil can produce comprehensive positive economic, social and environmental impacts in line with the BCG Economy Model, whether in the area of bio-economy through focus on use of bio-based resources for creating value through development of high-value products, or the circular economy that considers maximum of reuse of materials, and green economy which does not only prioritize economic development but instead development that balances social development and environmental conservation to achieve both security and sustainability.

The joint venture to found BSGF to be the first and only in Thailand to have production units for SAF from used cooking oil is a new chapter for Thailand's energy industry, which is undergoing a transition toward clean energy through use of green innovations and is another major step forward in the BCP 316 NET plan of Bangchak Group to achieve net zero GHG emissions by year 2050 and drive Thailand toward achieving net zero GHG emissions by year 2065.

# Production Logistics

The company gives importance to the enhancement and upgrade of the product logistic system to be more effective, accurate, timely and safe in order to reduce impacts on communities and the environment from contamination in cases of product spills. The company's guidelines are as follows:

- Enhance logistics effectiveness in terms of cost, time and safety and care for the environment by reducing greenhouse gas emissions.
- Take care of suppliers and drivers who oversee the delivery of refined fuels from refineries until they arrive at gas stations according to schedule.

## Enhancing Product Logistics Effectiveness

### Goals for 2018-2023

- Transport products by using large vehicles (semi-trailers) by 45% of all deliveries.
- Transport fuels to customers according to the company's future distribution plan (as calculated based on the rate of growth in gas stations for an increase by 330 stations from 2018 to 2023).
- Experience zero accidents in transportation (cases involving vehicle damage by a value exceeding 1 million baht).
- Receive no more than 3.5 complaints/one thousand transportation trips.

## Performance

### Proportion of Use of Large Vehicles (Semi-Trailers) in Transportation

(Target: At least 2% increase per year)Amount of Reduction in Greenhouse Gas Emissions (tons of carbon dioxide equivalent)

| Year | % | Amount of Reduction in Greenhouse Gas Emission (tons of carbon dioxide equivalent) |
|---|---|---|
| 2022 | 43 | **9,809** |
| 2021 | 41 | 7,946 |
| 2020 | 41 | 7,520 |
| 2019 | 39 | 8,839 |
| 2018 | 35 | 5,922 |

### No. of Transportation Complaints per One Thousand Trips

(Target: < 3.5 complaints per one thousand trips)

| 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| 0.5 | 0.2 | 0.3 | 0.2 | 0.21 |

### Transportation Accident Statistics*

(Target: zero accidents)

| 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| 2 | 2 | 2 | 0 | 0 |

*(Cases involving vehicle damage exceeding 1 million baht.)

## Strategy

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