Report on the Netherlands and Belgium survey 2024 -Survey on the status of initiatives for resource recycling and the circular economy-

Japan Industrial Waste Information Center (JW center)

自然にやさしいネットワーク
JWNET
Japan Waste Network.

Purpose of the Survey

- **In order to achieve carbon neutrality, efforts for resource recycling and the circular economy are gaining momentum in Japan and abroad. Circular economy initiatives are particularly advanced in Europe and are attracting attention. Therefore, the JW Center conducted a survey to understand the state of initiatives in the Netherlands and Belgium, in order to provide a reference for the Japanese waste management industry and JW Center operations.**
- **As part of its work-related content, the JW Centre will investigate examples of the use of waste information and use them as a reference for initiatives such as decarbonization through the use of manifest information.**

Method of the survey

- **Through a coordinator based in the Netherlands, the JW Centre asked companies, organizations and municipalities in the Netherlands and Belgium to cooperate in the interview survey.**
- **Companies and organizations explained their overview and initiatives, answered interviews and allowed to inspect their treatment facilities.**
- **The survey covered areas such as waste information tracking and information utilization, construction and demolition waste recycling, plastics recycling, battery recycling, food loss reduction and waste management and circular economy policies.**

Suvey schedule : 2–5 July in the Netherlands

2nd July (Tue)	• **Visit to JETRO Netherlands (Collection of information on Dutch industries)** https://www.jetro.go.jp/netherlands.html • **Visit to Excess Materials Exchange (Waste information tracking and information utilization)** https://cehub.jp/interview/excess-materials-exchange/
3rd July (Wed)	• **Visit to GP Groot (Construction and demolition waste recycler)** https://www.gpgrootinzameling.nl/ • **Visit to Remondis (Construction and demolition waste recycler)** https://www.remondisnederland.nl/home/ • **Dutch Waste Management Association (DWMA, Arranged visits to the above two companies)** https://verenigingafvalbedrijven.nl/english
4th July (Thu)	• **Visit to City of Amsterdam (Municipality)** https://www.amsterdam.nl/en/waste-recycling/ • **Dining with Taste before you waste member (Organization involved in food loss reduction initiatives)** https://www.tastebeforeyouwaste.org/
5th July (Fri)	• **Circular Economy Tour in Amsterdam**

Suvey schedule : 8-9 July in Belgium, 10 July in the Netherlands

8th July (Mon)	● **Visit to The One Project (Plastic recycling consultant)** **https://www.theoneproject.eu/** **https://ideasforgood.jp/2019/02/21/colossus3dprinter/**
9th July (Tue)	● **Visit to European Waste Management Association (FEAD)** **https://fead.be** ● **Visit to Bebat (Battery recycling company)** **https://www.bebat.be/en/homepage**
10th July (Wed)	● **Visit to Mud Jeans (Jeans rental company)** ＊ **Additional visits in relation to Circular Economy Tour conducted on 5th July**

The Netherlands Basic Information

[General information]

- **Population 17.94 million (1st Jan 2024, source: Central Bureau of Statistics)**
- **Capital city Amsterdam Population 930 000(1st Jan 2024, source: Central Bureau of Statistics)**
- **Land Area 41,543 sq km (about one ninth the size of Japan)**

The Netherlands Basic Information

[Main industries]

- **Major industrial sectors include semiconductor manufacturing, chemical industry and shipbuilding.**
- **Agriculture is thriving and agricultural exports are ranked second in the world.**

[Nationality]

- **Rationalism, pursuing efficiency**
- **World's firsts and see the value in achieving what no one else has done.**
- **The spirit of 'learning by doing'**

The Netherlands Basic Information

[Carbon neutral, environmental and other policies]

- **In response to the EU Directive, the Netherlands is intensifying its shift to the use of renewable energies, in particular hydrogen production and utilization. Groningen, a natural gas producing region, is also steering towards hydrogen production.**
- **Priority industries include hydrogen production, semiconductor manufacturing, sustainable chemicals and agri-tech, and research and development is being strengthened at engineering universities through industry-academia-government collaboration. Circular economy initiatives are being promoted to achieve carbon neutrality.**

Belgium Basic Information

[General information]

- **Population 11.76 million (end of 2023, source: NBB.Stat)**
- **Capital city Brussels Metropolitan area population 1.24 million (end 2023, source: NBB.Stat)**
- **30,688 sq km (about one twelfth the size of Japan)**

Belgium Basic Information

[Main industries]

- **Chemical Industry, Mechanical Industry, Metal Industry, Food Processing Industry**
- **A trading nation with some of the world's most advanced science and technology industries, including biotechnology, pharmaceuticals, petrochemicals, aerospace and aviation, nanotechnology, etc.**
- **Vaccine development and production sites of Pfizer and others are located in Belgium.**

Belgium Basic Information

[Carbon neutral, environmental and other policies]

- **"The National Energy and Climate Plan 2021-2030" developed in 2019, sets a target of 40% of total energy demand from renewable energy sources by 2040 mainly through the development of offshore wind power, and all of it by 2050.**
- **"The Long-Term Strategic Vision for Sustainable Development" indicates that the aim is to "reduce the environmental impact and reduce food residues through the production of products and agriculture that do not harm the human body or the environment".**

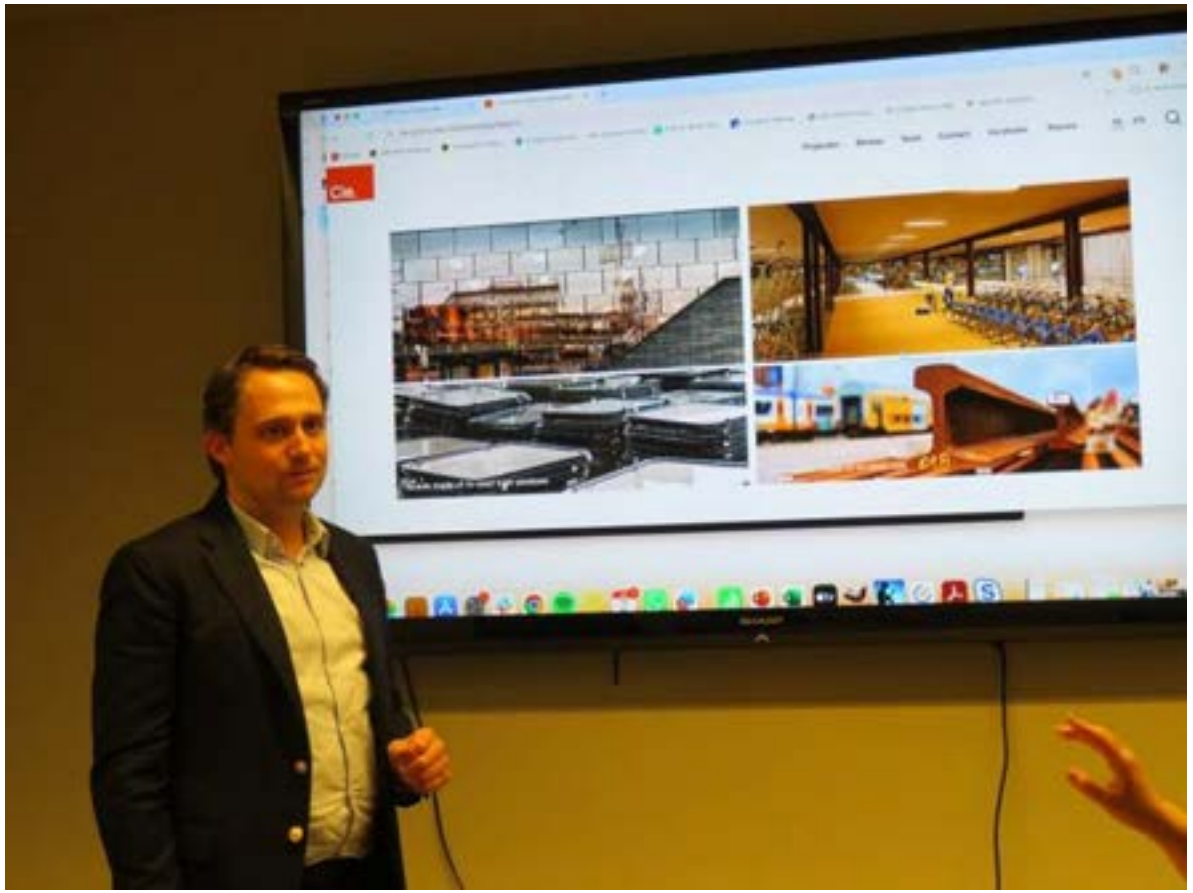
Survey Report 1

Excess Materials Exchange（EME）
（Case Study of Waste Information Utilization）

Excess Materials Exchange (EME)

Contact person: Mr. Christian van Maaren (Founder, CEO)

Visiting location: Amsterdam, The Netherlands



Company Profile

- **EME is a pioneering digital platform designed to accelerate the transition to a circular economy by facilitating the efficient reuse of materials and products. EME tackles the crucial issue of resource inefficiency in the global economy, providing a solution that benefits the environment and generates economic value for businesses. Through its innovative technology, EME connects companies, enabling them to identify, exchange, and repurpose excess materials transforming potential waste into valuable resources.**

Company Profile

- **EME was established in 2017. At the beginning of the start-up, there was no data on resources at all. In addition, in the construction industry, which generates large amounts of waste in many countries, half of the waste was not being used effectively. EME wanted to make a significant impact in such an industry. EME also wanted to leave an impact on waste from plastics, textiles and foodstuffs in terms of type.**

EME's services and tools

1

Resources passport: comprehensive material identity

The resources passport goes beyond simple identification;
it encapsulates a material's entire story. This digital passport includes detailed information on composition, origin, recyclability, and environmental impact, making it an essential tool for stakeholders to assess the value and sustainability of materials. It's a cornerstone of transparency in the circular economy, ensuring materials are fully utilized and efficiently recycled.

2

Tracking and tracing: ensuring accountability and transparency

EME's tracking and tracing system integrates cutting-edge technology to monitor the journey of materials throughout their lifecycle. Utilizing barcodes, QR codes, and RFID technology, it connects the physical material to its digital passport, allowing for real-time tracking and ensuring that materials are used responsibly and optimally throughout their lifecycle. This system is pivotal for closing the loop in the circular economy, providing the data needed to make informed decisions about material reuse and recycling.

3

Valuation: quantifying material value

Valuation at EME isn't just about financial metrics; it encompasses environmental and societal impacts, offering a holistic view of a material's true value.
This approach enables companies to make data-driven decisions, choosing pathways that not only maximize economic returns but also benefit the planet.
It's a revolutionary way of thinking about value, transforming the way industries perceive and utilize materials.

4

Matchmaking: AI-driven solutions for material reuse

EME's matchmaking service leverages artificial intelligence and machine learning to identify the best reuse and recycling opportunities for materials. This isn't just about finding a match; it's about finding the right match that maximizes value, minimizes environmental impact, and fosters innovation across sectors.
By combining technology with expert insight, EME ensures that materials find their highest-value uses, promoting efficiency and sustainability.

(1) Resource Passport

- **Applying QR code and blockchain technology, products are recorded with raw materials, processing information, duration and place of use. A digital record that allows stakeholders to check and update this accurate information is called a resource passport.**
- **Resource Passport has users in a wide range of industries and sizes, including government agencies, local governments, large corporations, and small and medium-sized enterprises, but it is often used in the construction industry.**

(1) Resource Passport

- **It is necessary to register and track information of materials at the beginning of the value chain, but in the case of use by government agencies, it may be difficult to register information due to their regulations. Some resource passports are standard across European countries, industries, and vendors, so it can be difficult to register for EME resource passport.**
- **It is not used for the purpose of government monitoring, but depending on the organization or industry, it is necessary to report to the government the use of recycled products, and it may be reported from the information in the resource passport.**

(1) Resource Passport

- **The fields of information to be registered are as flexible as possible. As the required information settings vary depending on the user and material, the field settings are flexible to enable effective matching.**
- **In the unlikely event that the information entered is incorrect, this could lead to trust issues. It is necessary to ensure that users enter their information with a high awareness of registering accurate information. The challenge is to ensure that users are able to enter accurate information.**

(1) Resource Passport

- **A good example of accurate information entry: carpets held by a recycler were insured because the information was registered accurately, even though polypropylene was the standard for less than 2% of use.**

(2) Tracking & Tracing

- **The information in the resource passport can be obtained by scanning QR codes and barcodes to obtain accurate information on waste. These are registered with waste movement information to keep track of the waste lifecycle.**
- **The QR code is used twice: once to scan the code and upload waste information, and again to scan the code and upload information on tracking, such as where the waste has been moved to.**

(2) Tracking & Tracing

- **High-level control of waste tracking requires minimizing risks such as data tampering. The EME system means that the history cannot be changed in the blockchain. The system also complies with the European GDPR (General Data Protection Regulation) and protects information on the material itself and the individuals registered.**

(3) Evaluation

- **When materials and products are reused as resources, the financial, global environmental, social and other impacts are quantified to assess the true value of the material. The global environmental aspects are calculated in terms of greenhouse gas emissions, water and energy use.**
- **The main point that was taken care of when building the system was to create diagrams and charts to enable the system to suggest solutions visually. The goal is to propose such a solution quickly and achieve matching.**

(4) Matching platform

- **EME's matchmaking service leverages AI and machine learning to identify the best reuse and recycling opportunities for materials.**
- **The AI is asked the following questions and given a score. (i) Can it be reused in the same industry and use Yes / No, (ii) Can it be reused as a different function Yes / No, … recycling is the worst.**
- **EME lets AI learn to make maximum use of materials through data. EME recognizes that reuse is a top priority approach from organizational, social and economic aspects.**

(4) Matching platform

- **For example, check whether a railroad track can be used as a track in the same way, if not, check whether it can be used elsewhere, and check whether it can be used for any other purpose at a construction site. In one case, EME checked whether it could be reused to construct a bicycle parking lot from the tracks, or if a train window could be reused as a window in a new building.**
- **Liquid waste is difficult to evaluate. There are also transactions with chemical companies, but it is difficult to separate each component. Mixtures with metals and textiles can also be difficult.**

(4) Matching platform

- **Matchmaking process (matching waste with companies that need it),**

i. **Scanning (data is imported by AI)**

ii. **AI matching**

iii. **Scrutiny of whether the match by AI meets the needs**

iv. **Matching is completed**

Effects of using the EME system
(1) Utilization for determining insurance coverage

- **The Resource Passport has proven to be an effective tool for insurance companies. It is also used to examine where and how insured items are used and whether they should be insured.**
- **Therefore, in order to minimize the risk of the company, it also provides value for insurance coverage. If it can be used as a resource, insurance is not required, and if there is a possibility of damage and a claim when used, insurance is applied. Although insurers may lose customers, they consider it important to provide value in a risk-free manner.**

Effects of using the EME system
(2) Utilization of AI

- **The use of AI is helping to enrich and upload data. It serves as a platform for accumulating detailed information on waste and for identifying individual information.**
- **The use of AI is helping humans and organizations make various decisions. Organizations in the marketplace are using data statistically to help them how to make decisions and what to simplify when business hours are limited. In the course of actually setting up EME projects, AI and machine learning are effective in collecting information on waste. It is important to recognize what AI can do.**

Effects of using the EME system
(3) Needs for information disclosure

In the market, there is a need for various stakeholders to disclose their materials. By disclosing information in the area of the market that deals with different materials, the EME plays a role in connecting markets in different industries. By obtaining information on companies and materials in different fields, there is a possibility that new materials will be discovered. It should be used effectively to consider auctioning things as materials rather than storing waste.

EME Challenges

It was a very difficult initiative for EME to set up such a system to actually influence the economic aspects of the system. EME would like to match waste with companies that need it, but there is no data on waste. Waste and procurement information is important prior to matching. At the same time, there is a shortage of actual resources and human resources. The certification system for resource recycling and matching is also insufficient. There is also a lack of an insurance system for resource recycling. In such a situation, it is difficult to move from a linear economy to a circular economy.

Survey Report 2

GP Groot
(Construction and demolition waste recycler)

GP Groot

Contact person: Mr. Wim Horeman (Director), Ms. Sasha

Visiting location: Alkmaar, The Netherlands

Company Profile

- **The company was founded in 1917 and has a history of 107 years. It began with businesses such as coal transportation and milk can collection. Since then, 65 gas stations have been opened.**
- **In 1973, landfill disposal was started and the land was expanded. In the early 1970s, when there were no regulations on landfill disposal, waste was increasing.**

Company Profile

- **In 1988, landfill regulations began and costs were incurred for landfill disposal in the Netherlands. Initially, the charge was collected by volume, but now it is collected by weight (tons). Since then, landfill disposal has gradually expanded, although regulations have been tightened.**
- **In recent years, the company has been working towards achieving carbon neutrality.**

Company History

GP Groot, our 107-year-old history

1917 GP Groot starts transporting coal

1921 Purchase first T-Ford

1935 First sand transport for road construction

1966 Opening first petrol station

1973 Opening landfill Alkmaar

2010 Opening first waste sorting plant

2017 Opening first NXT petrol station

2024 First hydrogen gas station

203

gp groot

Waste Disposal & Recycling Business

- **It collects about 1.9 million tons of waste per year for treatment and recycling (100~500 tons of debris per year). It collects waste generated mainly in the north of the Netherlands.**
- **Sorting has a capacity of 37 tons per hour and can process 140,000 tons per year.**
- **Of the waste collected, 75% is sorted and recycled and 25% is incinerated for energy recovery.**
- **Wood and biomass waste is either incinerated or produced as solid fuel (RDF). Limestone (used in ordinary European dwellings) from house renovation is separated and collected.**

Waste Disposal & Recycling Business

- **There are two systems for waste disposal: collection and sorting. In some cases, the waste is sorted by container at the stage it is brought in (metals, plastics, etc.), but in urban areas, waste is mixed and transported in containers as there is no space for multiple containers at the construction site for sorting.**
- **Minerals and concrete shells mixed with wood waste are used as raw materials for concrete production.**
- **Waste containing materials that cannot be incinerated in the Netherlands may be transported to Germany for incineration.**
- **The Netherlands has a small land area and limited capacity for landfill disposal (the Dutch share of landfill disposal is 2%).**

Waste Disposal & Recycling Business

- **Efforts continue to dig up and clean waste from old landfill sites for utilizing it as recycled material. Recent wastes are increasingly made of plastics and metals, which can be hazardous in landfill. Old landfill waste is less harmful, so it is dug up, cleaned and recycled as a resource. The plan is to continue digging up waste for the next 10 years, but it is not known whether this will continue further after 10 years.**

Waste Disposal & Recycling Business

- **In the future, plastic and wood recycling facilities will be introduced.**
- **For the disposal of demolition waste and waste generated by companies, there is no obligation to sign of commissioning agreements or issue manifests, as in Japan.**
- **Demolition waste is to report the annual volume collected to the competent ministry.**

Transition to a Circular Economy

- **The energy transition is also underway. The company has six electric vehicles, hydrogen-powered vehicles, hydrogen buses (public driving) and hydrogen stations (hydrogen is supplied by hydrogen companies).**
- **Mono-materials are difficult because products are composed of a composite of various materials and contain adhesives and other inclusions. Many manufacturers do not consider recycling, so it is necessary to appeal for recycling awareness on the part of manufacturers. In collaboration with the Technical University of the Netherlands, research is being conducted into methods of recycling and the environmentally conscious design of construction materials to increase the possibility of recycling.**

Photos: Waste stock yard (indoor)

Photos: Transport vehicle

Photos: Waste collecting

Photos: Sorting line

Challenges in the Waste Disposal and Recycling Business

- **Gas cylinders may be replaced in the renovation of houses, and they may be mixed in with demolition waste.**
- **Lithium-ion batteries explode once every two days, and fire protection equipment has been strengthened.**

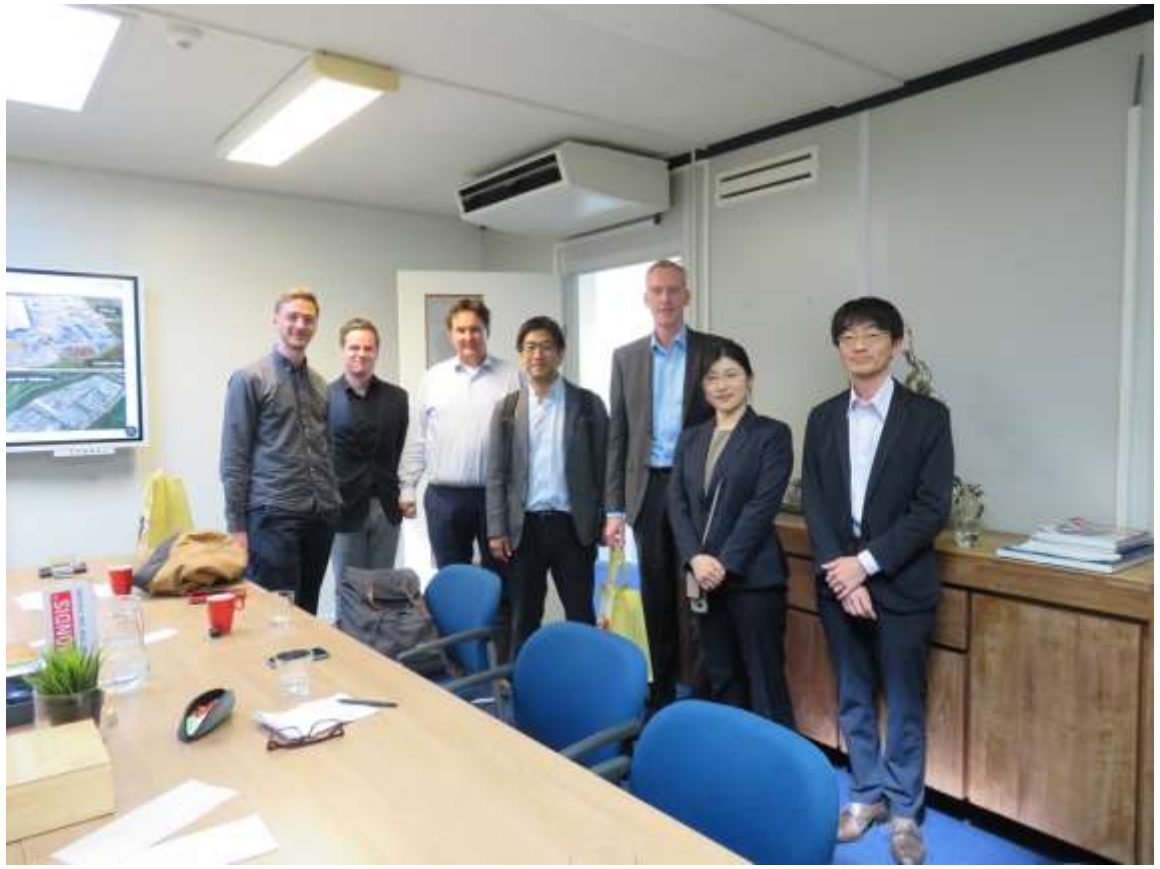
Survey Report 3

Remondis
(Construction and demolition waste recycler)

Remondis

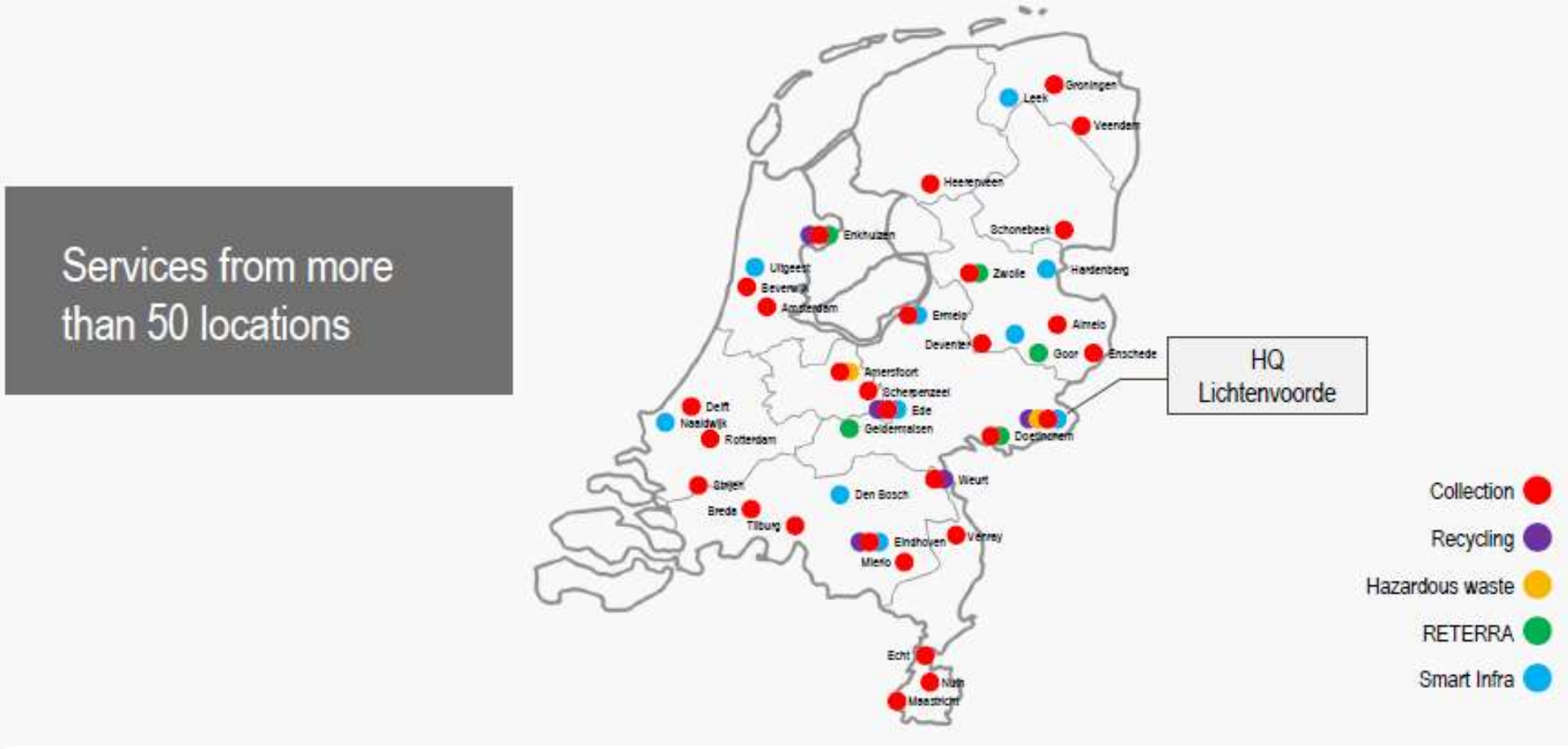
Contact person: Mr. Roger Versluis(Chairman of the DWMA's Construction and Demolition Working Group and Regional Director South of REMONDIS Netherlands)、Mr. Tijn de Jong

Visiting location: Son En Breugel, The Netherlands



Company Profile

- **It is a group of German companies with operations throughout the Netherlands.**
- **It collects, treats, and recycles demolition waste, wood waste, food waste, hazardous waste, etc.**



Company Profile

Main waste flows

Waste flows	Ton
Debris	222.763
Demolition Waste	220.486
Wood	126.209
Bulky waste	17.884
Industrial waste	16.435
Total	603.777

Waste Disposal & Recycling Business

- **When houses are demolished in the Netherlands, debris and timber have to be separated, so debris and timber yards are set up outside.**
- **About 90% of the demolition waste is collected from construction companies. On-site separating by construction companies is rarely carried out at construction sites, such as house renovation, because there is no space for containers to separate and store waste. Wood wastes and debris may be sorted and discharged by setting up containers.**
- **80% of the collected waste is recycled and 20% is incinerated. Waste electricity is generated by incineration and sold to the city in which the incineration facility is located.**

Waste Disposal & Recycling Business

Photos: Debris, construction and demolition waste stock yard (outside)

Waste Recycling Business (Wood Waste Recycling)

- **Wood waste is recycled into three types. The top grade of A-wood is exported to Belgium as a raw material for the manufacture of wood products. The next grade of B-wood is used by furniture manufacturers, and C-wood is used as a raw material for cement production and for bio-recycling (fermentation and power generation fuel).**

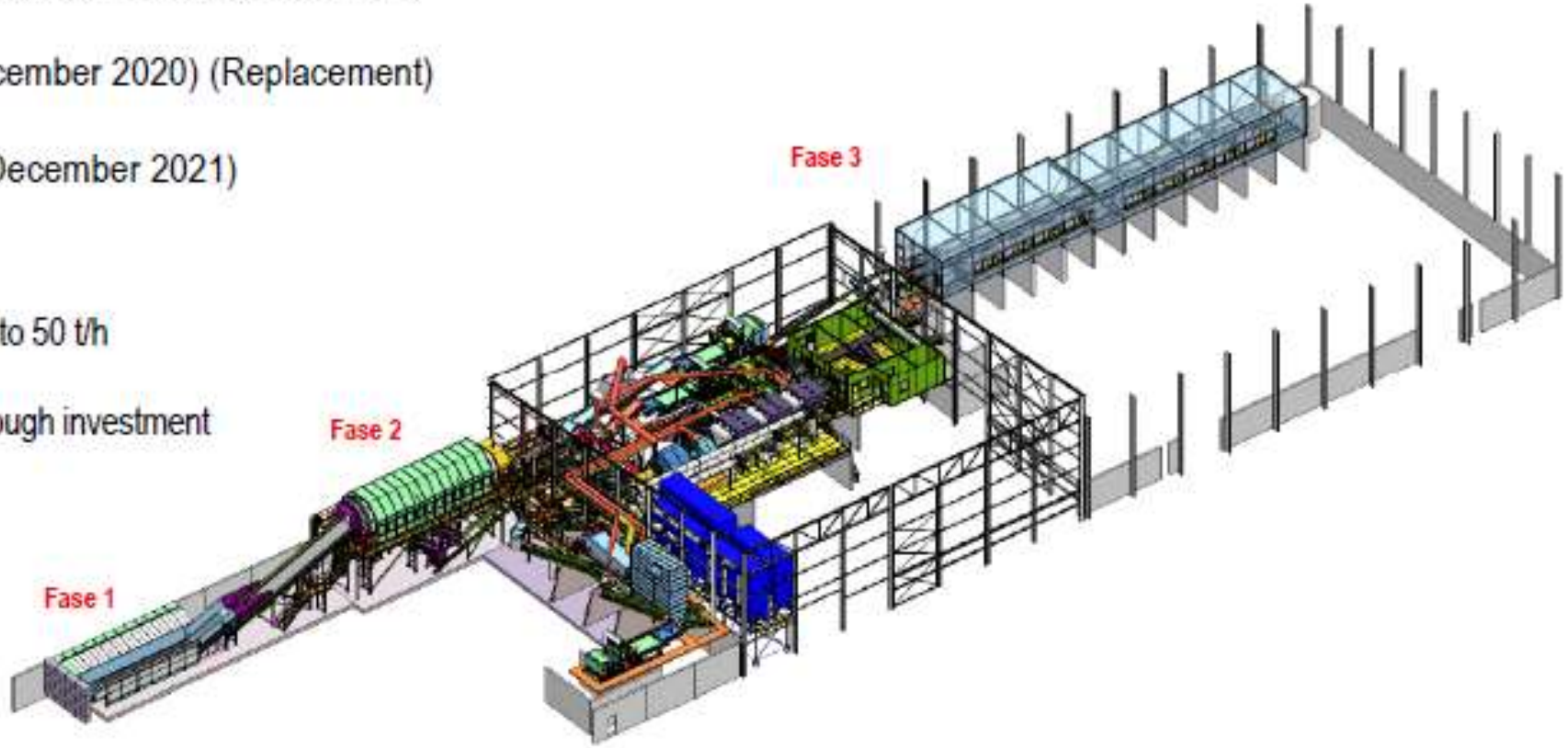
Waste Recycling Business (Sorting line)

Recycling Installation

- Fase 1 – New conveyor chain (August 2020) (Replacement)
- Fase 2 – New sorting drum (December 2020) (Replacement)
- Fase 3 – Upgrade sorting line (December 2021)

  Goals:

  - Increase in plant throughput up to 50 t/h
  - Reduction of manual labour through investment in automatic sorting equipment
  - Increase recycling rate



Photos: Pre-treatment and hand sorting

Photos: Inputting waste into sorting line (Fase1)

Photo: Sorting line (Fase2, 3)

Photo: Hand sorting line

Challenges and proposals for the Waste Recycling Business

- **There is a risk of fire if the container contains batteries. It is necessary to inform the waste dischargers that the batteries must be removed and discharged.**
- **In the Netherlands, landfilling was banned in 1998 excluding asbestos, so it was necessary to steer the country towards material recycling of wastes. In some European countries other than the Netherlands, waste is allowed to be landfilled and should be banned in all of Europe.**
- **If the quality of the collected waste is not uniform, the scope for reuse and recycling is reduced.**

Challenges and proposals for the Waste Recycling Business

- **Cinder(bottom ash) is used as a raw material for cement or the ash is washed to make it usable for various purposes, including as a material for concrete and floor finishes. Dust(fly ash) is also used as a raw material for asphalt. The use of cinder and dust is still a matter of debate.**
- **In the Netherlands, inexpensive incineration facilities are also used, and the ash may not be clean. The Dutch standard is a combustion temperature of 600° C.**

Survey Report 4

Dutch Waste Management Association (DWMA)

* Request coordination of visits by DWMA member recyclers
* Interviews on issues in the waste recycling industry in the Netherlands and Europe during visits to GP Groot and Remondis.

Dutch Waste Management Association（DWMA）

Contact person:　Mr. Unico van Kooten(European Secretary),
Mr. Jeroen Stein(Advisor Communication and Spokesman)

Outline of DWMA

DWMA promotes the interests of companies active throughout the whole waste management chain. By uniting the various parties and interests in the chain, the Association has become a key partner in the transition to the circular economy. The Association stimulates the transition to a circular economy, focusing on closed-loop recycling and materials and energy recovery, and negotiates with government and other organizations on behalf of its members. In terms of turnover and waste volumes, the Association represents about two-thirds of the Dutch waste market.

Challenges of the Dutch recycling industry

- **There is a problem of cost in reusing resources. In the previous decade, there was a sense of unwillingness to take risks regarding the reusing of resources. The government is making a shift and promoting reuse and recycling, but the spread of recycled materials is not progressing because the price of recycled materials is higher than that of virgin materials.**
- **It is important not only to pursue recycling technology, but also to design for recycling (environmentally conscious design).**

DWMA webpage article: The Crisis of the Plastics Recycling Industry

18 March 2024

CRISIS IN PLASTIC SORTING AND RECYCLING INDUSTRY

INDUSTRY SOUNDS THE ALARM: CIRCULAR ECONOMY AND CLIMATE GOALS IN DANGER, PRODUCTION OF RECYCLED MATERIAL STALLS

The Dutch Waste Management Association (DWMA) is sounding the alarm. Dutch and European plastic sorting and recycling facilities are facing major difficulties. The demand for recycled plastic from the plastic processing industry is insufficient for profitable recycling. Turnover is stagnating, stocks of plastic waste are mounting and recycling companies are winding down production. Jobs are in danger. The root of the problem lies in cheap imports of virgin plastic from Asia and America. The industry has sent an urgent letter to the caretaker environment minister Vivianne Heijnen with three suggestions. One: support the market price of recycled plastic with a fixed amount per tonne. Two: make the government's circular procurement objectives consistent with plastic recycling targets. Three: introduce a carbon credit system for using recycled plastic in products.

https://www.wastematters.eu/news/crisis-in-plastic-sorting-and-recycling-industry

Challenges of the Dutch recycling industry

- **Even if it is recycled, it is not used, and many resources are discharged as waste. Japan also imports resources from overseas and relies on imports to secure energy. Reuse and recycling strategies are issues that need to be considered together with resource and energy strategies on a global scale.**

Challenges of the Dutch recycling industry

- **Information on the location of emitters and waste volumes is collected and mapped at the request of the government, and information is shared with stakeholders on the impact on reducing CO2 emissions. The sharing of mapping information is important to understand where and how much resources are located. DWMA believes that it is necessary to know where and how much resources are available, not only in Europe but also all over the world, and to take equal risks worldwide. DWMA is appealing this idea to the European Commission.**

DWMA webpage article: JAPANESE VISIT TO DUTCH RECYCLING HUBS

https://www.wastematters.eu/news/japanese-visit-to-dutch-recycling-hubs

4 July 2024

JAPANESE VISIT TO DUTCH RECYCLING HUBS

On July 3rd, a delegation from the Japan Industrial Waste Information Center (JW Center) visited the Dutch Waste Management Association (DWMA) to learn about the Dutch approach to recycling and circularity in the construction and demolition waste sector. The Japanese delegation visited recycling companies GP Groot in Alkmaar and REMONDIS in Son en Breugel.

The visit focused on how to extract more recyclable material from construction and demolition waste and the importance of working with the construction sector, which aims to become circular. Japan generates about 80 million tons of construction and demolition waste each year. About 99% of this demolition waste is recycled. Japan is exploring ways to improve its overall recycling performance and make its construction sector more circular.

Motoki Sasaki (Chief Research and Survey Division of JW Information Center), Izumi Sasaki (Staff Research and Survey Division of JW Information Center), Wim Horeman (Director GP Groot Collection and Recycling) during the working visit to GP Groot in Alkmaar. At the recycling location, waste and material flows are processed into new raw materials. This is done, among other things, with 2 recycling installations that together have a processing capacity of 35 tons per hour (photo: Fotopersbureau Dijkstra / Cor Salverius).

DWMA webpage article: Waste statistics

https://www.wastematters.eu/userfiles/files/DWMA-Waste%20Statistics_edition%202024.pdf

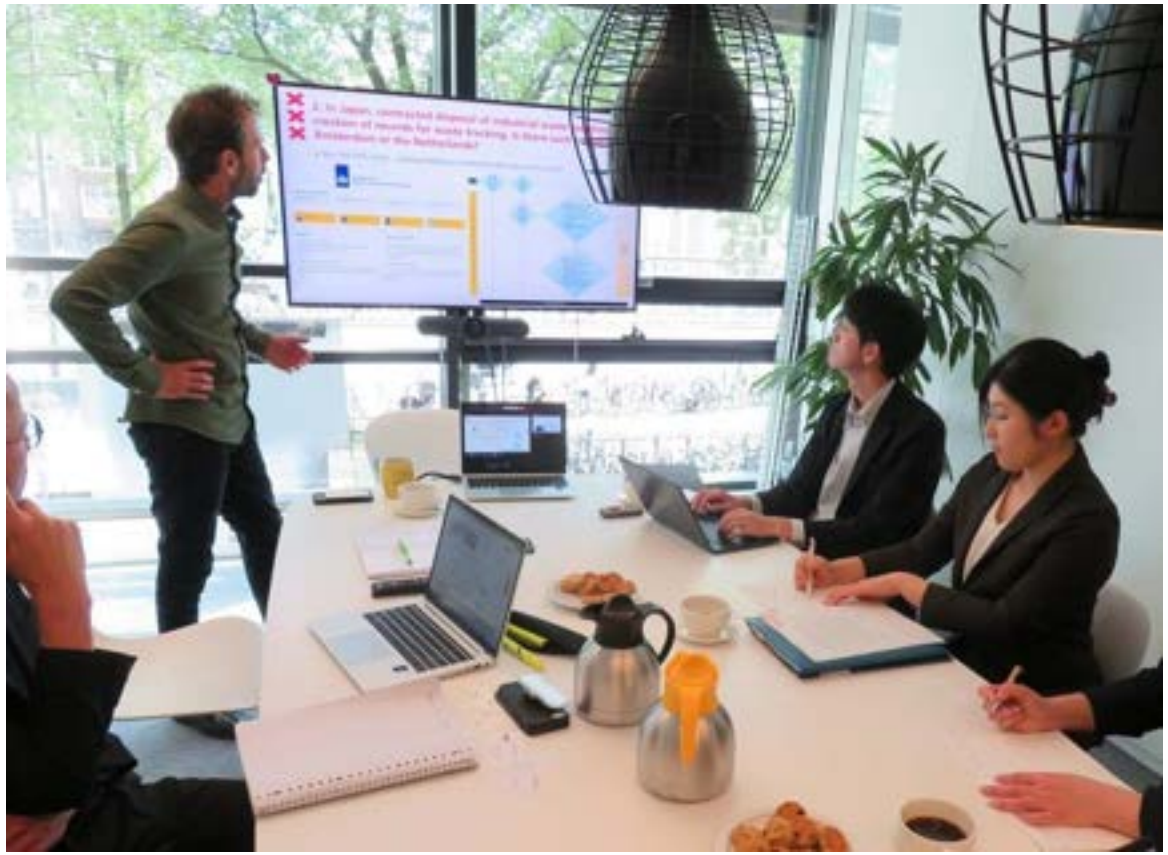
Survey Report 5

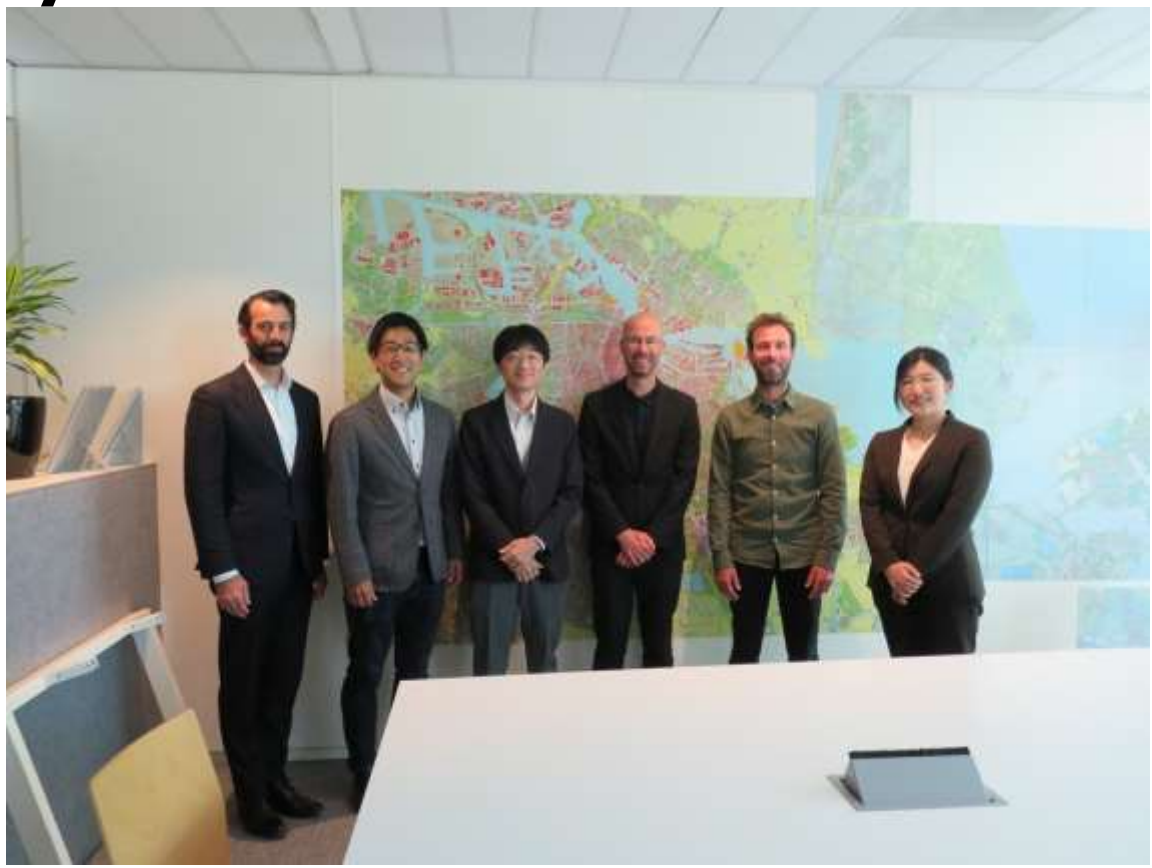
City of Amsterdam

City of Amsterdam

Contact person:　Mr. Marc Nellen（Advisor Circular Economy, Port and Industy）、Mr. Noam van der Hal（Projectleider Team Haven en Industrie Ruimte & Duurzaamheid）、Mr. Julien Rikkoert（Head of Japan Desk）、Mr. Marcel、Ms. Marlies

Visiting location:　Amsterdam City Office





Collection of household waste

- **The rules for separating household waste are glass, paper, and others. Recently, textiles have also been separated.**
- **Household waste is collected 2-3 times a week, but the day of the week and the frequency of collection are not fixed. Garbage from bins and household waste left on the street are collected.**
- **A method of measuring and collecting waste containers by measuring their volume with sensors has been introduced, but the collection driver does not rely on information from the sensor measurements and the centre-measured collection method does not work well, as the existing routes are more efficient.**

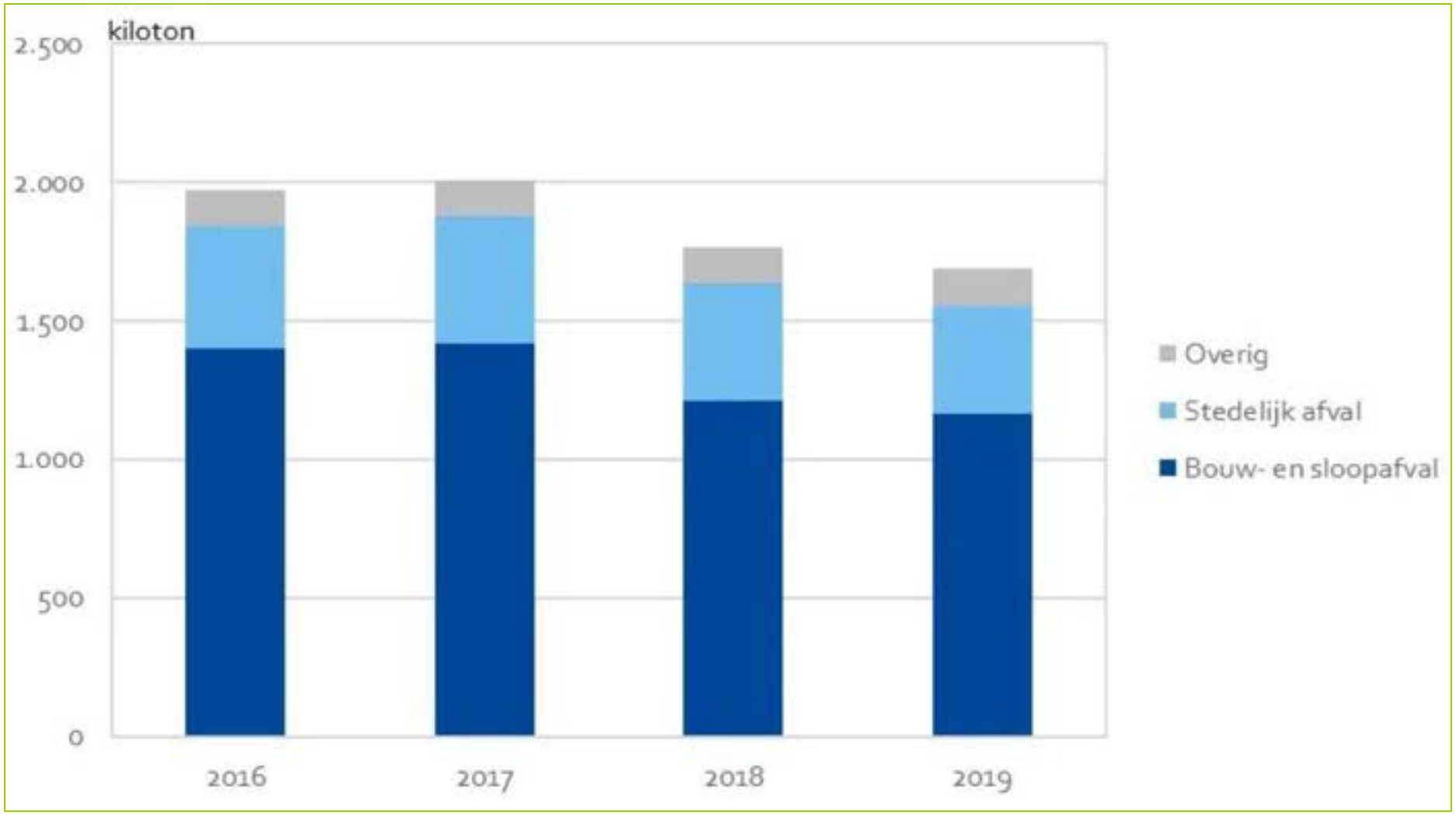
Collection of commercial waste

- **For commercial waste, the waste generator basically selects a private collection and transport company and contracts with them for waste collection.**
- **In the "9 Streets (9 Straatjes)" area, there is a cooperative scheme for the collection of commercial waste. A pilot initiative has been launched for residents of nine streets, who can call the city and a worker will collect their waste on an e-bike. It is also possible to request the collection of commercial waste under this scheme. The city center is piloting this approach because of different circumstances from other areas of the city, such as narrow roads that make it difficult for collection vehicles to enter the city.**

Collection of commercial waste

- **The Netherlands has the highest amount of construction waste, and the city of Amsterdam likewise has the highest amount of construction waste. Concrete and tile mixtures have been on the rise in recent years due to road construction in the city's Nieuwmarkt area.**

Primary waste streams in Amsterdam



■Construction and demolition waste ■General waste ■Others

Figure Amount of waste generated in Amsterdam (kilotonnes), 2016–2019

Process of waste disposal

- **All types of waste (other than paper and glass) are thrown in the same container. In the AEB, the waste is separated and further treated. Recyclables will be transport to a specific recycling plant. Organic waste will carry on and get incinerated in the AEB plant.**
- **Waste heat from incineration is supplied to households and electricity is also generated.**

Process of waste disposal

- **In general, most waste will be treated in the Netherlands, but paper, glass and textile waste might be transported also abroad.**


Process of construction and demolition waste disposal

- **Construction and demolition waste is mainly composed of concrete, wood, plastic, paper, stone, and metal.**
- **Construction and demolition waste is sorted by a disposal company (Afval.nl) and 90% is reused as raw materials.**

Process of construction and demolition waste disposal

- **There are six recycling stations in Amsterdam where large waste (in special containers) can be brought in free of charge, and individuals can also bring in waste from household renovation.**
- **In Amsterdam, commercial waste is rarely separated. The city calls for separating before bringing it to recycling centers, but not much is separated.**

Waste disposal access card

- **The system works by touching the card to the waste bin, which opens the lid and allows the waste to be thrown in. The volume that can be thrown in at one time is fixed.**
- **While the card is used in many Dutch cities, it is only used in a few locations in the city of Amsterdam. In addition, the waste card system is not working well due to faulty systems.**
- **In some cases, the cards are tracked under legal authority, but they rarely weigh the waste.**
- **The card is free to use, but in some cities, there may be charged for card use if a citizen uses the card beyond normal usage.**

Waste Information

- **If hazardous substances are generated above a certain amount, the generator must report the quantity and properties of the generated waste to the national system*.**

  ＊LMA (National Monitoring Waste Database)

- **Waste amounts are measured in terms of the weight of transport vehicles or containers entering incineration facilities or recycling stations. Waste statistics can be found in national databases*. This method of statistics based on the weight of the waste at the time of delivery is considered the European standard.**

  ＊LMA (National Data for Waste Collection)

Waste Statistics

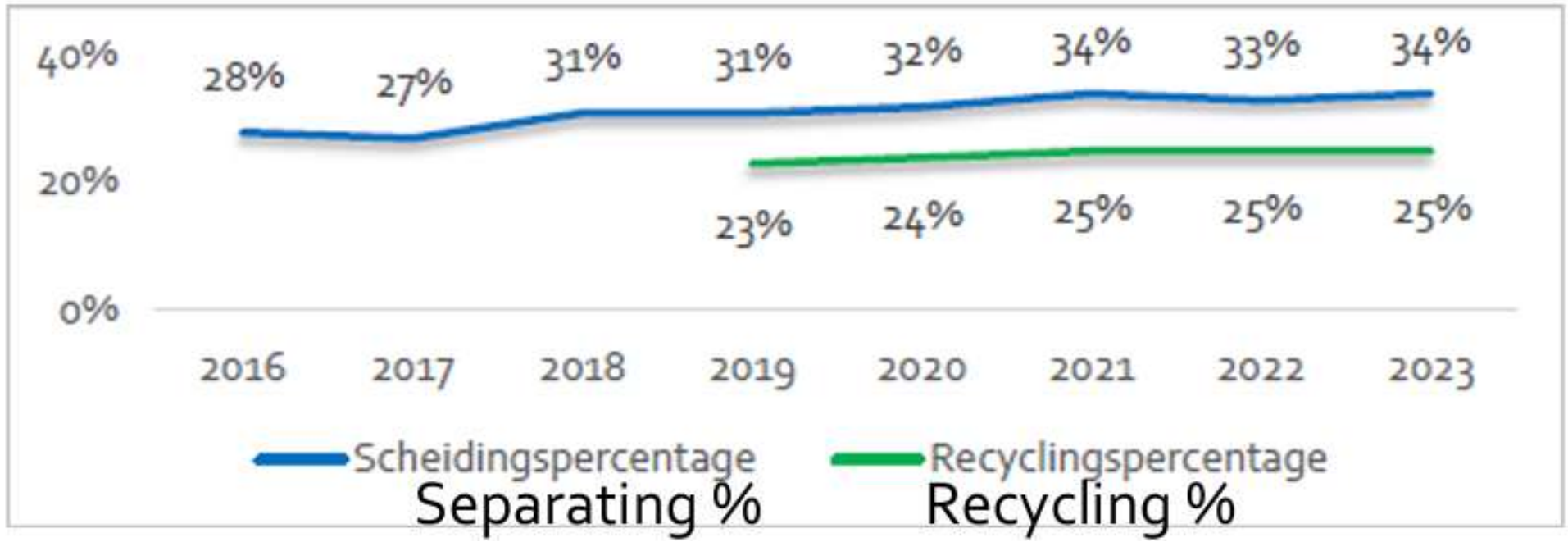


Figure : Separating and recycling rates in Amsterdam

In order to achieve 50% circular by 2030 (50% reduction in raw materials used), 78,000 tons must be recycled annually

Circular Economy Initiatives

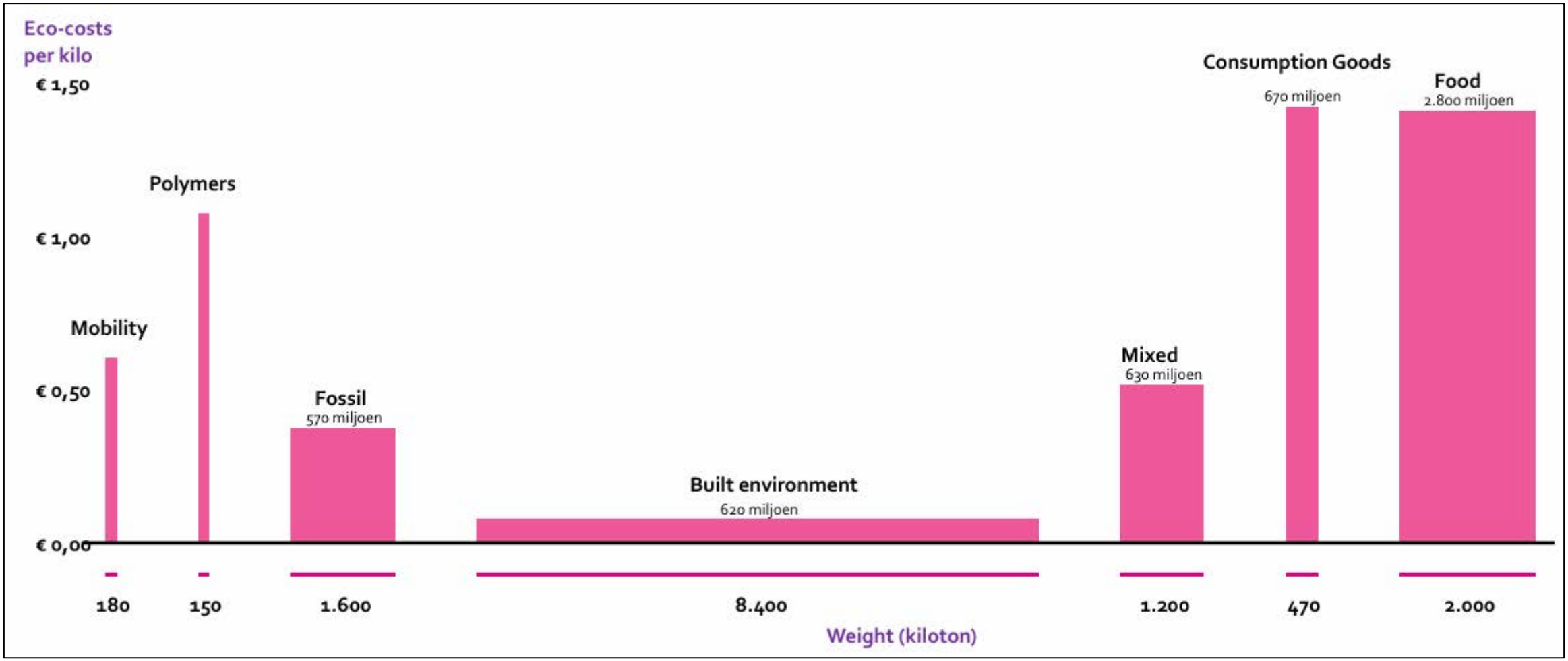
Investment allocated - €17.5 million

https://ideasforgood.jp/2024/01/26/circular-amsterdam-2023-2026/

Circular Economy Initiatives

- **GFT (organic waste) also includes gardening waste. These are promoted for recycling through composting and biogas generation by fermentation.**
- **The amount of paper waste has decreased because citizens no longer read newspapers and printed material has decreased.**
- **Promoted the idea of separating and disposing of waste in the bins. The information is disseminated through social networking sites, educational programs, etc.**
- **The location of textile waste bins can also be found on the internet.**

Circular Economy Initiatives



The environmental costs of CO_2 emissions, water pollution and other impacts are calculated and measures are to be focused on the built environment, consumption goods and food sectors.

Challenges of Circular Economy Initiatives

- **Time, money, capacity : Classic excuse to postpone what is necessary and keep doing things that are comfortable, within the budget and with the available means**
- **Behavioral change : Changing mindsets is not enough to change behavior**
- **Lack of space : making room for the circular economy in the available physical space**
- **Systemic change : moving from successful small pilots to widespread practice**
- **Stop nudging : soft measures are no longer enough, more directive legislation needed to reach goals (needed on all government levels, i.e. local –national-international)**

Survey Report 6

Taste Before You Waste
(TBYW, Organization involved in food loss reduction initiatives)

Taste Before You Waste

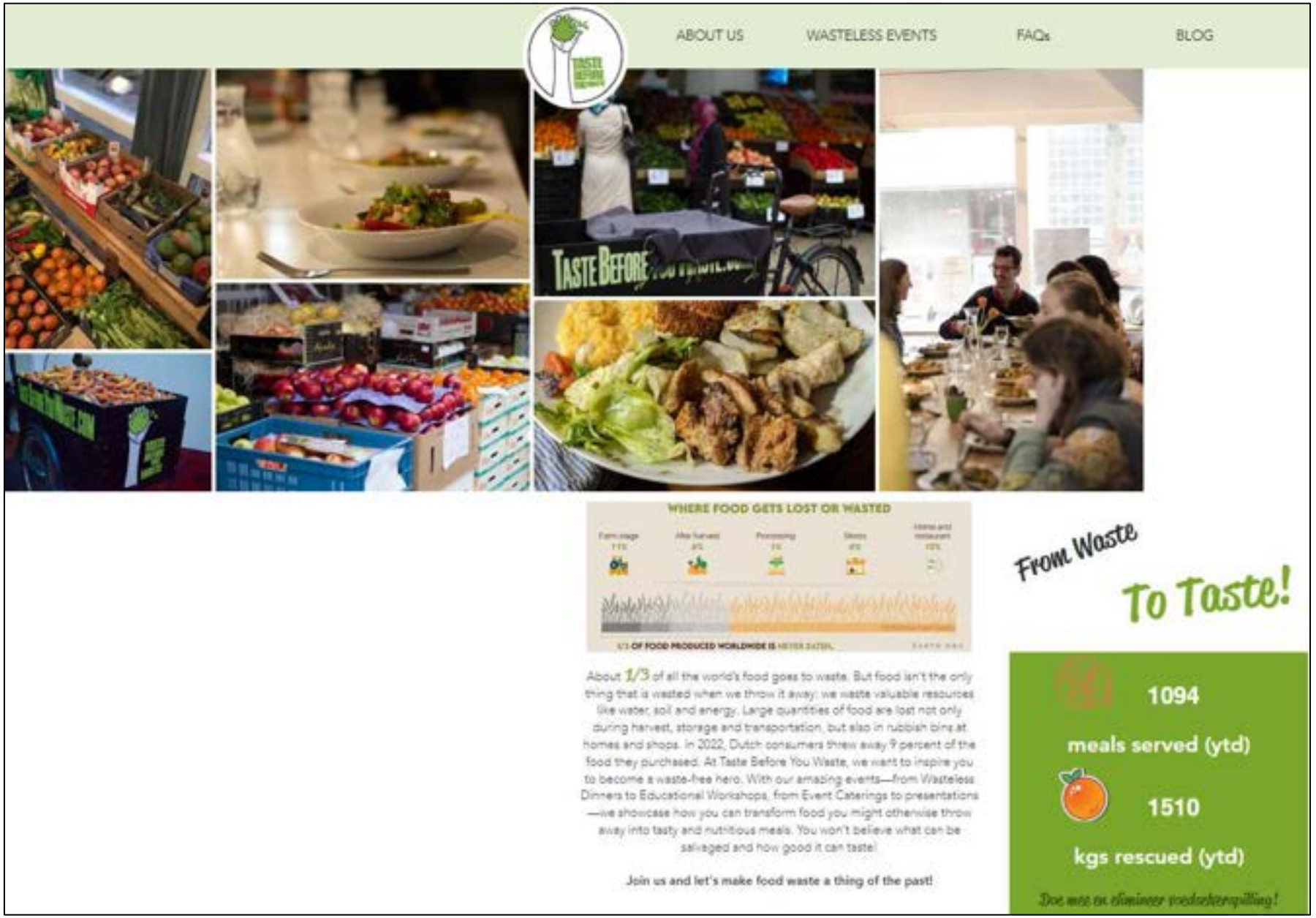
Contact person: Mr. Wingston Sharon（Chairman）,
Ms. Sindhura Anantharaju（Director）,
Ms. Lisa Albers （Communication Manager）

Visiting location: ZOKU Amsterdam, The Netherlands
(Dinner meeting)

Organization activities

- **The "Wasteless Wednesday Dinners" program is a weekly initiative aimed at reducing food waste and promoting sustainable food practices. Dinners are held every Wednesday, excluding winter and summer holidays, and feature meals prepared exclusively from discarded ingredients sourced from local grocery stores. Ingredients are donated by several neighboring grocery stores, ensuring that the dinners are made up of food that would otherwise be discarded.**
- **The events also include cultural events, workshops, open mics etc. to foster a community setting amongst the guests and to reach out to people who may have had dinner elsewhere.**

Organization activities (Website publication information)



Organization activities

- **TBYW's activities extend beyond simply reducing the wastage of groceries; they aim to provide guests with a tangible experience of the waste food problem. This is exemplified by their Food Cycle Markets, where surplus food from 5 fixed grocery shops is offered free of charge or on a pay-as-you-feel basis, visually highlighting the substantial waste generated by even just 5 local grocery stores.**
- **Moreover, TBYW fosters community dialogue on the issue of food waste through private catering events, workshops, and on-site lectures, creating a platform for local engagement and education.**

Organization activities

- **Introducing a shop specializing in selling by weight, a sustainable restaurant with a similar awareness of issues on their website.**

Little Plant Pantry

Is not only a **bulk shop**, but they have a **charming restaurant** inside with a lovely plants. There are a options, **and the food is** their own packaging (Tupp containers) and place containers, allowing the b **free packaging and plastic** of different seeds, nuts, sus and vegan and organic foo the earth a little by not u bringing your **reusable** Tup

Café de Ceuvel

This vegan café in Amsterdam Noord will show you what love is all about. This sustainable restaurant **was founded in 2014 by four young friends** who dropped out of school to pursue their dream of opening a **vegan and sustainable restaurant** where all decisions and actions would help **to improve the world a little bit.** They offer a variety of vegan courses with organic and plant-based food, but not only is it a good place to eat, you can also drink and enjoy the company of the sea. They make **their own sodas** with organic syrup, and all the beers come **from small breweries.** In addition, to try to be as sustainable as they can, **they don't use gas.**

Reference : Worm Hotels dotted around Amsterdam (activities of residents)

Rose Vollum
Jul 2

Turning Trash into Treasure: The Rise of Worm Hotels in Amsterdam

Worm hotels in Amsterdam can turn food waste into rich soil, that can in turn be used to grow new food.

An initiative in which residents produce compost by injecting organic waste such as food waste into the hotel where earthworms are staying.

TBYW activity expenses

- **TBYW's activities are funded through a combination of event participation fees and donations, with a focus on minimizing operational costs. This is evident in their Wasteless Wednesday Dinners, where ingredients are sourced free of charge from a designated grocery store and collected on the day of the event, eliminating storage expenses. Additionally, holding the event on Wednesdays streamlines the process for grocery stores to prepare discarded ingredients, contributing to the overall cost-effectiveness of the initiative.**

TBYW activity expenses

- **While relying on volunteers for meal preparation effectively minimizes costs and allows for a more personal community bonding experience, TBYW does face the challenge of maintaining long-term engagement with its volunteer base, many of whom are students with limited availability due to their academic commitments.**

Survey Report 7

Circular Economy Tour in Amsterdam

Circular Economy Tour

※ Participate in a tour organized by a local coordinator
※ Outline and photos of each visit

CIRCL

A circular economy complex built by the Dutch megabank ABN AMRO. CIRCL was built on the premise of minimizing the environmental impact of demolition as much as possible, for example, the timber used for pillars and other materials was made thicker than necessary so that it could be used for new purposes in the future. No chemical adhesives were used in the construction of the building, only removable metal fittings. the two elevators were designed in such a way that CIRCL would pay the manufacturer for the use of the lifts based on the number of times they were used, so that users of the facility would act psychologically to reduce the number of times they used them. At the time of the visit, it had been decided to dismantle them.

Fashion for Good

As the world's first sustainable fashion museum, it connects people working on sustainable innovation with fashion brands, retailers, manufacturers and funders. The museum closed on June 5.

The building consists of a basement floor and two ground floors: the basement floor was the 'past' floor, where visitors learned about the era of mass production with low-wage labor from the 19th to early 21st century; the ground floor was the 'present' floor, where visitors learned about cutting-edge sustainable initiatives already commercialized by fashion brands around the world; the second floor was the 'future' floor, where visitors learned about products and technologies that were being tested and researched in various countries and were expected to spread to the fashion industry in the future.

Tony's Chololonely

A chocolate brand from the Netherlands that does not rely on 100% forced labor. The chocolate supply chain, which runs from the millions of farmers who produce cocoa to the billions of consumers, includes an intermediate part where illegal child and forced labor may take place on cocoa farms in order to keep the purchase price of cocoa as low as possible. Tony's Chololonely applies the following five sourcing principles.

- Traceable beans ; Tony's Chololonely purchases cocoa beans directly from a limited number of partner co-operatives.
- A higher price ; The farmers receive the Tony's premium in the form of direct payments.
- Strong farmers ; Tony's Chololonely shows farmers how to operate more professionally, help them achieve economies of scale and create commitment and trust among the farmers.
- The long term ; Tony's Chololonely works with farmers for at least 5 years.
- Higher quality and productivity ; The Tony's premium encourages the farmers to improve their crop. As their farms become more profitable their motivation increases.

De Hallen

A complex of hotels, cinemas, food courts, a library and select shops on the site of a former railway maintenance yard. The facility has a space that retains the atmosphere of a maintenance yard, with railway tracks and steel frames. The ‘Recycle’ bicycle shop offers workshops for training to become a bicycle mechanic and sells bicycles that have been serviced.

Little Plant Pantry

As the first zero-waste shop in Amsterdam, it offers products with no or minimal plastic packaging. Products such as oils, spices, fermented foods and detergents are displayed without packaging in large containers and can be purchased by weight.

NDSM

Event space renovated on the site of a former shipyard, taking over the name of an Amsterdam shipbuilding company that went bankrupt in 1984. The warehouses and cranes of the old shipyard are being used as they are, and are being transformed into workspaces, art exhibitions, etc., to attract artists, entrepreneurs, young people and tourists.

↑ Renovated crane "Faralda Crane Hotel"

SchoonSchip

A sustainable waterfront residential area in the northern part of Amsterdam. In a residential area comprising 46 households and 30 houses, over 100 inhabitants, 516 solar panels, 30 heat pumps and 60 thermal panels have been installed to enable people to live unimpeded in an environment that is not connected to the gas system (Characteristic initiatives below).

- Energy for heating and hot water is provided by solar water heaters and heat pumps. The houses generate their own electricity with photovoltaic panels and each house has a battery to store temporary surpluses.
- All houses are connected by a smart grid, which allows houses to exchange electricity with each other.
- All houses have one-third of their roofs covered in green.
- Electric vehicles, cargo bikes and electric bicycles are shared.

De Ceuvel

The land was secured by a group of architects in 2012 on a 10-year lease from the City of Amsterdam to turn a former shipyard in the north of the city into a cultural city center at the cutting edge of technology, sustainability and the arts. The old shipyard's character as a former shipyard was used to upcycle the dilapidated vessels and opened as an office park in 2014.
De Ceuvel has a concept of keeping waste generated on site out, with composting toilets in place of a sewage system (flush toilets are provided in the on-site café).

MUD JEANS

The world's first circular denim brand that takes old MUD Jeans and reuses them as raw material for new products, with the aim of saving water and reducing greenhouse gas emissions in the denim production process. The production of one pair of MUD Jeans generates 400 liters of water and 3.4 kg of CO_2, but life cycle analysis shows that if recycled cotton, recycled water, water conservation, energy-saving production techniques (e.g. dyeing techniques) and renewable energy are used, water can be reduced by 72% and CO_2 can be reduced by 41%. The MUD Jeans take-back scheme allows customers to return their purchased MUD Jeans at any time for as long as the business is in operation and use them as raw material for recycled denim fabric. The new products contain up to 40% recycled cotton (products cannot be made from 100% recycled cotton due to the use of adhesives and durability).

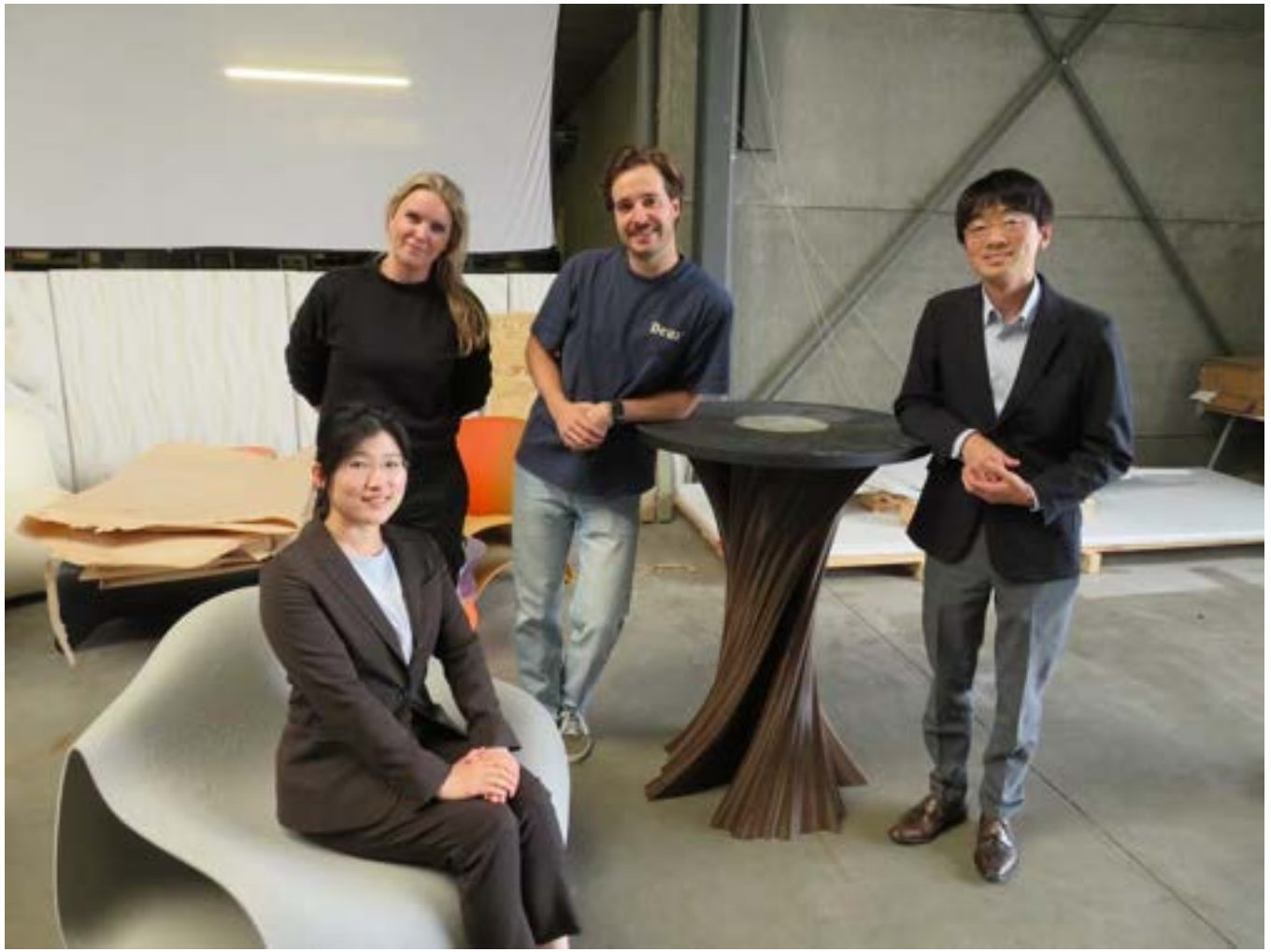
Survey Report 8

The One Project
(Plastic Recycling Consultant)

The One Project

Contact person: Ms. Renee Horlings, Mr. William De Ceulaer, Mr. Takuma Kitadani

Visiting location: Oudsbergen, Belgium (Office and factory)



Company Profile

- **The business specializes in recycling solutions and ready-to-use upcycling.**
- **Work with groups of experts from different sectors to recycle plastic materials into new, high-value solutions. Innovate recycling methods and opportunities to make recycling economically viable and at the same time protect product quality.**
- **Projects are also implemented in collaboration with global companies.**

Business History

In 2017, the world's first 100% recycled PET was used at a festival in Belgium

2018, the world's first large-scale 3D printer dedicated to plastic materials.

Developed the first 100% locally recycled APET FILAMENT

1st 100% closed loop sorting live on site for plastic packaging (rPET) at PUKKELPOP

Partnership with Huthamaki on end-of-life plastics

Business activities (Consulting and printer business)

- **Two large 3D printers have been installed in the US, one in Russia, two in the Middle East and several in Europe.**
- **It is priced at approximately JPY 50 million and is sold to customers, including training in the use of the machines and consultancy on their operation.**
- **Test prints are made before equipment is delivered. The key point is what waste is recycled.**
- **Printers can be transported by ship.**

Business activities (Consulting and printer business)

3D Printer

Second-generation installations with build volume 2700 x 1250 x 1500 mm

Business activities (Consulting and printer business)

- **Large-scale 3D printers enable the production of works of art, furniture, etc.**
- **The software is being developed to do the necessary design for manufacturing with a 3D printer.**
- **The company has experience in manufacturing building materials (e.g. wall materials) from waste products such as Nike. Plastic recycling was also promoted at the Nike booth in the 2024 Paris Olympics.**

Business activities (Consulting and printer business)

Recycled plastic materials (recycled materials that can be printed)

- **(r)PETg natural or including carbon fiber and fiberglass-reinforced products (all colors including transparent and translucent, carbon only in black)**
- **(r)PETg specials (Foam, stone, terracotta, etc.)**
- **(r)PP natural or including fiberglass-reinforced products**
- **(r)PP**
- **PPL-hollow glass bubbles**
- **(r)PP specials(Foaming agent、PP/PE cellulose)**
- **(r)PLA natural or specials (foaming agent, hemp mix, stone mix), etc.**

Business activities (Portable equipment business)

- **A mobile portable recycling plant has been developed. The facility has a modular design that can process different types of plastics.**
- **The necessary modules for washing, crushing, etc. are selected for the collected waste and the equipment is installed.**
- **This equipment can be installed at any location and enables waste treatment in areas where small-scale eco-systems are needed. The facility allows for the transport of cleaned flakes instead of waste plastics.**
- **The value of recycled materials continues to increase year after year and this project will help to increase the value of materials within the ecosystem.**

Business activities (Portable equipment business)

Facility image

Business activities (Data Traceability Business)

- **In cooperation with packaging manufacturers, information on the weight of cups delivered, the number of cups collected and the weight returned to the manufacturer is registered in an application and the information is used to improve collection and recycling rates.**
- **The sponsor of the event had a need to visualize the recycling rate of waste generated from the event, and it was decided to develop a system.**

Business activities (Data Traceability Business)

- **At the annual event, it is possible to track changes in the recycling rate over time, which is used to improve collection methods.**
- **It collects and analyzes energy and waste data throughout its entire life cycle from the collection of materials to the manufacture of products and vice versa. Clients can track their progress on targets, track CO_2 emissions, enhance material traceability, improve efficiency, and demonstrate their commitment to zero waste.**

Challenges of Plastic Recycling at Events

- **In the Netherlands, the use of disposable containers is increasingly regulated and a lot of application paperwork is required if PE disposable cups are used at an event**
- **On the other hand, repeated use of hard PP cups uses large amounts of water to clean them. In addition, the cups are marked with the sponsor's logo, but the logo print falls off after repeated use.**
- **The One Project believes that it is better to recycle PE in Europe instead of throwing it away.**

Survey Report 9

European Waste Management Association (FEAD)

European Waste Management Association（FEAD）

Contact person: Mr. Paolo Campanella (Secretary General)
Visiting location: Brussels, Belgium

Outline of FEAD

- **Location: Brussels, Belgium**
- **Institutional membership: Waste management associations in 19 European countries are members (DWMA is also a member)**
- **Number of member companies: Approx. 3,000**
- **Business: FEAD members are national waste management associations covering 19 countries in Europe. Representing around 3,000 companies operating across the waste management value chain, FEAD will make recommendations to the European Commission on a regulatory framework for the waste management sector.**

European Approach to Waste

The requirements for a substance to be classified as a by-product in Europe are as follows. Substances that do not fall into these categories are classified as waste.

- **The substance is commonly used for a specific purpose**
- **The substance can be used directly without the need for additional treatment processes**
- **There is an existing demand and the product complies with current legislation and standards applicable to the product**
- **The use does not have a negative impact on the environment or human health**

Disposal Status of Livestock Manure in Europe

- **Livestock manure is classified as a by-product of agriculture in Europe and is controlled by regulations relevant to the agricultural sector. This is due to the fact that the use of livestock manure in Europe fits the aforementioned by-product requirements and that the agricultural sector has historically had a greater say in Europe. In Europe, there are also administrative restraints on waste disposal, so it is easier for farmers to do business with livestock manure as a by-product than as a waste product.**
- **FEAD's position is that livestock manure is better managed by the waste sector, as there is a system in place to ensure traceability, leading to proper disposal.**

Disposal Status of Livestock Manure in Europe

- **Although there are differences depending on whether it is waste or by-products, the treatment method of livestock manure in Europe is basically the same as in Japan, and it is directly put into the soil, composted, and fermented with methane. Some member states may choose direct combustion for the purpose of energy recovery, waste heat utilization, or fertilizer use of incineration ash.**
- **Large-scale livestock farmers often compost themselves, but due to the low selling price of compost and the limited period of time during the year when fertilizer can be applied, setting a place to store the product is an issue.**

FEAD webpage article

May 17, 2024

FEAD Feedback on the Commission Directive amending the Council Directive on the use of certain fertilising materials from livestock manure

FEAD, the European Federation for Waste Management and Environmental Services, representing the private waste and resource management industry across Europe **welcomes** the Commission's latest Directive to amend the Council Directive 91/676/EEC on specific fertilizing materials from livestock manure. However, **FEAD believes that it is essential to clarify the status of RENURE (REcovered Nitrogen manURE) products,** especially if it needs to be subjected to the Regulation (EC) No 1069/2009, so called animal by-products Regulation and the relation in regardso to the EU fertilizing products Regulation (EU) 2019/1009.

https://fead.be/position/fead-feedback-on-the-commission-directive-amending-the-council-directive-on-the-use-of-certain-fertilising-materials-from-livestock-manure/

Waste tracking system

- **The European Union (EU) intends to bring new regulations on the transport of waste into force in May 2024, with the transport of waste generated within the EU to be managed by a central EU system.**
- **Although there are differences in operation depending on whether the waste is non-hazardous or hazardous, and whether it is transported within or outside the EU, for transfers of waste generated within the EU, information on the waste generator, transporter, disposal destination, type and quantity of waste and disposal method must be registered (for transfers within the home country, registration is planned to be voluntary).**

Waste tracking system

- **The tracking system consists of four copies of the document, which are signed by the generator, the transporter, and the disposal plant, and one is returned to the generator.**

Figure: Entries for the transport of waste (EU Regulation Annex)

INFORMATION ACCOMPANYING SHIPMENTS OF WASTE AS REFERRED TO IN ARTICLE 3(2) AND (4)

Consignment information (1)

1. Person who arranges the shipment Name: Address: Contact person: Tel. Fax E-mail:		**2. Importer/consignee** Name: Address: Contact person: Tel. Fax E-mail:
3. Actual quantity: Tonnes (Mg) m³:		**4. Actual date of shipment:**
5.(a) First carrier (2) Name: Address: Contact person: Tel. Fax E-mail: Means of transport: Date of transfer: Signature:	**5.(b) Second carrier** Name: Address: Contact person: Tel. Fax E-mail: Means of transport: Date of transfer: Signature:	**5.(c) Third carrier** Name: Address: Contact person: Tel. Fax E-mail: Means of transport: Date of transfer: Signature:
6. Waste generator (3) **Original producer(s), new producer(s) or collector:** Name: Address: Contact person: Tel. Fax E-mail:		**8. Recovery operation (or if appropriate disposal operation in the case of waste referred to in Article 3(4)):** R-code/D-code: **9. Usual description of the waste:**
7. Recovery facility ☐ **Laboratory** ☐ Name: Address: Contact person: Tel. Fax E-mail:		**10. Waste identification** *(fill in relevant codes)*: (i) Basel Annex IX: (ii) OECD *(if different from (i))*: (iii) Annex IIA (4): (iv) Annex IIB (4): (v) EC list of wastes: (vi) National code:

11. Countries/states concerned:

Export/dispatch	Transit			Import/destination

12. Declaration of the person who arranges the shipment: I certify that the above information is complete and correct to my best knowledge. I also certify that effective written contractual obligations have been entered into with the consignee *(not required in the case of waste referred to in Article 3(4))*:

Name: Date: Signature:

13. Signature upon receipt of the waste by the consignee:

Name: Date: Signature:

TO BE COMPLETED BY THE RECOVERY FACILITY OR BY THE LABORATORY:

14. Shipment received at recovery facility ☐ **or laboratory** ☐ Quantity received: Tonnes(Mg): m³:

Name: Date: Signature:

(1) Information accompanying shipments of green listed waste and destined for recovery or waste destined for laboratory analysis pursuant to Regulation (EC) No 1013/2006. For completing this document, see also the corresponding specific instructions as contained in Annex IC of Regulation (EC) No 1013/2006.
(2) If more than three carriers, attach information as required in blocks 5 (a), (b), (c).
(3) When the person who arranges the shipment is not the producer or collector, information about the producer or collector shall be provided.
(4) The relevant code(s) as indicated in Annex IIA to Regulation (EC) No 1013/2006 are to be used, as appropriate in sequence. Certain Basel entries such as B1100, B3010 and B3020 are restricted to particular waste streams only, as indicated in Annex IIA.
(5) The BEU codes listed in Annex IIB to Regulation (EC) No 1013/2006 are to be used.

Waste tracking system

- **Waste is divided into two lists: the Green List, which is a list of recyclable and non-hazardous waste, and the Amber List, which is a list of hazardous waste; the Green List system is built on the assumption that all registration procedures will be digitalized. In addition, since there is no need for prior notification or consent to the competent authorities for the transportation of waste, it does not take long to transport waste. On the other hand, the Amber List is a more time-consuming mechanism than the Green List as it requires prior notification of the transport of waste to the competent authorities and requires document verification in the country where the waste is generated and the country where it is transported.**

Waste tracking system

- **The new regulations will not come into effect until May 2027, it is expected that the EU Member States' waste transport systems will be developed over the next few years. This system will enable the collection and publication of uniform waste information within the EU.**
- **FEAD believes that the data can be used as material for considering measures for the effective use of recyclable materials by making the status of waste landfill in member states known. In Italy, where a similar system has already been introduced, it was also noted that through the use of the system, communication can take place between the parties involved, making it easier to collect waste of the same quality.**

Waste tracking system

- **FEAD believes that the data can be used as material for considering measures for the effective use of recyclable materials by making the status of waste landfill in member states known. In Italy, where a similar system has already been introduced, it was also noted that through the use of the system, communication can take place between the parties involved, making it easier to collect waste of the same quality.**

Reference : Waste shipments (European Commission)
https://environment.ec.europa.eu/topics/waste-and-recycling/waste-shipments_en

Status of Recycled Plastics

- **As recycled plastics are expensive in Europe, there is little demand from plastic product manufacturers and consumers, making it a challenge to promote their use.**

Status of Recycled Plastics

- **The competitors for recycled plastics are virgin and recycled materials coming from China and other countries. In Europe, the use of a certain amount of recycled plastic as material for plastics used in beverage bottles is aimed at creating demand for regular recycled plastic, but plastic product manufacturers use cheaper materials from outside Europe. However, recycled plastics coming from outside Europe cannot be judged by their appearance as to whether they meet the recycled plastic standards required by Europe. There is also suspicion that virgin plastic is being exported as recycled plastic because of the clean appearance of the plastic.**

Status of Recycled Plastics

- **FEAD's position is that recycled plastics used within Europe should be limited to those produced within Europe, but this is not possible due to World Trade Organisation (WTO) regulations. A system for third-party certification of the quality of recycled plastics coming from outside Europe to ensure that they are equivalent to European standards is required, as well as measures to permit plants producing recycled plastic**
- **FEAD has recommended to the European Commission requirements for the establishment of a quality certification regime for recycled plastics by third parties. The European Commission has responded that the Commission does not have the capacity to run a certification system.**

Status of Recycled Plastics

- **As the disposal of plastics generated within Europe is a challenge, the policy is to first reduce the amount generated. Efforts are being made to reduce single-use plastic products and to use a certain amount of recycled plastic as material for products.**

Survey Report 10

Bebat
(Battery Recycling Company)

Bebat

Contact person: Mr. Peter Coonen（Managing Director）
Ms. Nele Peeters（Director Marketing, Operations and Innovation）
Visiting location: Tienen, Belgium

Company profile

- **A system is in place to collect and recycle batteries safely and efficiently in order to protect the environment.**
- **Around 5 000 companies participate in Bebat's battery collection and recycling project.**
- **Bebat has set up around 25,000 collection points and collects 3,907 tonnes of batteries per year in order to contribute to the environment. It collects more than 90% of all collectable batteries.**
- **There is a strict rule in Europe that 'battery distributors must pay the cost of recycling', and Bebat works with car dealers and other companies from a variety of industries.**

Battery collection system

- **There is one collection point every 400 m and per 500 inhabitants.**
- **Consumers can bring in any small battery free of charge.**
- **The European Government has passed new battery regulations, which allow consumers to bring in large batteries free of charge.**

Battery collection system

- **'Technical Commercial Advisors' are deployed at collection points to remind people to co-operate with safe battery collection and to respond to collection points' questions about battery collection.**
- **Paper boxes (approximately 8 cm square) are distributed to each household, and batteries of a size that can fit into these boxes are put into containers installed at schools and retailers, while batteries of a size that cannot fit into the boxes are taken to municipal recycling centers.**

Collection container

- **The collection containers are fitted with fill rate sensors which automatically inform Bebat when the container is full.**
- **Temperature sensors give a local alarm and inform Bebat in case of fire.**
- **Collection containers vary between retail outlets, schools and recycling centers. The fill rate is communicated via the SIM card provided.**
- **The fire prevention boxes are patented and exported in Europe and to the US, Canada and Australia.**

Fire prevention box

Sorting line

- **Sorting is carried out by means of pre-treatment, manual sorting and mechanical sorting.**
- **An AI-equipped X-ray sorting system will be installed in 2024-2025. This will separate primary and secondary batteries and sort out those containing high levels of rare metals, such as nickel, to increase the recovery rate of rare metals.**

Sorting line

- **Battery storage and sorting operations have a high risk of fire, so short sorting times and temperature control are important. In case of fire, water storage containers have been installed to extinguish fires. There is also a move to consider fire prevention design at the battery production stage.**
- **Collection containers are contaminated with household waste such as plastic bottles, jars and cans other than batteries. Liquor and cigarettes are sometimes mixed in.**

Sorting line
(mechanical sorting by sieve vibration)

Sorting line (small batteries after sorting, contaminants other than batteries)

Sorting line (small batteries after sorting, lamps mixed in collection containers)

EV battery recycling

- **EV batteries are highly dangerous if not dismantled according to procedure. Conventional batteries can be handled due to experience, but batteries containing lithium are difficult to handle.**
- **30,000-50,000 t of EV batteries are disposed of in Europe every year, which is expected to rise to 600,000 t by 2030.**

EV battery recycling

- **A company specializing in EV battery collection has been established to centrally manage information on EV batteries, so that the system can identify where waste batteries can be brought to.**
- **Lack of recycling capacity. In particular, there is no participation of Japanese manufacturers.**
- **The new lithium batteries contain LFP (lithium iron phosphate), which is not yet addressed by the Belgian national or European recyclers.**

Battery passport

- **The battery passport is very positive about its operation, but progress is slow because it is not top-down from the government and requires coordination with various organizations.**
- **It is important to ID the battery and the following benefits (next slide) can be derived from the passport information.**

Battery passport

- **If the origin of who manufactured and sold the batteries is known, it is possible to identify who should be charged for the collection and disposal of the batteries. If the origin is not known, it is difficult to identify the party to be charged for the costs.**
- **Knowing the substances contained from passport information will help to identify precautions to be taken when recycling, and contribute to improved safety in battery collection and sorting operations. It may also change recycling methods and disposal costs.**
- **Tracing battery information enables usable batteries to be identified and reused.**

Energy storage system batteries (ESS) for solar energy

In Belgium, fees are paid when purchasing ESS batteries and serial numbers are registered. After 15 years, the process is checked to ensure that the fees have been paid.

E-bike battery

Bicycle batteries are usually 40% reusable. Currently, 70-80% are not reused.

Environmental education

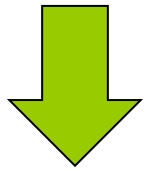
- **A factory tour facility, 'Villa Pila' has been set up to provide environmental education, including recycling, for children aged 9-12.**
- **Collecting batteries at school earns points, which can be used to help pay for playground equipment and field trips.**
- **Workshops for school personnel and children are also actively conducted.**

Battery exhibit

Findings of the survey

– Based on survey report 1 to 10 –

European resource recycling initiatives are considered advanced. It is true that they are moving quickly and are putting in place policies that have an impact.



After survey･･･

Not all initiatives have been successful.

- ✓ **There may be a lack of information and failed initiatives to recycle waste as a resource.**
- ✓ **Even innovative technologies and systems are gradually becoming more effective through trial and error.**
- ✓ **The European Commission's policy and the European countries' coordination are very difficult. (More agencies and actors involved than in Japan?)**

Europe, Japan and the whole world are aiming for the same goal
“Carbon neutral by 2050”

Each country, institution, office and department around the world will pool their wisdom to achieve the target. Japan's (Asia's) efforts could also serve as a reference abroad…

- ✓ **A waste information platform has been established by law (e-manifests in Japan).**
- ✓ **High recycling rate of construction waste (thorough separation at construction sites)**

Common European and Japanese challenges regarding waste disposal and recycling.

- ✓ **There are limits to the pursuit of recycling technology. Reuse and recyclable designs are needed at the product manufacturing stage.**
- ✓ **There are also issues with waste separation and collection methods. The separation methods need to be communicated and thoroughly enforced in line with the recycling system.**

Learning and issues related to waste information

- ✓ **In order to make use of the information, it is important to enter accurate information.**
- ✓ **The issue is what information can be shared by the parties concerned. Some information can and cannot be shared due to privacy concerns.**

Characteristics of construction and demolition waste in the Netherlands

Construction and demolition waste in the Netherlands was often in the form of mixed waste. Why？

- **The Netherlands is earthquake-free! Buildings don't lose value after 100 years! Houses don't collapse even if they are slanted!**
- **It is not possible to change the exterior of old buildings in the Netherlands. Therefore, there is a lot of renovation inside buildings.**
- **There is no space on the housing site for a number of containers for sorting, and the containers are mixed with waste generated by renovation.**

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