

As a member of global citizens engaged in the business of construction machinery, industrial machinery, and environment-related equipment, Nikko Group recognizes that the preservation of the global environment is one of our most important issues. Based on our basic principle of “Prioritize the environment,” we act in harmony with the environment and strive to conserve the global environment. In addition, in order to contribute to the establishment of a recycling-oriented society, we offer a wide variety of products and solutions that support the recycling of industrial waste. For details of our environmental policies, visit our website. →<https://www.nikko-net.co.jp/sustainability/environment.html>

(1) Promote activities to reduce the environmental burden

Nikko Group promotes resource and energy conservation as well as waste reduction and recycling, to reduce the environmental burden as much as possible.

(2) Develop and spread products that contribute to the establishment of a recycling-oriented society

Since the 1970s, the Nikko Group has been pursuing the development of plants capable of recycling construction and road waste materials for reducing the environmental burden, thus contributing towards improving resource productivity and establishing a recycling-oriented society. Furthermore, we have been proactively implementing various initiatives such as developing a system to extract metal resources from industrial waste to expand the potential of urban mining, and recycling of concrete sludge towards minimizing industrial waste.

1 Recycling of asphalt waste <more than 99% is recycled>

To advance the recycling of asphalt mixture and concrete waste materials, Nikko in the 1970s commercialized asphalt mixture recycling plants and crushing plants that handled resource recycling. Since then, we have been continuously improving the products, and as a result, have been recycling almost all of the asphalt waste generated (more than 99%). Currently, about 75% of the asphalt mixtures used for paving roads are mixtures that use the aggregate recycled from asphalt waste as raw material.

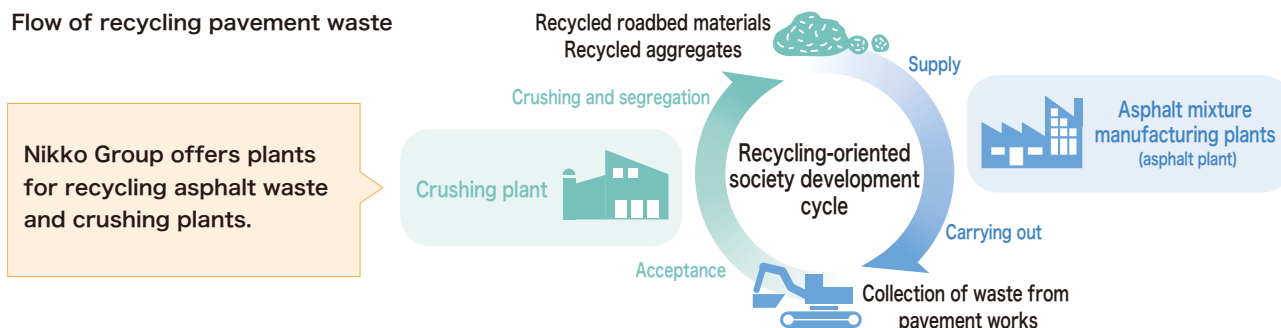
Trend in industrial waste volume and breakdown by type

Breakdown	Recycled or not	Unit	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Paper scraps	Paper	bag	1,897	1,897	2,049	2,580	10,000
Metal scraps	Scraps	kg	1,600,730	1,668,980	1,604,900	1,820,320	1,571,170
	Shavings	kg	141,330	120,960	139,840	150,580	126,550
	Gas cutting slag, scales	kg	18,960	61,200	43,420	38,650	41,250
	Tin can	kg	21,340	19,960	22,430	24,040	19,800
	SUS scraps, electrical wire scraps	kg	34,690	39,530	38,530	28,130	29,520
Industrial waste	Wood chips	m ³	323	332	368	370	336
	Plastic waste	kg	213	3,020	20,649	13,265	13,050
	Construction waste	m ³	58	75	72	77	92
	Floor sand	t	11	10	12	13	11
	Non-combustibles	m ³	1	0	2	3	1

Trend in water consumption

Breakdown	Unit	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Water supply	m ³	10,767	9,155	9,413	10,107	9,969

Flow of recycling pavement waste



2 Recycling of metal resources in urban mining

Urban mining refers to a recycling concept that reuses valuable metal resources contained in home appliances, electronic devices, and other items discarded in urban areas. Generally, mineral resources are extracted from underground; however, already at the end of the 20th century, a number of metal resources had reached a state where the volume already extracted was greater than that confirmed to be reserved underground. Nikko intends to make effective use of this already extracted mined metal in the sphere of human activity as a resource.

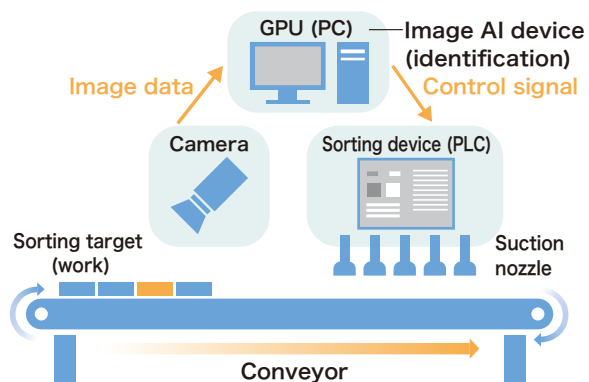
Gold, silver, and copper contained in small home appliances (per unit)

 Cellular phone	Gold: approx. 0.05g Silver: approx. 0.26g Copper: approx. 12.5g	 Laptop computer	Gold: approx. 0.3g Silver: approx. 0.84g Copper: approx. 81.6g
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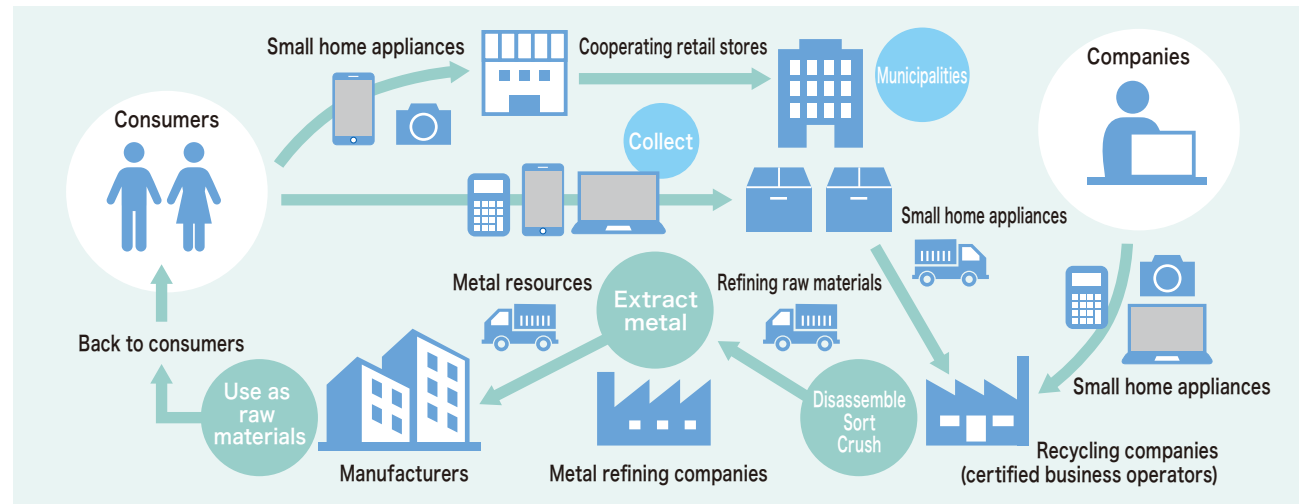
Source: Ministry of the Environment

Nikko has developed and commercialized a system that uses AI to sort metal resources from collected small home appliances. Analyzing images taken by cameras using AI to categorize object allows us to improve operational efficiency.

Processing flow of AI'll be sorter separation system based on AI image recognition developed by Nikko



Recycling process of metal resources contained in small home appliances



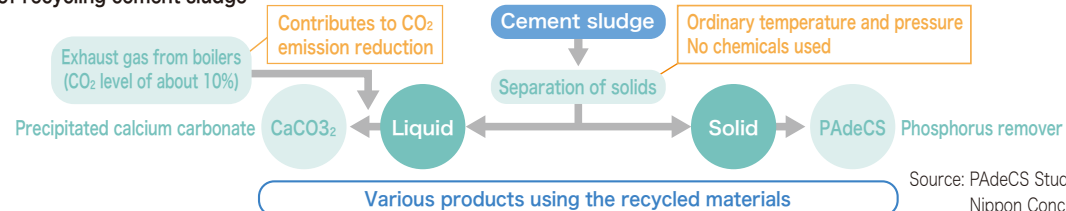
Source: Ministry of the Environment

3 Recycling of cement sludge

Cement sludge comes from residual concrete and returned concrete generated during the manufacture of ready-mixed concrete and secondary concrete products. Cement sludge requires specific processes, such as dewatering and drying, before being disposed of as industrial waste. Japan produces about 3.5 million tons of cement sludge every year, and the disposal cost is 5,000 yen to 10,000 yen per ton. When cement sludge is separated into liquid and solid, precipitated calcium carbonate (CaCO_3) is extracted from the liquid and phosphorus remover (PAdeCS) is extracted from the solid portion. Various products use precipitated

calcium carbonate as a raw material: pharmaceuticals, paper, cosmetics, ferrite, condensers, optical glass, coatings, rubber, and plastics. Phosphorus remover is also expected to have many applications: rock phosphate substitute, neutralizer, night soil treatment agent, deodorizer, antiseptic, heavy metal remover, and water-bloom suppressant. Precipitated calcium carbonate absorbs CO_2 in the refining process that could reduce CO_2 . Nikko will contribute to technology development for recycling cement sludge and its practical applications by closely working with the ready-mixed concrete, secondary concrete products, and cement industries.

Flow of recycling cement sludge



Source: PAdeCS Study Group, Nippon Concrete Industries Co., Ltd.