



WORLD BANK GROUP

SOLID WASTE MANAGEMENT IN INDONESIA

OPPORTUNITIES AND CHALLENGES FOR RECYCLING AND WASTE REDUCTION

Jakarta, Indonesia

October 25, 2018

STRUCTURE OF PRESENTATION

1. Integrated Solid Waste Management in Indonesia
2. Potential for recycling and waste-to-energy
3. Marine Debris Management



NATIONAL PROGRAM FOR IMPROVING SOLID WASTE MANAGEMENT

Addressing Underlying Sector Issues



Section 1:

Current Status of Solid Waste Management Sector

Government targets demand high sector performance

Waste Management Act (No. 18/2008)

- Requires the closure of all open dumping by 2013.
- Requires all three levels of government to contribute to financing the sector.

Regional Development Act (No. 23/2014)

- Responsibility of local government in solid waste management (SWM).

National Medium Term Development Plan (RPJMN 2015 – 2019)

- Targets: 100% SWM urban services (collection, treatment or disposal) by 2019.

National Waste Management Policy and Strategy– Perpres No. 97/2017

- 30% waste reduction and 70% handling by 2025 → Prov/City/District Jakstrada

Marine Debris Handling – Presidential Regulation (Perpres) No 83/2018

- Commitment of Indonesia for reduction of 70% marine plastic by 2025

Acceleration of Development WtE Facilities – Perpres No 35/2018

- Covering 12 cities, feed-in tariff of US\$ 13.35 cent/KWh for power plant < 20 MW, and up to IDR 500k/ton-waste tipping fee contribution from APBN (central).

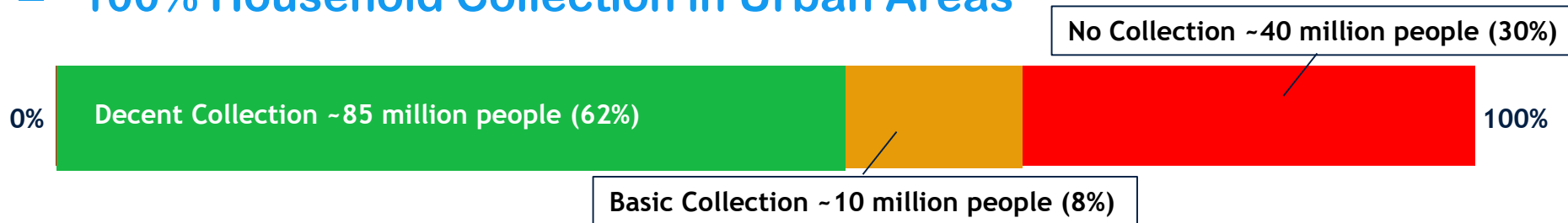
Conclusion: – IN SHORT AMOUNT OF TIME

Indonesia aims for 100% urban collection, 100% sanitary disposal for large urban areas, & international best practice rates of waste reduction (30%).

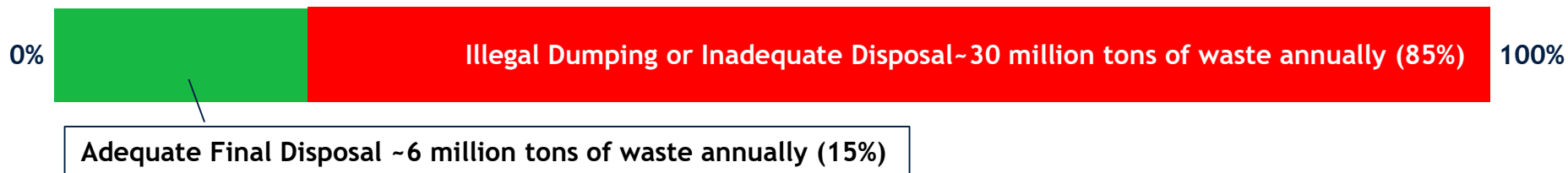
Despite total waste generation rapidly increasing from wealth(↑) and urbanization(↑)

Current performance does not come close to targets

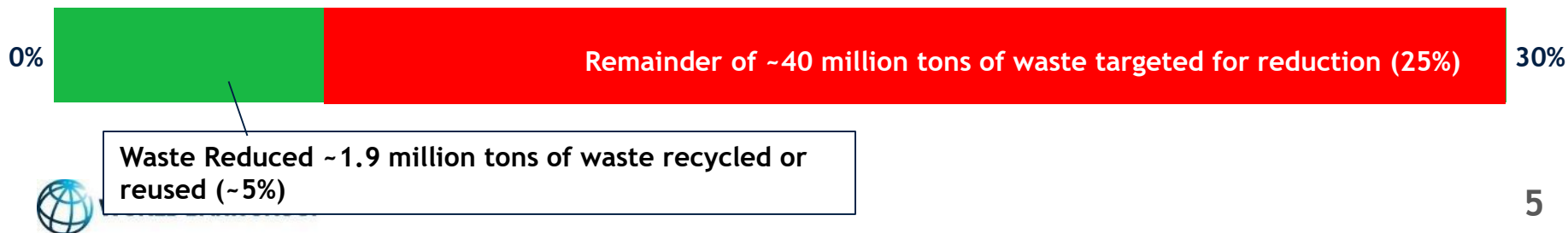
– 100% Household Collection in Urban Areas



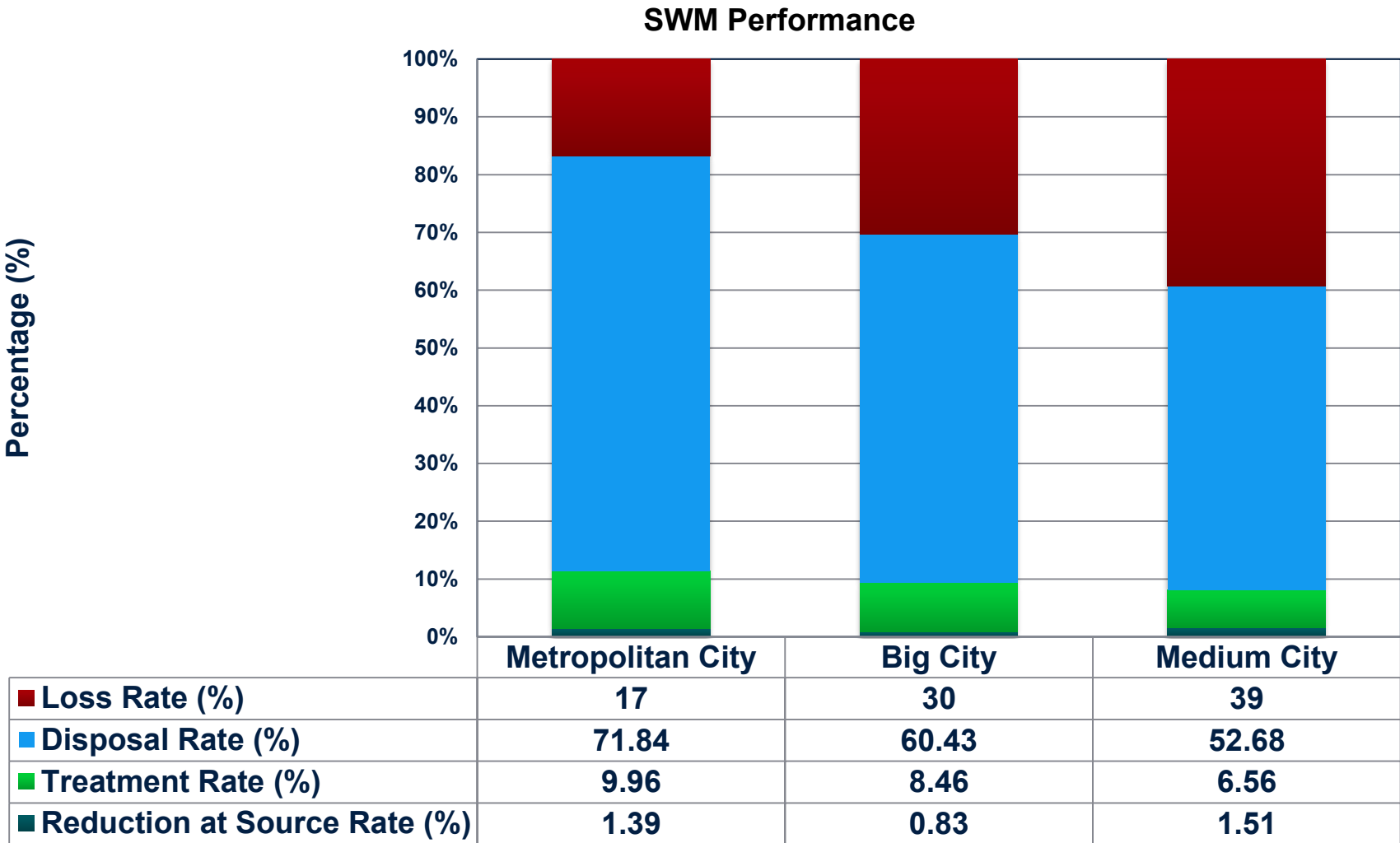
– 100% Sanitary Disposal (Large Urban Areas) & Controlled Dumping (Small and Medium Urban Areas)



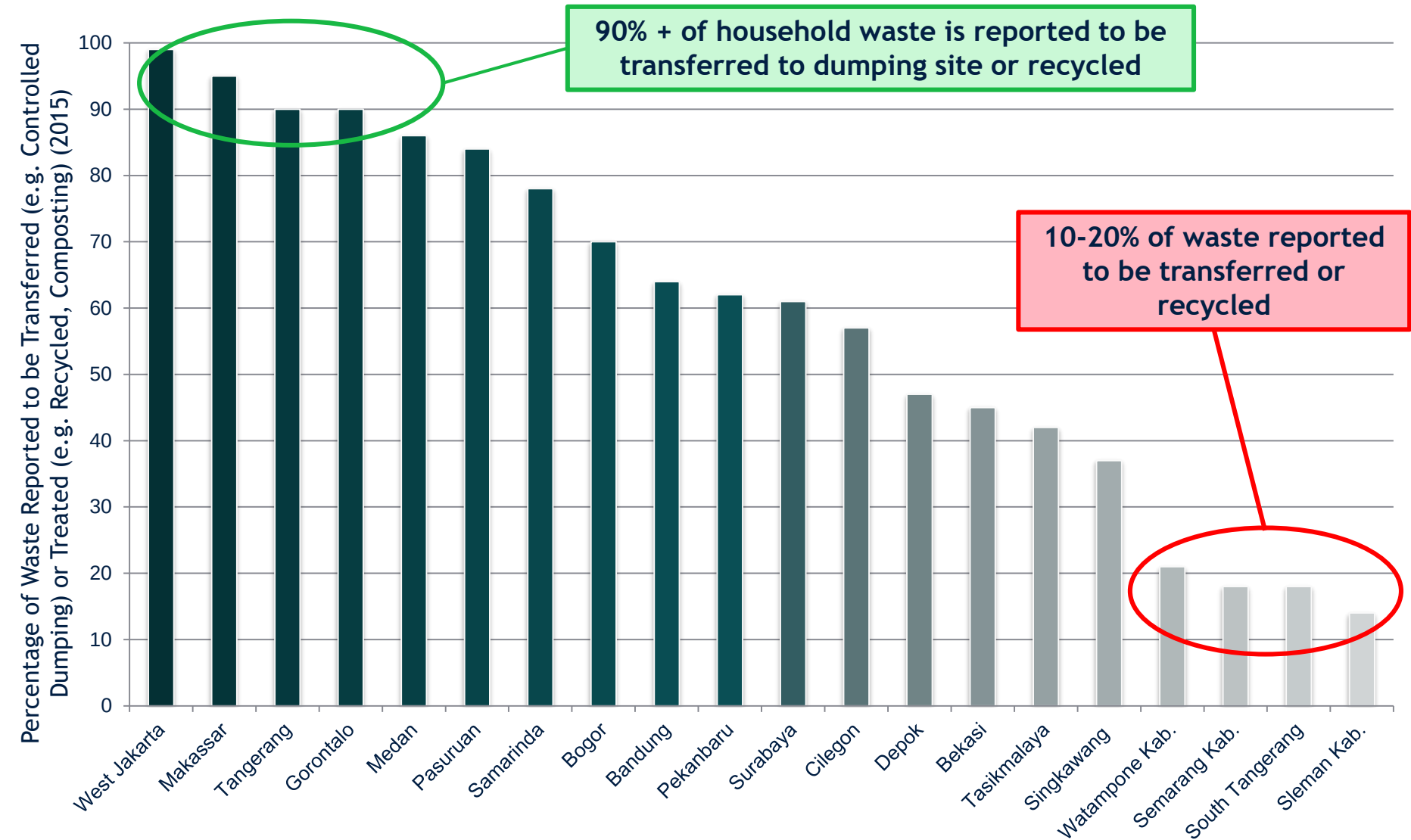
– 30% Waste Reduction



SWM performance is poor in all types of cities



Not one size fits all: performance varies significantly between cities & urban districts.



Identifying the key sector challenges

1. Insufficient Financing

2. Organizing Collection

3. Operational Capacity

4. Incentivizing City / District Performance

5. Land Shortages





Analysis for National Sector Development Program

Methodology for identifying committed cities and scope of intervention

Phase 1: **Compiling Available SWM Data**

SWM Database for 104 Cities of Metropolitan, Big, and Medium Cities (1m+; 0.5m-1.0m; 100,000+ population)



Phase 2: **Evaluation of SWM Commitments Per Urban Area**

Mixture of Standardized Scoring & Sector Insider Advice



Phase 3: **City Prioritization**

Classifying Cities into 3 Readiness Tiers (1,2,3)



Phase 4: **City Investment Planning to Achieve 100% Service**

City and District Assessment (World Bank 2017) and GOI WtE Priority Cities

Tier 1 Cities + Districts		
Metropolitan Cities	Medium Cities / Districts	
Makassar*	Banjar Baru	
DKI Jakarta*	Bitung	
Palembang*	Bukit Tinggi	
Surabaya*	Karimun District	
Tangerang*	Kendari	
Big Cities	Malang District	
Balikpapan	Magelang	
Malang	Pare Pare	
Padang	Pematang Siantar	
	Probolinggo	
	Salatiga	Sukabumi

Tier 2 Cities + Districts		
Metropolitan Cities	Medium Cities / Districts	
Bandung*	Ambon City	Mojokerto City
Depok	Banda Aceh City	Pasuruan City
Medan	Banyumas District	Payakumbuh City
Semarang*	Banyuwangi District	Tangerang District
Big Cities	Bau-Bau City	Tanjung Pinang District
Banjarmasin	Blitar City	Tebing Tinggi City
Denpasar*	Cianjur District	
Jambi	Jepara District	
Manado*	Kudus District	
Pekanbaru	Lahat District	
Surakarta*	Madiun City	

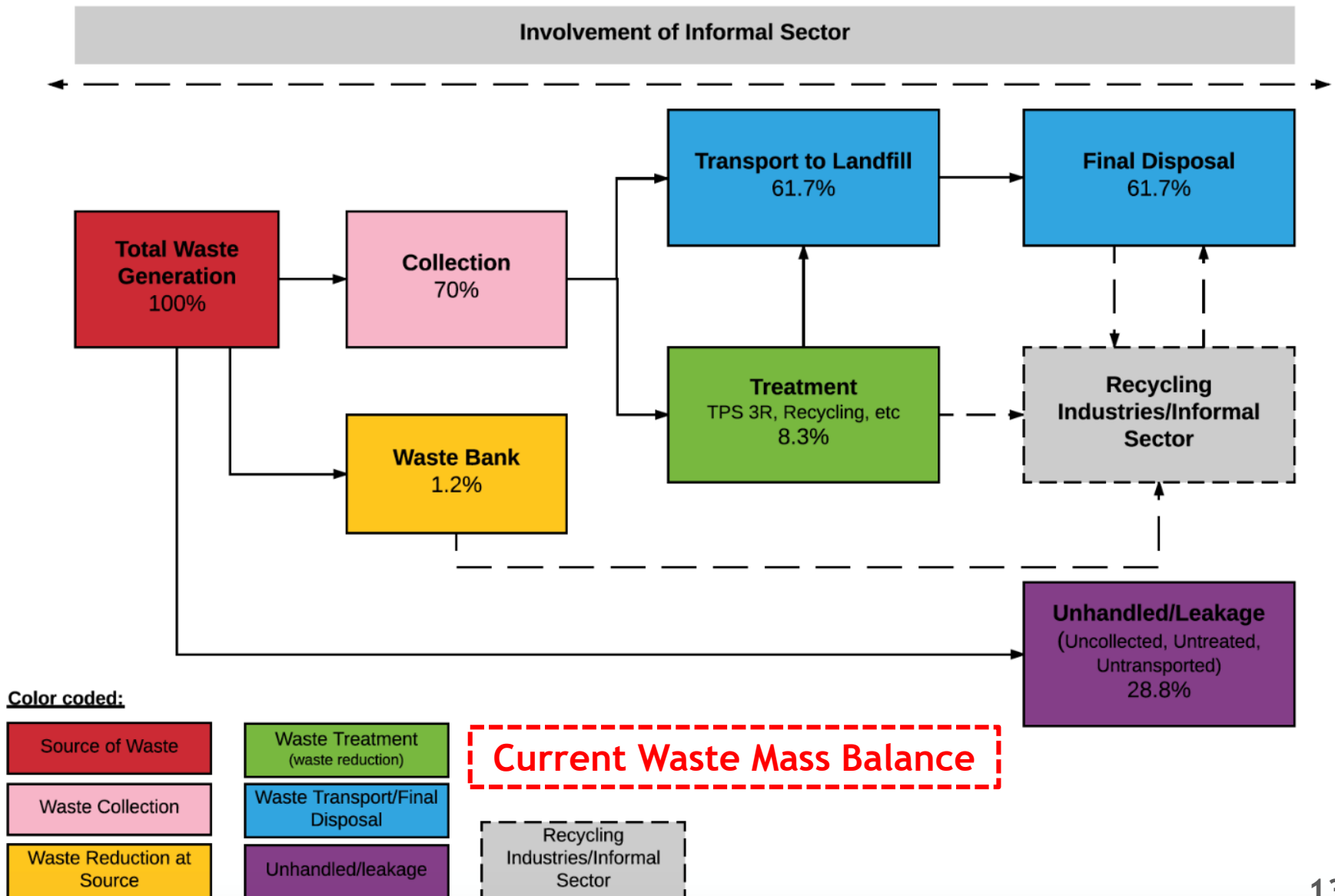
*. Cities covered by Perpres 35/2018 on WtE. Other are Tangerang Selatan and Bekasi

Investment Financing Gaps are Apparent

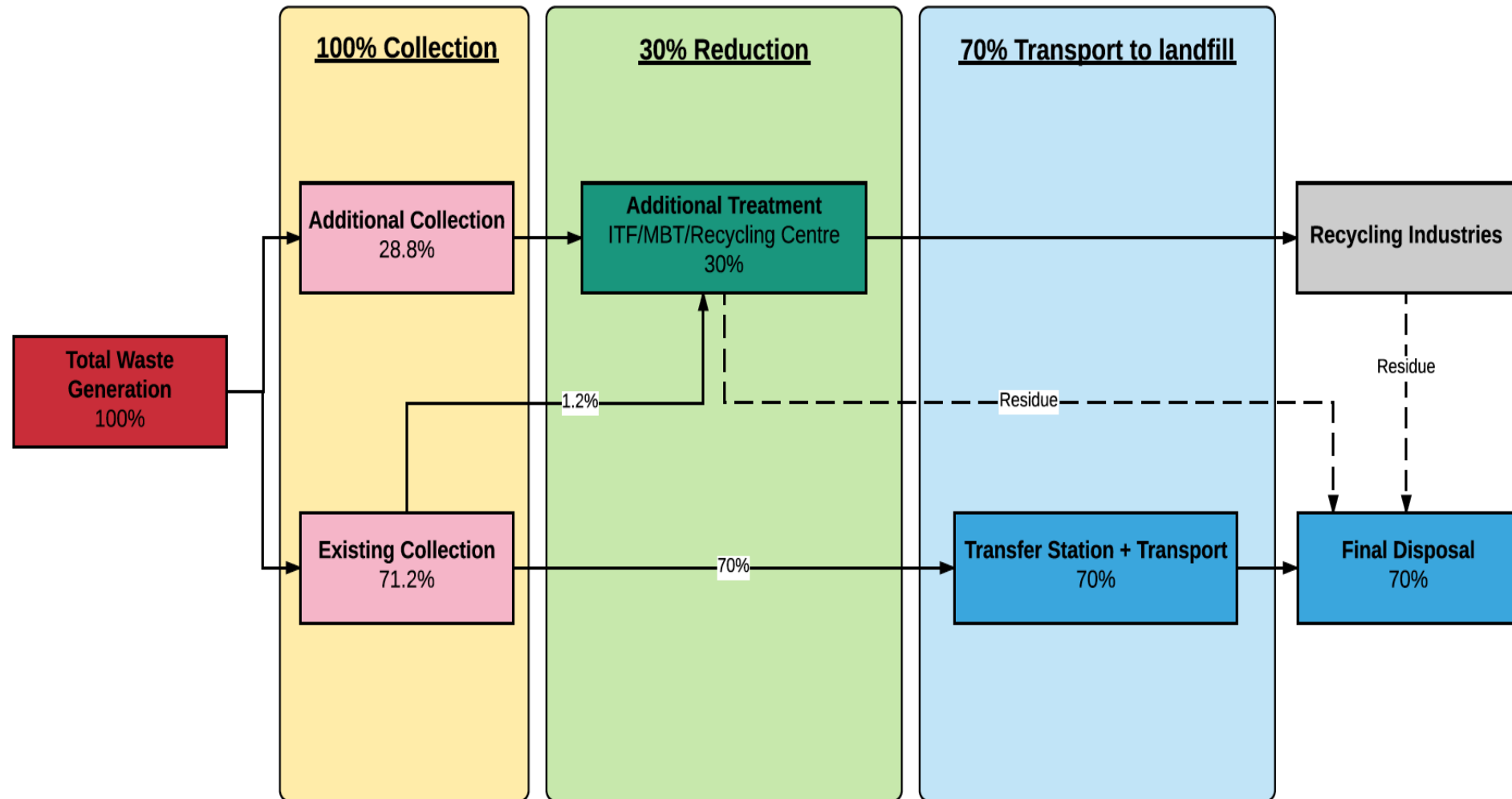
- In 2016, it was estimated that US\$1.2 billion is available for investments (25% of need), which is large enough to deliver improved sector performance measurable at a national scale **when funds are spent effectively and efficiently.**

Investment Funding Challenges (2017-2022)	
Required (MPWH Estimate)	IDR 66 trillion (\$5 billion)
Likely Available Financing (e.g. APBN, APBD, Donors)	IDR 17 trillion (\$1.2 billion)
Financing Gap (e.g. DAK, APBN, APBD, PPP)	IDR 49 trillion (\$3.7 billion)

Investment Scenarios – Current System



Investment Scenario – Full collection, adequate disposal, 30% Waste Reduction



CONDITIONS IN INDONESIA FOR ADVANCING WASTE RECYCLING

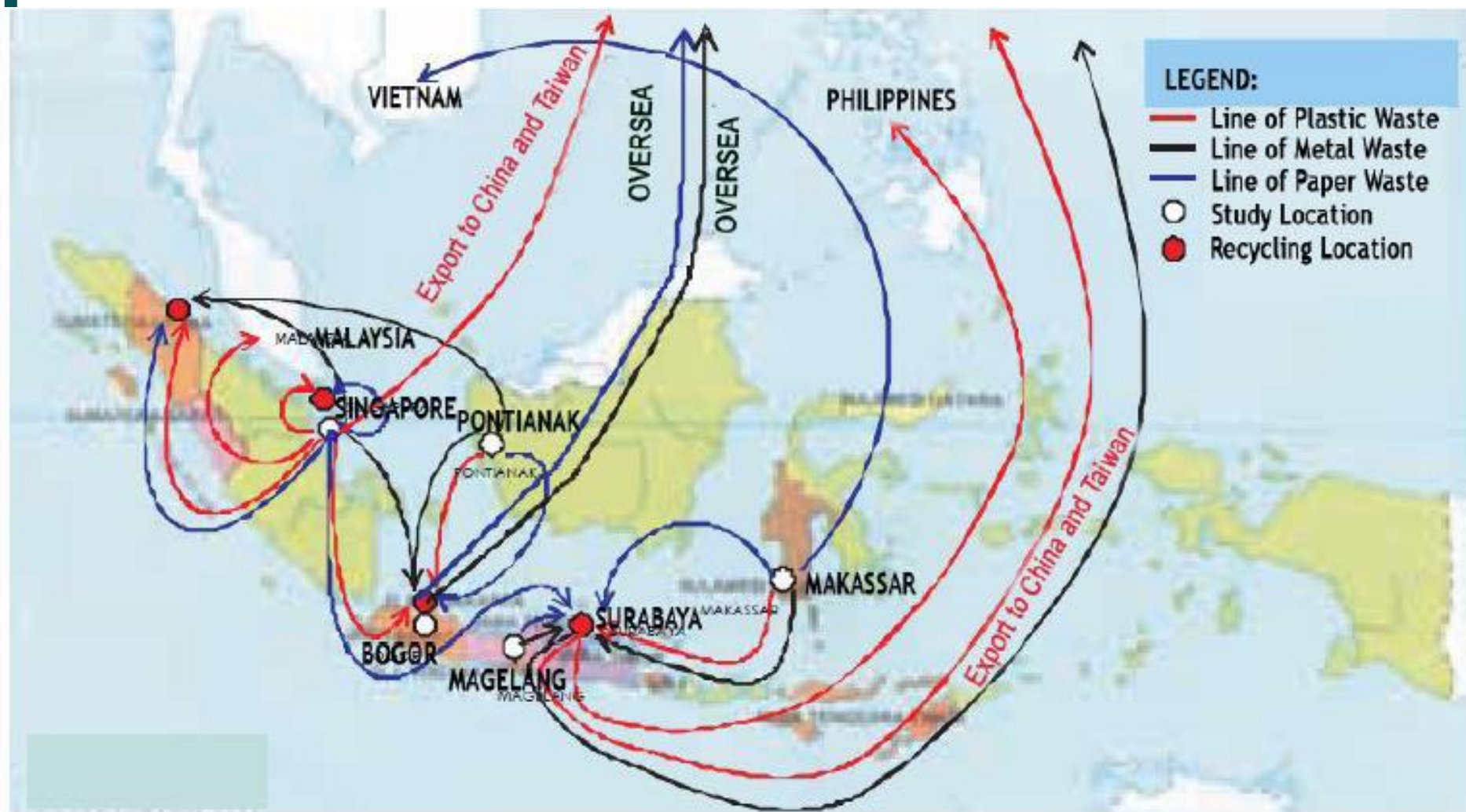
Approx. 3,000,000 people engaged in waste recycling, including informal collection (waste picking, collection and processing, trade).

Informal collection of recyclables in Java estimated at about 10%, less on other islands due to transport costs and lack of local capacity for trade and treatment.

Formal recycling around 2% from waste banks (segregated collection) and around 8% from sorting of mixed waste (self-reported, including composting)

Poor data on waste volumes, some data such as up to 4,000,000 ton/a of plastic recycling and low percentages of valuable recyclables in disposed waste suggest overall recycling around 20% and thus quite effective → further improvements will need effort (and funding)

High end recycling (business to business) at IDR 700,000/ton.



WHEN DOES WTE MAKE SENSE?

Land availability and transport infrastructure constrained

Large land sites are not available near urban centers, land is expensive, or difficulties siting WtE significantly extend landfill life

WtE facilities can be put in city centers, lowering waste transport costs

Electricity and/or tipping fees are high

Attractive electricity tariffs (e.g. renewable FIT), especially if no or low tipping fees

Where displacing high cost import fossil fuels (e.g. diesel, LNG)

Proximity to electricity demand, co-locate with end user(s) for co-gen

Favorable policies—viewed as contributor to meeting future elect. capacity need

Favorable and consistent waste quality

Scale generally important, 1,000 tons per day MSW facility can support 16-40MW power generation

Lower moisture content, higher calorific content, lower inerts (ash, construction debris)

However, new technologies available to upgrade or burn low quality waste

Rapidly growing large urban cities – Have many of above attributes

Megacities or large cities in middle income countries (MICs)

Effective SW management favorably impacts other urban – flooding, tourism, property values

Part of a integrated SW management plan including recycling, re-use, and waste reduction

CONDITIONS IN INDONESIA FOR WASTE-TO-ENERGY (INCINERATION)

Land availability, waste transport distances / transfer time and siting issues cause problems with landfill extension in majority of cities

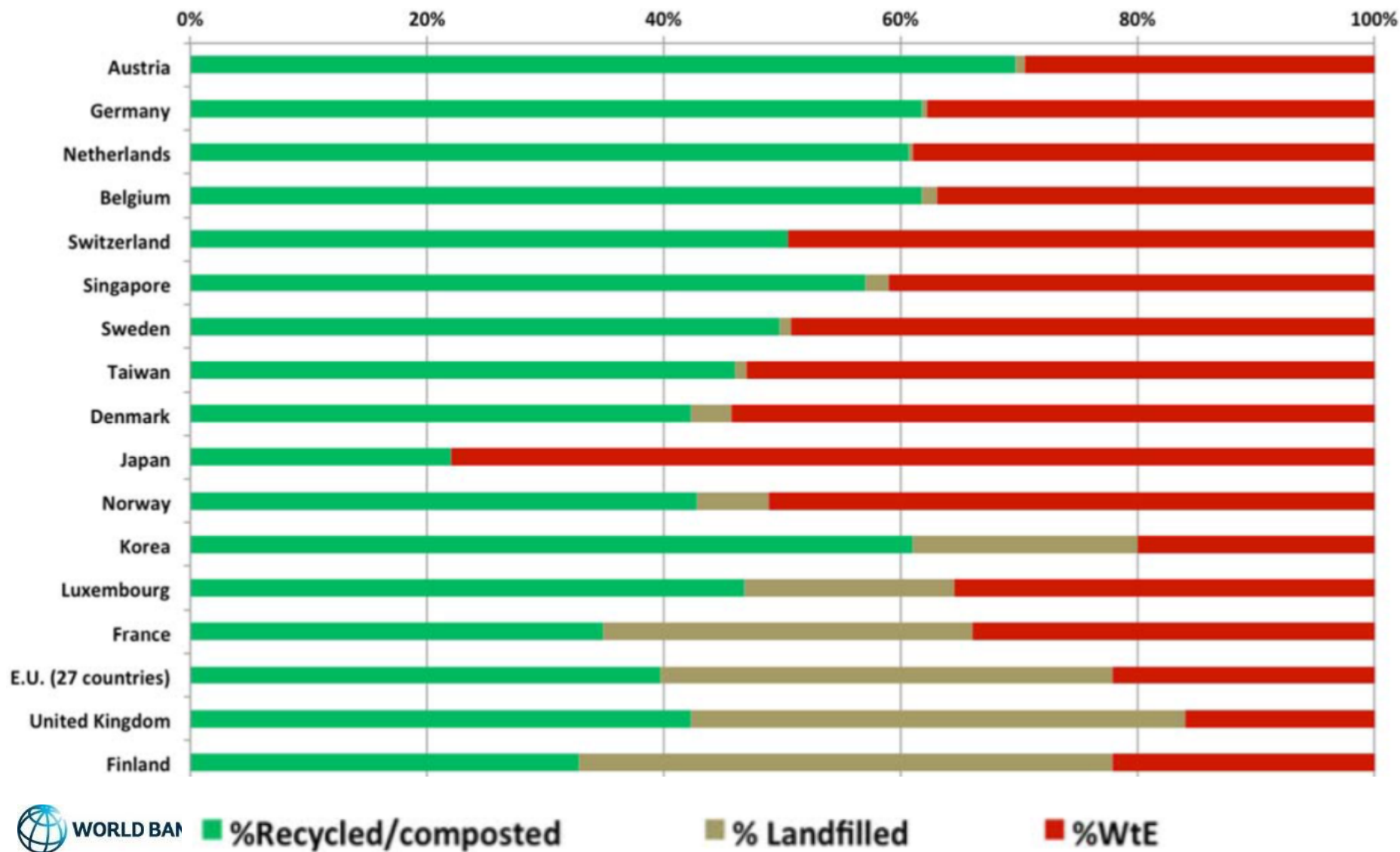
Tipping fees on average too low, but proposed feed-In-tariffs up to 133.5 \$/MWh and topping up gate fees to IDR 500k/ton for earmarked cities can tip the balance in favor of WtE (DKI Jakarta Province, The City of Tangerang, Bandung, Semarang, Surakarta, Surabaya, Makassar, Bekasi, Manado, Tangerang Selatan, Palembang and Dempassar)

High organics/water content of waste is less attractive

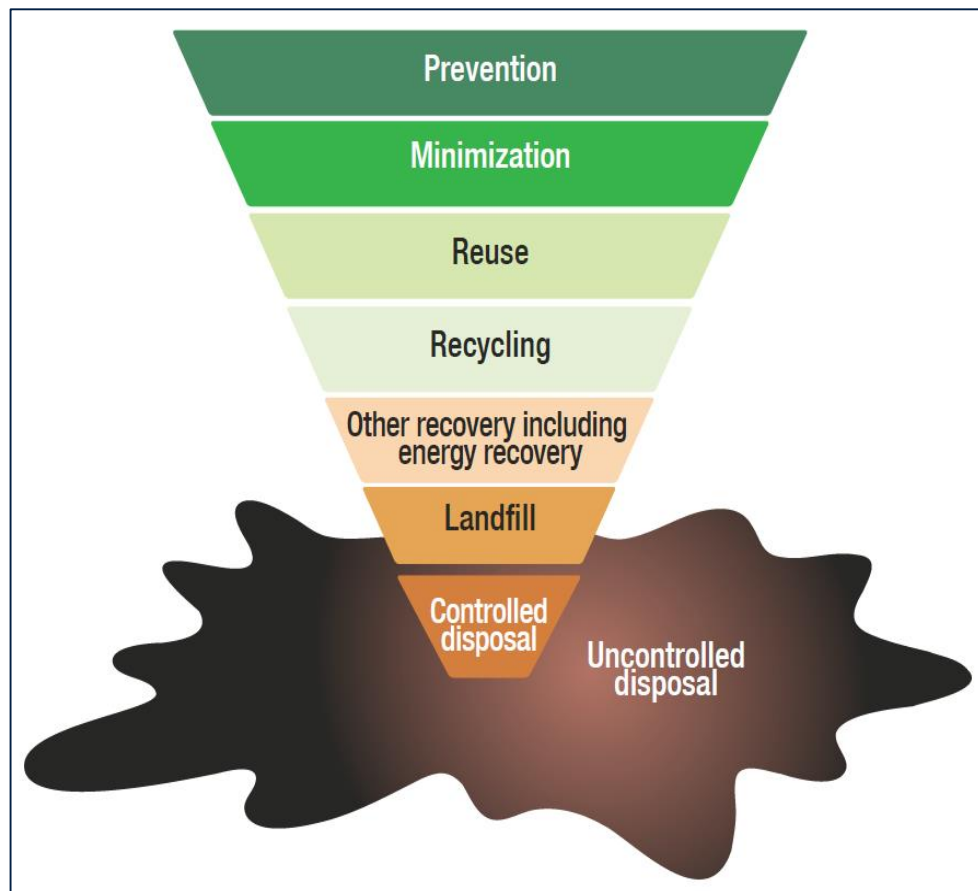
Limited capacity to creative required business conditions and guide transactions for WtE arrangements with private sector funding

Sufficient interest from private technology providers and private financing

WASTE RECYCLING AND WTE ELSEWHERE



WTE IN WASTE HIERARCHY



WtE below 3R in hierarchy, ... but processes mixed waste

Marine Debris Management in Indonesia

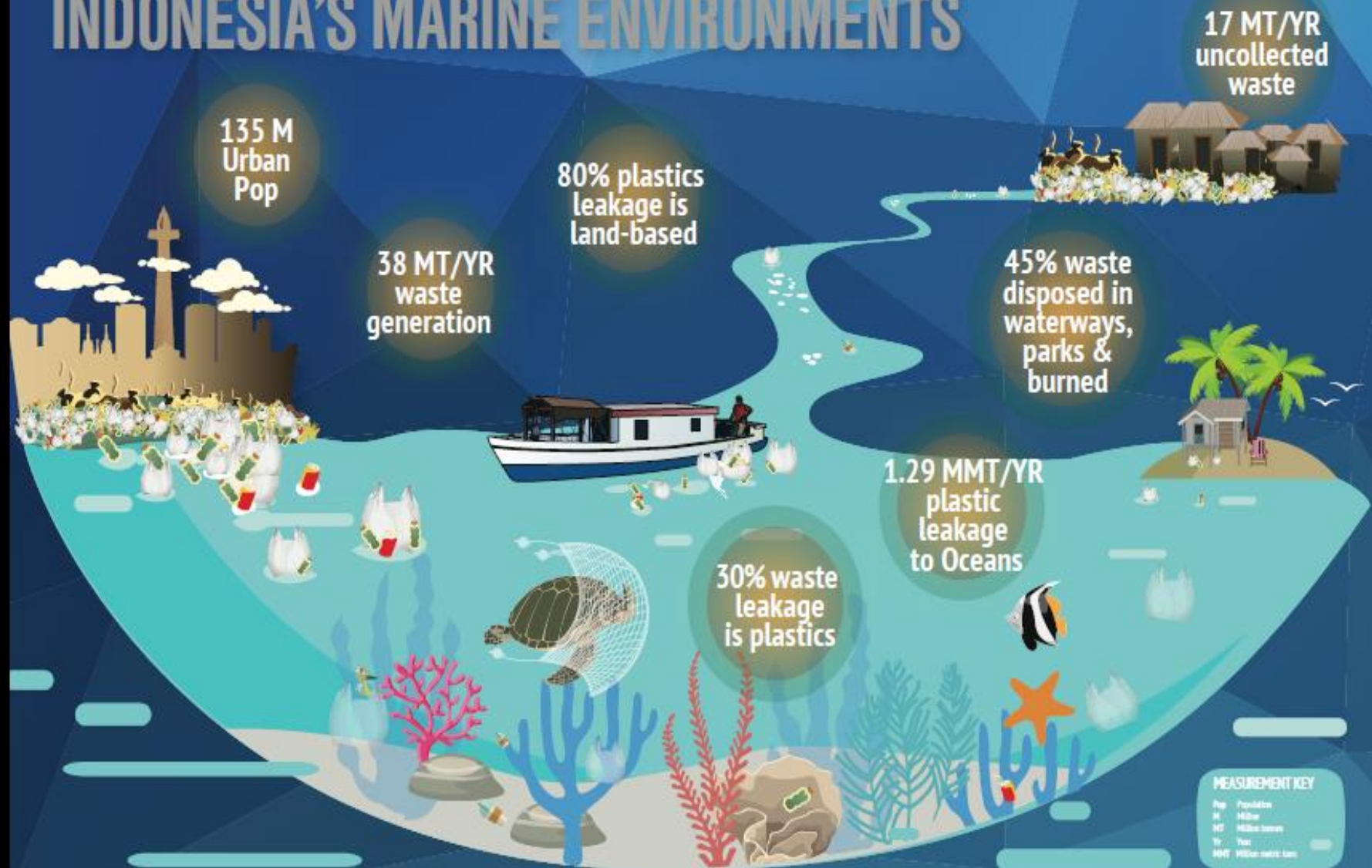
A photograph of a beach heavily littered with plastic waste, including bottles, cups, and other debris. In the background, several people are visible on the beach, and the ocean is in the distance under a cloudy sky.

Issues relating to oceans and marine debris management are high on Gol's agenda.

Recognizing the scale of multiple challenges, Indonesia is developing a National Oceans Agenda, anchored in a National Oceans Strategy (currently under preparation)

In June 2017, Indonesia launched the National Action Plan on Marine Debris, which calls for efforts to control plastic waste leakage/marine debris and raise awareness of the issue. It notes that improving municipal solid waste in coastal areas could reduce plastics leakage to the ocean by as much as 80%, and prioritizes efforts to collect and safely dispose of solid waste, including through a National Solid Waste Management (NSWM) Program

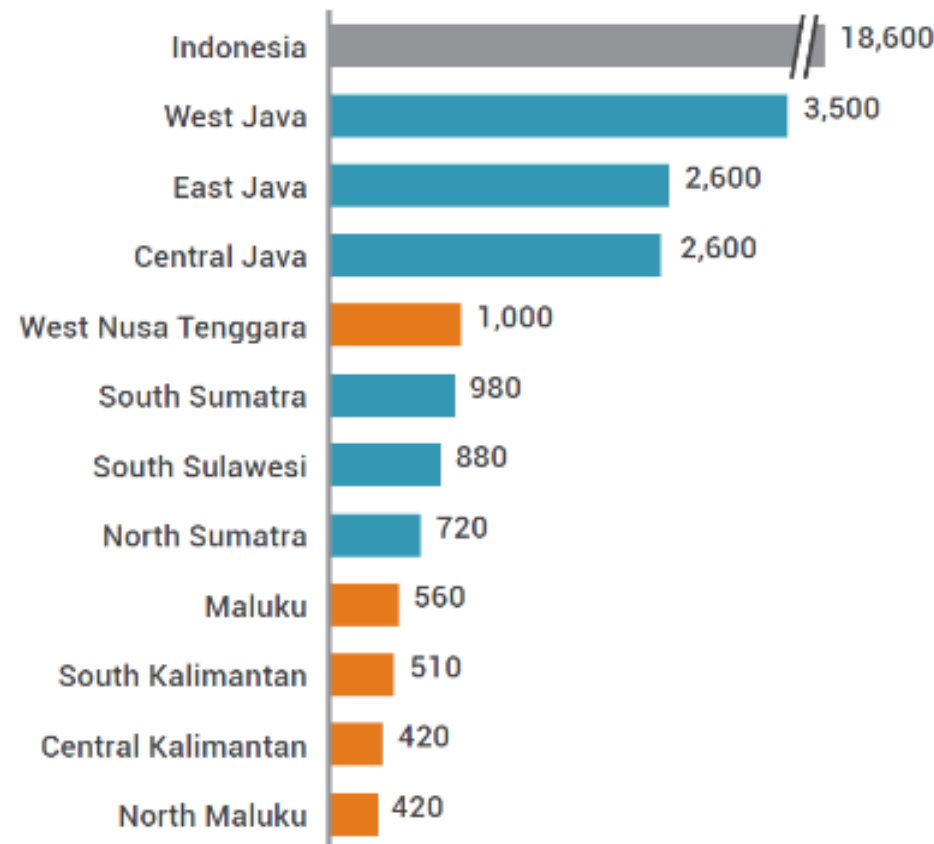
LAND-BASED LEAKAGE OF PLASTICS INTO INDONESIA'S MARINE ENVIRONMENTS



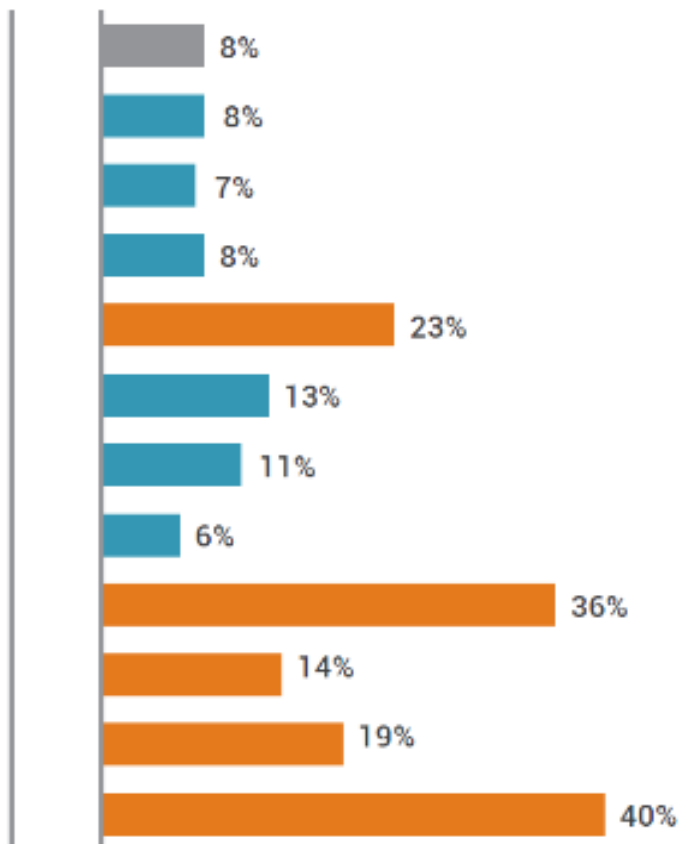
Marine Litter Management in Indonesia

Population primarily disposing their waste in the marine environment, no. of people in Indonesia (in thousands) by top 10 provinces, 2012

Province with a top 10 largest city Rural island province



Percentage of households who dump in marine environment as primary waste disposal method, 2012¹



Marine Litter Management in Indonesia

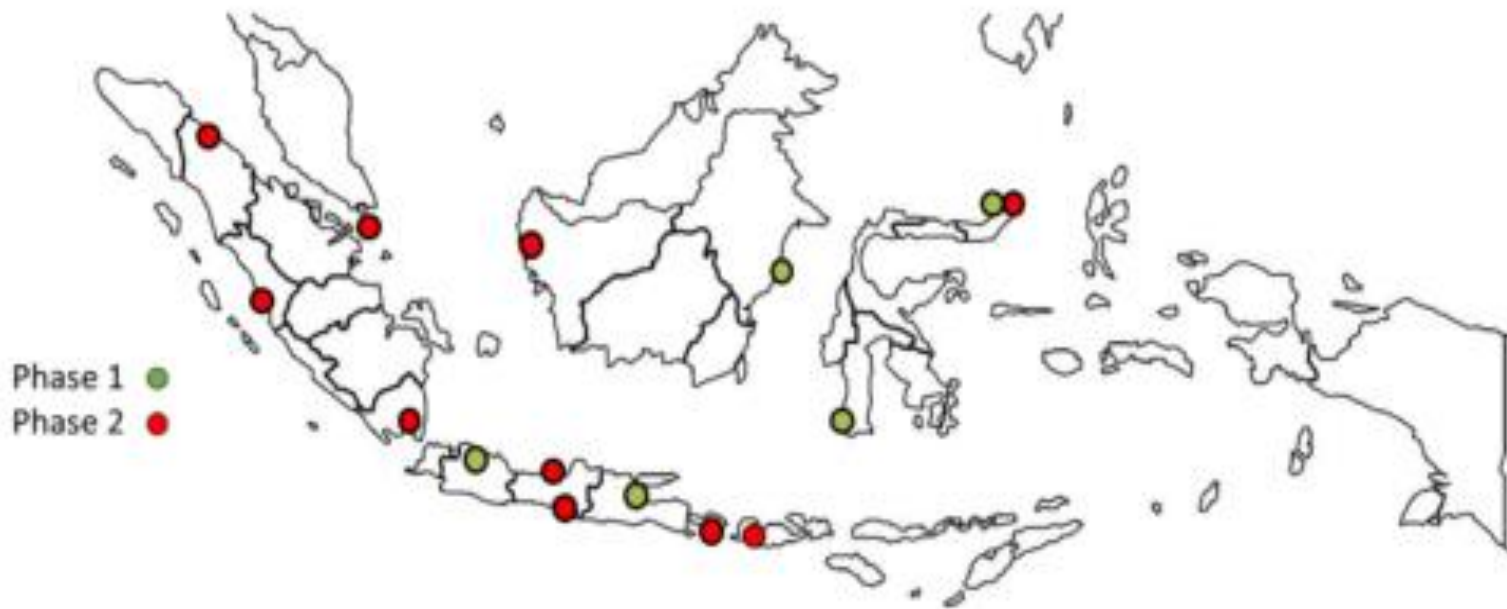


15 coastal cities in Indonesia

Baseline conditions in tidal and non-tidal areas; systems and institutional arrangements (water basin and waste management); waste characteristics; hotspots mapping: social behavior.

Marine Litter Management in Indonesia

15 target cities: Bali (Denpasar), Java (Jakarta, Semarang, Surabaya, Yogyakarta), Kalimantan (Balikpapan, Pontianak), Sulawesi (Bitung, Makassar, Manado), Lombok (Mataram), Sumatra (Lampung, Batam, Medan, Padang)



Marine Litter Management in Indonesia – after the waste ends up in waterways

Standard excavator



Dump truck



Boat collection



Trash Rack



Bamboo Trash Trap



Trash Rack



Marine Litter Management in Indonesia - Findings

1. Wide ranging approaches and effectiveness of waste removal from waterways
2. Waste removed over 30% plastics (16% plastic bags), first results confirm indicative estimates of marine litter quantities
3. Relatively poor waste services in tidal areas
4. Low awareness of problems with waste to waterways
5. Link marine litter management (reduction of waste to waterways) with solid waste and water basin management programs

Marine Litter Management in Indonesia – Linkage to Waste Management Services and Planning

1. Adequate waste collection and treatment/disposal can solve 80% of current waste leakage to waterways
2. Scope for prioritizing reduction of waste to waterways in waste sector programs (focus on coastal areas, public education, relocation of infrastructure)
3. Solid waste sector programs tend to focus on urban areas, thus poorly address waste collection in tidal areas and river communities
4. Special policies for reduction of packaging materials, particularly plastic bags, sachets (EPR)
5. Further research into waste removal from waterways

Reducing Ocean Plastics Pollution in Indonesia

Four-Pronged Approach

1. Reduce land-based leakage of plastics
2. Reduce sea-based leakage of plastics and other pollutants
3. Reduce accumulated coastal and marine pollution
4. Reduce plastics production and use



