

The UN Secretary-General's Advisory Board on Zero Waste

Smart Waste Ambon



Zero waste good practice

SweepSmart, Recovered Indonesia and Green Moluccas

Ambon, Indonesia

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About

Synopsis

Smart Waste Ambon is an innovative, best practice Smart Waste Collection model and Sorting Facility to handle waste safely and efficiently.

Implementation
period

2022 - 2023

Country

Indonesia

Location

Ambon

Stakeholders and Partners: SweepSmart, Recovered Indonesia (Reco), Green Moluccas, City Government of Ambon, MVO Nederland, GEESINKNORBA, Rebel Group, TNO

Connection to Zero Waste

Zero waste movement emphasizes the reduction of waste and maximizing recycling. With Smart Waste Ambon, two main points of the initiative are the collection points and the segregation facility. The collection points replace the current open dumpsites with closed-lid segregated waste bins, where the household can separate their waste into recyclable and non-recyclable waste. The waste is then transported to the segregation facility, to be sorted further into 21 types. The segregation materials are then sent to the local recycling facility to be made into new materials. This whole process promotes the reduction of waste, as more materials can be recovered by recycling into new products which prolongs their lifespan even further.

Contribution to Sustainable Development Goals

The main goal is Goal 12, with one of the targets being “By 2030, substantially reduce waste generation through prevention, reduction, recycling, and reuse”. The Smart Waste Ambon provides prevention of waste generation by building awareness of the importance of segregating waste in the local communities. This prevents the waste from being thrown away before the end of its lifespan. The waste is transported to the recycling facility for sorting and then brought to a local recycling partner for recycling.

Besides, other goals related to the initiative are:

Goal 3: By empowering the organisations we work with to prevent waste leakage to the environment, we enable a clean living environment and reduce pollution caused by waste dumping and burning.

Goal 8: By scaling up the capabilities of waste management organisations and their workers, we improve dignity and working conditions of waste workers, majority from vulnerable communities and many women.

Goal 11: By building modern & efficient waste systems, we make cities, communities and the industry more circular and sustainable.

Goal 17: Waste is a systemic issue and we work with stakeholders in all areas to solve it, like governments, NGOs, companies, funders, communities and waste workers.

Background, Challenges and Objectives

Ambon City is the capital of Maluku Province in Indonesia. With a population of around 350 thousand people, 90.000 tons of waste per year is produced in the city of which only 2% is recycled. The lack of a proper waste management system and regulation are some of the main challenges that resulted in the condition that it is now. However, with the rising awareness of the need to address this challenge, a partnership between a group of Dutch and Indonesian organizations was made through Plastic in Circles: an Indo-Dutch Consortium on Circular Plastics (PiCi).

Video of the project [here!](#)

Smart Waste Ambon was developed to become a smart waste handling model for economies with less developed waste sectors to collect and sort waste in a safe, efficient, and inclusive way. The initiative focuses on an integral solution for improved waste management, from awareness raising and source segregation at households, to implementing best practice waste collection and sorting systems that feed into the plastic recycling capacity of local partner Reco. This creates a holistic solution, where the intention is to connect all layers of the process.



Actions and Implementation

In the actions and implementation chapter, the steps taken to achieve sustainable waste management are outlined.

1. Design & Feasibility study to develop a design that fits the local context
2. Partnership with local government and local community, to acquire land for the collection points and waste sorting facility
3. Awareness and education and community empowerment in waste reduction and waste segregation (2000 households)
4. Design and implementation of Collection points, designed by local students with local and sustainable materials. The collection points have coloured closed-lid bins for drop-off of source segregated waste (recyclable/non-recyclable) by households
5. Implementation of a European waste compactor truck, to automatically empty the bins and transport the waste safely and hygienically
6. Installation of Smart Waste Sorting facility, including semi-mechanised equipment for sorting (conveyor belts), compression (baler machine) and internal transport (skid-steer loader, stacker)
7. Extensive Quality, Health and Safety trainings, Standard Operating Procedures, PPE and manuals implemented for collection and sorting
8. Partnership with local recycling company Reco to recycle the plastics, in particular focused on low-value, difficult to recycle plastics
9. Plastic credits assessment and implementation to improve the economic viability of collection and sorting of the low-value plastics
10. Monitoring through an impact monitoring model developed by TNO and Rebel Group, plus a Smart Waste App that enables digital tracking system for the operational activities, waste flows and financial flows and KPIs, from collection, to sorting and the aggregator/recycler that buys the materials.

Outcomes and Impact

The Smart Waste Ambon model is a replicable blueprint for small to medium-scale smart waste management in upcoming economies. In particular the following results were generated:

1. Source segregation and awareness generation at 2000 households and education at schools
2. Waste drop-off in coloured bins at 5 collection points that enable source segregation and hygienic storage of waste
3. An innovative waste collection model with a compactor truck that transports the waste 2-4 times more efficiently and drastically improves safety, ergonomics & hygiene.
4. A smart waste sorting facility that sorts 12 tons per day (capable to handle source segregated recyclables and mixed waste), ready for recycling by local partner Recovered Indonesia
5. 28 green, safe and healthy jobs created for the waste workers, focused on the informal sector population currently working on the landfill
6. Implementation of Plastic Credits to improve the economic viability of ocean-bound plastics (focus on low-value plastics), to be published on PCX standard website soon.

2,000 households & schools

Source segregation and awareness at 2000 households and schools.

5 collection points

Waste drop-off in colored bins at 5 collection points.

12t per day

Smart waste sorting facility processing 12 tons per day, ready for recycling.

Replicability and Scaleability

Smart Waste Ambon can be replicated in other areas in Indonesia and other upcoming economies. SweepSmart has built the Smart Waste Ambon model based on experience in setting up 14 other Smart Waste Facilities and is continuously scaling up its impact to other locations. It has already worked in 7 upcoming economies (India, Indonesia, Ghana, Kenya, Thailand, Malaysia, Guatemala) on similar solutions. This project had a particular focus on a remote (island) location like Ambon, where the business case for waste management is more difficult than normal due to its remoteness to recycling and other markets. Also, it was the first time to implement the Smart Waste Collection model.

Several points that need to be prepared beforehand:

- Collaboration between the right partners with the same vision
- Aligning expectations of the partners before the start of the project
- Involve local governments and build partnership/trust, especially to get support to provide land and buildings for the waste collection and sorting locations (otherwise the business case is not economically viable)
- Involve local communities to learn more about the grassroots and to make them feel included
- Keep a close eye on all aspects of the financial model and be ready to amend if needed. This is important to create a sustainable business case so the project can continue even after the initiative period ends.

Inclusion and Innovation

Smart Waste Ambon involves both global and local stakeholders in the process. At the start, it was initiated by PiCi program which was supported by Dutch Ministry of Infrastructure and Water Management and Dutch Embassy in Jakarta and funded by P4G, the Dutch Ministry of Foreign Affairs, and local partners. To implement the initiative in Ambon, SweepSmart as the Dutch partner provides concept and technology, which then be implemented by the local Indonesia partners: Green Moluccas, RECO, and the City Government of Ambon. Gaining engagement from the local communities is one of the important points to make the initiative inclusive, including community approval on placement of the collection points. Partnering with Green Moluccas, a local Ambon NGO that focuses on environmental education and community empowerment. Through the education programs, the communities are able to directly implement their new knowledge by segregating their waste into the coloured bins prepared at Smart Waste Ambon Collection Points. Students are also one of the main important beneficiaries, as they can share the knowledge they learned at school and influence their family at home. The initiative is also focused on creating decent jobs with high standards on health, safety and ergonomics for the waste workers, in particular for vulnerable groups and including the existing informal waste sector. The implemented machinery and Personal Protective Equipment reduces physical strain and minimizes contact with the waste. Safety mechanisms are built into the machinery and implemented QSHE policies and training.

Accountability and Sustainability

The challenges in operating a waste sorting facility usually lies on the lack of profitability in the business case and no data being collected in the process. To address the challenge, the full operations from source to recycler are tracked by an app that helps to manage operations and creates transparency in the waste flows. This enables trade of plastic credits/EPR or fair/community-trade plastics by the facility. The app tracks operational activities, waste flows and financial flows and KPIs, from collection, to sorting and the aggregator/recycler that buys the materials. Operational and financial KPIs are maintained in a dashboard. This way, operations and profitability can be managed more effectively, thus improving the efficiency and profitability of the centres. There is also an impact monitoring tool developed by Dutch research organisations Rebel Group and TNO that tracks the overall social, environmental and economical impact of the project.

Financial Data

The budget is USD 1.1 mil. It was funded by P4G, the Dutch Ministry of Foreign Affairs, and local partners. Besides being supported financially, the Dutch partners (SweepSmart and Geesinknorba) also support the initiative with concepts and technology, which are then being taught to the local Ambon partners so that they can operate and manage the facility by themselves.

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