Proposal for Circular Economy through Integrated Waste Management at the Kiteezi Landfill, Uganda

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Circular Economy through Integrated Waste Management
at the Kiteezi Landfill, Uganda

01 Project Overview

Proposal title

· Project for Circular Economy through Integrated Waste Management at the Kiteezi Landfill

Purpose

· To support resource circulation economy

· To supprot integrated waste management system

· To secure landfill capacity

Project outline

· Location & Facilities

- MRF for recyclable waste & transfer station at Kiteezi
- New sanitary landfill for residues at Dundu

· Estimated total investment cost : TBD

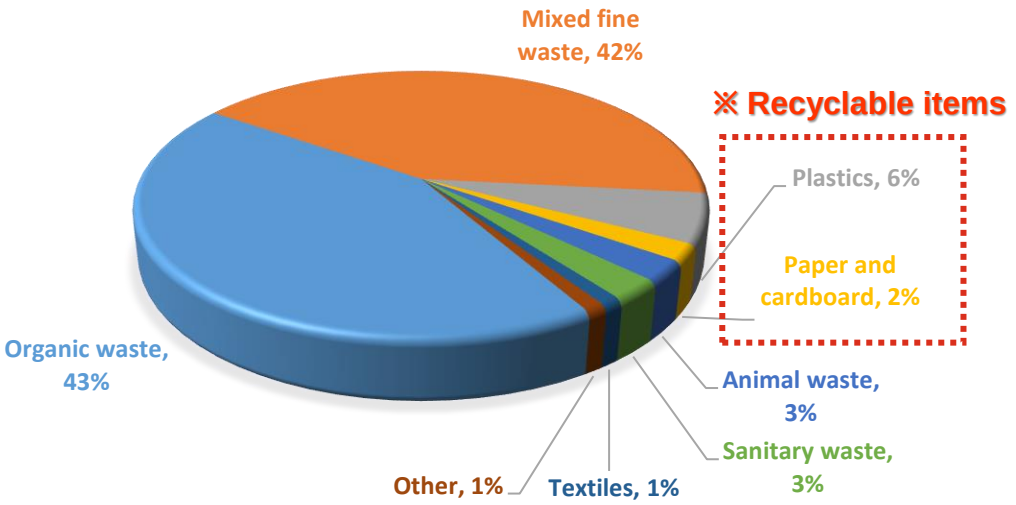
· Construction period : 2 years

※ The location of proposed site is subject to change during feasibility study and design.

※ MRF: Material Recovery Facility

02 Identification of Issues

Waste Characteristics



- Amount of waste brought into Kiteezi Landfill : **avg. 1,200 tons/day**
- Dominant “Organic waste (43%)” composition in the municipal solid waste
- **Recyclable waste (plastics & paper/cardboard) : approx. 8%**
  ※ Current recycling target, recycling rate, and unit sales price of recycled products need to be confirmed.
- **Need pretreatment methodology by MRF (Material Recovery Facility)**
- At the final treatment stage, every valuables are taken by waste pickers from private sector

02 Identification of Issues

Waste Management Scenario

Baseline
(Current status)

Waste Generation → Mixed waste → Dumping Site

Alternative
(This plan)

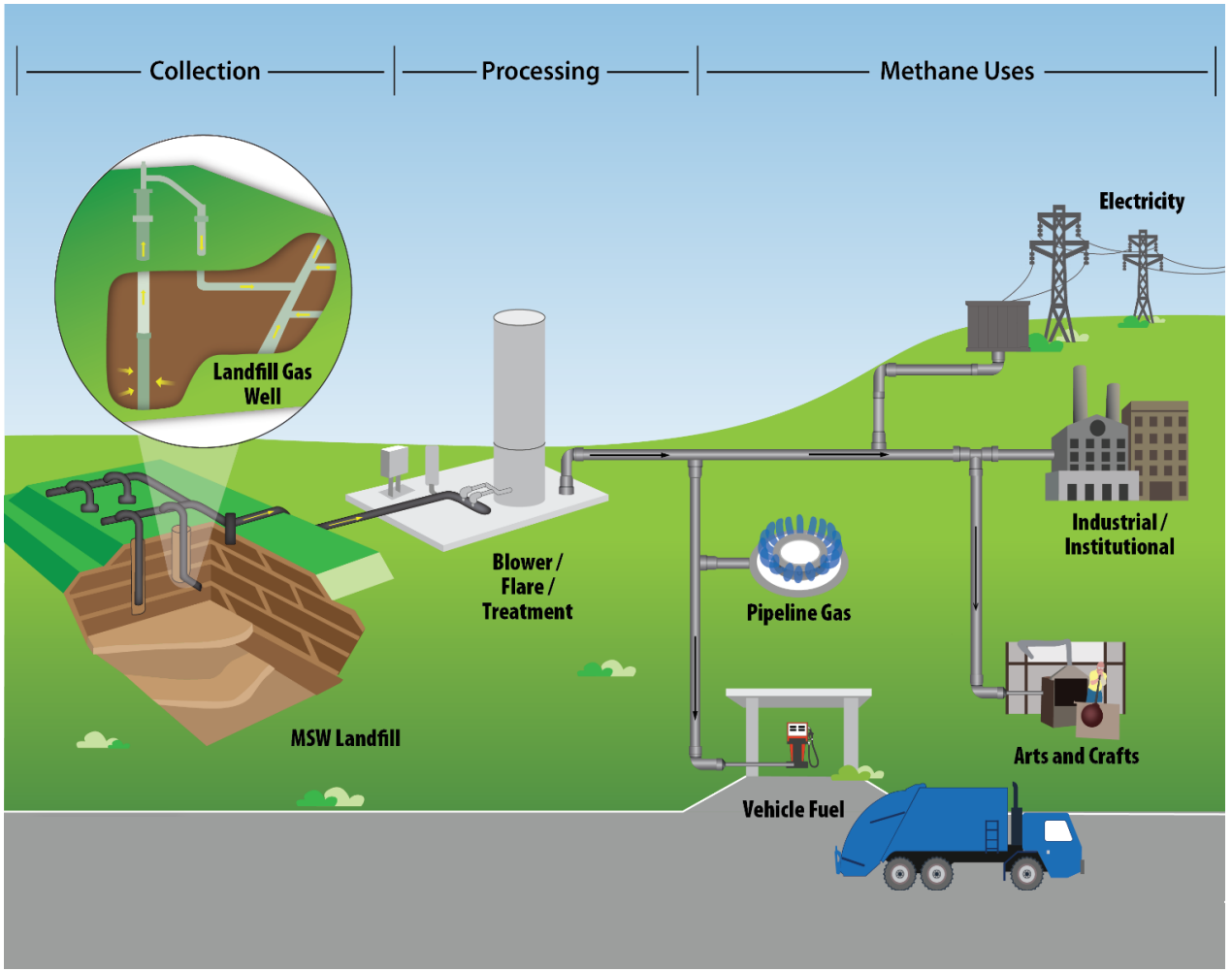
Waste Generation (without source seperation) → Sorting line for Recyclables → Others → New Sanitary Landfill

- Primary purpose : **Waste reduction by promoting recycling**
- List of Interventions :
  - **Exsiting Kiteezi landfill site closure**
  - **Recycling center (MRF)**
    and transfer station at Kiteezi
  - **New sanitary landfill at Dundu**

03 Project Implementaion Plan

Concept of Collecting and Treating Landfill Gas (LFG)

- Instead of escaping into the air, LFG can be captured, converted, and used as a renewable energy resource. Using LFG helps to reduce odors and other hazards associated with LFG emissions, and prevents methane from migrating into the atmosphere and contributing to local smog and global climate change. In addition, LFG energy projects generate revenue and create jobs in the community and beyond.



Reference) https://www.epa.gov/lmop/basic-information-about-landfill-gas

03 Project Implementaion Plan

Technologies for LFG Processing & Power Generation at Kiteezi site

LFG collection

CSV tank

Moisture removal

H_2S removal

Heat exchanger

Power sale

Power generation

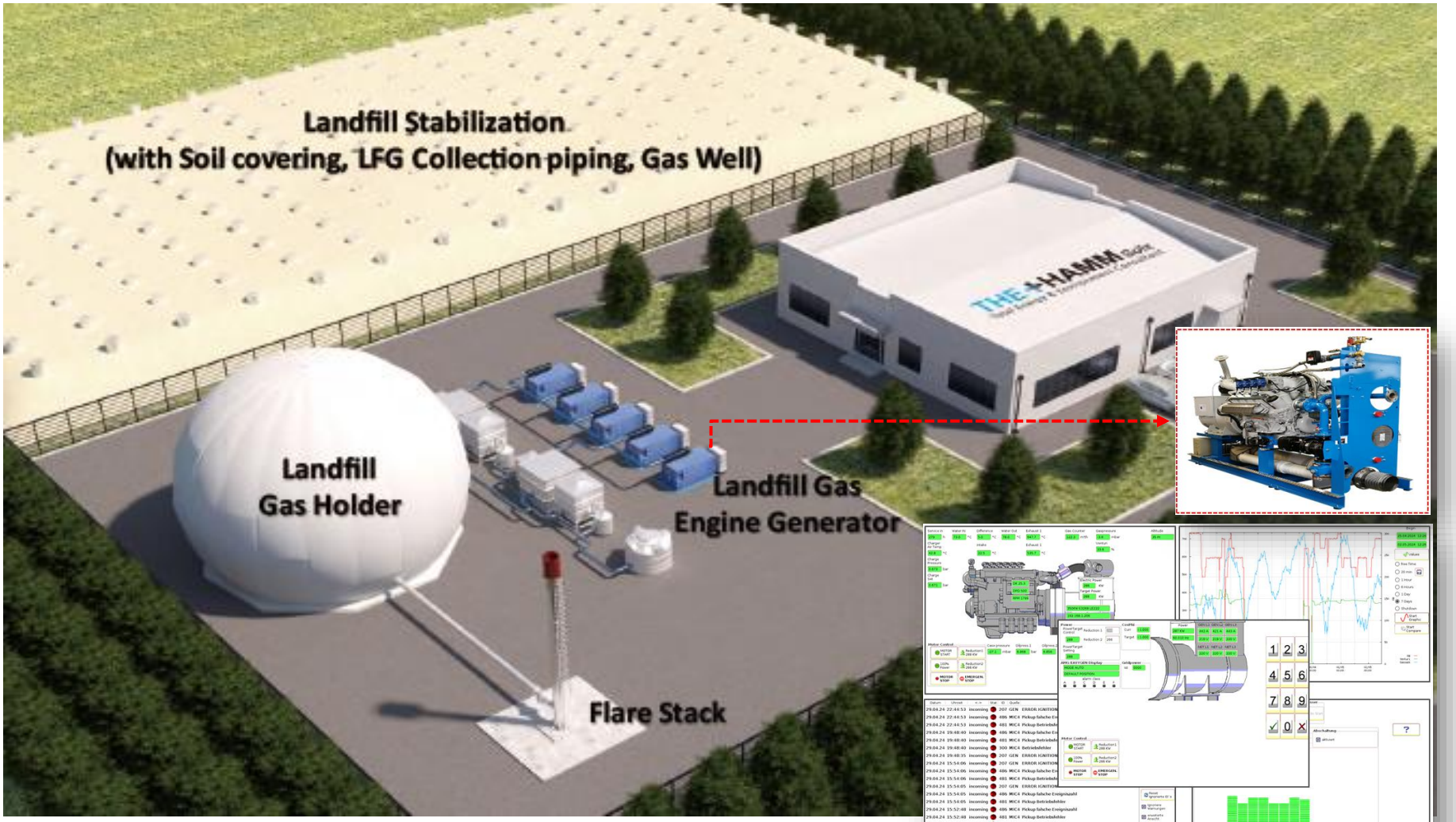
Siloxane Removal

Roots blower

Concentration meter
(CH_4, CO_2, O_2, H_2S)

03 Project Implementaion Plan

Layout Plan (example) and O&M at Kiteezi site



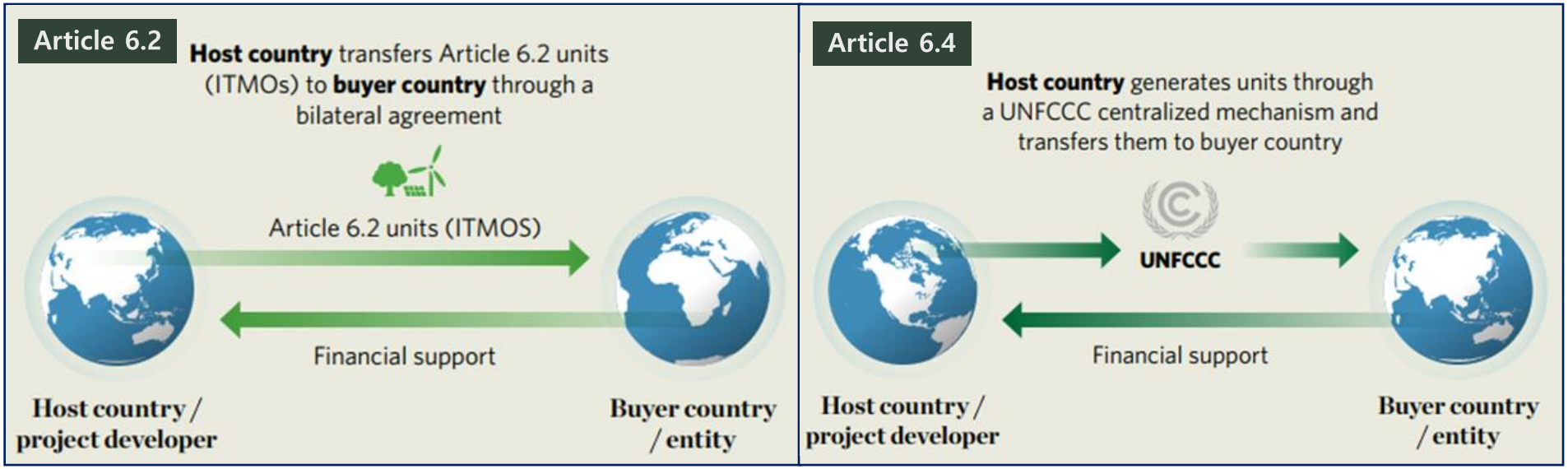
03 Project Implementaion Plan

Greenhouse Gas (GHG) Reduction at Kiteezi site

▶ Methodology

Category	Business scale		Methodology name	Note
AMS-Ⅲ.G.	**Small**	**Reduction up to 60,000 tons**	Landfill methane recovery, Version 10.0	• Assessing the validity of expected GHG reductions in renewable energy projects of similar scale in developing countries. • Proposal of project promotion type PA (single project) or PoA (program project) considering the potential demand of landfill sites, reduction effect size, and project operation period
ACM 0001	Big	Reduction exceed to 60,000 tons	Flaring or use of landfill gas, Version 19.0	
AMS-Ⅰ.D.	**Small**	**Power generation up to 15MW**	Grid connected renewable electricity generation, Version 18.0	

▶ Article 6 of the Paris Agreement



Reference) https://sustainabilityguru.medium.com/decoding-article-6-of-the-paris-agreement-0f7ab14247f3

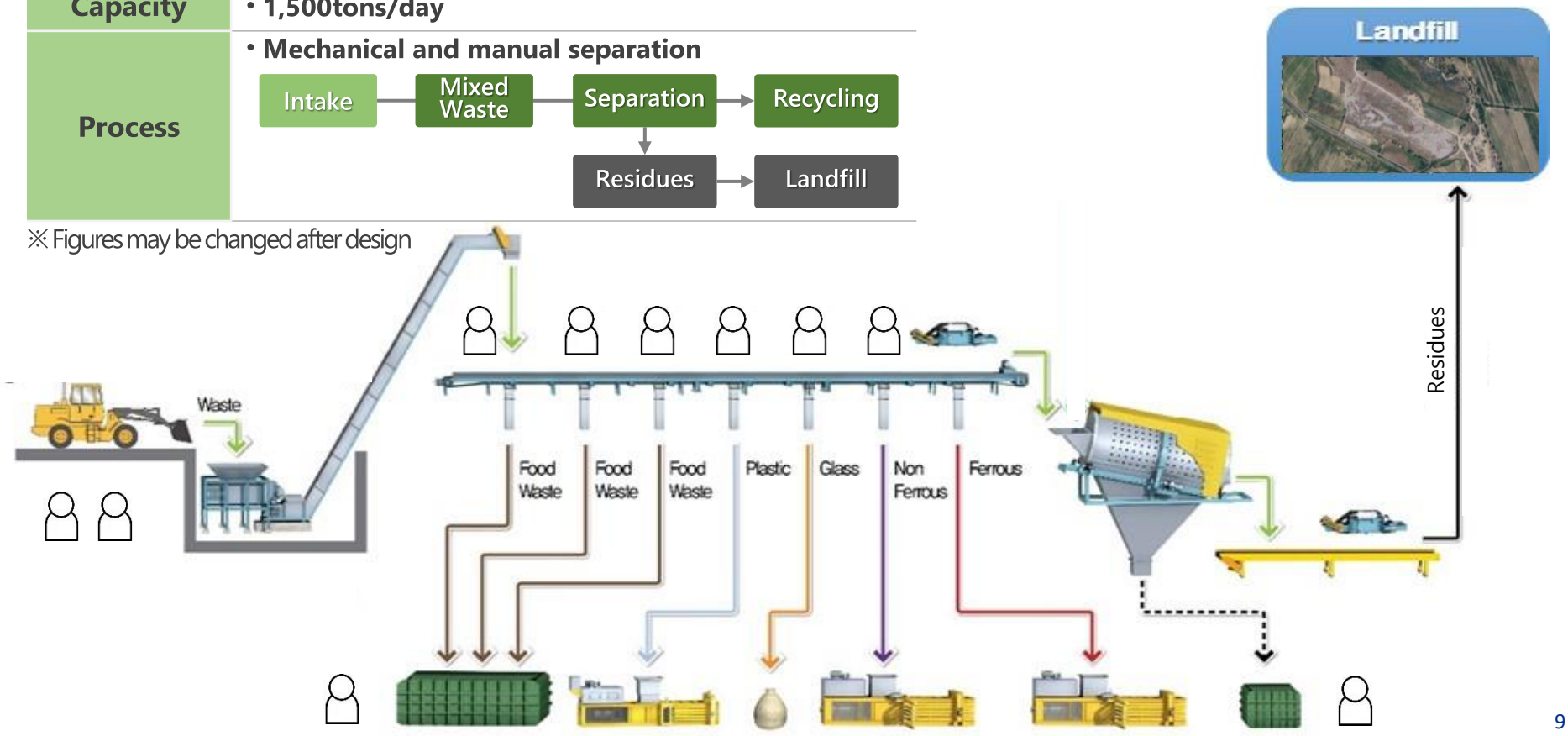
03 Project Implementaion Plan

Recycling center (1/2) at Kiteezi site

Concept of Material Recovey Facility (MRF)

Description	• Reduce the landfilling amount • **Encourage recycling (plastics, metals, glass etc.)** • Manual sorting to ensure job creation
Capacity	• **1,500tons/day**
Process	• **Mechanical and manual separation** Intake → Mixed Waste → Separation → Recycling Separation → Residues → Landfill

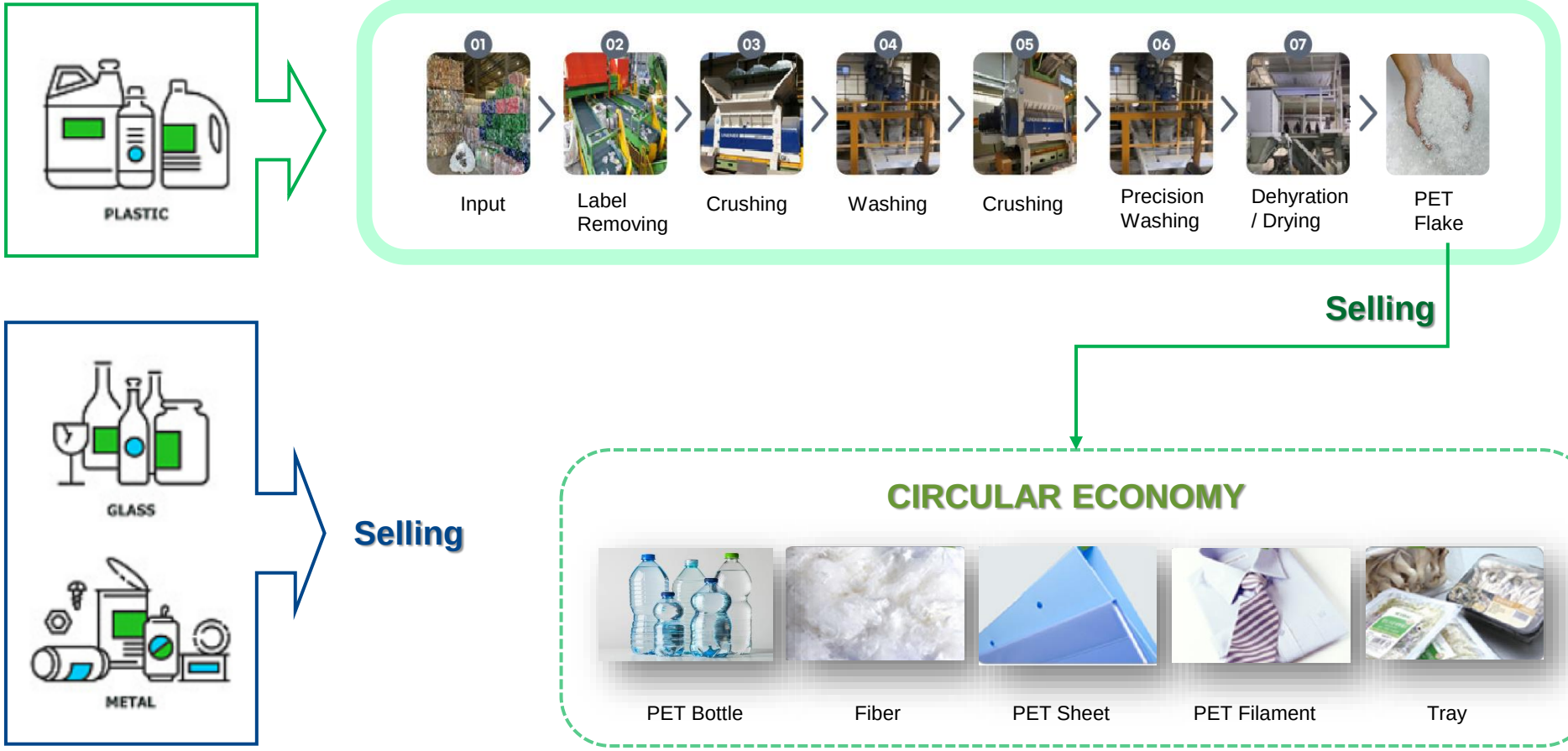
※ Figures may be changed after design



03 Project Implementaion Plan

Recycling center (2/2) at Kiteezi site

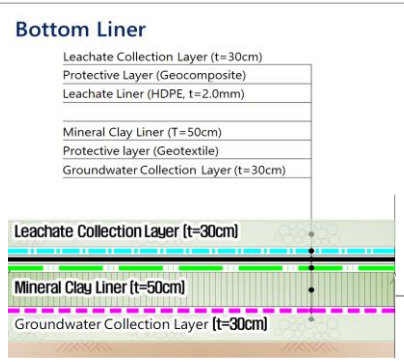
Concept of Plastic Recycling Facility after MRF



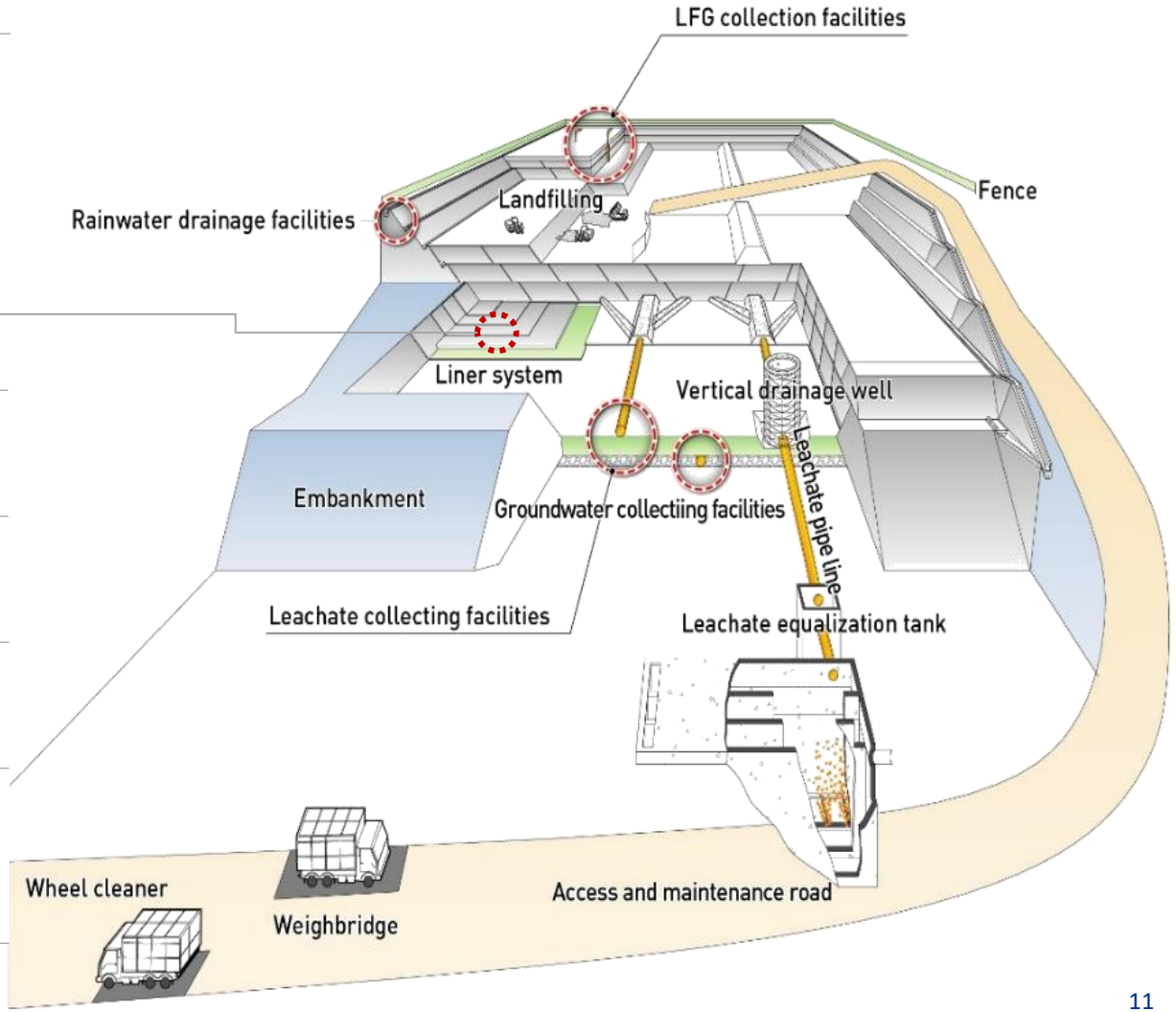
03 Project Implementaion Plan

Sanitary landfill at Dundu site

Concept of Sanitary Landfill

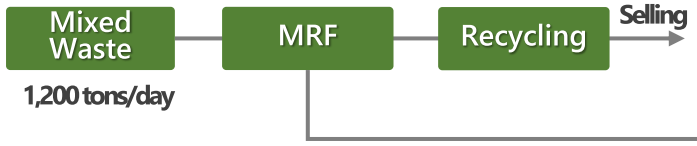
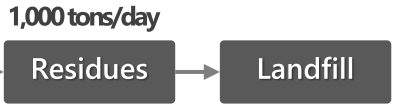
Liner System	
Landfill Area	**approx. 134 acres**
Capacity	**approx. ( ) ㎥** **(approx. O mil. tons)**
Operation Period	**10 ~15years / phase**
Auxiliary	Weighbridge / Leachate treatment / LFG collection etc.

Note) The above concept may change during design.



04 Business Structure & Funding Source

SPV Role (draft)

Items		Koean JV	KCCA
Role		• Investment & EPC • Operation for GHG/MRF plant	• Waste supply • Operation for new landfill
DBO	Design, EIA	• Master plan of site • DBO	• EIA
	Funding	• Investment : GHG/MRF plant • Funding from K-EXIM : landfill	• (TBD)
	Construction	• GHG/MRF plant	• Tender : new sanitary landfill
	O&M	• GHG/MRF plant (15 years)	• KCCA supported by Korean Gov.
Service Cost		• (TBD)	• (TBD)
Etc.		• Administrative support required • Location: Kiteezi site	• Location: Dundu site
Process			

Note) DOB : Design, Built, Operation

Thank you