Kanadevia Corporation
TNFD Report 2024 (Outline)

In December 2023, Kanadevia Group (hereinafter referred to as the Group) expressed its support for the information disclosure recommendations of the Task Force on Nature-related Financial Disclosures (hereinafter referred to as "TNFD") and registered as a TNFD Early Adopter. In the future, the Group will strive to proactively disclose information based on the TNFD information disclosure framework. This report was created with reference to the TNFD Final Recommendations v1.0, published in September 2023.

In principle, the terminology used in this overview is the same as in this report.

1. Scope of disclosure

The Group conducts business in three areas: Decarbonization, Resource circulation, and Safe and prosperous community. In the field of Resource circulation, we are the world's largest plant engineering company for the Waste to Energy (WtE) facilities and have installed more than 1,500 facilities around the world(Fig. 1).

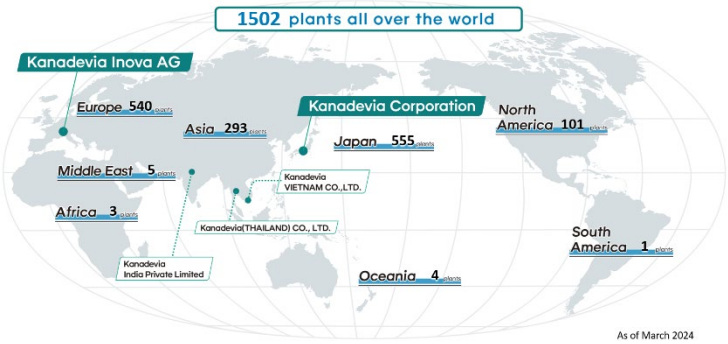


Fig. 1 Our WtE Facilities

This report focuses on the WtE Business (waste incineration power generation and biogas power generation) and the biomass power generation business, which are the core businesses of the Group, from the present until 2050, as indicated in the medium-term management plan Forward 25.

The WtE Business accounts for approximately 50% of our consolidated sales and is expanding its operations not only in Japan, China, and Asia but also in Europe, the Middle East, Africa, Oceania, North America, and South America, thanks to the active business expansion of our European subsidiaries, Kanadevia Inova Group. In fiscal 2023, the amount of waste incinerated using our group's technology was approximately 55,000 tonnes/day, accounting for about 26% of the total waste incinerated worldwide.

The group designs facilities based on the specifications and environmental performance outlined in the Requests for Proposal (RFP) issued by municipalities and private waste treatment companies. After the handover, we or our subsidiaries (SPCs) may operate the facilities on behalf of the customers. Therefore, based on the FY2023 data, we compiled and estimated the main raw materials and their production sites, manufacturing sites, construction, installation, and disposal sites, and operation sites for 38 facilities operated by the group Japanese and overseas, assuming upstream (procurement), design and manufacturing, construction and local coordination, and downstream (operation and management). As a result, we found that our direct involvement with natural capital is significantly influenced and varied by customer decisions, as the environmental performance and use of the facilities strictly follow customer requirements. As a plant engineering company, leveraging environmental technologies and innovating procurement to enhance the environmental quality of our proposals to customers directly aligns with our natural capital goals.

Please refer to the Integrated Report for information on the governance of our group.[1]

[1] https://www.kanadevia.com/english/ir/data/pdf/ir2023_E_A3.pdf

2.Collection and evaluation of natural capital-related data

2.1 Areas with nature-related issues

For the 38 facilities covered in this report, we evaluated them using a database of protected areas and Key Biodiversity Areas (KBA), which are crucial for biodiversity conservation. Except for one facility in Japan, there were no incidents, and management has been sufficient, leading to the conclusion that the impacts on biodiversity are low. For the facility with an incident, it was assessed as "Very High", because there are birds and other habitats of endangered II (VU) in the surrounding area. However, we confirmed that the impacts of the incident on the surrounding environment are low and that measures to prevent a reoccurrence of the incident have been implemented.

2.2 Dependencies and impacts on natural capital

In the WtE Business, there are high dependencies on “Surface water,” “Groundwater,” and “Water flow maintenance” services in the procurement process (Table 1). This is because the suppliers’ “machine, parts, and equipment manufacturing” processes consume a large amount of water, and they often rely on nature to water supply and water flow maintenance. In the construction and on-site coordination process, it was also recognized that construction is influenced by the climate depending on the site environment, leading to a high dependency on “Climate regulation.”

Regarding impacts on the natural capital (Table 2), particularly in the “Construction and on-site coordination” and “Disposal during construction” processes, there are “Very High” risks of land use changes in terrestrial or marine areas depending on the facility’s location, which consequently pose risks to natural capital and ecosystems. The Impacts are generally high at all stages of the process, but the ‘waste’ of the operating process, the ‘incineration residue’, is important when considering the goals and strategies of the WtE business.

Table 1　Dependencies of the WtE Business on natural capital (Heatmap)

Process	Classification	Provisioning Services		Regulating Services								Maintenance Services	
		Surface water	Ground water	Contaminant neutralization	Climate regulation	Dilution by atmosphere and ecosystems	Filtration	Flood and storm protection	Mass stabilization and erosion control	Mediation of sensory impacts	Ventilation	Water flow maintenance	Water quality
Procurement	Machine, parts and equipment manufacturing	H	H	-	VL	-	-	-	M	-	-	H	-
	Iron manufacturing	M	M	-	VL	-	-	-	L	-	-	M	-
Design and Manufacturing	Machine, parts and equipment manufacturing	M	M	-	VL	L	VL	M	VL	M	L	M	L
Construction and on-site coordination	Infrastructure Construction	-	-	-	H	-	-	M	M	-	-	-	-
Disposal during Construction	Infrastructure Construction	-	-	-	-	-	-	-	M	-	-	-	-
O&M	Waste incineration power generation	L	L	VL	VL	-	L	M	L	-	-	L	L

Table 2　Impacts of the WtE Business on natural capital (Heatmap)

Process	Classification	Land, freshwater and ocean use change			Direct use	Climate Change	Pollution/ Pollution removal				Others
		Terrestrial ecosystem use	Freshwater ecosystem use	Marin ecosystem use	Water use	GHG emissions	Non-GHG air pollutants	Water pollutants	Soil pollutants	Solid waste	Disturbances (noise /light)
Procurement	Machine, parts and equipment manufacturing	-	-	-	H	H	M	H	H	H	M
	Iron manufacturing	-	-	-	H	H	-	-	-	H	-
Design and Manufacturing	Machine, parts and equipment manufacturing	-	-	-	M	H	M	H	H	H	M
Construction and on-site coordination	Infrastructure Construction	VH	H	VH	H	H	M	M	H	M	H
Disposal during Construction	Infrastructure Construction	VH	H	VH	H	H	H	M	H	M	H
O&M	Waste incineration power generation	-	H	-	L	M	L	M	M	H	H

Stage Assessment: Very High: VH, High: H, Medium: M, Low: L, Very Low: VL

The biomass power generation business is only one facility in Japan. The facility's dependence on nature for the procurement of 'material (wood chips)' is an issue, but it is rated 'Medium' because it uses only certified chips based on a thorough forestry plan. The impacts on natural capital are considered to be similar to that of the WtE Business.

2.3 Global Core Disclosure Indicators

The core global indicators for the WtE Businesses are shown in Table 3. Items and data under aggregation are not shown.

Table 3　Global Core Disclosure Indicators for the WtE Business

Classification	Indicators		Kanadevia performance＊	Unit
C1 Land / Freshwater / Marine Use and Changes	C1.0 Total spatial footprint		1,468	1,000m^2
		Within the total area disturbed	51	
	C1.1	Extent of change in terrestrial	12	
C2 Pollution/ pollution removal	C2.1 Wastewater Discharge		4,239	1,000m^3
		Concentrations of key pollutants in the wastewater discharged	below the regulated value	
	C2.2 Waste generation and disposal		1,333	1,000kg
		Weight of hazardous and non-hazardous waste disposed	898	
		Amount of landfill avoided (Material recycling, chemical recycling)	435	
	C2.4 Non-GHG air pollutants			1,000kg
		Particulate matter (PM10)	1,556	
		Nitrogen oxides (No_x)	1,747	
		Volatile Organic Compounds (NMVOC)	927	
		Sulphur oxides (SO_2)	1,759	
		Ammonia (NH_3)	1,095	
C3 Resource use/ replenishment	C3.0 Water withdrawal and consumption from areas of water scarcity		1,781	1,000m^3
	Quantity of high-risk natural commodities sourced from land/ocean/ freshwater			1,000kg
		Biomass	79,228	
		Ores	120,180	
		Building materials	318,617	
		Fossil fuels	157,290	
		Iron ore	29,496	
		Copper ore	51,469	
		Nickel ore	2,653	
		Lead ore	1,489	
		Zinc ore	2,670	
		Gold	22,314	
		Aluminum ore	3,558	
		Natural gas	27,421	

*The total includes offices and factories related to the WtE Business, plants performing O&M, and procurement estimates.

3. Risks and opportunities

3.1 Financial risk

In addition to the results of the dependencies and impacts assessment, estimates going back through the supply chain also show that the risks are higher in resource-rich countries (Chile) and mining implementing countries (e.g. China, Russia) with regard to ores usage (see value chain analysis, Appendix 2). Based on these and business strategy policies, the items with the highest reliance on and impacts on natural capital are water use, waste and ores usage, with financial risks as shown in Table 4.

Table 4　Financial Risk

	Related process	Risks analysis / Assesment
Water use	Design/Manufacturing	High Physical/Transition risks, but can be reduced by environmental controls direct production isu now
	Procurement, Construction/on-site coordination, Disposal during Construction	Not directly managed, but alternatives can be considered. Need to work on reducing
	O&M	Minimisation through recycled use possible. As regulation and impact on the local people, impact will be a maximum of 1 to 10 billion yen (JPY)
Waste	O&M	Landfill of incineration residues is a risk, but leads to opportunities for business proposals and new business development
Ores Usage	Procurement	Due to price increases and short-circuiting PJ units due to delivery delays, impact will be a maximum of 1 to 10 billion yen (JPY)

3.2 Business opportunities

The Physical risks of the WtE Business are high due to the operation of WtE Facilities. However, as interest in the environment increases, the demand for WtE facilities also rises, expanding business opportunities for engineering. The WtE is a technology that generates electricity by burning a unique fuel, waste. The Group, as vertically integrated waste treatment plant engineering companies with expertise and core technologies in burning such unique fuels, can develop various business models and provide comprehensive proposals according to the maturity of waste disposal issues in different countries and regions (Fig. 2). With a sustainable vision of "net-zero environmental impact within Planetary boundaries," and under the medium-term management plan Forward 25, we aim to expand the WtE Business and Waste to X (WtX) Business, including material recycling and chemical recycling, to achieve a business scale of 550 billion yen (JPY) by 2030.

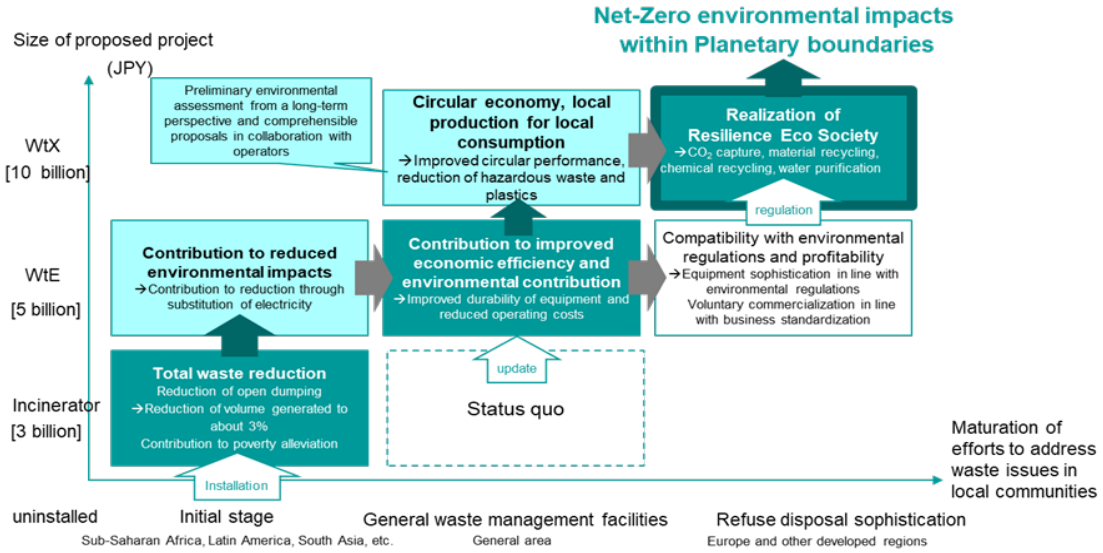


Fig. 2 Business proposals according to the maturity of efforts to tackle waste issues

4. Goals and targets for natural capital

The Promoting the expansion of the business from WtE to WtX is also a strategy to realize our Sustainable Vision of "*Realize net-zero environmental impacts within Planetary boundaries*." "*net-zero environmental impacts*" means not only the environmental impacts from our business activities but also the environmental impacts of our supply chain and the environmental impacts of our customers using

our products and services, all within the region's environmental recovery capacity. Based on the analyses in TNFD, we have set concrete goals again (Table 5).

Table 5 Outlines the natural capital-related goals for the WtE/WtX Businesses

Field	Goals	Meaning
GHG Emissions	Carbon Neutral	Carbon neutral for our Group and our customers(In the case of customers, this includes the amount of avoided emissions)
Plastic Emissions	Zero plastic load	Working with manufacturers to achieve 100% plastic recycling
Land area utilizaion	Zero impact from Land area utilization	Minimize waste landfills for our customers
Ores Usage burde	Zero ores usage burden	Minimizing newly mined ores through recycling
Burden of hazaedous chemicals	Achieving zero emissions standards	Establishing and adhering to voluntary standards that align with the most stringent standards in each country or region that apply to the sites and facilities it operates, as well as to the WtE/WtX Facilities operated by its customers

For waste, targets have been set as shown in Table 6, based on the organization of the Global Core Indicators; see also the Integrated Report for GHG targets[2]. For those items for which specific targets could not be set, we will continue to encourage relevant stakeholders to consider them in the future.

Table 6　Targets for the WtE Business

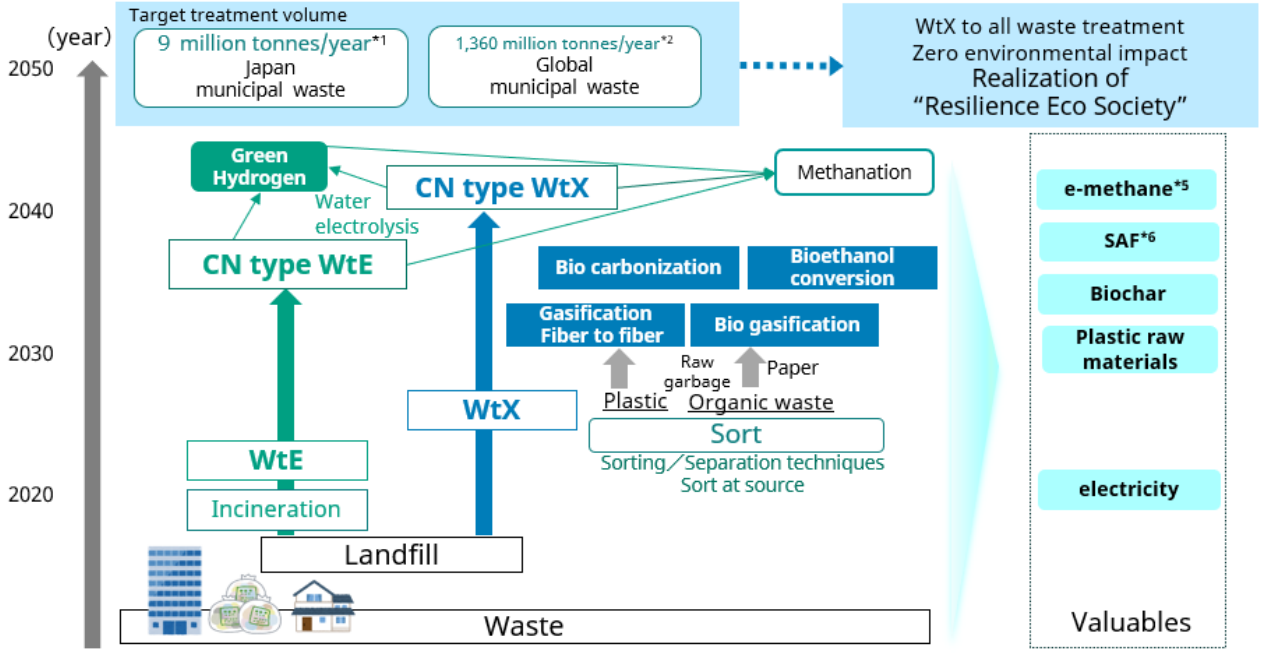
Field	Targets
Waste burden	
Our business activities	Activeing zero emissions standards ・Enhancing the recycling rate of waste generated at our facilities and minimize the final landfill rate to the greatest extent feasible
Customer business activities	Incineration residue recycling rate: 95 % or more ・Developing business and technology solutions that facilitate the recycling of incineration residues, including bottom ash and fly ash, generated by customers

5. Business Strategy to Achieve Goals and Targets

These goals and targets are closely linked to our business strategy, which aims to evolve from the current WtE Business to material recycling and chemical recycling business by 2030 (WtE to WtX business), and further to the business strategy for 2050 as illustrated in Figure 3. By 2050, global waste generation is expected to reach approximately 32 billion tonnes per year, with about 3.4 billion tonnes of municipal waste expected to be treated through incineration and other methods. To manage this enormous amount of waste, the Group will actively expand the WtE Business in various countries and regions. As illustrated in Figures 2 and 3, introducing incinerators alone can have significant environmental improvement effects for customers facing challenges such as open dumping. However, proposing the introduction of WtE Facilities with higher environmental improvement effects, or encouraging customers with more advanced awareness of issues to introduce WtX Facilities or carbon-neutral WtE/WtX Facilities in the future, will greatly reduce the environmental burden in the regions where the customers' facilities are located (see Section 6.2 of this report for simulation results confirming the environmental impacts reduction effects of introducing waste incineration facilities). In WtX technology, where plastics and organic wastes are

[2] See Note 1

included in the raw materials, sorting technology and source segregation are essential. In particular, to reduce the environmental impacts of "Ores usage," it is important to promote measures such as standardizing facilities and promoting material recycling after facility dismantling. Through the implementation of these strategies, we propose and aim to achieve a "***Resilience Eco Society***" as a world view of a "net-zero environmental impact within Planetary boundaries" state, where the environmental impacts at the place of operation are kept within the planetary boundaries.



*1 The projected amount of Japan municipal waste generation in 2050 (18 million tonnes/year*3), with our share being 50% of that value
*2 The projected amount of global municipal waste generation in 2050 (3,401 million tonnes/year*4), with our share being 40% of that value (including Inova)
*3 "Mid- to Long-Term Scenario (Draft) for Achieving Net Zero Greenhouse Gas Emissions by 2050 in the Waste and Resource Circulation Sector" (Ministry of the Environment, 2021)
*4 "What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050" (World Bank)"
*5 e-Methane: Synthetic methane produced from CO2 and hydrogen using renewable energy, a carbon-neutral fuel that can be used in existing natural gas systems.
*6 SAF (Sustainable Aviation Fuel): Renewable fuel that reduces aviation's carbon footprint, produces from sustainable sources such as waste oil and biomass.

Fig. 3　Business strategies to achieve the goals of the WtE/WtX Business in 2050