GLOBAL LEADERS PROGRAMME

CREATING A CIRCULAR PLASTIC ECONOMY FOR BALI, INDONESIA

MAY 2023

GIFT GLOBAL INSTITUTE FOR TOMORROW.

TABLE OF CONTENTS

KEY TERMS

Circular Economy	A model of production and consumption based on the continuous reuse and regeneration of existing materials or products
Polluter Pays Principle	Common practice where polluters bear the expenses of carrying out pollution prevention and control measures
High-value plastic (HVP)	Rigid plastics that are easier to recycle i.e., PET, HDPE, and PP
Low-value plastic (LVP)	Flexible plastics, films, e.g., LDPE, PS, or multi-layered plastic
Multi-layered plastic	Plastic made from several different types of plastic layered together with technology; mostly found in packaging e.g., sachets
Bales	Strapped bundles of mono plastic material e.g., PET bale
Flakes	Plastic that has been shredded or cut to enable further processing
Pellets	Standard raw material (tablets or granules of uniform size and colour) used in plastic manufacturing
Mechanical Recycling	Recovers plastic waste via mechanical processes (grinding, washing, separating, drying, re-granulating, and compounding)
Chemical Recycling	Converts plastic waste into chemicals by changing polymers into monomers to then be used again as a raw material
Organic waste	Biodegradable waste from plants or animals; in Bali, food scraps, garden trimmings, and ceremonial waste are common
Material Recovery Facility (MRF)	Specialised plant that receives, separates, and prepares dry recyclable materials
PERGUB	Provincial level Government regulation (Bali)
TPA	Government-run landfill site (Bali)
TPS3R	Government-owned waste management infrastructure at the village level, serving a minimum of 400 households each; can be run by private companies, NGOs or the community (Bali)
Junk Shop	Informal waste collector and aggregator buying waste from waste pickers and selling to middlemen or recycling companies
Waste Bank	Community or NGO-run temporary waste collection and/or sorting sites

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY (1/2)

***Vision:* Develop Bali into one of the world's first circular economies for plastic with a replicable model for tourism-dependent islands in Indonesia and ASEAN, and globally.**

Targeting Bali's largest waste sources, **high-value plastic** (HVP), **low-value plastic** (LVP), and **organic waste**, this business plan provides commercially viable recommendations on how Bali can address and overcome its challenges with waste management at all stages (collection, sorting, processing, manufacturing), and serve as a circular economy model for islands where tourism is a key driver for economic growth.

PROJECT PARTNER: KIBUMI

Learn more

This Business Plan is composed of 3 key components:

- The **Clean Bali Fund**
- Cooperatives (Co-ops)
- Centres of Excellence (CoEs)

SOCIETAL IMPACT

Within the first 3 years…

SOCIAL

30 co-ops created across Bali incentivising ~43,000 households to separate waste at source

ENVIRONMENTAL

30 – 40% of LVP prevented from being dumped illegally and leaked into the ocean

ECONOMIC

Approximately US$20 million will be directed towards co-ops to facilitate waste separation at source

1

CLEAN BALI FUND

The Clean Bali Fund incentivises waste separation at source and partially funds waste management via a minor surcharge imposed on tourists of US$2 per room per night.

2

COOPERATIVES

Community-owned and run, the co-ops will be the first point of collection for unsorted or sorted waste at the village level. Subsidies provided by the Clean Bali Fund, will prevent underpricing of LVP and organic waste processing to ensure both types of waste are properly managed.

3

CENTRES OF EXCELLENCE

The CoEs will aggregate and/or process HVP, LVP, and compost to be sold to respective buyers. CoEs will be the first in Bali with flaking capabilities and thus can sell HVP at a higher value.

EXECUTIVE SUMMARY (2/2)

The Business Plan will be supported by local-level policy recommendations and industry group commitments:

PUBLIC POLICY

1 Mandate the use of recycled content

Mandate the use of a minimum of 30% recycled material in private and public construction projects by 2027, including hotels and public works.

2 Limit the export of plastic waste

Ban the export of plastic waste outside of Bali after 2027. Under the order, only recycled flakes or pellets would be allowed to be exported for further processing.

3 Ban multilayered plastic

Expand the current single-use plastic ban to include non-essential multilayered plastic such as sachets by 2025. By 2035, expand the list to include all imported and domestic virgin plastic.

4 Incentivise recyclable product design & adoption

Reward brand owners and producers with tax credits or rebates for rolling out easily recyclable products e.g., colourless or label-free products. Reward suppliers and distributors for utilising recycled low value plastic in their products.

INDUSTRY GROUP COMMITMENTS

1 Support the establishment of the Clean Bali Fund

Hotel and tourism industry groups should make public commitments and ensure participation in the Fund by their members by 2024.

2 Make commitments to support the material inflow and outflow of the CoE

Hotel, retail, and agriculture industry groups should guide members to send at least 30% of their waste to CoEs, and integrate at least 30% recycled content into their respective supply chains by purchasing recycled products.

FINANCIAL ANALYSIS

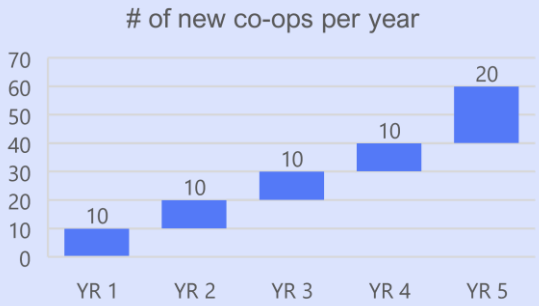
Fund Inflow

The Clean Bali Fund is projected to raise approx. US$11 million in Year 1

The Fund will be supported by a Government matching scheme in Year 3 of US$0.5 for every $2 from the hotel industry.

Fund Outflow

The Fund will target to subsidise the building of a total of 60 co-ops in 5 years.



The Fund will provide:

- co-ops with CapEx for infrastructure and a US$0.5/kg subsidy for the processing of LVP & organic waste,
- CoEs with service fees for providing capacity building and brokerage services to co-ops, and
- local recyclers with soft loans.

PROGRAMME BACKGROUND

GLOBAL LEADERS PROGRAMME

The **Global Institute For Tomorrow (GIFT)** is an independent pan-Asian think tank, committed to purposeful leadership learning and partnering with clients to help them unlearn conventional wisdom and unleash organisational potential to redesign society.

The Global Leaders Programme (GLP) is GIFT's flagship experiential learning programme designed for senior executives from leading global organisations to think critically about the drivers of change in the 21st century and develop new business models and innovations that address the defining challenges of our time.

During this GLP, 20 participants from business and government from around the world convened in Hong Kong and Indonesia over the course of two weeks (8 – 19 May 2023) to undertake **classroom sessions**, **stakeholder meetings**, **site visits**, and **business plan development sessions**. The highlights of this proposal were presented at GIFT's **Public Forum** on 19 May 2023 in Bali, which was attended by over 100 attendees.

GIFT would like to thank everyone who put in their valuable time and effort to make this GLP possible.

PARTICIPATING ORGANISATIONS

DBS

NEC

BASF
We create chemistry

DYNAPACK
ASIA

ORIX

InvestHK

Panasonic

SUPPORTING ORGANISATIONS

Our appreciation to all the stakeholders involved!

ADUPI

delterra
Real Change, At Scale.

South China Morning Post

Asia Business Council

HSBC

HYATT

PROJECT BACKGROUND

GLOBAL OUTLOOK *| Mitigating a Plastics Apocalypse*

400 million tonnes

of plastic are produced globally every year, much of which is mismanaged.

850 million tonnes

of green house gas emissions are emitted from the production and incineration of plastic, which is **equivalent to the emissions of 200 coal-fired plants** this year.

15%

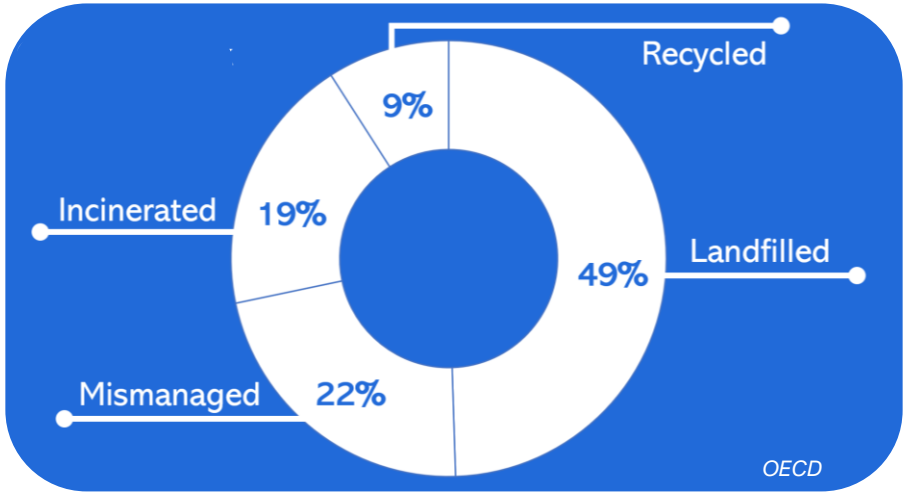
of global emissions will come from plastic by 2050, if left unchecked.

8 million tonnes

million tonnes of plastic waste escapes into the ocean from coastal nations every year.

US$2.5 trillion

is estimated to be the damage to marine ecosystems a year by scientists, contaminating the food chain and water supply, and leading to severe health impacts for humans.



Despite landfills reaching saturated conditions globally, plastic recycling rates are low, averaging at only 9%. A large proportion of plastic waste is dumped at landfills and illegal dumping sites or openly burned, releasing high levels of greenhouse gas emissions.

THE BALI CRISIS

As one of the top destinations globally for tourism, Bali attracts millions of tourists each year. Behind the scenes, however, the island is increasingly being buried in plastic pollution.

1.6 million tonnes

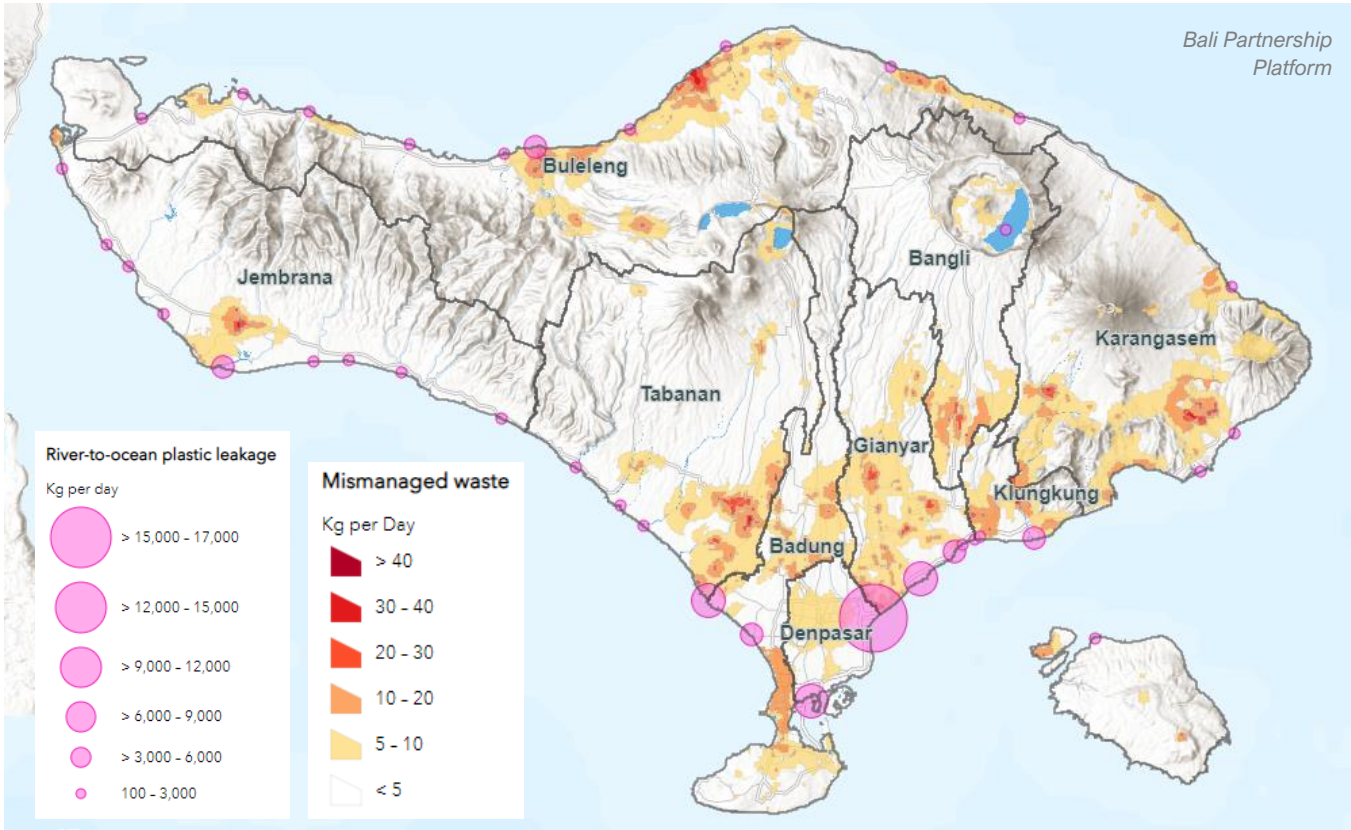
of waste is generated per year by Bali residents, tourists, and organisations, **20% of which is plastic waste (303,000 tonnes), and 70% is organic waste.**

50%

of total waste and 11% of plastic waste is **leaked into the ocean** from illegal dumping sites, polluting its vital marine ecosystem.

3.5x

more waste is **generated by tourists** per day than residents.



PROJECT SCOPE

Objective:
Participants on the GLP were asked to develop a business plan for Bali that can address its challenges and improve its current approaches to waste management and recycling and serve as a circular economy model for replication in other regions of Indonesia and ASEAN, and globally.

Methodology:
- Stakeholder interviews and site visits with subject matter experts from government, waste management companies, the hotel industry, the informal sector, NGOs, and community members
- Desktop research and analysis
- Business model generation and planning sessions

Outcome:
- A business plan with analysis of key areas including business model, operations, strategic partnerships, policy recommendations, financial analysis, and societal impact.
- A presentation at a public forum on 19 May 2023 at the Grand Hyatt Bali on the business plan to corporate partners, investors, hotel groups, government, academia, NGOs, community, and media.

PROJECT PARTNER

KIBUMI

Founded in 2020, Kibumi is a local start up focused on improving Indonesia's plastic waste collection and recycling by working closely with the informal sector. They eliminate middlemen from the waste recycling value chain by buying waste directly from junk shops, thereby increasing the value of waste collected by waste pickers and junk shops. They process the collected waste into bales of PET & HDPE at their Bumi Hubs. The bales are then sold to recycling companies for further processing into flakes and pellets.

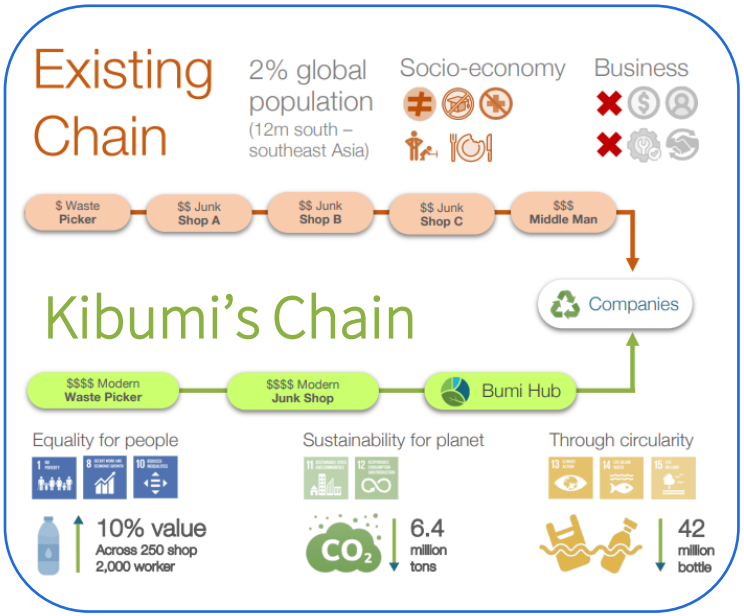
Kibumi currently owns 4 Bumi Hubs across Sumatra and Java. They plan to expand into Bali, Sulawesi, and Maluku. They are currently providing the following services:

- Recyclables sourcing for recycling companies (local & international)
- EPR reporting & plastic credits for brand owners & producers
- Research & implementation for community-based pilot projects

Kibumi is also building an end-to-end technology solution, providing digital waste management services, an EPR platform, and ESG dashboard to benefit its ecosystem of stakeholders.

They have built strong partnerships with organisations from various sectors, including brand owners and producers, recycling companies, governments, and NGOs. Examples include Mayora, ADUPI, United Nations FAO, GIZ, Veolia, and Prevent Waste Alliance.

We would like to take this opportunity to thank our Project Partner, Kibumi for their continued support.



PROJECT SUPPORTER

ADUPI
ASOSIASI DAUR ULANG PLASTIK INDONESIA

Established in 2015, ADUPI is the largest and most prominent plastic recycling industry association in Indonesia, representing over 600 members, including SMEs and larger companies, informal and formal, from every stage of the supply chain from collectors and balers to recyclers and manufacturers, as well as academic institutions.

We would like to take this opportunity to thank our Project Supporter, ADUPI for their continued support.

BUSINESS MODEL

CURRENT CHALLENGES

Due to poor waste management infrastructure and supporting policies, Bali is unable to efficiently collect, sort, and recycle waste. The following are key issues that need to be tackled:

Waste collection is poor and lacks separation at source. Most waste is sent to landfills or illegal dump sites and leaked into the ocean. Only 7% of Bali's plastic waste is collected for recycling.

Bali's largest landfill – TPA Suwung, will shut down this year. The landfill currently collects 1000 tonnes/day from 400 trucks. There is no clear direction on where this waste will be diverted once the landfill has shut down.

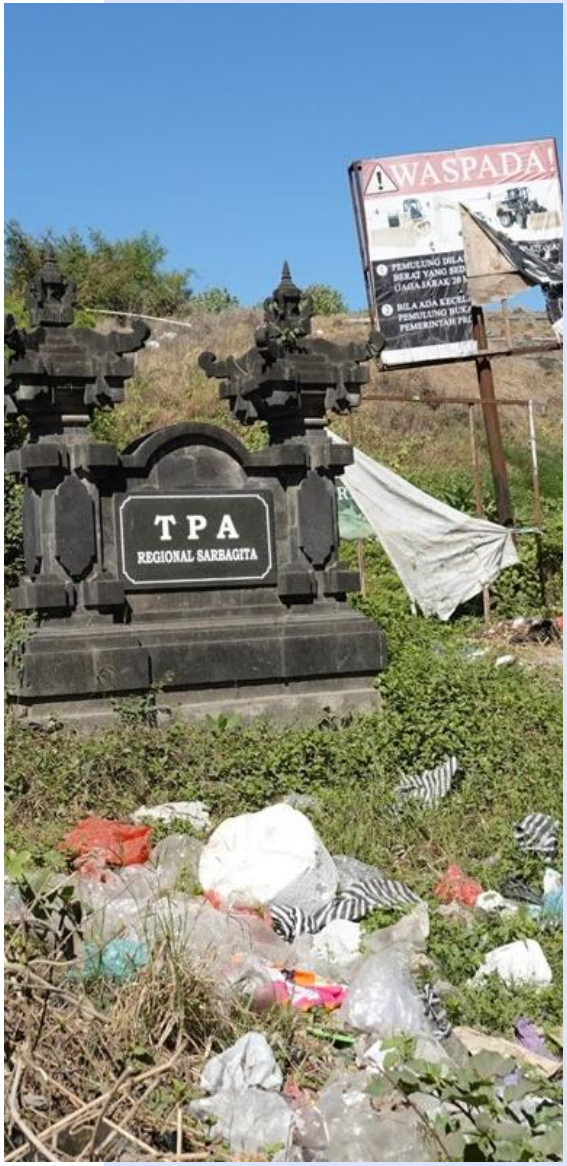
Household collection is decentralised across 700 villages and varies from village to village. There is insufficient regulation or incentives in place to encourage proper waste collection and recycling.

Apart from a few exceptions, current village level waste management infrastructure (TPS3R) is not standardised nor operating effectively. Furthermore, they will not have the capacity to process waste diverted from the TPA Suwung landfill.

Despite generating 3.5x more waste than locals, there are no regulations or schemes in place to curb waste generated by the tourism sector.

Organic waste and low-value plastic (LVP) are currently underpriced by the market, and thus least recycled and most leaked into Bali's land and waterways. LVP is often multi-layered e.g., sachets, making it almost impossible to recycle mechanically.

There is currently no infrastructural capacity to recycle high-value plastic (HVP) in Bali after the sorting phase into flakes and pellets. Therefore, HVP which could bring economic value to Bali's recycling industry, is instead sent to East Java for further processing at a lower market value.



SOLUTION OVERVIEW

***Vision:* Develop Bali into one of the world's first circular economies for plastic with a replicable model for tourism-dependent islands in Indonesia and ASEAN, and globally.**

Targeting Bali's largest waste sources, **high-value plastic** (HVP), **low-value plastic** (LVP), and **organic waste**, this business plan provides commercially viable recommendations on how Bali can address and overcome its challenges with waste management at all stages (collection, sorting, processing, manufacturing), and serve as a circular economy model for islands where tourism is a key driver for economic growth.

The business plan is composed of **three key components**: the Clean Bali Fund, Cooperatives (Co-ops), and Centres of Excellence (CoEs):

BENEFITS

- Incentivises behaviour change for standardised collection and separation at source at the village level
- Reduces illegal dumping and waste leakage into the ocean
- Increases the value of and provides a circular loop for LVP & organic waste
- Increases Bali's capacity to process HVP within the province
- Holds the tourism sector accountable for waste generation

1

CLEAN BALI FUND

The Clean Bali Fund incentivises waste separation at source and partially funds waste management via a minor surcharge imposed on tourists of US$2 per room per night.

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Community-owned and run, the co-ops will be the first point of collection for unsorted or sorted waste at the village level. Subsidies provided by the Clean Bali Fund, will prevent underpricing of LVP and organic waste processing to ensure both types of waste are properly managed.

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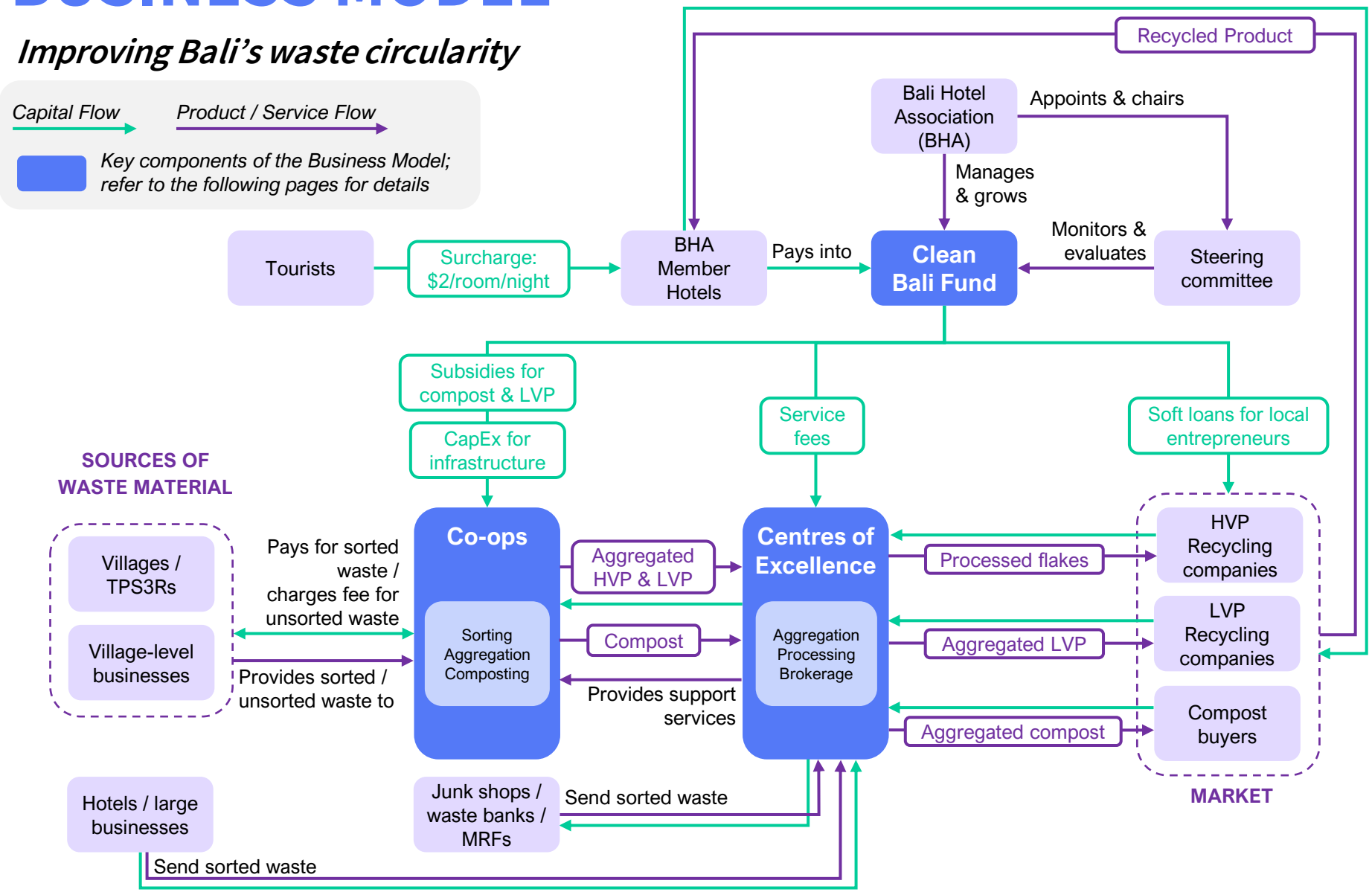
CENTRES OF EXCELLENCE

The CoEs will aggregate and/or process HVP, LVP, and compost to be sold to respective buyers. CoEs will be the first in Bali with flaking capabilities and thus can sell HVP at a higher value.

BUSINESS MODEL

Improving Bali's waste circularity



THE CLEAN BALI FUND (1/2)

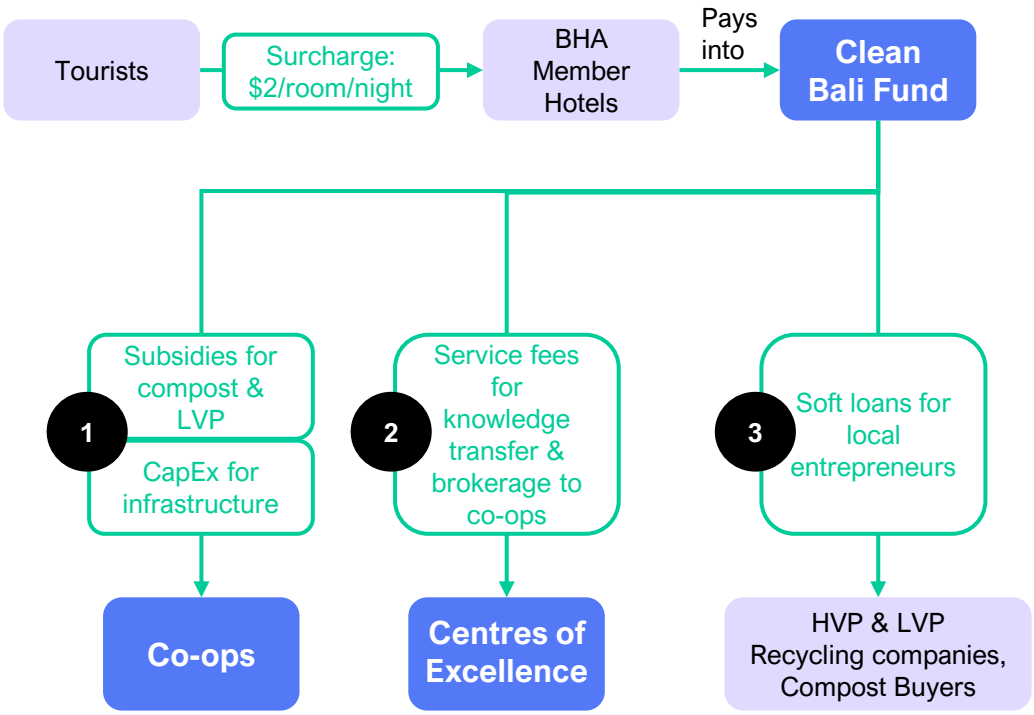
A Clean Bali Fund is proposed to improve waste management in Bali based on the Polluter Pays Principle. This would be funded via a minor surcharge imposed on tourists residing in hotels participating in the scheme of **US$2 per room per night**. The Fund would be leveraged to address many of the challenges faced by Bali in waste management and recycling, while enabling the tourism industry to flourish through a bold commitment to sustainable and responsible tourism.

The Fund would be used to subsidise activities across the waste recycling value chain from the collection and sorting level by incentivising households to collect and sort and thus support co-ops, to the recycling and manufacturing level by supporting the CoEs and local recyclers.

1. At the co-op level, the Fund will provide subsidies to bolster the underpriced compost and LVP market, capital expenditure to support the establishment of co-ops and operational infrastructure costs, as well as any community needs in village-level waste infrastructure.

2. At the CoE level, the Fund will provide service fees to support consistent knowledge transfer, training services, and quality checks of the co-ops during set up and operation, as well as brokerage fees to facilitate selling compost from co-ops to buyers.

3. At the market level, the Fund will provide soft loans to local entrepreneurs to encourage building LVP and HVP recycling capacity within Bali itself.



THE CLEAN BALI FUND (2/2)

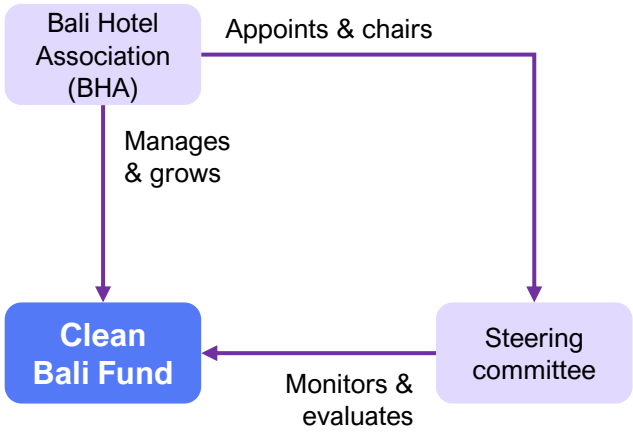
As the largest hotel association, representing 158 star-rated hotels and resorts in Bali and totaling over 25,000 hotel rooms, it is recommended that the **Bali Hotel Association (BHA)** help establish, manage, and grow the Clean Bali Fund. The Fund can grow from charging tourists residing at BHA member hotels to eventually all hotels in Bali. Once established, the Fund need not be restricted to the hotel industry and can invite participation from other tourism industry groups as well.

It is also recommended that a **Steering Committee**, appointed and chaired by the **BHA**, periodically monitor and evaluate the Fund's activities and administration.

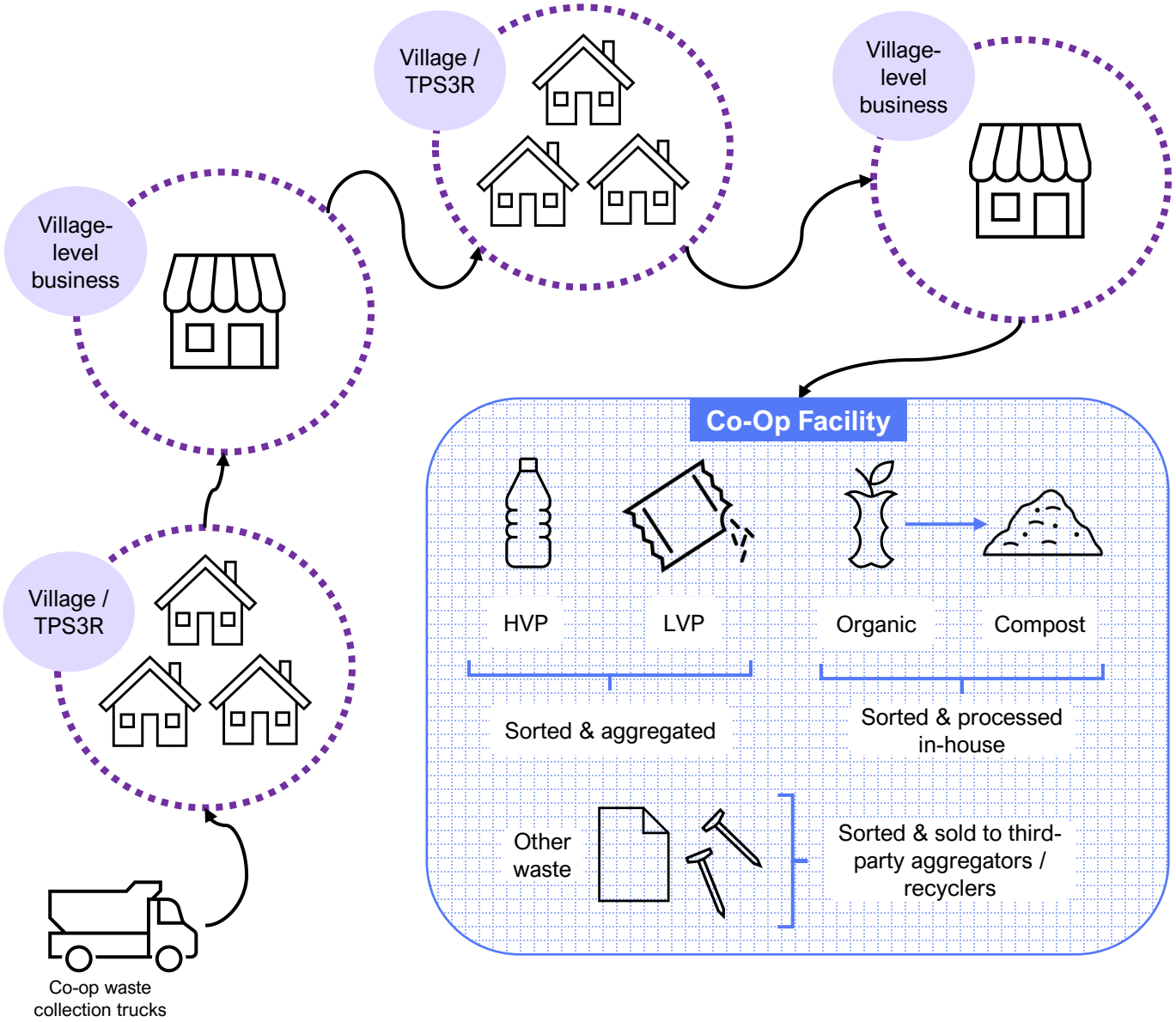
The Steering Committee should comprise of waste management and tourism industry experts, government and community representatives, and financial experts.

The Committee will meet quarterly to:

- Enforce implementation of the Fund in partnership with the BHA
- Evaluate progress, collection procedure, and financials of the tourist surcharge
- Evaluate the Fund's beneficiaries, supported activities, and expenditures
- Assign a network of villages and TPS3Rs to each co-op
- Set up and manage the tender system and bidding process for CoE operator selection, including assessing application procedure, eligibility, performance specifications etc.
- Assign a network of co-ops to a CoE once an operator company has been chosen
- Ensure the Fund's professionalism, transparency, and alignment with community needs



CO-OPS



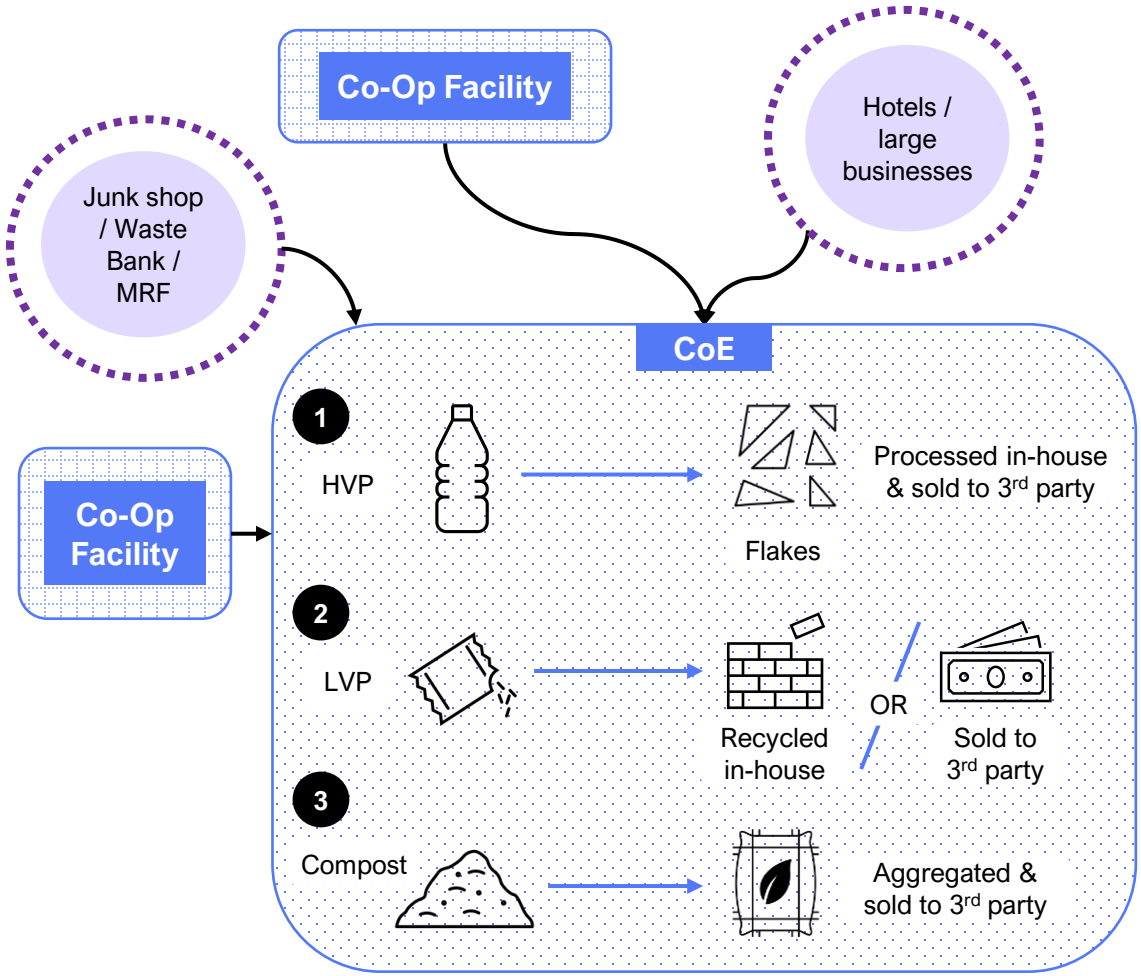
Community-run village cooperatives (co-ops) are proposed to be the first point of aggregation for sorted or unsorted waste. The co-ops will deploy trucks to collect waste from villages, TPS3Rs, and village-level businesses.

If the collected waste is unsorted, a service fee will be charged. If the collected waste is sorted by plastic, organics, paper, and metal etc., the co-op truck will pay the village / TPS3R / business in accordance with market rates.

On site at the co-op facility, plastic is further sorted and aggregated by plastic type and colour. Organic waste is processed in-house into compost. If the amount of compost collected at the co-op is large enough, it can be sold directly to third party buyers through the CoE as a broker, otherwise it can be sent to their assigned CoE for aggregation. Other waste e.g., metal, paper, is sorted and sold to third-party aggregators or recyclers.

Existing high functioning TPS3Rs that fulfill all co-op operations can also act as a co-op or be upgraded into a co-op if they meet performance specifications.

CENTRES OF EXCELLENCE



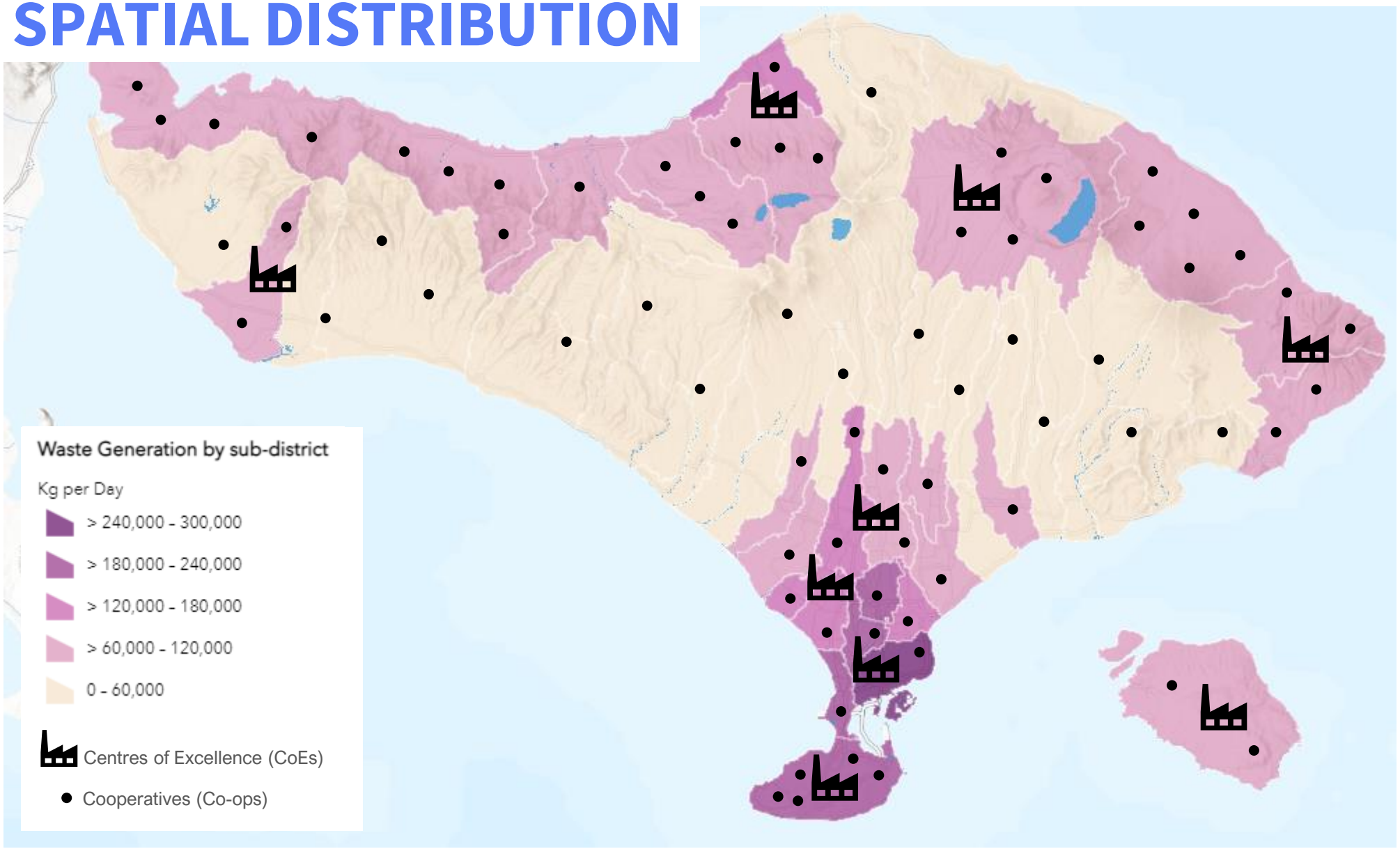
The **Centres of Excellence** (CoEs) will collect and pay for sorted and aggregated HVP, LVP, and compost from assigned co-ops, nearby junk shops, and waste banks. Hotels and large businesses will be charged a fee to process sorted waste.

1. At the CoE, HVP will be flaked on-site. Processed flakes will then be sold to East Java for manufacturing purposes, further processing into pellets, or sold on the international market.
2. Likewise, depending on the CoE's key unit operations, LVP will either be recycled in-house into recycled products e.g., construction materials, tourism products or sold to third-party recycling companies.
3. All CoEs will aggregate and sell compost to third-party buyers. If compost is sold at the co-op level, the CoE will act as the broker.

A **tender system** will be set up by the **Clean Bali Fund**'s Steering Committee to pre-qualify CoE operators across the province. It is proposed for **Kibumi** to run the pilot CoE; refer to *Appendix: Pilot CoE* for details.

CoEs will win a concession contract to run the scheme for a network of co-ops within a specified region to receive material from. Apart from material exchange and **brokerage services**, CoEs will provide **support services to co-ops** to support consistent knowledge transfer, training services, and quality checks.

SPATIAL DISTRIBUTION



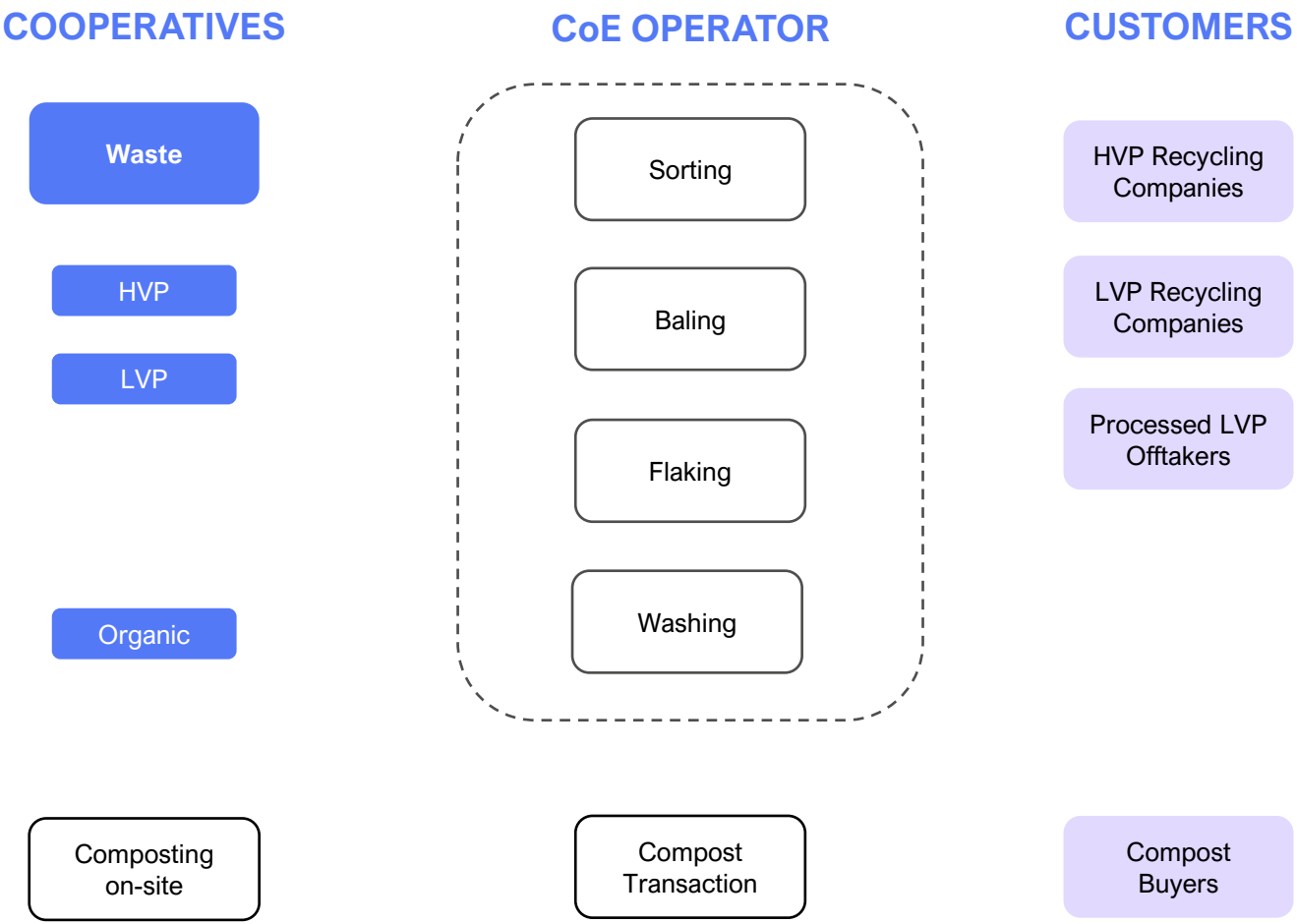
Co-ops and CoEs will be located close to hot spots for waste generation to ensure effectiveness.

OPERATIONS

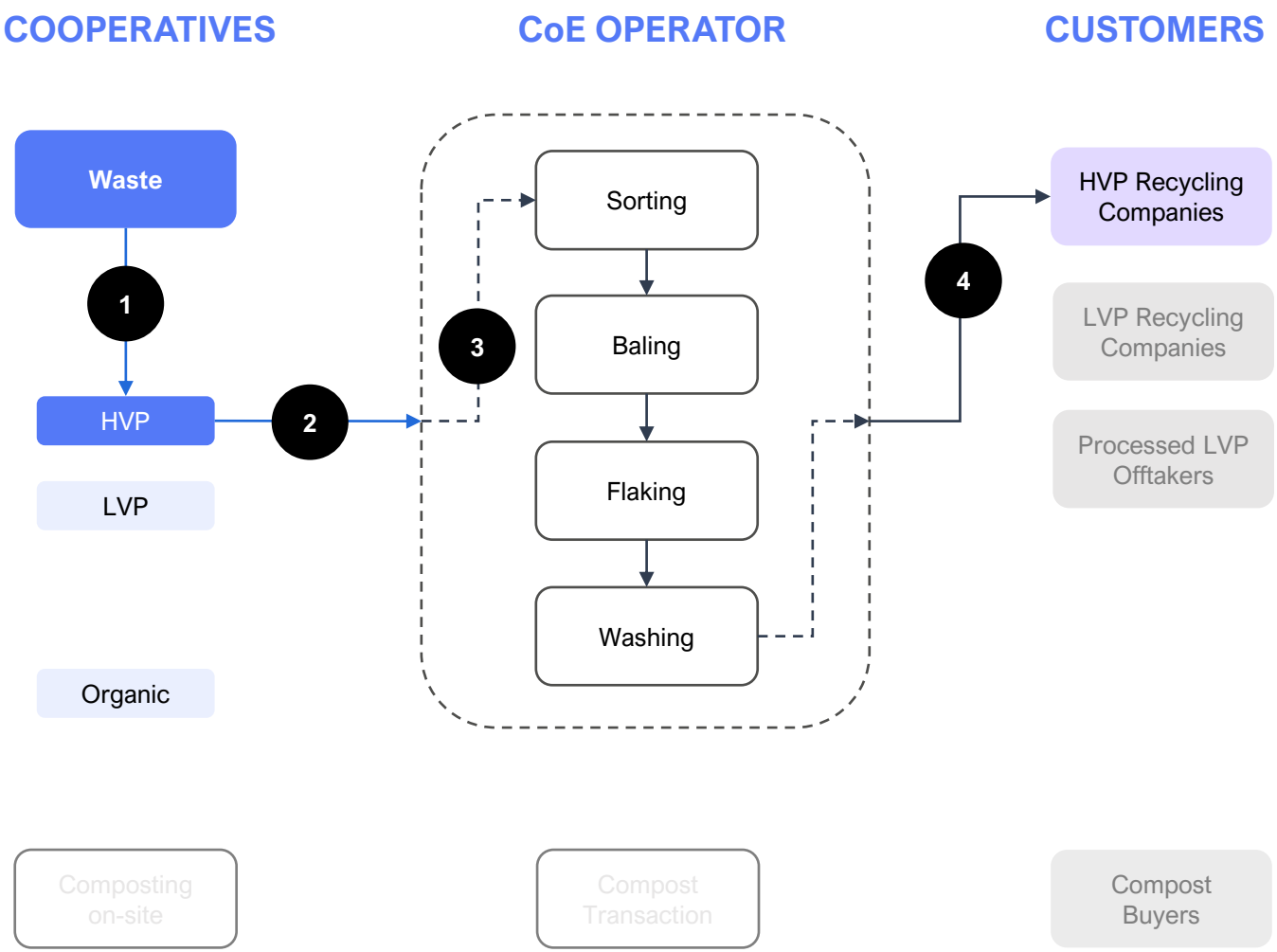
MATERIAL FLOW

The diagrams on the following pages illustrate the respective material flow of HVP, LVP, and organic waste from co-ops to a CoE, and finally to third-party buyers for offtake. Refer to *Buyers & Partners* for details on third-party buyers.

KEY:
- Products
- Processes
- Buyers



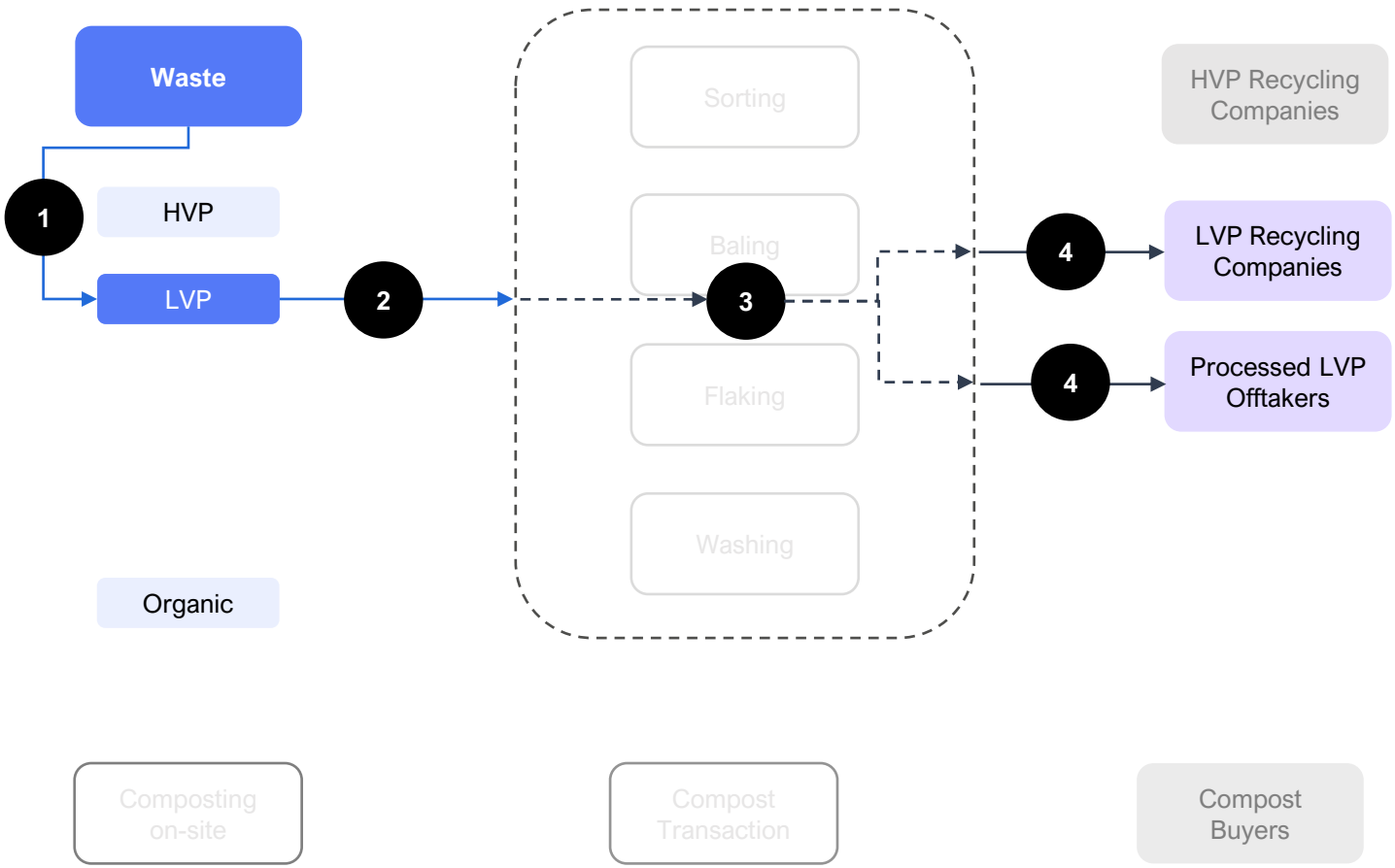
MATERIAL FLOW *| High-value plastic (HVP)*



PROCEDURES

1. Waste is separated by co-ops.
2. HVP is purchased by the CoE.
3. At the CoE, HVP is processed into flakes.
4. CoE flakes are sold to recycling companies.

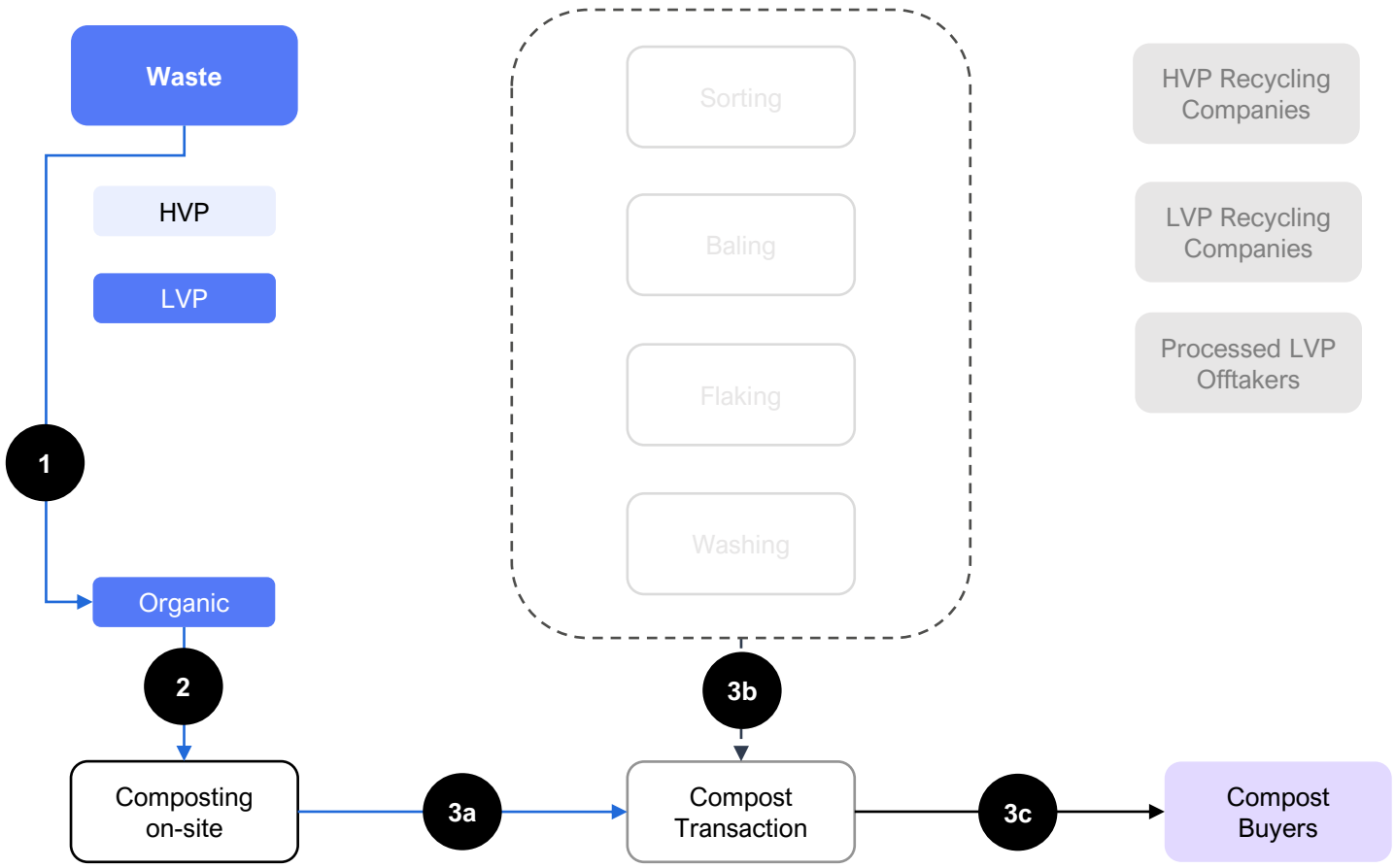
MATERIAL FLOW *| Low-value plastic (LVP)*



PROCEDURES

1. Waste is separated by co-ops.
2. LVP is purchased by the CoE.
3. At the CoE, single-layer LVP is processed similar to HVP, while multilayer LVP is simply aggregated.
4. Single-layer LVP is sold to offtakers. Multilayer LVP is sold to third party recycling companies for processing.

MATERIAL FLOW / *Organic Waste*



PROCEDURES

1. Waste is separated by co-ops.
2. Organic waste is composted on-site.
3a. Compost is sold by co-ops.
3b. The CoE facilitates and brokers the compost transaction.
3c. Third party buyer purchases the compost.

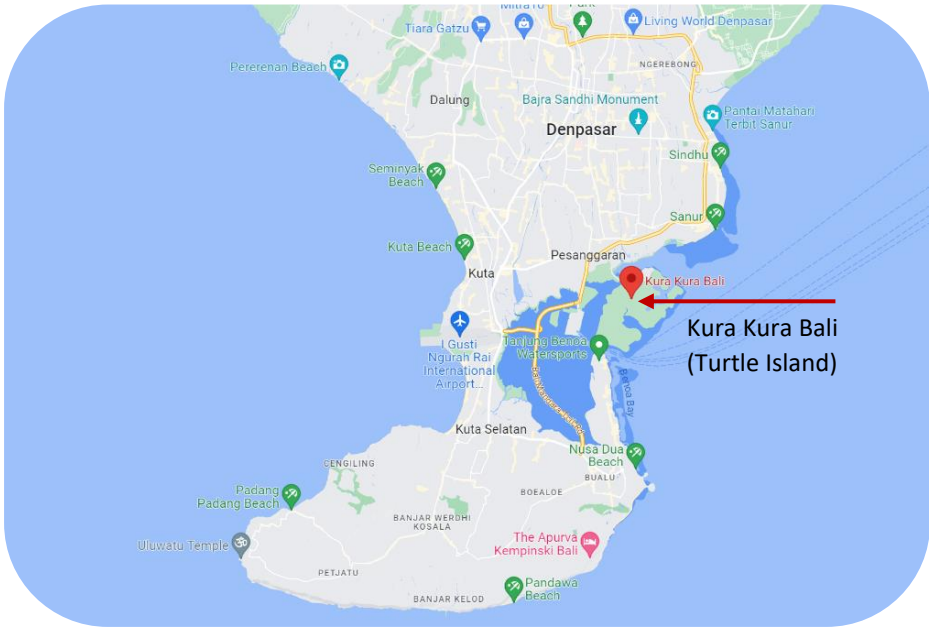
PILOT Centre of Excellence

It is recommended for Project Partner, Kibumi to operate the Pilot CoE.

KIBUMI

The pilot CoE should service the largest generator of waste on the island – South Bali, which covers parts of Denpasar and Badung.

As such, one potential location for the pilot CoE is Kura Kura Bali, colloquially known as Turtle Island, which was recently announced as Indonesia's Special Economic Zone. It is a 500-hectare island nurtured and developed over the past 20 years and is currently welcoming project investors who aim to integrate a green approach in the design of their structures – therefore indicating synergies with the CoE.



RESOURCES REQUIRED

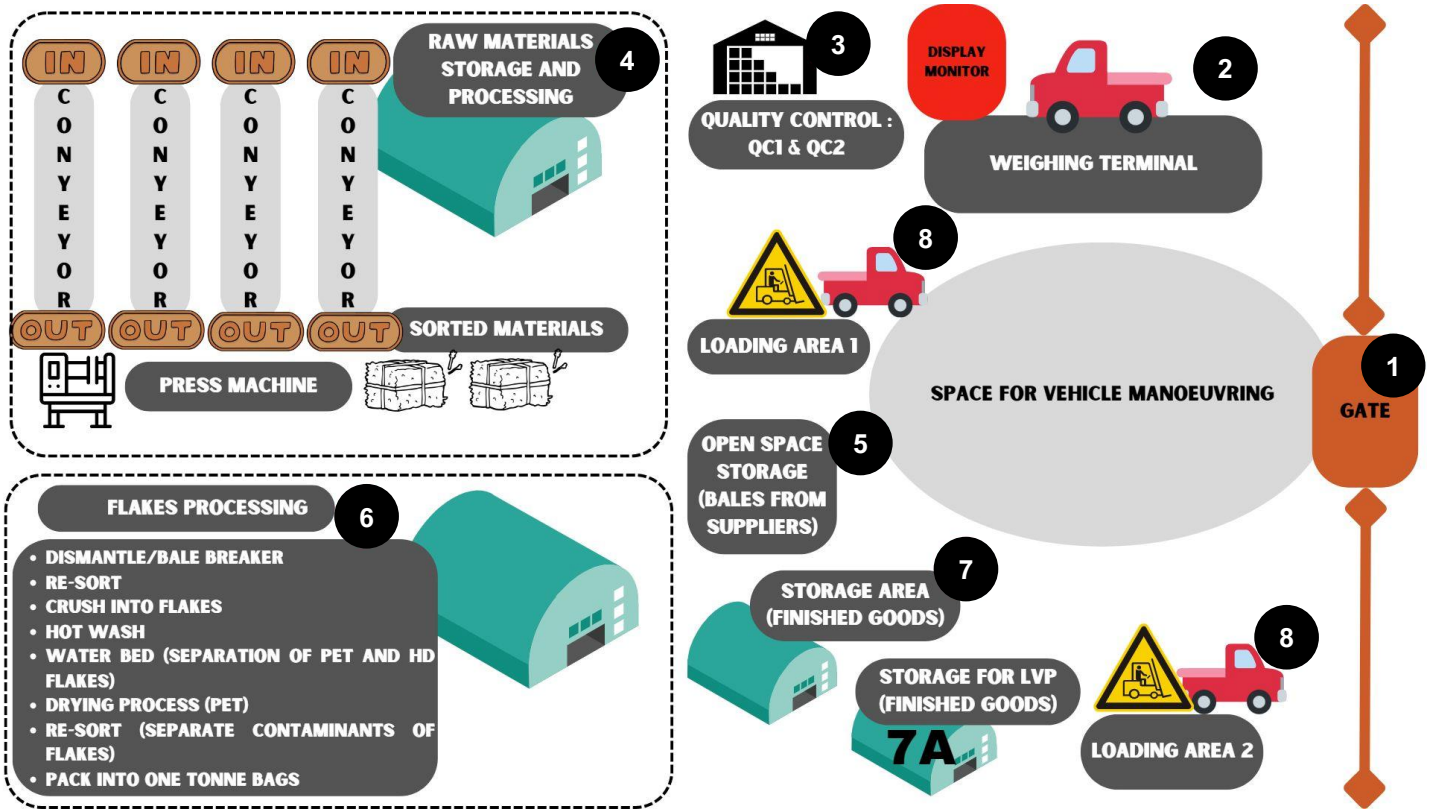
The following presents a **sample** list of resources that may be required for the pilot CoE. Please note that these are rough estimates, and a more detailed feasibility study would be required prior to tenders being invited.

LAND	2 hectares
RAW MATERIALS STORAGE AND PROCESSING PLANT	Machinery required: Weighing terminal Horizontal press machine (3 units) Screw Conveyor (10 units) 2-tonne weighing scales (6 units) Forklift (2 units)
PET FLAKES PROCESSING PLANT	Machinery required: Forklift (3 units) Bale breaker (1 unit) Screw Conveyor (2 unit) Grinding machine (1 unit) Boiling tank (1 unit) Drying machine (1 unit)
OTHER	Wastewater treatment plant (installed by a certified vendor) Third-party logistics provider (i.e., material transport between co-ops and CoE) Staff

OPERATIONAL LAYOUT

The following presents a **sample** operational layout for the pilot CoE:

1. Main entrance
2. Weighing terminal for incoming trucks
3. Quality Control 1: incoming sorted waste material (i.e., HVP & LVP); Quality Control 2: incoming bales from other CoEs.
4. Storage and processing of waste material. Materials are placed on conveyor belts and sorted by plastic type and pressed into bales. LVP is aggregated and sold to buyers.
5. Open storage area for PET bales from external suppliers.
6. HVP bales and bags processed into flakes and packed into one-tonne bags; final sorting carried out to separate contaminants.
7. Storage for finished goods.
8. Loading dock for finished goods, including forklift and container lorry.



QUALITY ASSURANCE

All CoEs will be expected to uphold high quality assurance standards. This will be a key factor in the Clean Bali Fund's Steering Committee's tender bidding process for any waste management company aiming to operate a CoE. The following are examples of performance specifications that would be considered for the pilot CoE in accordance with local and international laws and industry standards:

Material quality: Material samples, testing, classification, e.g., sample 10% of every input and output material to ensure proper classification.

Staff Training: Regular training and re-training for permanent and contract staff, with a quarterly monitoring programme.

Health & Safety: Developing and enforcing a set of standardised actions that detail every step needed to conduct a job safely to minimise health and safety risk to staff. This would include provision of personal protective equipment including helmets, gloves, appropriate footwear, masks, etc.

Site audit & Inspection: Regular inspections by third party certifiers providing testing, inspection and certification services, as well as internal inspections with daily assessment reports.

Quality Control: Customer feedback loop for continuous improvements in CoE services for each transaction.

TECH-BASED DATA COLLECTION

Kibumi has established end-to-end technology for its users to generate real time reporting and traceability in its existing facilities. This technology can be integrated into the pilot CoE as a showcase of how technology can be used to enhance data collection on Bali's waste management and recycling ecosystem. The data can then be used to evaluate and make recommendations on how the overall business model can be improved, as well as to provide insight into best practices and lessons learned for the Bali community.

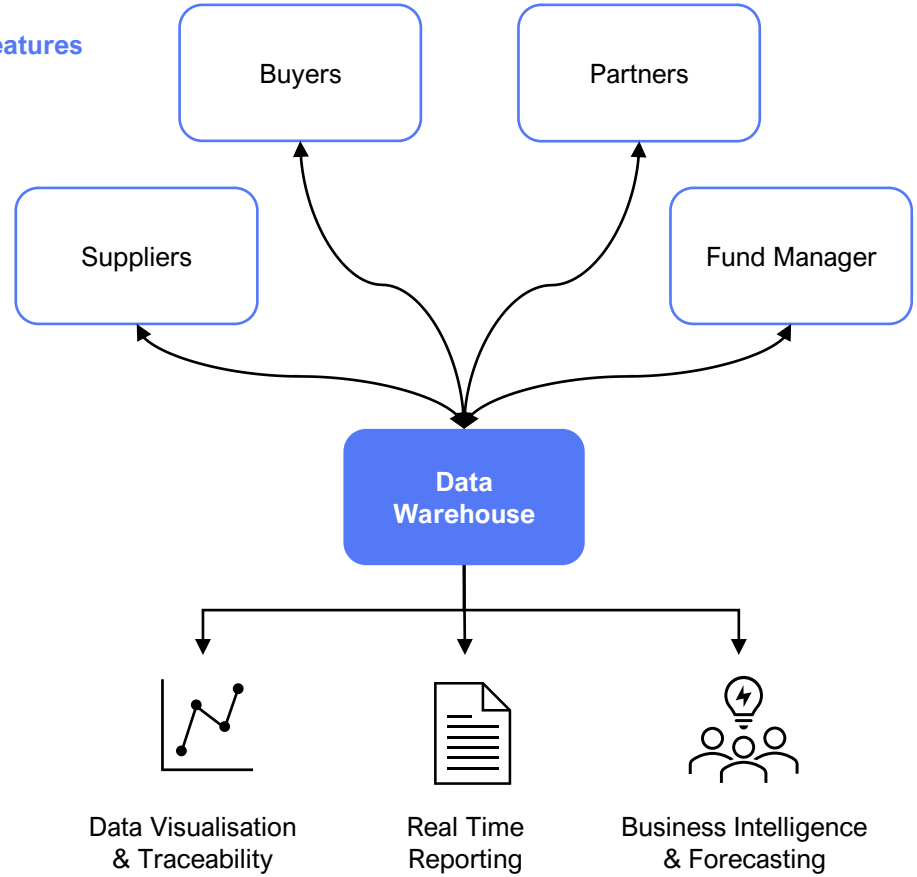
Application & Dashboard

Mobile App
Digital Waste Management Services

EPR Platform
Digitise, automate, and connect stakeholders

ESG Dashboard
Providing reliable real-time traceability data (ESG/EPR)

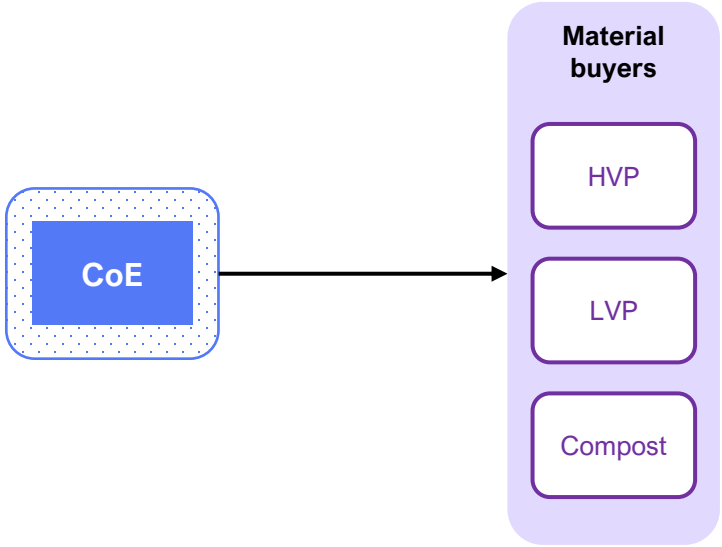
Connectivity & Features



BUYERS & PARTNERS

BUYER ECOSYSTEM

Unlocking market opportunities for materials processed at the CoE will be key in implementing business model successfully. Buyers for material processed at the CoEs will form the **main revenue stream for the CoEs**. By creating **recycled material and/or products** out of material processed by the CoEs, buyers will close the loop and **create value for Bali's economy and people**.



HVP BUYERS

Recycling companies who can further recycle flakes into pellets or manufacture products from flakes will be the main buyers of HVP from the CoE.

Given that HVP already has an established high-value market, it will be the primary revenue source for the CoE.

The following are **examples** of local, regional, and international recycling companies that can offtake the CoE's flakes.

LOCAL

PLASTIK KEMBALI

The CoE can sell recycled flakes to local recyclers in Bali, such as Plastik Kembali, which makes art and home goods using recycled PP.

REGIONAL

BIPJ

The CoE can sell its recycled flakes to East Java, for further processing into pellets or directly into manufacturing. One example is Bumi Indus Padma Jaya, a food-grade facility, which can turn PET flakes into pellets.

INTERNATIONAL

REBOUND
Global Recycled Plastic Exchange

The CoE can find regional or international buyers through platforms such as the Rebound Plastic Exchange, a quality assured trading platform.

LVP BUYERS

LVP is the dominant plastic material leaked into illegal dumping sites, landfills, and the ocean. Creating the LVP market will close the loop and reduce environmental leakage, while increasing its market value.

The following are **examples** of **recyclers** that could buy LVP from the CoE. After the recyclers convert the LVP into recycled products, they can be bought by hotels to be used in their product inventory and new construction.

MECHANICAL

ëco8

The CoE can sell their aggregated LVP to recyclers, such as ëCollabo8, which creates recycled plastic moulded products, furniture, and art.

MECHANICAL

The CoE can sell their aggregated LVP for construction use, such as with The Ministry for Maritime Affairs, Ministry of Public Works and Housing, & ADUPI who have commenced a joint effort to turn plastic waste into road tar.

CHEMICAL

PLASTIC ENERGY®

The CoE can sell their aggregated LVP to chemical recyclers, such as Plastic Energy, who can chemically convert plastic that cannot be mechanical recycled to resemble virgin plastic.

COMPOST BUYERS

Subsidising compost at the co-op level to supplement the existing low market value of compost will incentivise the processing of organic waste and create a stable supply of nutrient-rich feedstock to be used by various industries in need of soil amendment.

The following are **examples** of **sectors** that would buy compost from the co-ops or CoEs:

SECTORS

HOTELS

GOVERNMENT

ORGANIC FERTILISER COMPANIES

FARMERS & PLANTATIONS

LANDSCAPING COMPANIES

COMPOST SHOPS

HOUSEHOLDS / VILLAGES*

**Sold at the co-op level only*

STRATEGIC PARTNER: HOTELS

Closing the Loop & Anticipating the Future of Tourism

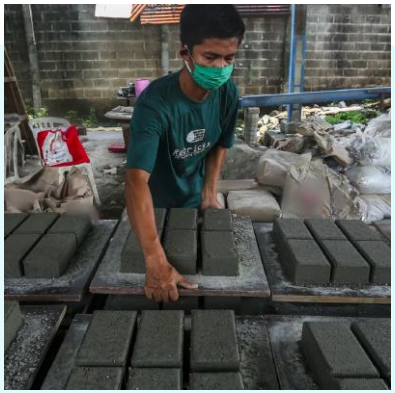
As Bali's primary economic sector and a hefty contributor to the province's waste issue, the hotel and tourism industry are key to creating a circular economy in Bali. Apart from supporting and partaking in the **Clean Bali Fund**, hotels can utilise recycled LVP and HVP products and compost in their hotels to close the material loop.

Incorporating recycled products in internal supply chains will enable Bali hotels to meet growing demands for sustainable and eco-tourism, and indirectly save operating costs in the long-term. Several hotels in Bali have already begun their sustainability journey and incorporated recycled products or alternative materials at scale, including Alila Villas Uluwatu, Grand Hyatt Bali, and Raffles Bali.

The following pictures illustrate types of recycled products that can be utilised in hotels:

"There are no beaches in Bali that are free from plastic pollution."

I Gede Hendrawan,
Head, Marine Computation Laboratory,
Udayana University



Building material, source: Rebricks

Furniture, source: ëCollabo8

Hotel supplies, source: ëCollabo8

Compost soil amendment

OTHER STRATEGIC PARTNERS

There are other key stakeholders in the Bali ecosystem committed to bettering waste management and recycling that can be potentially engaged in various ways with the CoE for knowledge, technology, or resource sharing.

The following are **examples** of organisations with high potential for collaboration:

- **Bali Government**; refer to *Policies & Commitments* for details
- **Universities** e.g., Udayana University
- **Industry Associations** e.g., ADUPI, Indonesia Society of Landscape Architects
- **Non-profit organisations** e.g., Delterra, Merah Putih Hijau, Sungai Watch
- **Waste management companies** e.g., Kibumi, Eco-bali, Waste4change, Plastic Bank, Sangkara, Urban Biologist Bali
- **Brand owners & Producers** e.g., Danone
- **International organisations** e.g., Alliance to End Plastic Waste, SYSTEMIQ, Ellen MacArthur Foundation

POLICIES & COMMITMENTS

EXISTING POLICY FRAMEWORK

National Policy

PERPRES No. 97 2017 Waste Management

Set bold targets, including minimising marine plastic by 75% and improving collection to 80% by 2025. By 2040, the aim is to increase recycling to 40%.

Regional Policy

PERGUB No. 97 2018 Limitation Single-Used Plastic

Limits the use of 3 types of plastic (single-use, Styrofoam, and straws)

Regional Policy (Bali)

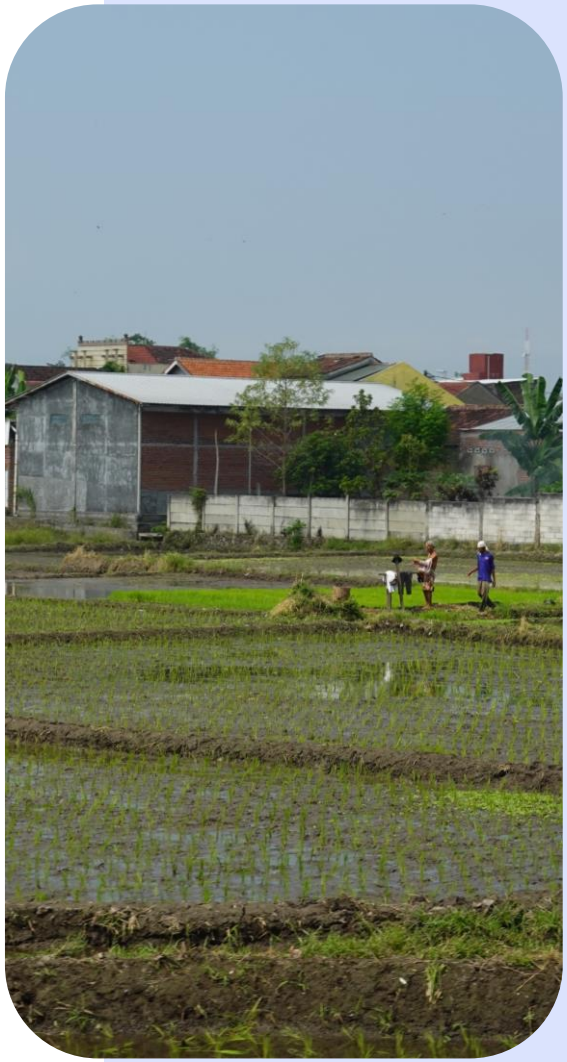
PERGUB No. 47 2019 Waste Management

Sets out guidelines for household waste management to practice separation at source, reduce dumping at illegal sites and landfills.

Customary Policy

Awig-awig

Invites traditional villages to play an active role in waste management by organising customary awig-awig to increase policy adoption and foster a culture of clean living.



RECOMMENDATIONS

The Bali Government will be a key enabler of the proposed plan and business model. Only with support including strong policies and enforcement can the vision of a circular and low-plastic, low-waste economy be realised.

Based on the identified key challenges in Bali's waste management and measuring gaps within the existing policy framework, four public policy recommendations are proposed for consideration by the Bali Government. These will be critical to successfully transition Bali into a circular economy.

At the same time, the private sector is essential to strengthen adoption of the Business Model. Two industry group commitments are proposed for consideration by local and regional industry associations, given their ability to collectively mobilise individual businesses swiftly.

PUBLIC POLICY

1. **Mandate the use of recycled content**
2. **Limit the export of plastic waste**
3. **Ban multilayered plastic**
4. **Incentivise recyclable product design & adoption**

INDUSTRY GROUP COMMITMENTS

1. **Support the establishment of the Clean Bali Fund**
2. **Make commitments to support the material inflow and outflow of the CoE**

PUBLIC POLICY

1 Mandate the use of recycled content

WHY To reduce the use of virgin raw material and encourage a circular economy in Bali, thereby enabling cost savings and significant reductions in environmental impacts.

HOW A Governor Order (PERGUB) should be introduced to mandate the use of a minimum of 30% recycled material in procurement by 2027. This order would apply to both private and public construction projects including hotels and public works. Government subsidies can be provided to support early uptake and compliance through revenue generated from EPR schemes or the **Clean Bali Fund**.

2 Limit the export of plastic waste

WHY To build Bali's self-sufficiency as a local recycling hub, and increase transparency with end-of-life disposal and recycling.

HOW A PERGUB should be introduced to ban the export of plastic waste outside Bali after 2027. Under the order, only recycled flakes or pellets would be allowed to be exported for further processing.

3 Ban multilayered plastic

WHY To increase the recyclability of all materials produced, hold brand owners and producers accountable at the product design stage, and reduce leakage into the environment.

HOW Expand PERGUB No. 97/2018 to include non-essential multilayered plastic such as sachets by 2025. Essential products, e.g., toothpaste, should be clearly defined by the Government and supported by sound evidence to obtain exemption. By 2035, expand the list to include all imported and domestic virgin plastic. Government incentives or subsidies by the **Clean Bali Fund** can be provided to support the development and scaled adoption of alternative materials.

4 Incentivise recyclable product design & adoption

WHY To close the loop in local recycling and manufacturing by incentivising the manufacturing and buyer market.

HOW Reward brand owners and producers with tax credits or rebates for rolling out easily recyclable products e.g., clear PET bottles (colourless) or label-free products. Similarly, reward suppliers and distributors for utilising recycled low value plastic in their products.

INDUSTRY GROUP COMMITMENTS

1 Support the establishment of the Clean Bali Fund

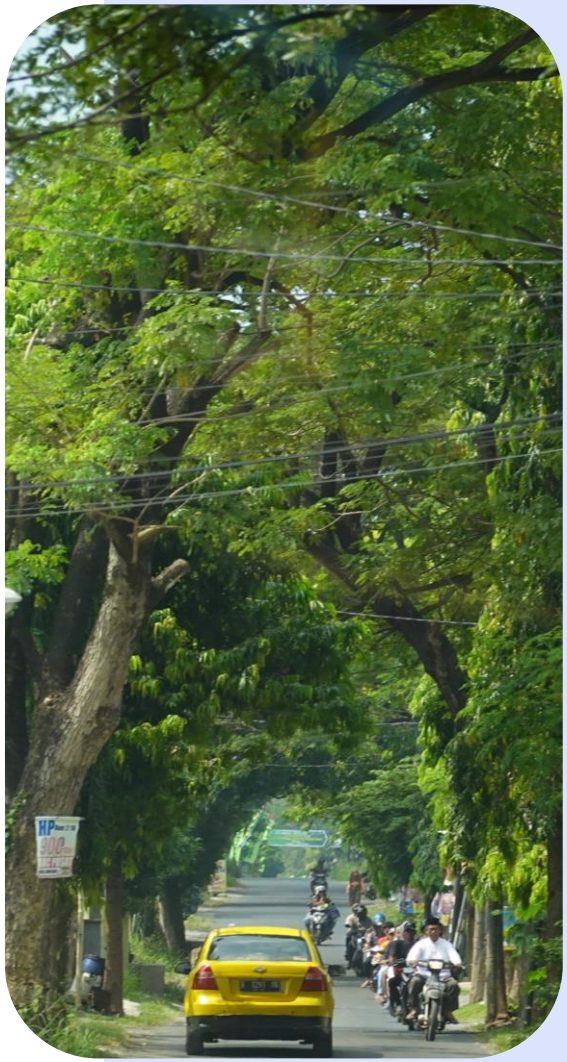
WHY To foster responsible tourism and tourist waste accountability, secure income sustainability for circular waste management, and enhance brand image.

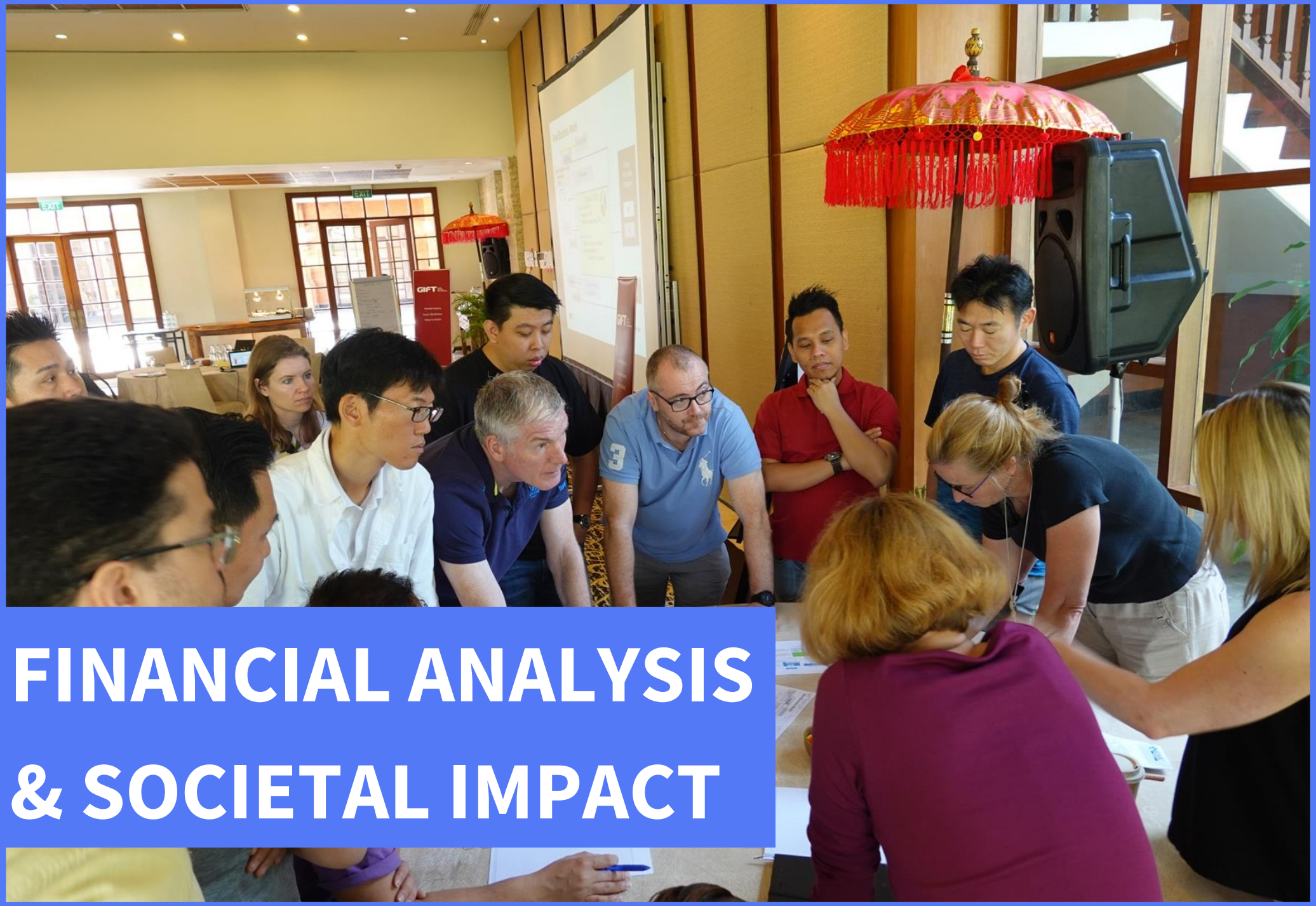
HOW Hotel groups should make public commitments to support and promote the **Clean Bali Fund** and guide hotel members to partake in the Fund by 2024. Once established, other tourism industry groups will be invited to do the same.

2 Make commitments to support the material inflow and outflow of the CoE

WHY To close the material loop in waste management, and support the creation of a commercially viable market for HVP, LVP, and compost in Bali.

HOW Hotel, retail, agriculture industry groups should make public commitments to support CoEs, and guide members to make commitments to send at least 30% of their total waste to CoEs and integrate at least 30% recycled content (HVP, LVP, and compost) into their respective supply chains by purchasing recycled products.





FINANCIAL ANALYSIS & SOCIETAL IMPACT

KEY FINANCIAL ASSUMPTIONS

	Indicator / Assumption	Value
Waste Generation & Management in Bali	Waste generation	1.6 million tonnes/ year
	Waste composition breakdown	70% - organic waste 4% - HVP 22% - LVP 4% - others
	Unmanaged or mismanaged organic waste (household food and ceremonial waste only)	25%
	Rate of increase in waste generation annually	+10%
	Percentage of waste currently dumped in landfills or illegal dumping sites that will be captured by co-ops	30%
Clean Bali Fund	Number of hotel rooms under the BHA & average occupancy rate	Total: 25,000 Occupied: 15,000 / day Average 5-year occupancy rate (2015 – 2019): 60%
	Funds raised in Year 1	US$10,950,000 (based on 100% participation by BHA members)
	Number of hotel rooms in Bali in total & Rate of non-BHA hotels partaking in the Fund beginning in Year 3	Total rooms in Bali: 50,000 Participation rate: +10% / year, beginning in Year 3
	Government matching scheme will start in Year 3	The Bali Government will contribute $0.5 for every $2 contributed by the BHA, beginning in Year 3
	Number of co-ops built & Average size of each co-op	Number: 60 co-ops within 5 years Size: 100 m2 / co-op
	Subsidy provided to co-ops for organic waste and LVP collection, separation, and/or processing	US$0.5 / kg
	Investment required for co-ops	US$80,000 (CapEx – full & OpEx – partial)

FUND INFLOW

25,000 BHA member hotel rooms

x

365 nights / year

x

60% average occupancy

x

US$2 surcharge / room / night

=

The Clean Bali Fund is projected to raise US$10,950,000 in Year 1

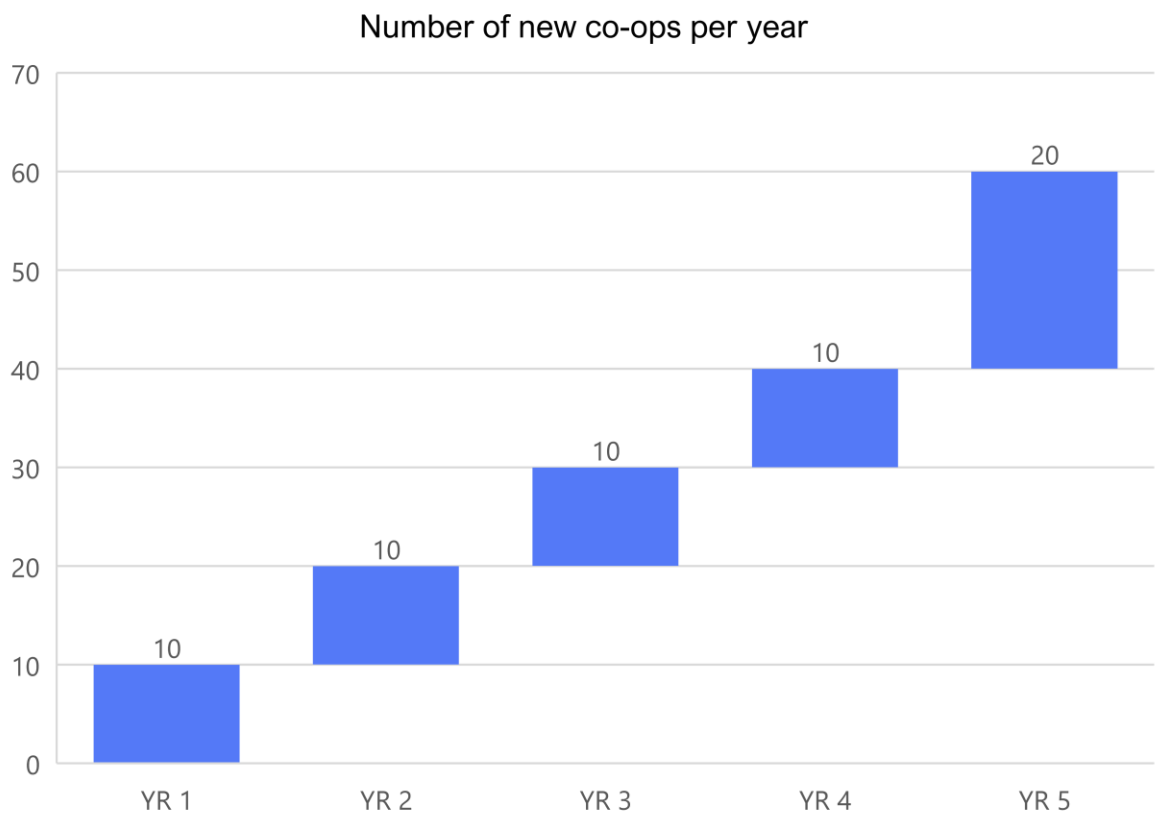
FUND OUTFLOW – Co-ops

The Clean Bali Fund will fully fund capital expenditure and partially fund operating expenses at **US$80,000** for each co-op. In addition, each co-op will receive **US$0.5/kg** for organic waste and LVP collection, separation, and/or processing.

Capital Expenditure / Co-op	US$
Sorting equipment & trucks	40,000
Composting machine (500kg / day)	20,000
Building construction	10,000
Total (initial set up)	60,000

Operating Expenses / Co-op	US$
Salary & Benefits (10 staff)	31,200
Utilities	12,000
Machine maintenance & servicing	1,069
Total per year	44,269

CO-OP GROWTH & OUTPUT



Based on average waste composition breakdown rates, each co-op is expected to produce the following annually:

Material Output / Co-op	Tonnes / year
Compost	500
LVP	314
HVP	56
Other	60

The Fund will target to subsidise the establishment of a total of 60 co-ops in 5 years.

FUND CASH FLOW *| 5-year projections*

		YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
		10 co-ops	20 co-ops	30 co-ops	40 co-ops	60 co-ops
BHA Members Participation Rate	100% ($2/ room/ night)	$10,950,000	$10,950,000	$10,950,000	$10,950,000	$16,425,000
Non-BHA Participation Rate	+10% ($2/ room/ night)	/	/	$1,095,000	$1,204,500	$1,806,750
Government matching scheme	$0.5 for every $2 from BHA	/	/	$2,737,500	$2,737,500	$4,106,250
TOTAL INFLOW		$10,950,000	$10,950,000	$14,782,500	$14,892,000	$22,338,000
Initial investment for new co-ops	US$80,000 / new co-op	$800,000	$800,000	$800,000	$800,000	$1,600,000
Compost + LVP subsidy per kg	US$0.5	$2,500,000	$5,000,000	$7,500,000	$10,000,000	$15,000,000
TOTAL OUTFLOW to co-ops		$3,300,000	$5,800,000	$8,300,000	$10,800,000	$16,600,000
Balance		$7,650,000	$5,150,000	$6,482,500	$4,092,000	$5,738,000

In Year 5, the surcharge will increase from $2 to $3 to account for growth in tourism and subsequent increase in waste generation.

The remaining fund balance will be used to provide service fees for CoEs and soft loans for local entrepreneurs. The latter will be provided in partnership with the Government and/or social impact investors. Some funds will also be kept as cash reserves.

IMPACT OF WASTE SEPARATION */ 5-year projections*

KEY: Current situation with no separation | Separation & processing with Co-ops & CoEs

The following table presents 5-year projections on waste generation and processing (1,000 tonnes), comparing the current waste management situation in Bali against the impact of waste separation at source through the operation of co-ops and CoEs:

It is assumed that 30% of plastic dumped in the landfill is currently collected

Annual rate of increase of waste generation is assumed to be 10%

This includes non-plastic or non-organic waste e.g., metal, paper sent to 3rd parties, as well as a minimal amount of mixed and difficult-to-recycle waste that would still be sent to landfill or leaked outside the co-op system.

(1,000 tonnes)	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Mixed Waste	755	755	770	785	801	817
Collected PET	45	45	46	47	48	49
Leaked waste	800	800	816	832	849	866
Total	1,600	1,600	1,632	1,665	1,698	1,732
Organic Waste	/	468	459	441	412	364
Compost	/	92	112	142	182	242
HVP	/	58	59	60	61	62
LVP	/	350	357	365	372	379
Other waste	/	632	645	658	671	684
Total	/	1,600	1,632	1,665	1,698	1,732

Limited value creation from just PET

Greater value creation from waste segregation!


For only $2 a day, the public
good (social & environmental)
created is immeasurable!

RISK ANALYSIS & MITIGATION (1/2)

1. **Risk**: Challenges arising from a new Government or changing policies
   Mitigation: Work closely with policymakers, businesses, associations, and NGOs

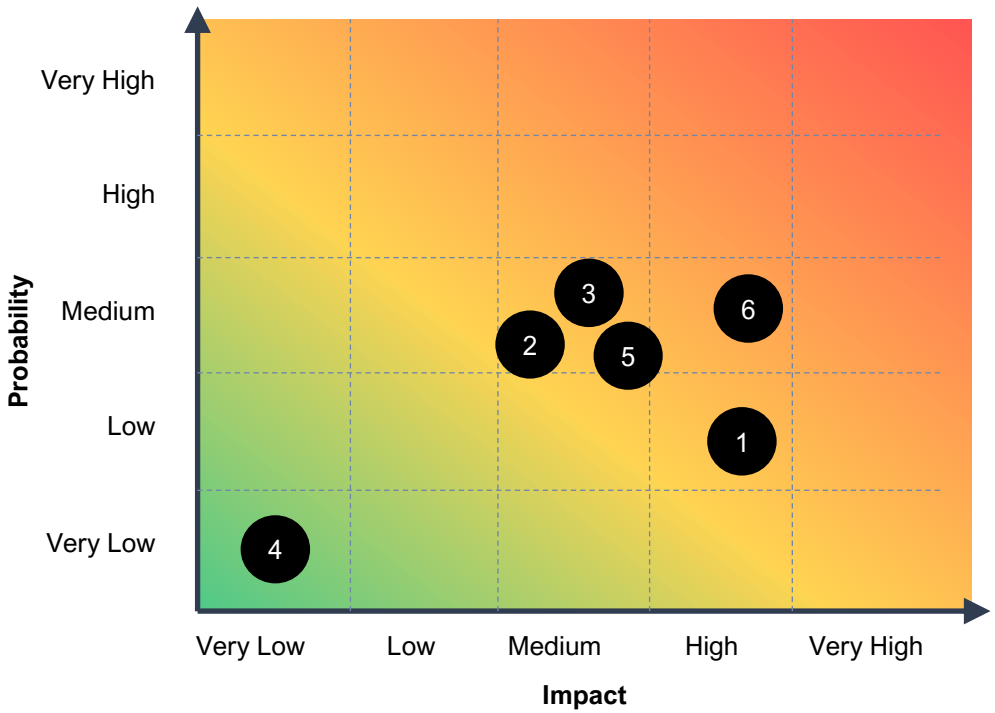
2. **Risk**: Poor village-level capabilities to manage co-op
   Mitigation: Seek advisory support from CoE for capacity building

3. **Risk**: Lack of collaboration between stakeholders or conflict of interest among stakeholders in the recycling ecosystem
   Mitigation: Consensus building, transparent communication, and new strategy building led by the Steering Committee of the Clean Bali Fund

4. **Risk**: The CoE does not break even
   Mitigation: Seek professional and experienced talent, re-evaluate pricing strategy & work closely with co-ops and Steering Committee to identify performance gaps

5. **Risk**: Overaccumulation of LVP at the CoE
   Mitigation: Develop market strategy for acquiring long-term, consistent LVP buyer contracts

6. **Risk**: Volatility of HVP & LVP prices
   Mitigation: Maintain minimum inventory (avoid speculative prices)



RISK ANALYSIS & MITIGATION (2/2)

7 **Risk**: Logistical challenges
Mitigation: Outsource when possible (e.g., work with logistic partners for collection, design optimal route planning for materials to increase efficiency and cost savings)

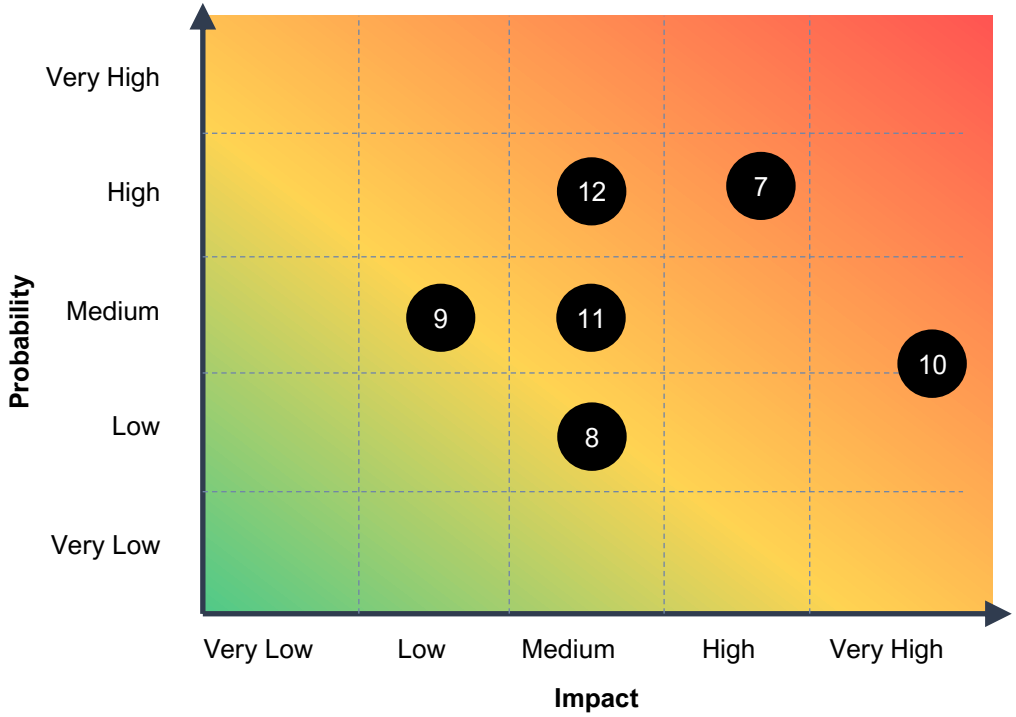
8 **Risk**: Financial and/or social targets not met by the Clean Bali Fund
Mitigation: Continuous monitoring by Steering Committee through metrics and analysis, and re-evaluating strategies as needed

9 **Risk**: Financial beneficiaries seeking insight on the distribution of the Clean Bali Fund
Mitigation: Transparent reporting and disclosure through annual reports and regular communication

10 **Risk**: Mismanagement of funds, corruption
Mitigation: Strong financial controls and governance, audited by Steering Committee, Bali Government. 100% transparency and periodic reporting on cash flow and outcomes achieved.

11 **Risk**: Co-ops decided to sell HVP to other parties
Mitigation: CoEs must ensure competitive pricing and high-quality service for retention

12 **Risk**: Overaccumulation of compost at co-op
Mitigation: On behalf of co-op, CoE to develop market strategy for acquiring long-term, consistent compost buyer contracts



SOCIETAL IMPACT

Within the first 3 years…

Social Impact

30 co-ops created across Bali to incentivise ~43K households to sort waste

Environmental Impact

30 - 40% of LVP prevented from being dumped illegally and leaked into the ocean

Economic Impact

Approximately US$20M will be directed towards co-ops to facilitate waste separation at source

SCALING IMPACT

A model for other tourism-dependent islands in Indonesia and ASEAN, and globally.

While designed for application in Bali, the model and strategies outlined in this Business Plan provide opportunities for other tourism-dominated islands around the world, particularly those with regional similarities such as in Indonesia and ASEAN, where collaboration can lead to stronger waste management outcomes.

The following are examples for model replication and scaling impact:

Phuket

Four out of five of Phuket's landfills are already full, with little capacity for incineration.

Fiji

The rivers and ocean in most pacific islands are inundated with plastic. Kai, a stable food item in Fiji, has been found to be heavily contaminated by plastic.

Maldives

The majority of plastic generated is openly burned, exacerbating carbon emissions and creating public health hazards.

Lombok

The island severely lacks waste management facilities, resulting in heavy pollution and plastic waste build up at beaches.

Trinidad & Tobago

The largest producer of waste per capita in the world and largest contributors to marine plastic.

Boracay

Like many islands around the world, Boracay had to close down for 6 months to clean the island and its beaches from waste pollution.

CONCLUSION

CONCLUSION

Protecting the Economic Sustainability of Bali

Bali is being inundated by waste pollution. Apart from the inherent threat to local livelihoods and the environment, this issue is also detrimental to Bali's main economic activity – tourism.

With the aim of finding a healthy balance between sustaining economic growth from its vital tourism sector, and meeting the island's social needs, this Business Plan has proposed the Clean Bali Fund. By only charging a nominal fee to tourists, the Fund can create immeasurable impact on improving waste management and recycling in Bali and transitioning the island into a truly circular economy.

The supporting system of Cooperatives and Centres of Excellence introduced in the Business Plan will incentivise behaviour change from the ground up to enhance standardised waste collection, sorting, and processing, beginning from the village level.

In a collective effort to heal the island, and following the Indonesian philosophy of *Gotong Royong (mutual community-based assistance and cooperation),* the Business Plan provides a substantial role for all stakeholders to play from government and business, to civil society and community.

The Global Institute For Tomorrow looks forward to taking this proposal forward with any interested stakeholders.

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