

# Getting in the Loop: Enabling Conditions for a Circular Economy Upstream and Downstream Innovation and Technology

*PROMOTING ACTION ON PLASTICS POLLUTION FROM SOURCE TO SEA IN SOUTHEAST ASIA AND PACIFIC  
SUBPROJECT 2: PRIORITIZING AND IMPLEMENTING ACTIONS TO REDUCE MARINE PLASTIC POLLUTION*

*TA-6669 REG*

*22nd of February 2024*

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*In Consortium with*



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# 01 Presentation of the Consortium

**Veolia**

**The Global Leader of Ecological Transformation**



**€42.9 billion**  
of turnover worldwide

**220,000**  
employees across the globe



## WATER

	Drinking water production plants managed	4,130
	People supplied with water	111M
	People connected to wastewater system	97M
	Wastewater treatment plants managed	3,506



## WASTE

	People provided with collection services	46M
	Metric tons of treated waste	61M
	Waste-processing facilities operated	823
	Business customers	534k



## ENERGY


	Thermal installations managed	47k
	Heating and cooling networks managed	680
	MWh of energy produced	44M
	Industrial sites managed	2,716

- **World's #1 provider** of environmental services
- Specialised in design and implementation of **water, waste and energy management solutions**
- Direct contribution to the **sustainable development of communities**
- Valuable feedback from **facilities operations** around the world

# Seureca

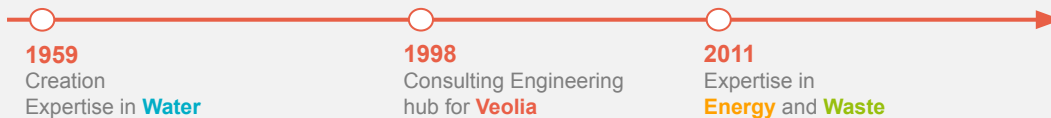
## The Consulting Engineering Division of Veolia



 **39 M€**  
in Revenue

 **>300**  
employees

**26 nationalities**  
~220 Engineers



### Our Activity



Active in over  
**65 COUNTRIES**



**WATER**  
75%



**WASTE**  
18%



**ENERGY**  
7%

### Our Business



**STUDIES AND PROJECT  
MANAGEMENT**



**DESIGN AND WORKS  
SUPERVISION**



**STRATEGIC AND  
OPERATIONAL ASSISTANCE**

**Seureca is the Consulting Engineering and Strategic & Operational Assistance Division of Veolia, the global leader in services to the environment with 170 years history.**

Seureca advises and assists public authorities and industry in improving the infrastructure and the management of the urban water, wastewater, energy and solid waste services.

# DT Global

Creating Impact, Transforming Lives, Partnering for a Better World



## Economic Growth & Trade

- Economic Reform & Market Systems
- Private Sector Development
- Finance, Investment & Trade
- Agriculture & Food Security
- Tourism & Culture
- Rural Development



## Environment & Infrastructure

- Water, Sanitation, & Hygiene
- Solid Waste Management
- Sustainable Infrastructure
- Climate Resilience
- Clean Energy
- Natural Resource Management
- Transport
- Resilient Cities



## Governance

- Rule of Law
- Government Reform
- Civic Engagement
- Public Financial Management
- Elections



## Conflict Prevention, Stabilization & Transition

- Conflict Prevention
- Stabilization & Transition
- Peacebuilding & Reconciliation
- Women, Peace & Security
- Climate Change & Natural Resource Scarcity
- Preventing & Countering Violent Extremism
- Political Economy Analysis & Research



## Cross Cutting Capabilities

- Gender Equality, Disability, & Social Inclusion
- Digital Technology
- Learning & Innovation
- Development Effectiveness
- Monitoring, Evaluation, Research, & Learning
- Locally Led Development

DT Global is an international development consultancy with over **60 years of experience** in **delivering complex and high impact projects** globally to make a positive impact on the world's most disadvantaged populations.

Our global team of **2,500 staff and experts work in over 90 countries** to solve complex problems in the peacebuilding, governance, economic development, environment, and human development sectors.

DT Global believes in building better futures together for all. We do this by building better economic futures, better places to live and better infrastructure. We also offer a range of services to support the wider development community to **build better futures together**.

## 02 Scope of Work

## Context

### Reducing Marine Plastic Pollution in South East Asia



Technical Assistance (TA) Cluster Project TA 0044:  
**Promoting Action on Plastic Pollution from Source to Sea in Southeast Asia and the Pacific**

**Marine plastic pollution**, and the damage it causes to our global ecosystem, have reached critical levels. There are already approximately **150 million tonnes of plastics circulating in the oceans** and this is increasing by between 8 and 12 million tonnes per year, with Asia as the epicenter of this pollution.

**ADB has committed \$5 billion** under its Healthy Oceans Action Plan furthering ADB's commitments to sustainable, environmental development for its Developing Member Countries.

Technical Assistance Cluster Project TA 0044 is a key element of ADB's commitment working with **Vietnam, Philippines, Indonesia, and Thailand**.

This TA covers a wide range of activities focusing on **marine plastics pollution, ocean health and circular economy solutions** to help address the management of plastics in the value chain and reduce their pollution of the environment.



## Project Brief

### Overall Scope of the TA

▶ **4 Beneficiaries**  
Different Scales  
of Intervention

▶ **2 Work  
Packages**  
Driving One  
Another



**1. Thailand** (70 million inhabitants)  
→ National Regulation

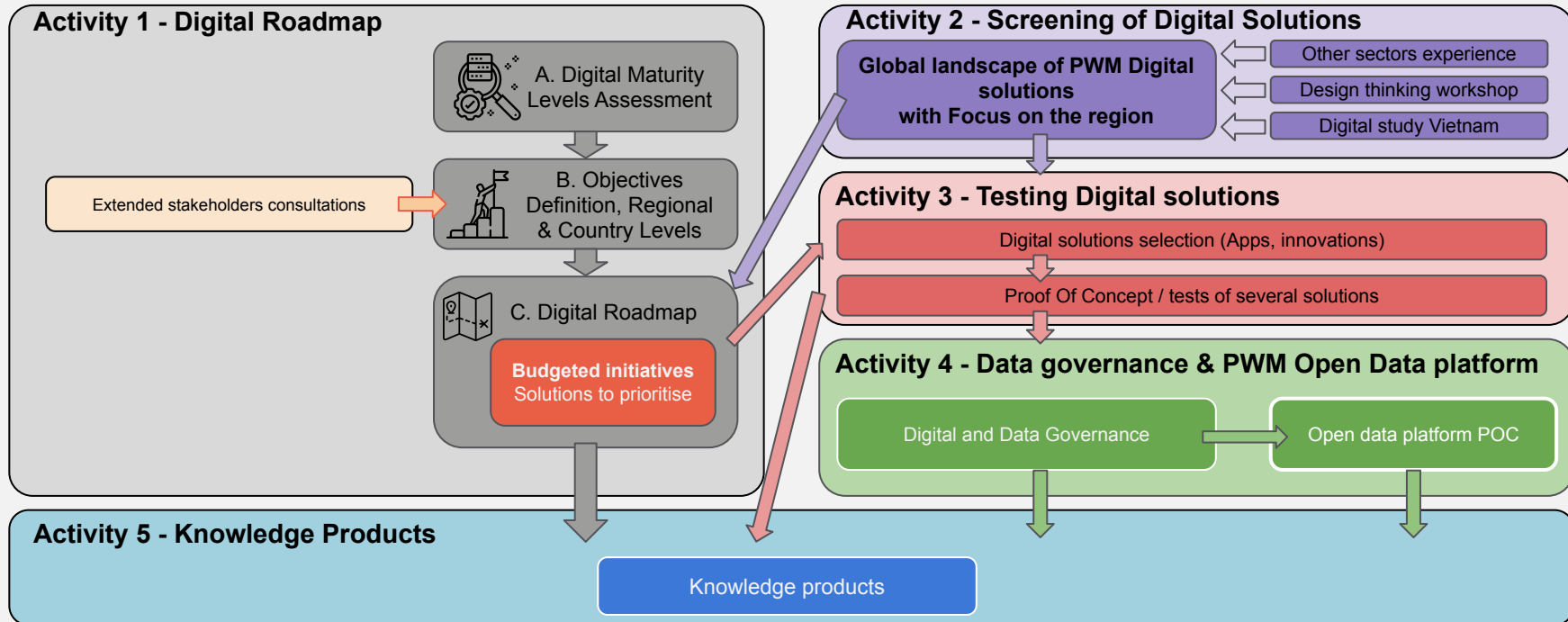
**2. Indonesia, Cirebon City** (~ 330,000 inhabitants)  
→ City Action Plan + Pilot Project enforcing National  
Regulation

**3. Philippines, Manila City** (~ 1.8 million inhabitants)  
→ City Action Plan

**4. Viet Nam, Tan An City** (~ 215,000 inhabitants)  
→ City Action Plan + Pilot Project areas

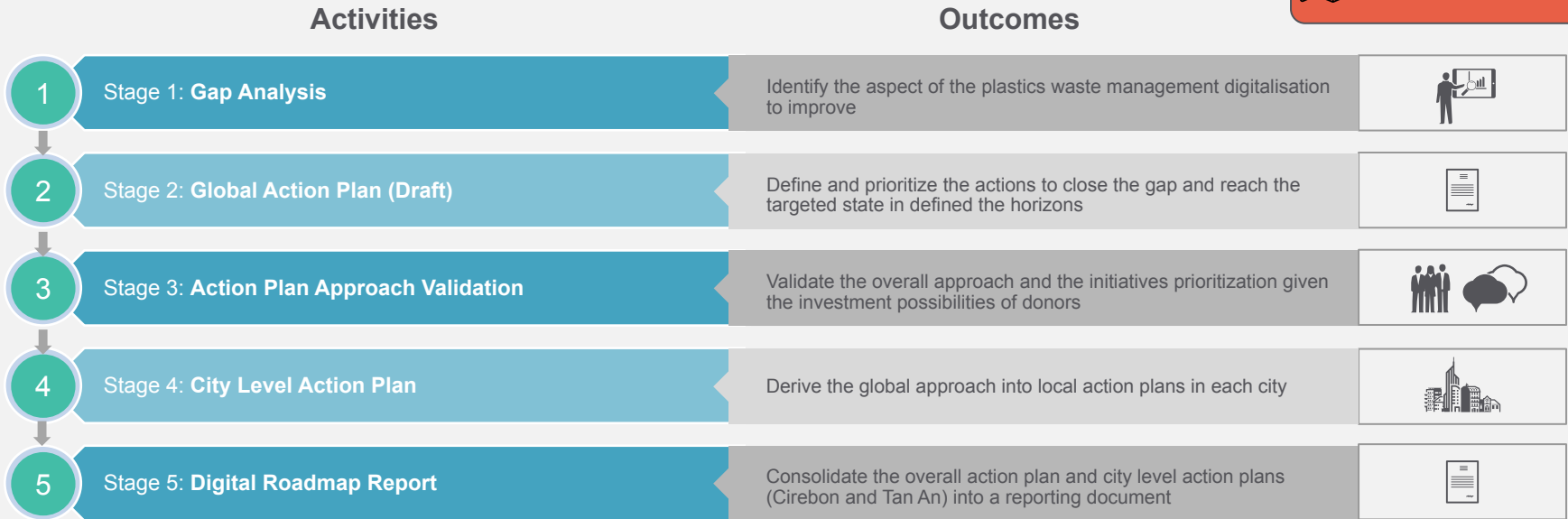
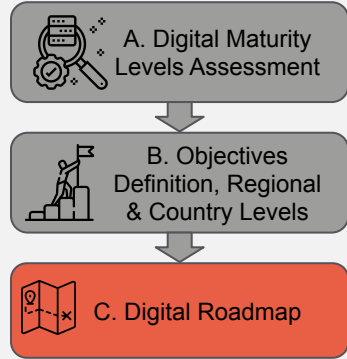
# Scope

## From a worldwide review to evaluating digital solutions in Indonesia and Vietnam



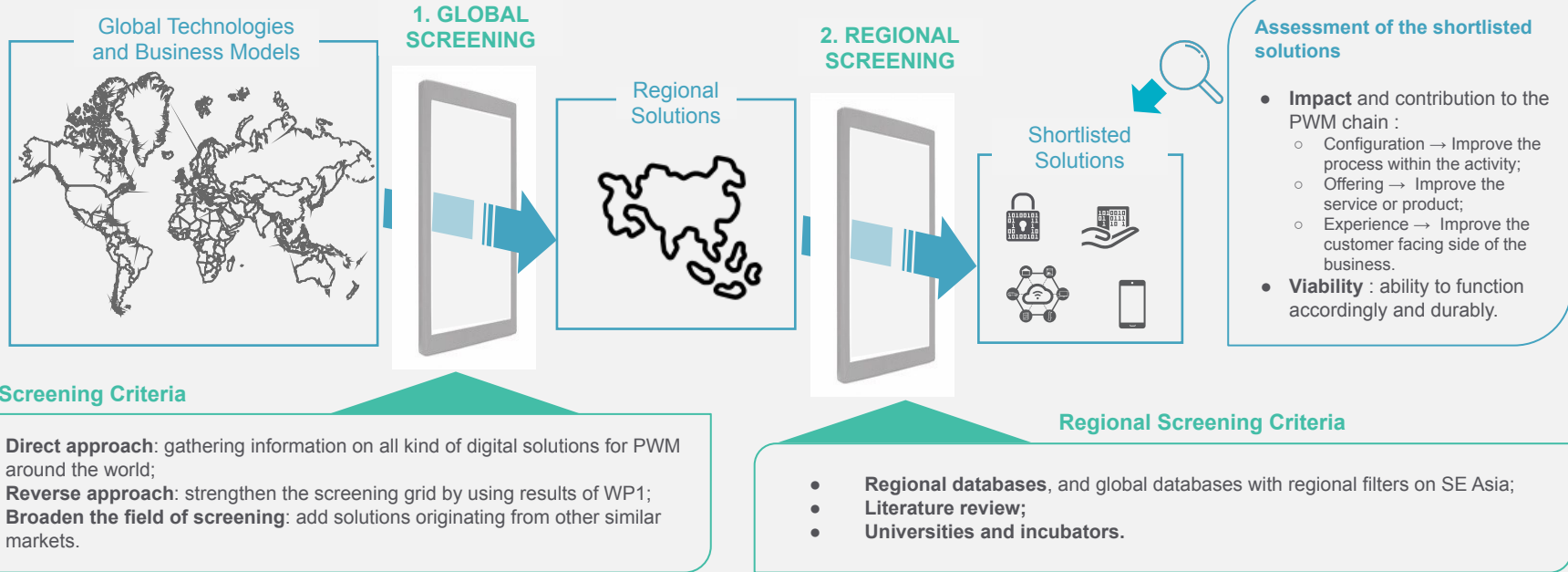
# Activity 1 - Digital Roadmap

## C. Prepare Digital Roadmap



# Activity 2 - Screening of Digital Solutions

## A. Understand the global landscape of digital solutions for PWM to select promising apps/platforms/solutions at the regional level

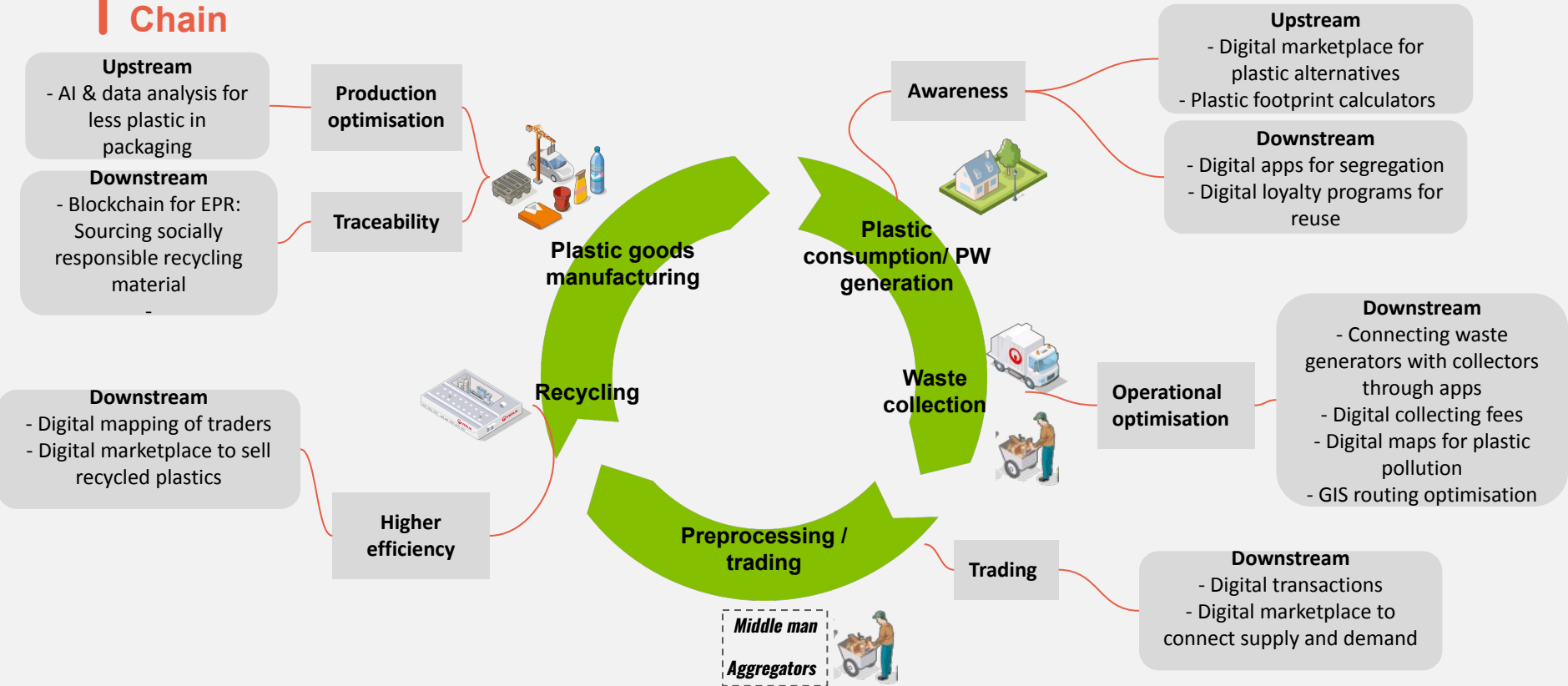


The review of the digital solutions available will be made in light of the challenges identified along the plastic value chain and in the perspective of the plastic treaty

# 03 Upstream and Downstream Innovation and Technology

# Getting in the Loop: Enabling Conditions for a Circular Economy

## Upstream and Downstream Innovations and Technologies in the Plastic Value Chain



A sea turtle is swimming in clear blue water, positioned above a large, dense pile of discarded plastic bottles and containers. The scene is set underwater, with light filtering through the water from above, creating a somber and environmental message.

# 04 Case studies

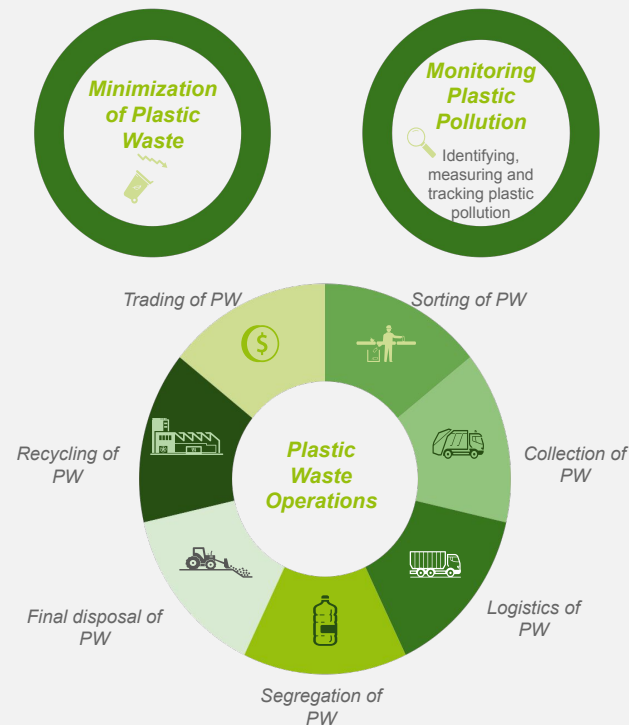
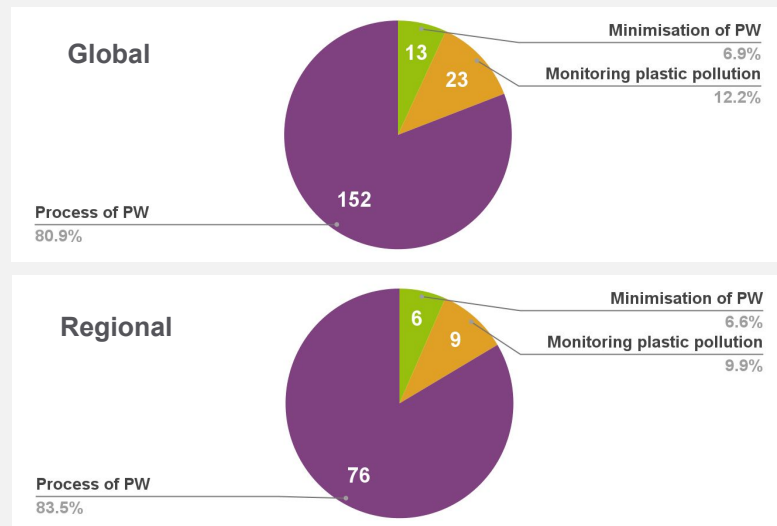
# Getting in the Loop: Enabling Conditions for a Circular Economy

## Classification of global and regional digital solutions in the plastic value chain

### By sector and segment of application

- Minimisation of plastic waste;
- Monitoring of plastic pollution;
- Plastic waste operations.

The majority of solutions are focused on the processing of plastic waste.





# Getting in the Loop: Enabling Conditions for a Circular Economy

## Global and regional digital solutions by segment of application

### Plastic Waste Operations

The majority of the solutions are focused on the segregation and collection segments of the plastic waste value chain.

Global	Segregation of PW	Collection of PW	Logistics of PW	Sorting of PW	Trading of PW	Recycling of PW
N° digital solutions	70	110	27	21	61	30

Regional	Segregation of PW	Collection of PW	Logistics of PW	Sorting of PW	Trading of PW	Recycling of PW
N° digital solutions	45	65	11	6	47	17

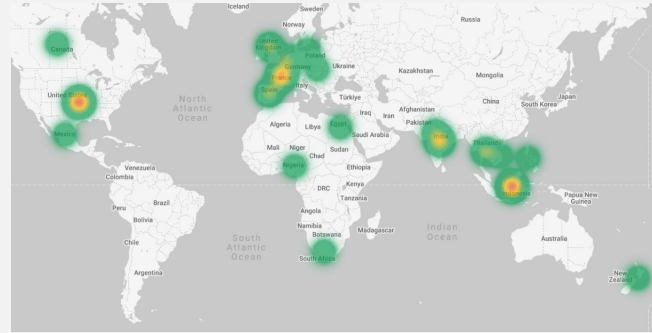


# Getting in the Loop: Enabling Conditions for a Circular Economy

## Global and regional digital solutions by functional utility for users

### Solutions by functional utility for users

- **Awareness:** Providing a fresh perspective and aid in understanding environmental issues and poor waste management.
- **Performance:** Aiming to improve different segments of the plastic value chain.
- **Traceability:** Identification of flows, tracking, creation of databases, geolocation etc.
- **Cash Transfert:** All solutions that enable payment for the trade of plastic waste or for services related to plastic waste management.



Awareness solutions are mainly deployed in the U.S and in Europe



Solutions concerning payments are mainly deployed in the Southeast Asia region

# Getting in the Loop: Enabling Conditions for a Circular Economy

## Plastiloop Veolia Indonesia - End-to-end inclusive approach in the collection value chain



A proprietary blockchain application of Veolia to: ensure that plastics are sourced responsibly, trace the amount of Danone products are returned, meet EPR requirements.



Local NGO support in the field across Indonesia



**Value proposition to informal collectors**

- **Social and financial services** (BBKJ, Savings account)
- **Trainings:** clean and healthy behavior, child labour awareness, financial lit.
- PPE and provision of uniform to promote social recognition

- **Social and financial services** (BBKJ, Savings account)
- **Trainings:** child labour awareness, EHS, financial lit., technical training (Veolia quality)
- PPE provision

- **Grants** (equipments, site improvement) and technical training
- **Trainings:** EHS, quality, other
- Cooperation agreements (Veolia)
- Employee contracts (L2)
- PPE provision
- **Social and financial services** (BBKJ, Savings account)
- Monthly monitoring

**Traceability systems**

Mapping and assessment of over 2,000 L0 waste pickers over the past 3 years and L1s linked to our L2 suppliers engaged under the Inclusive Recycling Indonesia and PRAISE programmes. All L2 suppliers are mapped by Veolia procurement team and assessments are carried out under the Sustainability Programmes.

# Getting in the Loop: Enabling Conditions for a Circular Economy

## Business model case study- Upstream solutions

### equo

A startup that created an online marketplace to sell sustainable products to replace **single-use plastics**. **A single-use plastic is used 15-20 years and it stays on the planet for hundreds of years.**

In addition, their packaging is 100% compostable and biodegradable. In case of bulk orders, they also use recyclable carton and limit the interior packaging. All of their products are made from materials that would normally be discarded in landfills like grass, rice, coconut, sugar cane and coffee.

The website contains a blog with articles on awareness and living sustainably by reusing natural materials in different ways.

After starting in 2023 in Viet Nam, it has **expanded rapidly in a lot of countries like the US, Germany and Australia.**

Plastic and paper are cheaper by at least 6000% than the raw materials used by **equo**. They attract customers by raising awareness on the plastics problem. In Asia there is a lot more adoption on a daily basis even without government intervention and a large social movement.

#### Challenges:

- Average business are very concerned with their revenue so they try to find those that have the same mindset as them.
- Surpassing false belief that alternative products are as strong or better than plastic and paper.

⇒ **Business value, network, rapid expansion & funding**



# Getting in the Loop: Enabling Conditions for a Circular Economy

## Business model case study - Upstream solutions

### Siklus

It provides refill solutions for everyday-use consumer products of different brands. Customers can order a refill from the app or by contacting Siklus on WhatsApp to order their refill. A motorist will bring their order and provide a container so that the customers can get a refill of the product with their packaging.

The solution tackles single-use plastics while also having a positive socioeconomic impact on its customers as the cost of the refills is 20% percent lower than the store price of the same product.

#### Business model:

- **1st phase:** They work with FMCGs to purchase their products in bulk, in large 20-25L jerry cans. They then refill their customer's containers at a 20% lower price and return the jerry can to the FMCG.
- **2nd phase:** Monetize advertising and data analytics through their application or a new platform.
- **3rd phase:** Launch their own brand and expand to other channels like supermarkets.

This is a sustainability solution that also **provides economic benefits to its customers** and **business value to the FMCGs** that work with Siklus because it allows them to **reach or retain customers and meet their ERP requirements**.

In 2021, they managed to save over more than 1.8 million single-use plastics from being produced.

#### Funding:

One funding round in 2020 according to Crunchbase.

(10K page views per month on [average](#))

⇒ **Business value, Network, rapid expansion & funding**



# Getting in the Loop: Enabling Conditions for a Circular Economy

## Business model case study - Downstream solutions

### Cataki

A Brazilian startup: **connects collectors with waste generators**.

The waste generators can pay upon collection but this is optional. There is a **negotiation stage** involved beforehand **between the waste generator and collector**.

- Possible through the website to suggest other collectors. Cataki propose **training to increase the digital literacy level** of the waste pickers who then use their application to tap into a new market.
- **Digital marketing** through the app to **raise awareness about the importance of their work** and to challenge the negative stereotypes associated with their profession.



Cataki is an open, collaborative non-profit organisation. **A lot of volunteer work** for for the developments of its application and website, its communications and designs and other aspects of the business. **The application is currently financed by grants and donations**.

**To be financially sustainable**, they want to eliminate intermediaries and by **become a large aggregator and deal directly with recyclers**. This will allow them to provide collectors with higher profit margins.

⇒ They have a funding raising team.

**Key figures:** ⇒ **increased waste-picker income by 63%, weight collected by 49%**

- app downloaded 220 000 times;
- 3 000 registered waste pickers in 2021;
- used in 540 brazilian cities;

⇒ **Network, rapid expansion, technology & funding**

## Getting in the Loop: Enabling Conditions for a Circular Economy

### Business model case study - Downstream solutions

#### Kolekt

The app aims to connect sellers and buyers along the value chain of recyclable waste. It is a digital marketplace for various materials like plastic, paper, metals etc. Waste generators can also advertise their recyclables so that they can be picked up.

The application also features a subscription based dashboard with different kind data for companies who who want to meet their EPR requirements for example.

Designed with waste pickers in Indonesia, the app did not scale there.

⇒ **A new feature**, opening your account with face-recognition on another phone allows waste pickers without phones to trade using the app. The unbanked and undigitized can benefit from the app.

Bvrio lead a study and a pilot about establishing a digital waste management solution in Angola and Mozambique.(funder : European Union Africa RISE programme)

In the present state, the app is mostly used in Mozambique.

Mozambique:

- Additional income for waste-pickers
- Data reporting, analytics and traceability for businesses

The app will also provide certificates of waste collection and responsible dispose.

⇒ **Technology, funding, network, rapid growth**



# Getting in the Loop: Enabling Conditions for a Circular Economy

## Business model case study - Downstream solutions

### Bower

A Swedish startup: enables to **earn rewards from recycling**. Consumers scan the product and the application gives indications **where to bring recyclable waste**. The app also provides information about recycling and allows users to **calculate their environmental impact**.

- Rewards come from the brands – to meet sustainability goals by seeing their packaging recovered.

**To earn money, the application charges brands to participate** into the program and provides them with **data about their client** that they can leverage to grow sales and a platform that allows them to **communicate easily** with their clients or conduct surveys.



Bower initially started by proposing a reusable model to grocery stores and quickly pivoted its strategy after the following insight:

- **Companies won't pay if it does not add business value. A sustainability solution is not enough.**

Other insights gained were that:

- People don't recycle because they **don't know how to or because it's not fun** ⇒ they added a gamified component to their application that increased engagement.
- People start recycling because of the **financial incentives** but once **they see their impact they start to care**.

**Key figures:**

- 580 000 registered users
- 73 million recycled packages

⇒ **Business value, network, rapid expansion, funding & technology**



## Getting in the Loop: Enabling Conditions for a Circular Economy

### Business model case study - Downstream solutions

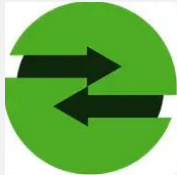
#### EnCashea & Hasiru Dala (India)

EnCashea: an online platform **organising collection** from households and businesses and **selling the collected materials in its marketplace**.

- B2C good margins but slow growth
- B2B had higher growth but slower margins high specialised demand

It was considering buying its competitor Raddiman but eventually closed down. After a year of operation with around 25 employees, the company has decided to close as the margins were lower for every new customer and they couldn't achieve profitability.

⇒ **Technological advantage for EnCashea & funding**



Hasiru Dala Innovation, a **waste management service**, bought the proprietary technology of EnCashea which eventually closed down. One of the founders of Hasiru Dala Innovation was **president of the association of waste pickers** and after opening Hasiru Dala Innovation he collaborated with the waste pickers to provide collection services to bulk waste generators including **multi-dwelling residential units and businesses** and plastic recovery services that provide higher quality recyclables to companies like **H&M, The Body Shop and Cofresco**.

Even though EnCashea had better technology, Hasiru Dala Innovations had **a network that it could leverage to source scraps cheaper and provided business value to companies by providing higher recyclable plastic sourced responsibly**.

⇒ **Better business value, network, rapid expansion & funding**



## Getting in the Loop: Enabling Conditions for a Circular Economy

# Funding, Challenges and enabling conditions for digital solutions in the Plastic Value Chain

### Benefits of digital solutions

- Low-cost scalable solutions for awareness
- Higher quantity and quality of plastic recyclables (better educations, segregation)
- Improving segregation rates
- Improving reuse rates

#### Benefits to the informal sector (esp. livelihood)

Increase of income	20% - 50%
Increase of volume collected	30% - 60%
Traceability allows revenue from EPR schemes and plastic credit	
Improving the working conditions by provision of gloves, vests etc.	
Increasing their digital literacy	
Provides ability to hold e-wallets and open digital savings accounts ( the majority are unbanked)	
Improving perception of waste-picker's profession	

### Funding for digital solutions:

- Extended Producer Responsibility schemes
- Corporate Social Responsibility schemes
- Private funding and donations
- Generation of revenues

### Challenges and enabling conditions:

- Geographical expansion
- Funding
- Market and policies
- Digital maturity
- Network (leveraging informal sector)
- Technological advantage
- Business value for financial sustainability

A sea turtle is swimming in clear blue water, positioned above a large, dense pile of discarded plastic bottles and containers. The scene is set underwater, with light rays filtering through the water. The turtle is facing left, and its shell shows a pattern of green and brown. The plastic waste is a mix of clear and white bottles, some with caps, and is piled up in the foreground.

# 05 Opportunities for growth

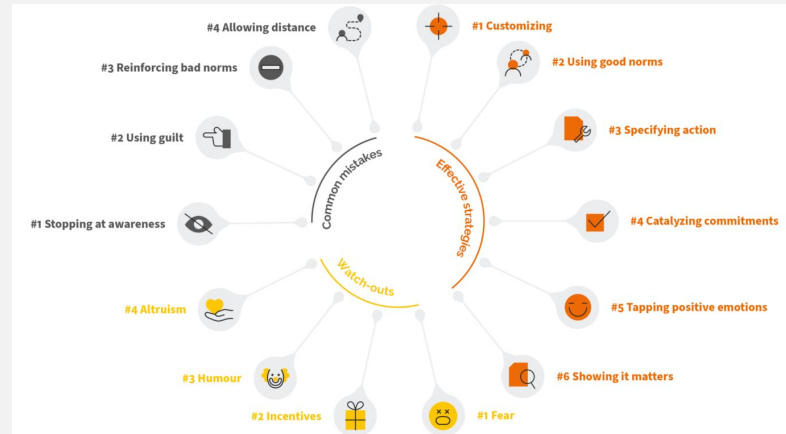
## Getting in the Loop: Enabling Conditions for a Circular Economy

### Opportunities for growth

- **Digital marketing:** social media provides a big opportunity to raise awareness
  - Very high usage amongst the highest generators of plastic waste,
  - Low-cost, scalable, easy to implement.

**60-70% of the population uses social media in Indonesia & Vietnam**

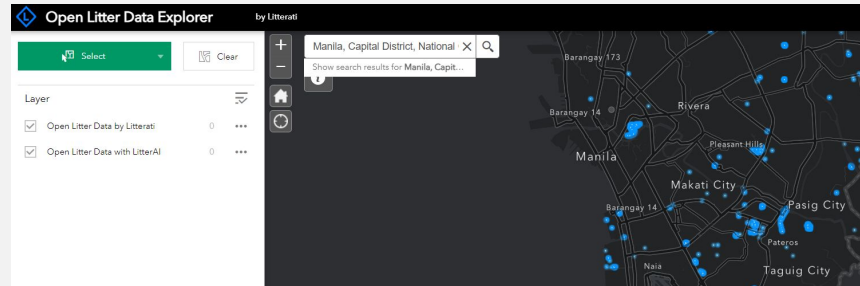
**REDUCING PLASTIC  
POLLUTION:  
CAMPAIGNS THAT WORK**



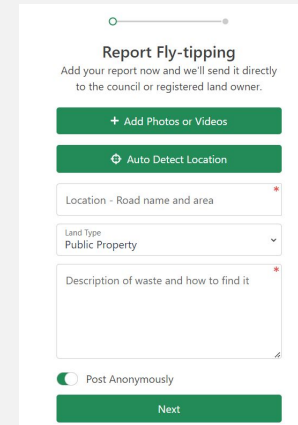
## Getting in the Loop: Enabling Conditions for a Circular Economy

### Opportunities for growth

- **Centralisation** of plastic pollution identification apps by country:
  - Connect waste management services or voluntary groups for pollution hotspot cleanups.



- **Citizen science** - a big number of people that are already sensitive to plastic:
  - Locals, tourists, digital nomads, backpackers etc;
  - Can contribute to identify plastic pollution, water-body entry points and more;
  - Inform and incentivize for cleanups in remote areas and voluntary work.

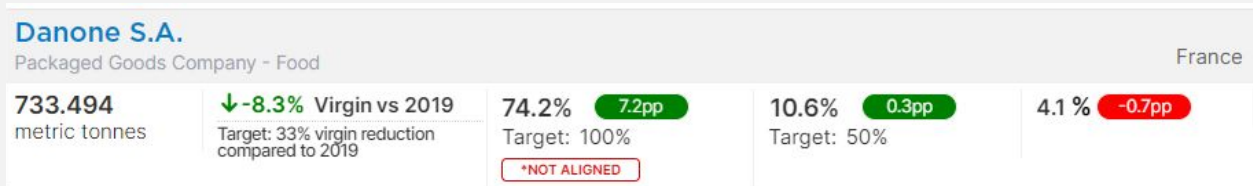


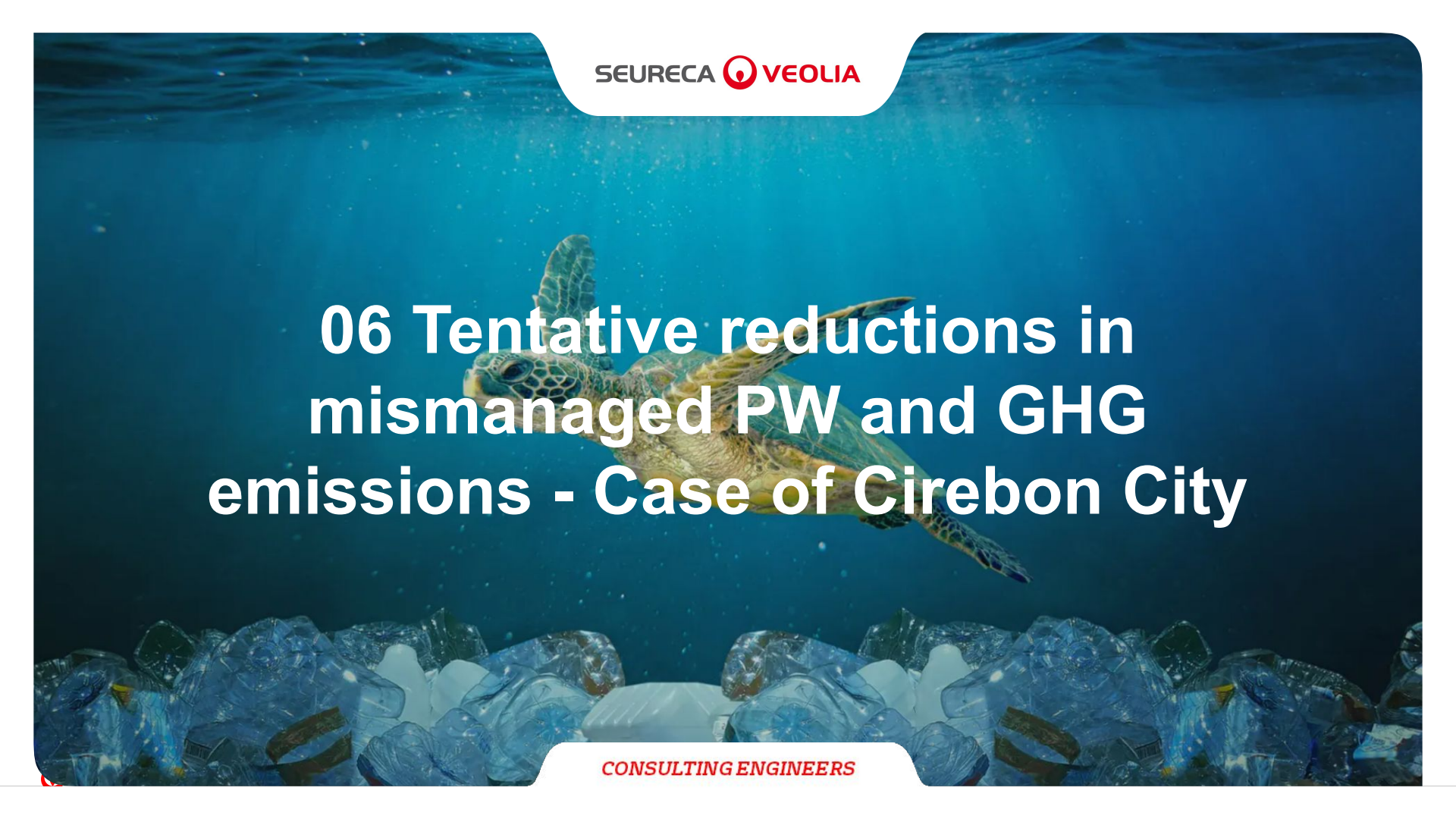
The screenshot shows the 'Report Fly-tipping' form. It includes a title 'Report Fly-tipping' and a subtitle 'Add your report now and we'll send it directly to the council or registered land owner.' Below the title, there are two green buttons: '+ Add Photos or Videos' and 'Auto Detect Location'. The form has several input fields: 'Location - Road name and area' with a red asterisk, 'Land Type' with a dropdown menu showing 'Public Property', and 'Description of waste and how to find it' with a red asterisk. At the bottom, there is a 'Post Anonymously' toggle switch and a green 'Next' button.

## Getting in the Loop: Enabling Conditions for a Circular Economy

### Opportunities for growth

- **Digital waste management apps:**
  - geographical expansion by providing support through funding and networking.
- **IoT and monitoring technologies:**
  - Fill-level sensors, plastic detection sensors on marine vessels;
  - Aerial imagery, CCTV, vehicle-mounted cameras etc.
- **Open platforms and leveraging data (AI, data analysis):**
  - Inform decision makers for targeted actions;
  - Optimise operations, higher efficiency and lower costs;
  - Monitor producers of plastic and enforce better EPR schemes.





**06 Tentative reductions in  
mismanaged PW and GHG  
emissions - Case of Cirebon City**

# Getting in the Loop: Enabling Conditions for a Circular Economy

## Tentative reductions in mismanaged plastic - Case of Cirebon City

### Estimated impact of digital solutions

According to the NPAP analysis; World Economic Forum, Radically Reducing Plastic Pollution in Indonesia: A Multi Stakeholder Action

- 4.820 Mtons of PW are mismanaged country wide
- An average of 18.22 kg/year/capita

Cirebon City's case as an example for Indonesia

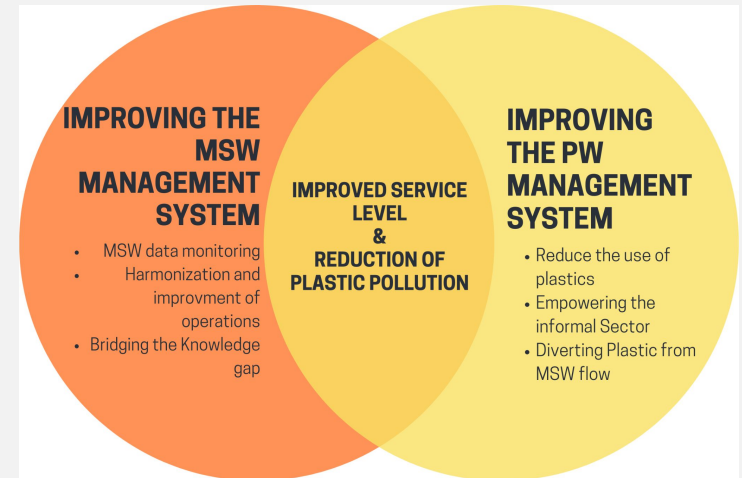
- Cirebon City most closely resembles the “medium” archetype from the NPAP Analysis. This archetype represents 1.044 Mtons of mismanaged PW.
  - Cirebon City's mismanaged PW per year per capita: **26.5 kg/year/capita**
  - Estimated **8,553 tons per year of mismanaged PW**

Raising awareness digital campaigns amongst households can have compounding benefits with better segregation and recycling rates of plastic waste, higher reuse of packaging and use of alternative solutions.

Other solutions allow plastic pollution identification and cleanup operations by international volunteers reducing pollution faster, improving their quality of life by better living conditions and faster economic development.

### Estimated impact of the waste management road map

- Reducing plastic pollution is directly connected to improving the MSW Management system in a city like Cirebon as there is no dedicated PW management system.



Opportunities recommended targeting the MSW and PW of Cirebon City, overlapping in their impact



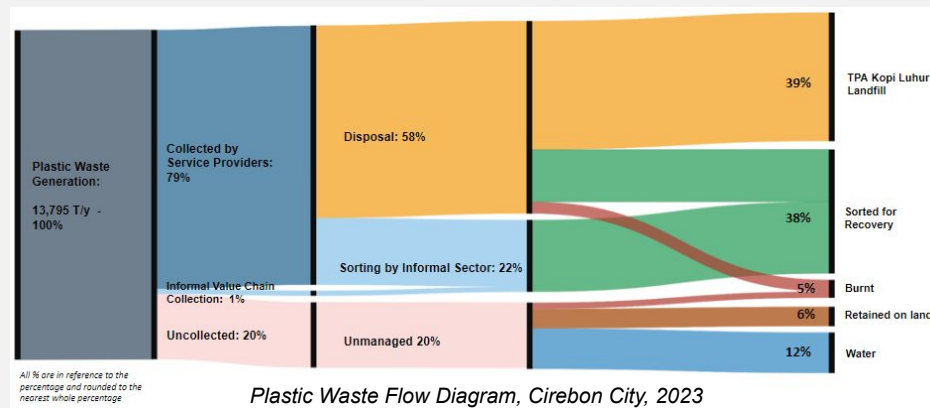
## Getting in the Loop: Enabling Conditions for a Circular Economy

### Tentative reductions in mismanaged plastic - Case of Cirebon City

Alternative digital solutions to plastics such as refill and alternative material are shown to reduce single-use plastic waste by 5.4 tons for every 1000 active users every month ⇒ **If this solution is scaled at 20% of the population of Cirebon there will be a decrease of SUP by 300 tons per year.**

Assuming that there are 300 waste-pickers in Cirebon, using a digital solution to identify plastic hotspots and high plastic waste generators can help increase the weight collected by at least 30%. ⇒ **This can lead to an increase of treated plastic waste of 910 tons per year.**

Incentive based solutions for plastics recycling have shown to increase recycling rate by 3.8 kg/year/capita in Europe. Taking into account the difference in plastic waste generation per capita in Indonesia and Europe ⇒ this would amount to a 2.9 kg/year/capita increase in recycling rates. **If adopted by 20% of the population of Cirebon it amounts to 190 tons per year.**



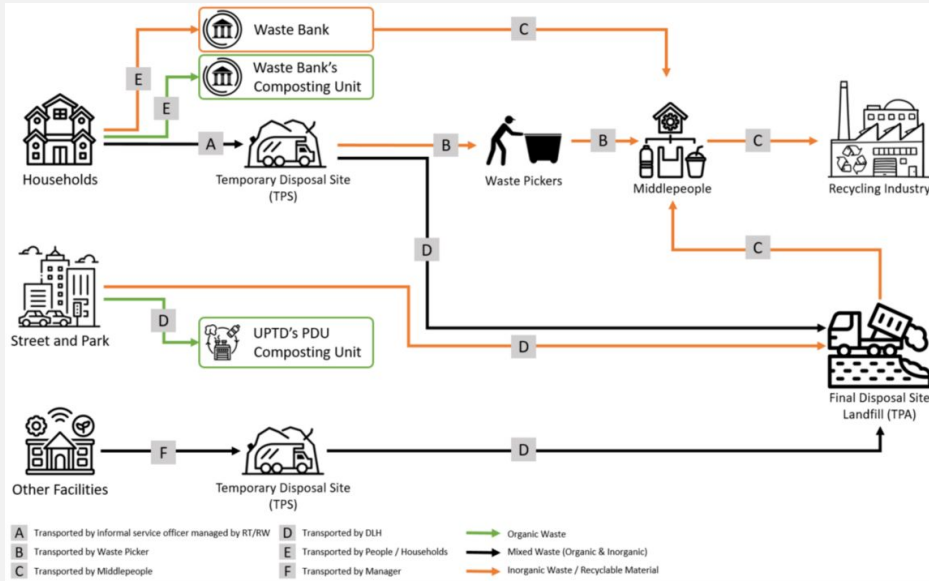
### Managed and unmanaged plastic

Our aim with the roadmap of recommendations is to eliminate PW mismanagement by designing 6 opportunities that Cirebon City can follow. These opportunities follow the key principles of the 5 R's: Refuse (to buy plastics), Reduce, Reuse, Repurpose (old plastics for different use) and Recycle. Thus addressing 8,553 tons/year of mismanaged PW

# GreenPath Digital solution - Case Study of Cirebon City

## Modeling the Existing SWM System's GHG Emissions

Flow Diagram of existing solid waste management system in Cirebon City



- MSW, Commercial and Institutional Waste and Street Waste is collected by the city and disposed of at the landfill without sorting from the city
- The landfill is not sanitary, waste is left untreated
- The landfill is situated in the city
- The informal sector is the only stakeholder doing any sorting of recyclable materials currently

# GreenPath Digital solution - Case Study of Cirebon City

## Modeling the Existing SWM System's GHG Emissions

MSW Disposed of at TPA from collection services	Weight (tonnes/year)	Proportion of overall waste disposed at TPA (%)
Indirect collection from the TPS by DLH	29,850	71%
Direct collection by DLH for private companies (MoU)	8,648	21 %
Direct collection by DLH (Protocol Road Cleaning and Squares)	3,014	7 %
Direct collection by DLH (Illegal Waste in Streets)	306	1 %
<b>TOTALS</b>	<b>41,818</b>	<b>100 %</b>

Sources of MSW disposed at TPA Kopi Luhur Landfill and amounts, Baseline study of Cirebon, Seureca, 2023



		Total	
		CO2	Uncertainty
Scope 1	1-2 - Direct emissions from mobile sources of combustion	3,714	2,377
	1-4 - Fugitive direct emissions	0	0
Scope 2	2-1 - Indirect emissions from electricity consumption	0	0
	3-3 - Emissions from fuels and energy (not included in scope 1 or scope 2)	898	654
Scope 3	3-4 - Upstream transportation and distribution	0	0
	3-5 - Waste generated	47,124	0
<b>Total</b>		<b>51,736</b>	<b>3,031</b>

*All values are in Tons CO2e.*

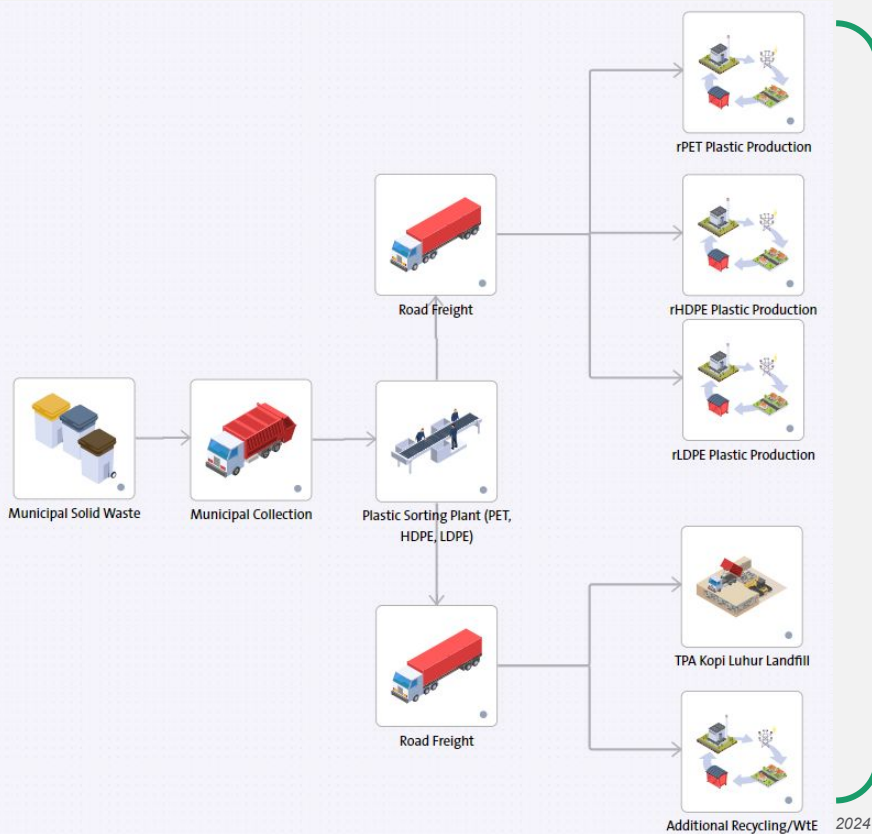
GreenPath Analysis of CO2eq emissions over a 30 year period

### GreenPath analysis based on data:

- Primary sources of GHG emissions over a 30 year period are:
  - Emissions generated from waste landfilled - **47,124 tons CO2eq**
  - Emissions from fuel consumption of trucks for waste collection - **4,612 tons CO2eq**

# GreenPath Digital solution - Case Study of Cirebon City

## Model of Plastic Recovery, RDF and Biogaz Recovery Solution



GreenPath analysis based on data:

- **Recovery of all PET, HDPE, LDPE** waste from the city through plastic sorting plant
  - **Additional Recovery of waste at the landfill for RDF**
  - Waste landfilled **with capture and biogaz recovery**
- GHG emissions over a 30 year period are:
- **19,916 tons CO<sub>2</sub>eq ± 5,672 tons CO<sub>2</sub>eq**

	Total		Avoided Emissions	
	CO <sub>2</sub>	Uncertainty	Avoided Emissions	Uncertainty
Scope 1				
1-2 - Direct emissions from mobile sources of combustion	0	0	0	0
1-4 - Fugitive direct emissions	0	0	0	0
Scope 2				
2-1 - Indirect emissions from electricity consumption	0	0	0	0
Scope 3				
3-3 - Emissions from fuels and energy (not included in scope 1 or scope 2)	0	0	0	0
3-4 - Upstream transportation and distribution	4,224	3,082	0	0
3-5 - Waste generated	15,692	2,590	8,852	2,783
<b>Total</b>	<b>19,916</b>	<b>5,672</b>	<b>8,852</b>	<b>2,783</b>

# Case Study of Cirebon City

## Comparison of Models - GHG Emissions

### Baseline

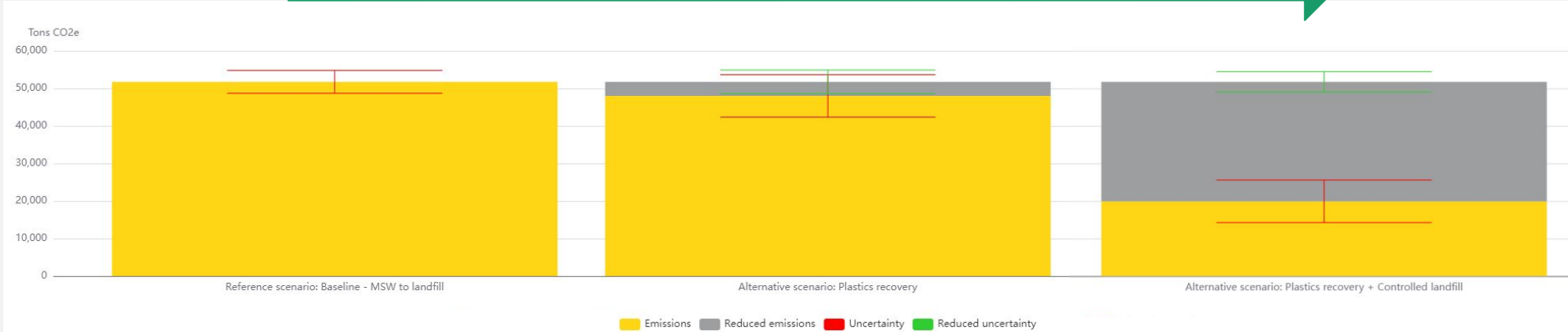
- **51,736 tons CO<sub>2</sub>eq ± 3,031 tons CO<sub>2</sub>eq**
- **No plastic recycling**

### Plastic Recovery

- **47,997 tons CO<sub>2</sub>eq ± 5,672 tons CO<sub>2</sub>eq**
- **CO<sub>2</sub>eq reduction: - 7%**

### Plastic Recovery, RDF and Biogaz capture and recovery

- **19,916 tons CO<sub>2</sub>eq ± 5,672 tons CO<sub>2</sub>eq**
- **CO<sub>2</sub>eq reduction: - 61,5%**



# Getting in the Loop: Enabling Conditions for a Circular Economy

## Upstream and Downstream Innovation and Technology - Concluding Remarks

- **Classification of Digital Solutions**
  - Minimisation of Plastic Waste
  - Monitoring of Plastic Pollution
  - Plastic Waste Operations (Sorting, Collection, Disposal, etc)
- **Enabling environment for digital applications**
  - Awareness, accessibility, affordability and digital literacy are factors for uptake by the informal sector
  - Innovations (eg facial recognition) can help overcome some of the digital solution uptake challenges
- **Benefits from Digital Apps**
  - Improved traceability and quantification for EPR schemes;
  - Enhanced waste collection at low cost;
  - Increased income - better welfare and livelihood for informal sector/waste pickers
- **Potential Benefits**
  - Reduced mismanaged waste
  - Reduction in GHG Emissions (but only limited compared to overall waste management improvements)

### Next Steps

- Reaching out to key actors in the plastic value chain to assess high potential digital solutions in Activity 3 in Cirebon (Indonesia) & Tan An (Vietnam)

# Thanks for your attention

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