

BUILDING ROBUST GOVERNANCE AND SECURING SUFFICIENT FUNDING TO ACHIEVE INDONESIA'S WASTE MANAGEMENT TARGETS



Norwegian Embassy
Jakarta



FULL REPORT
NOVEMBER 2021

BUILDING ROBUST GOVERNANCE AND SECURING SUFFICIENT FUNDING TO ACHIEVE INDONESIA'S WASTE MANAGEMENT TARGETS

Policy Studies on Waste Management by SYSTEMIQ

in partnership with APKASI, APEKSI and FITRA

Supported by:

Norwegian Embassy in Indonesia and Coordinating Ministry of
Maritime Affairs and Investment

FOREWORD



DR. IR. NANI HENDIARTI, MSC

Deputy for the Coordination of Environmental and Forestry Management, Coordinating Ministry for Maritime Affairs and Investment (CMMAI)

As this report was being developed, Indonesia is undergoing one of the greatest challenges of the century. From the public health standpoint, Indonesia is battling to contain the COVID-19 pandemic which ramifications ripples through the economy and people's daily lives. At the same time, Indonesia is also battling an environmental emergency, the waste crisis.

Up to around 30-40 million tonnes of waste (around 3-4 million of it plastic) are currently either burned, releasing dioxins, heavy metals and carbon di- and monoxide into the atmosphere along with other greenhouse gases, or dumped into the environment where it contaminates soil, ground water, rivers and eventually the ocean, with dire health, social and environmental consequences. If no action is taken, plastic waste entering Indonesian's water bodies, including the ocean, is estimated to reach 780,000 tonnes per year by 2025.

This report outlines several root causes of Indonesia's waste challenges and identifies the key levers for Indonesia to achieve the country's waste targets. These include reducing waste by 30% at the source and increasing waste handling to 70% by 2025, as well as reducing 70% of marine debris by 2025. Achieving them will not be easy, but it is possible if we solve the right problems with the right solutions.

By strengthening waste governance, and increasing funding to the waste system, we believe Indonesia can achieve them; fulfilling the right of every citizen to live in a healthy environment.

Institutional solutions such as having a robust governance system by institutionalising waste system through BLUD implementation, stronger law enforcement and prioritising waste management in the local government agenda, are instrumental in strengthening waste governance. In addition, maximising funding sources are also critical to fulfil the funding gap for Indonesia to achieve the targets, which is estimated to be in the order of IDR 54-67 trillion for capital expenditures (CAPEX) and IDR 7-12 trillion for operational expenditures (OPEX) annually between 2017-2025.

In light of these, I invite everyone to join Indonesia in embarking on this challenging yet exciting journey. The pandemic has shed light to the many vulnerabilities of the system, but it has also brought about stronger collective action across key stakeholders. Collective action from government, businesses, academics, non-governmental organisations, communities and all stakeholders are necessary for Indonesia to overcome its waste crisis. Together, we can and will bring Indonesia towards a healthy and prosperous nation for future generations.

WELCOMING REMARKS



ROSA VIVIEN RATNAWATI, SH, MSD

Director General of Waste Management, Waste and Hazardous Toxic Materials (PSLB3), Ministry of Environment and Forestry (KLHK) of the Republic of Indonesia

The waste problem is a serious and multidimensional problem that requires the attention of all parties. Currently, around 67.8 million tons of solid waste are generated per year in Indonesia and will continue to increase along with population growth. Indonesia and the rest of the world are also currently facing the COVID-19 pandemic which has an impact on all aspects of people's lives, from health to the economy, making the needs for and challenges on sustainable waste management even greater.

The Government of Indonesia has enacted several national policies related to waste management, one of which is by issuing Presidential Regulation Number 97 in 2017 on the National Waste Management Policy and Strategy (Jakstranas) for the Management of Household Waste and Household-like Waste which sets a target of 30% waste reduction and 70% waste handling by 2025, involving all stakeholders to carry out integrated waste management from source to final processing. To achieve these targets, provincial and regency/city governments must draft the Regional Waste Management Policy and Strategy (Jakstrada) document which will be the reference point for the regional waste management master plan whose achievements are measured in stages until 2025.

Overcoming the problem of waste management and achieving Indonesia's waste management targets will require the involvement and contribution of all parties including the central government, local governments, businesses, non-governmental organisations, associations, communities and all other components of society. This report is a manifestation of a multi-stakeholder collaboration to help overcome Indonesia's waste management challenges.

This report analyses and outlines in detail the waste management challenges faced in the field and proposes two main determining factors to overcome these challenges and also to achieve national waste management targets, especially the waste handling, namely robust waste system governance, and stable, sufficient funding. This report is accompanied by recommendations that provide new perspectives and ideas, including the adoption of Local Government's Public Service Body's Financial Management System (PPK BLUD) in the Local Technical Operation Unit (UPTD) as an option for waste management governance in regencies/cities; the categorisation of waste management as a Mandatory Basic Service to prioritise and increase funding for waste management; and the maximisation of revenues from waste retribution fees through indirect fee collection system by combining the collection of waste retribution fees through utility bills such as electricity or water bills.

I warmly welcome the publication of this report and thank all those who have written and published this report, in particular the Norwegian Embassy in Indonesia, the Association of Indonesian Regency Governments (APKASI), the Association of Indonesian City Governments (APEKSI), the Indonesian Forum for Budget Transparency (FITRA), and SYSTEMIQ. We hope that waste management stakeholders in Indonesia, including regency/city governments, can make use of the data, information, findings and recommendations in this report as the basis for the policy making in improving waste management services in regencies/cities, which ultimately contribute to the achievement of the national waste management targets.



DR. IR. ARIFIN RUDIYANTO, MSC

Deputy Minister for Maritime and Natural Resources Affairs at Ministry of National Development Planning (Bappenas) of the Republic of Indonesia

Indonesia has committed to improving its integrated waste management from upstream to downstream as reflected in the National Medium-Term Development Plan (RPJMN) 2020-2024 National Priority 6: Building the environment, improving disaster resilience, and climate change through the development of the circular economy policies and low carbon development. In addition, Indonesia also has a number of national waste management targets, one of which is the target of waste reduction by 30% and waste handling by 70% by 2025 as stated in the National Waste Management Policy and Strategy (Jakstranas) on the Management of Household Waste and Household-like Waste. These commitments and targets need to be supported by evidence-based policies.

Therefore, we appreciate the analysis and strategic recommendations provided by this report. We hope that the analysis and recommendations can support the government's performance, especially in the aspect of waste management planning, both at a central and

local level. There is still a long way to go for Indonesia's journey on its waste governance system reformation. However, scientific-based research will accelerate the achievement of a holistic waste management system. It is also important for us to note that each region in Indonesia has different waste management characteristics, including its institutional governance and funding, as well as regulation needs. Hence, the best solution in tackling the waste challenges will depend on the characteristics of each region.

The next significant step is how we implement the policies into concrete efforts of the waste management system reformation by prioritising the importance of collaboration between stakeholders in Indonesia. We cannot move alone to achieve these targets. We will need the support of all parties, especially the government, producers and the community as the main actors in the waste management chain, from source to end in an integrated manner.



SUTAN RISKA TUANKU KERAJAAN, S.E.

Regent of Dharmasraya, Chairman of the Association of Indonesian Regency Governments (APKASI)

First of all, let us praise the presence of God Almighty, because of His grace and guidance we were able to complete the report which outlines the results of the waste management studies of Indonesia, entitled: Building Robust Waste System Governance and Securing Stable, Sufficient Funding to Achieve Indonesia's Waste Management Targets.

We have all realised that the issue of waste in our country has become very serious, not only at the national level, but also for local governments. Hence, we support every

effort from all parties that aims to tackle the waste crisis. The research on waste management conducted in partnership between APKASI, APEKSI, and SYSTEMIQ is a positive step to provide solutions in tackling the country's waste challenges.

With the publication of the report, APKASI hopes that it can serve as a reference point for my fellow regents in managing waste in their respective areas, providing a maximum waste service for the communities.



DR. H. BIMA ARYA SUGIARTO

Mayor of Bogor City, Chairman of the Association of Indonesian City Governments (APEKSI)

Indonesia's journey on regional autonomy has passed one decade and has yielded very diverse results. Many city governments are now advanced in managing their city, some have even become "serial awardees" in a range of sectors. At the same time, many city governments are also stagnant, in that they do not stand out in their accomplishments, yielding average results in their development.

The consequence of undergoing regional autonomy is that city governments have gained several authorities in managing a range of sectors, including environmental affairs such as waste management. However, until today, city governments are still facing many challenges in managing waste, including the governance and funding aspects of waste management.

The issue of waste management at the local level have become a priority in local government's agenda. Waste has also become a national issue. Requisite coordination and collaboration between central and local governments are needed. Hence, we support every effort from all parties that have strongly committed to tackling this. The research on waste management that was conducted by APKASI, APEKSI and SYSTEMIQ is one of the positive efforts in providing support and solutions to tackling the waste management issues at a local level.

With the publication of the report, APEKSI hopes that the analyses can be a reference point and guidance for my fellow mayors or regents in achieving good waste management in our respective regency or city, providing adequate and maximal service to the community.



H.E. VEGARD KAALE

Norwegian Ambassador to Indonesia and Timor Leste

Marine litter and plastic leakage are a serious threat to the world's oceans and seas, and thereby also a threat to human beings. This is not just a national issue but a global one, the reason why international cooperation is so important.

Norway and Indonesia are both significant coastal nations, and have a strong common interest in working together for a clean, healthy and productive ocean. In 2018, President Joko Widodo declared that Indonesia intends to reduce marine litter by 70% by 2025. In the same year, Norway's Prime Minister launched High-level Panel for Sustainable Ocean Economy, consisting of 14 heads of government, including the President of Indonesia. In the Panel's Call to Action Report, published in last December 2020, the 14 countries commit to bold transformations towards a sustainable ocean economy where environmental protection and conservation – and economic production and prosperity – go hand in hand.

We all know that most of the sources of marine litter are

land-based, so our main efforts should focus on better waste management. To design and implement efficient and sustainable waste management systems, knowledge is the key and this is where this report comes in. This report is the result of collaborative research which proposes two fundamental levers to solve waste system challenges in Indonesia and ultimately support the government achieve its national targets: stable, robust waste system governance and stable, sufficient waste system funding. The report comes with comprehensive and valuable data and information, as well as detailed recommendations on how to achieve the two levers.

Norway is proud to support this important work as part of its initiatives in Indonesia to reduce waste and marine litter. I hope that this report will be a useful tool for the Government of Indonesia and all related stakeholders to improve waste management system in Indonesia and eventually reduce marine litter and create a clean, healthy and productive ocean. Together we can achieve a lot more than if we stand alone.

ENDORSEMENTS



Ir. Medrilzam, M.Prof. Econ, Ph.D., Director of Environmental Affairs, Ministry of National Development Planning/National Development Agency/BAPPENAS

To encourage sustainable waste management towards a circular economy and the implementation of low-carbon development, several steps are needed to accelerate the reformation of waste governance. These reforms include holistic planning, technical reliability, funding availability, institutional capability and law enforcement. Realising these reforms will require collaboration from all stakeholders, not only the government. We hope that this study will be useful in supporting the reform of waste governance in Indonesia.



Drs. H.M. Budi Santosa Sudarmadi, MSi, Director of BUMD, BLUD dan BMD, Directorate General of Regional Finance (Bina Bangsa), Ministry of Home Affairs (MoHA)

Improving government public services for the community has become a necessity, and one such service is waste management provided by the regency and city governments. Through the adoption of the Local Government's Public Service Body (BLUD) in the Technical Operation Unit (UPT) for waste management, waste management can gain many flexibilities in its management, such as being able to utilise its revenues, usage of annual budget surplus (SILPA) directly for waste service, having non-government employees, providing and getting loans and receivables independently, setting tariffs through regent or mayor's decree, and investing in business and so on. All of these are for waste service improvement so that one day 100% of waste services will be achieved throughout the regency or city, eventually achieving national targets and policies related to solid waste management.

Thank you to SYSTEMIQ, APKASI and APEKSI who have made efforts to support the implementation of BLUD at waste UPTs in regencies and cities.



Ir. Guntur Sitorus, MSc, Chairman of Indonesian Solid Waste Association (InSWA)

Waste management is a systematic and comprehensive activity involving reduction and handling, which ideally should provide 100% service coverage. According to Jakstranas, by 2025 it targets a reduction of 30% and handling of 70% of waste. To achieve these targets, all stakeholders (ministries/agencies, provincial government, regency government, city government, community, private sector, NGOs, practitioners, universities/academic, etc.) must work hard, collaborate and synergise in order to obtain optimal results. They should not walk alone and blame each other, feeling they are the smartest and know the most. In this regard, the study that has been carried out by SYSTEMIQ in partnership with APEKSI and APKASI is a very useful effort that can be used as a reference for future waste management practices, especially in relation to the financial management of PPK BLUD and waste governance. The results of this study that have been compiled in the form of a report can be used by all parties to be pursued, not just as a meaningless addition to the references shelf. Finally, as chairman of InSWA, I would like to express my highest appreciation to SYSTEMIQ, APEKSI and APKASI who have successfully completed this study.



Misbah Hasan, General Secretary of Indonesian Forum for Budget Transparency (FITRA)

The potential of funding from the APBN (central government budget) and APBD (local government budget) to cover and pursue the national targets on waste management is still wide open. Often, government budgets are not effectively spent and are not completely spent at the end of the year. However, it takes a strong commitment (political will) from the relevant ministries and local leaders to have the courage to increase the budget allocation for waste management. The current COVID-19 pandemic is especially relevant for this. Household medical waste such as used masks, tissues, contaminated clothes and personal protective equipment can be mixed with household waste. This report can serve as a basis for realising budgetary policies that is in favour for better waste management.



Mohamad Bijaksana Junerosano, Founder and CEO Waste4Change (W4C)

Through this study conducted by SYSTEMIQ, APEKSI and APKASI, it is increasingly validated that technology is not the main thing that needs to be improved for waste management in Indonesia. We see that the two most important things that need to be addressed from this study are funding and governance. Adequate funding is the backbone for the sustainability of holistic waste management to achieve 100% waste service coverage. We strongly support the results of this study to be implemented in every city and regency so that adequate funding can be achieved, for example through innovative indirect retribution fees collection through an electricity bill waste fee bundling system, or seeking funding from other stakeholders through the city's bankable master plan. In addition, we also agree that there should be governance reforms with separation between operators or implementers, and regulators of law enforcement in waste management. Hence, the recommendation for the adoption of Local Government's Public Service Body (BLUD) is aligned to address this.

As the Managing Director of Waste4Change, and as a representative of the private sector, I am ready to support and be more prepared to invest in a responsible waste management service system in the city/regency, should the funding mechanism and governance be improved according to the results of this study.

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GLOSSARY

APBD: Anggaran Pendapatan dan Belanja Daerah Local government budget

APBN: Anggaran Pendapatan dan Belanja Nasional/Central government budget

APEKSI: Asosiasi Pemerintah Kota Seluruh Indonesia/The Association of City Governments

APKASI: Asosiasi Pemerintah Kabupaten Seluruh Indonesia/The Association of Regency Governments

Bank sampah: Waste bank

BLUD: Badan Layanan Umum Daerah/Local government's public service body

BUMD: Badan Usaha Milik Daerah/Local government-owned enterprise

BUMDES: Badan Usaha Milik Desa/Village-owned enterprise

BUMDESMa: Badan Usaha Milik Desa Bersama/Joint Villages-owned enterprise

Bupati: Head of Regency/Regent

CAPEX: Capital Expenditures (CAPEX)

CV: Persekutuan Komanditer/Commanditaire Vennotschap, an enterprise that is established by two or more persons as partners

DD: Dana Desa (village fund: funding for village governments which come from the central government's budget/APBN)

Desa: Village (consist of sub-villages)

Dinas: Agency, a sub-governmental department at local government level

DLH: Dinas Lingkungan Hidup/Environmental Agency

DPR: Dewan Perwakilan Rakyat/House of Representative (national parliament)

DPRD: Dewan Perwakilan Rakyat Daerah/Local Parliament

Dusun: Sub-village

EPR: Extended Producer Responsibility

FGD: Focus Group Discussion

FITRA: Forum Indonesia untuk Transparansi Anggaran/Indonesian Forum for Budget Transparency

Gol: Government of Indonesia

HDPE: High-density polyethylene

HH: Household

Kabupaten: Regency

Kades: Kepala Desa/Village head

Kecamatan: Sub-district

Kelurahan: Urban ward, at the same geographic administration level as a desa

Kemendagri: Kementerian Dalam Negeri/Ministry of Home Affairs (MoHA)

Kemenkeu/MoF: Kementerian Keuangan/Ministry of Finance

Kemenko Marves/CMMAI: Kementerian Koordinator Bidang Kemaritiman dan Investasi/Coordinating Ministry for Maritime Affairs and Investment

Kementerian PUPR/PUPR: Kementerian Pekerjaan Umum dan Perumahan Rakyat/Ministry of Public Works and Housing

Kementerian: Ministry

KLHK: Kementerian Lingkungan Hidup dan Kehutanan/Ministry of Environment and Forestry (MoEF)

Kota: City

KPBUs: Kerjasama Pemerintah dengan Badan Usaha / Public-Private Partnership (PPP)

KPKT: Malaysia's Ministry of Housing and Local Government

KSM: Kelompok Swadaya Masyarakat/Community Self-help Group

KSP: Kantor Staf Presiden/Executive Office of the President of the Republic of Indonesia

LDPE: Low-density polyethylene

LGUs: Local Government Units

Lurah: Head of Kelurahan (urban wards), appointed by mayor/regent

Menteri: Minister

MRF: Material Recovery Facility

NPAP: National Plastic Action Partnership

OECD: Organisation for Economic Co-operation and Development

OPEX: Operational expenditures (OPEX)

PBT: Malaysia's local government

PDAM: Local Government-owned Drinking Water Company

Perbup: Peraturan Bupati (Regent's Regulation): Regulation issued by Bupati/Regent, referring to local law (doesn't have to be approved by parliament)

Perda: Peraturan Daerah (local regulation): highest level of regulation at local government (must be approved by parliament)

Perdes: Peraturan Desa (village regulation): regulation at village level (must be approved by village parliament)

Perkades : Peraturan Kepala Desa / Village head's regulation: regulation issued by village head, referring village regulation (doesn't have to be approved by village parliament)

PET: Polyethylene terephthalate

PLN: Perusahaan Listrik Negara/State-owned electricity company

PP: Polypropylene

PRO: Packaging Recovery Organisation

PT: Perseroan Terbatas/Limited company

RT: Rukun Tetangga/Sub-neighbourhood (consist of 30 to 100 houses)

RW: Rukun Warga/Neighbourhood (consist of three to six RTs)

Sampah: Waste in Bahasa Indonesia

SPM: Standar Pelayanan Minimal/Minimum Service Standard

SWCorp: Solid Waste Management Corporation

TPA: Tempat Pemrosesan Akhir/Final disposal site or landfill

TPS: Tempat Penampungan Sementara/Waste transfer station

TPS3R: Tempat Pengolahan Sampah Reduce, Reuse, Recycle (integrated processing facility with waste sortation, organic processing and sorted waste sales, usually integrated with a waste bank)

TPST: Tempat Pengolahan Sampah Terpadu (larger scale integrated waste processing facility with waste sortation and organic waste processing)

UPTD: Unit Pelaksana Teknis Daerah/Local government's Technical Operation Unit

UU: Undang-Undang/Law

UUD 45: The 1945 Constitution of the Republic of Indonesia

Walikota: Mayor

WtE: Waste to Energy



EXECUTIVE SUMMARY

The Government of Indonesia (GoI) has set major targets of 30% waste reduction and 70% waste handling by 2025, as well as 70% marine debris reduction by 2025. However, today, only between 39%¹-54%² of Indonesia's waste is properly managed. This results in around 30 and 40 million tonnes of waste (3-4 million of it plastic) going into the environment annually. In addition, between 40 and 45 per cent of TPS3Rs and TPSTs (material recovery facilities) are either not active or status is unknown³ as local operators struggle to make waste system economics work. Similarly, more than half of sanitary and controlled landfills have backslided into becoming open dumpsites due primarily to insufficient funding. Inadequate waste system funding, along with inapt governance, and a lack of local technical capacity to sustainably set up and operate waste systems, are major underlying factors behind Indonesia's low waste handling levels. An 18-month research effort has identified the root causes behind the first two challenges – waste governance and funding in Indonesia's waste systems – and pinpointed key levers to solve them to bring Indonesia to a tipping point to reach 70-80% waste handling – providing a viable pathway for a system change to Indonesia's waste management.

against dumping and burning, in practice this is not enforced).

2

Insufficient waste system funding. Waste management costs more than the available funds and available funds are often difficult to access and spend. To reach government targets by 2025, one-time funding of Rp 54-67 trillion (USD 3.8-4.8 billion) for capital expenditures (CAPEX) is needed to set up new waste systems in areas without waste management and Rp 7-12 trillion (USD 490-826 million) is needed to cover worker salaries, fuel and other operating costs (OPEX) each year.

3

Lack of technical training and capacity. There is a lack of technical knowledge countrywide in how to set up and operate economically sustainable, circular waste systems.

This study focuses on the first two root causes given their connection to policy and regulatory choices.

KEY ISSUES

Three root causes are particularly important in understanding Indonesia's low waste handling levels:

1

Inadequate waste system governance. Current governance makes it hard to achieve long-term waste system sustainability because:

- Waste systems are dependent on individual leader motivation and fragile to political changes and pressures.
- In rural areas, the "community" often has formal responsibility for waste management, yet does not have the financial resources, institutional capacity or technical knowledge to do so.
- There is no legitimate requirement for governments to provide universal waste services and there is a lack of incentives for households to responsibly manage their waste (e.g. while there might be local legislation

RECOMMENDATIONS

To reverse current trends, and help Indonesia achieve its waste management targets, this paper recommends:

1

To create more stable and robust waste systems, the government can improve waste system governance through:

- Mainstreaming Badan Layanan Umum Daerah (BLUD) to solve governance set-up challenges,
- Changing the waste management responsibility from community-based waste handling systems in rural areas to regency/city (institutionally) coordinated waste systems,
- Categorising waste management as a Mandatory Basic Service to improve waste management service to citizens to effectively enforce the law on dumping/burning waste.

2

To build more stable, sufficient waste system funding⁴: OPEX and CAPEX funding could be materially increased from four waste system funding sources:

- Maximising retribution fees through Permendagri (MoHA Regulation) No. 7/2021 and using indirect fee collection,
- Categorising waste management as a Mandatory Basic Service to prioritise local government funding for waste management,
- Increasing waste monetisation through better household sortation, partnering with waste aggregators and material brokers and vertically integrating to capture greater margin along the value chain,
- Exploring potential private sector funding through a Packaging Recovery Organisation (PRO) system and Public-Private Partnerships (PPP) or a Kerjasama Pemerintah dengan Badan Usaha (KPBU) mechanism to maximise complementary funding from private entities.

So often papers share strategies for what must be done to curb plastic pollution but do not give the tools to do it in a particular country's unique context. This paper goes deep

into Indonesia's current waste management legislative landscape and pinpoints the particular governance structures, financing flows and legislation that need to be changed to dramatically increase Indonesia's waste handling rates and meet national targets. It is the result of 18 months of policy research on the back of building waste systems in three cities in Java and Bali for 225,000 people and experiencing the challenges of setting up and operating waste systems firsthand. It is also the result of thoughtful expert feedback from workshops with 14 ministries directorates, two regional representative council bodies, four local government associations, and several NGOs, academics and waste experts.

In June 2021, findings from this research were presented to stakeholders through a national assembly which was attended by over six hundred participants from relevant ministries, regency and city governments, waste management organisations, private sector representatives, embassies, donor and international development agencies and other relevant stakeholders. This paper has also incorporated additional feedback received during the assembly.

While the recommended changes are substantial, they are doable, stress tested and supported broadly. We hope this work encourages many new conversations about potential solutions to Indonesia's waste system challenges, and that these conversations lead to ever greater commitment and bolder action.





CHAPTER 1:

THE ROOT CAUSES BEHIND INDONESIA'S WASTE SYSTEM CHALLENGES AND THE KEY LEVERS TO BRING IT TO A TIPPING POINT

To improve waste management and reduce ocean plastics, the Government of Indonesia has made major commitments and set ambitious targets. Its aim is to achieve:

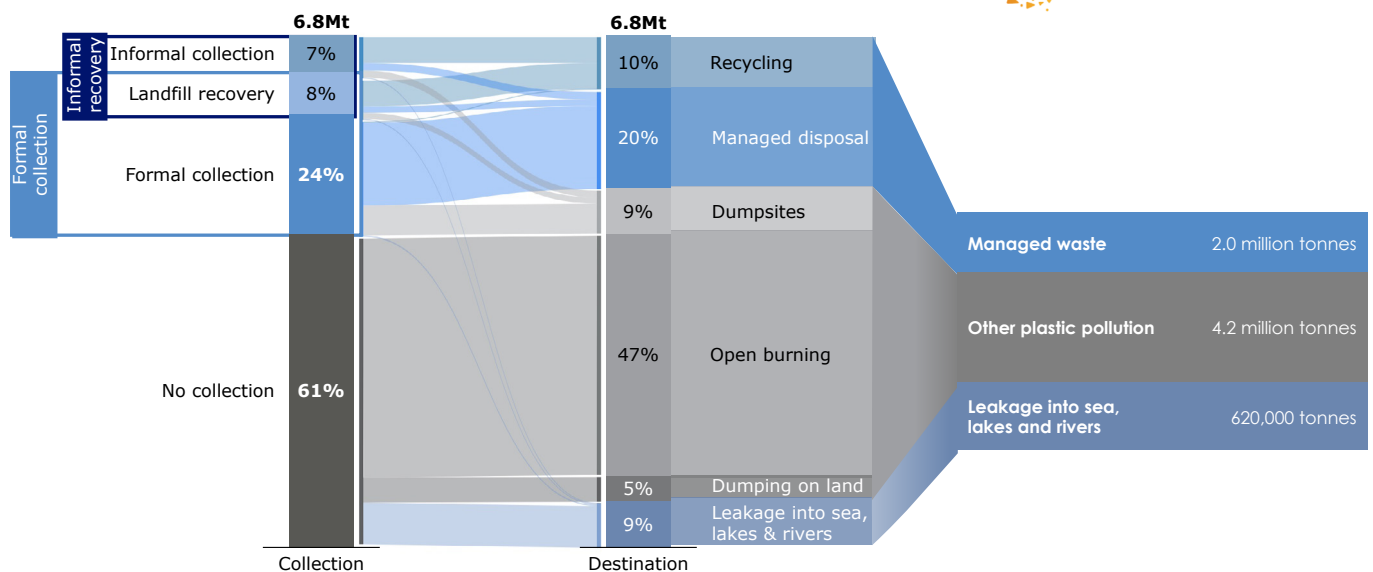
1. 30% waste reduction and 70% waste handling by 2025⁵
2. 70% of marine debris reduction by 2025⁶.

In 2020, the Indonesia National Plastic Action Partnership (NPAP) published a report highlighting the baseline of the waste situation in Indonesia and the system changes required to achieve the above government targets. The research used 2017 data and showed that only 39% of plastic waste is properly managed in Indonesia⁷ – which

includes waste reduction and waste handling. This means 40 million tonnes of waste is being burned (releasing dioxins, heavy metals, carbon dioxide, carbon monoxide and other greenhouse gases into the atmosphere) or dumped into the environment where it contaminates soil, ground water, rivers and eventually the ocean. Both practices have dire health, social and environmental consequences.

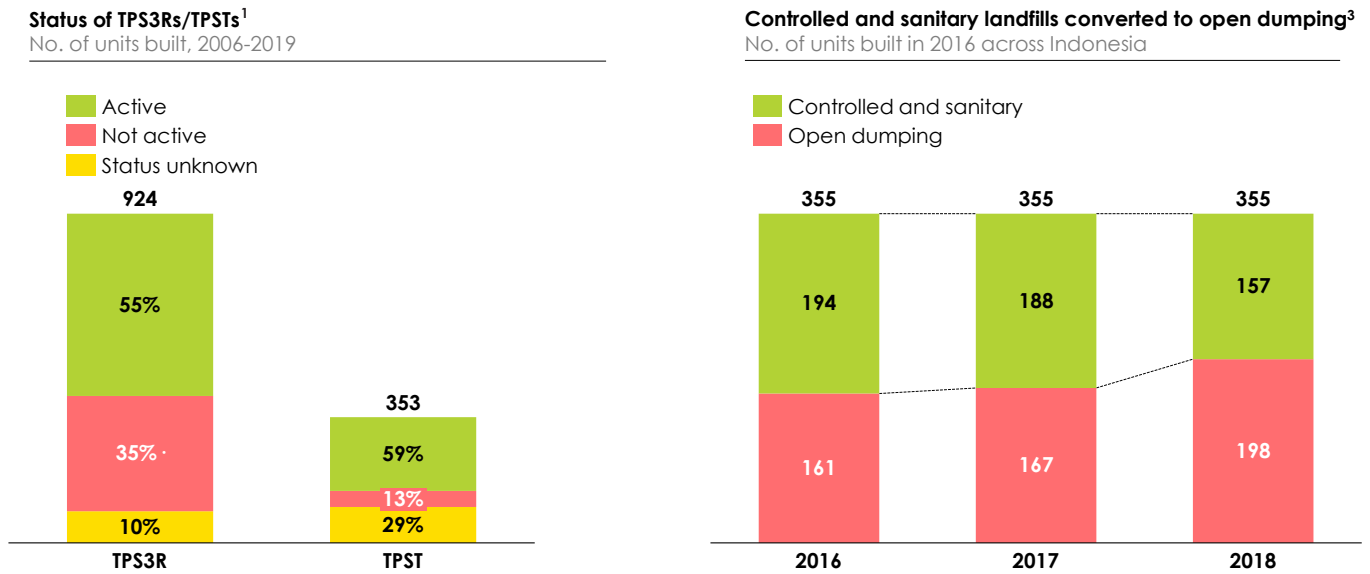
More recent data from the Ministry of Environment and Forestry (MoEF) appears to be more positive. Using a 2020 report from approximately 290 regencies and cities (out of a total of 514), MoEF figures suggest that proper waste management has improved to above 54%⁸ (including waste reduction and waste handling). However, there is still a gap to achieve the government targets.

FIGURE 1. WHERE INDONESIA'S PLASTIC WASTE ENDS UP TODAY



Source: SYSTEMIQ, Indonesia National Plastic Action Partnership (NPAP), World Economic Forum

FIGURE 2. STATUS OF INDONESIA'S WASTE INFRASTRUCTURE



1). Ministry of Public Work - Direktorat Sanitasi, Ditjen Cipta Karya. Data received by SYSTEMIQ on 6 and 8 July 2021; 2). Out of 35%, 22% are due to defective facilities and 13% are functional but not operational; 3). KLHK: Peluncuran GERAKAN INDONESIA BERSIH dan Rapat Kerja Nasional Pusat dan Daerah, Jakarta, 21 Februari 2019; Data Program Adipura 2017, Pengelolaan Sampah Plastik, Presentasi Dr. Novrizal Tahar, Direktur Pengelolaan Sampah pada HPSN 2019.

In addition, while Indonesia has invested in waste TPS3Rs/TPSTs², only around 55% of the total TPS3Rs and 59% of the total TPSTs built are reported to be active and the remaining are either not active or status is unknown¹⁰. Similarly, every year, more sanitary and controlled landfills backslide into uncontrolled dumpsites. Between 2016 and 2018 alone, 37 controlled and sanitary landfills became uncontrolled dumpsites¹¹.

With the support of the Royal Norwegian Embassy in Indonesia, and in partnership with the Association of Regency Governments (APKASI), the Association of City Governments (APEKSI), and the Indonesian Forum for Budget Transparency (FITRA), SYSTEMIQ has conducted a comprehensive study to understand the root causes behind Indonesia's low waste handling levels and determine which policy and financial levers would be most effective to address the country's waste management challenges. The goal is to ultimately support the Government of Indonesia. The study aims to answer a crucial question: What are the most important levers to reverse Indonesia's existing waste system challenges and double Indonesia's waste handling rate sustainably by 2025?

The research involved:

1. Conducting an extensive review of Indonesia's waste management regulatory framework as well as other regulatory frameworks related to funding and governance such as local government and regional autonomy regulations.

2. Synthesising learnings on the ground as a result of building waste systems for 225,000 people and designing waste systems for millions of people living in hundreds of villages in four cities¹².
3. Undertaking an analysis of peer countries with similar economies to Indonesia to identify key levers in enabling high handling of waste.
4. Consulting, through focus group discussions (FGDs) and workshops with 14 ministries directorates, two regional representative council bodies, two regency representatives, four local government associations, more than 10 non-government organisations (NGOs), academics and experts involving a total of 56 participants.
5. Organising a national assembly which was co-hosted by the Coordinating Ministry for Maritime Affairs and Investment on 22 June 2021 and attended by over 600 participants. These included representatives from key ministries working on waste management, regencies, city governments across Indonesia, private sectors, prominent non-governmental organisations of ocean plastic and waste management, as well as representatives of foreign countries, embassies, donor agencies, international development agencies and finance groups.

The study has identified three root causes of Indonesia's waste system:

1

An inadequate waste governance system. The existing institutional capacity and governance of Indonesia's waste management is inadequate due to three main reasons: (1). Governance structures that make it hard to achieve financial sustainability and accountability, and waste system success is dependent on individual leaders; (2). Fragmented waste management responsibilities between government and communities (villages/RT/RW); (3). Weak enforcement of the regulations for dumping/burning of waste and lack of incentives and consequences if waste targets are not achieved (e.g. by the government or producers of waste).

2

Insufficient and unreliable funding. The current funding that is channelled into the waste system is acutely insufficient. The necessary costs for waste management are significantly higher than the available funds and some

of the existing funds are also difficult to access and spend. This leads to a lack on both the capital expenditure (CAPEX) for waste infrastructure, and the operational expenditure (OPEX) for keeping waste systems running sustainably.

3

A lack of technical capacity. There is a countrywide lack of technical knowledge in how to set up and operate economically sustainable circular waste systems. Waste personnel are often recruited without the requisite skills, and standardised and regular training to run a sustainable system for waste management officials and personnel is very limited across Indonesia's regencies/cities. In addition, government officials are often rotated, resulting in those who have experience on waste management often being moved to different agencies/departments resulting in a lack of continuity among the leaders who manage the system.

This report focuses on solving the first two root cause waste system challenges.

Achieving 80% waste handling as the focus of the study

While the system changes recommended by NPAP highlight that both waste reduction and waste handling are important to solve Indonesia's waste management issues, this new research focuses on the waste handling segment. The NPAP analysis shows that a minimum 80% waste collection rate of the unreduced waste must be achieved and supported by other downstream waste handling elements – sorting, recycling and sanitary disposal – to be able to meet the 70% marine debris reduction target by 2025 set by the President.

In Chapter 3, to support the funding discussion, this report calculates the estimated cost required – the minimum 80% waste handling rate is used as a benchmark. Additional funding will still be required to close the rest of the gap to meet the 30% reduction and 70% handling targets, but all the same levers are applicable. A follow-up study is advised to address the funding challenges for waste reduction, which in its nature is more education-heavy and has unique institution- and infrastructure-focused needs.



CHAPTER 2: STABLE, ROBUST WASTE SYSTEM GOVERNANCE

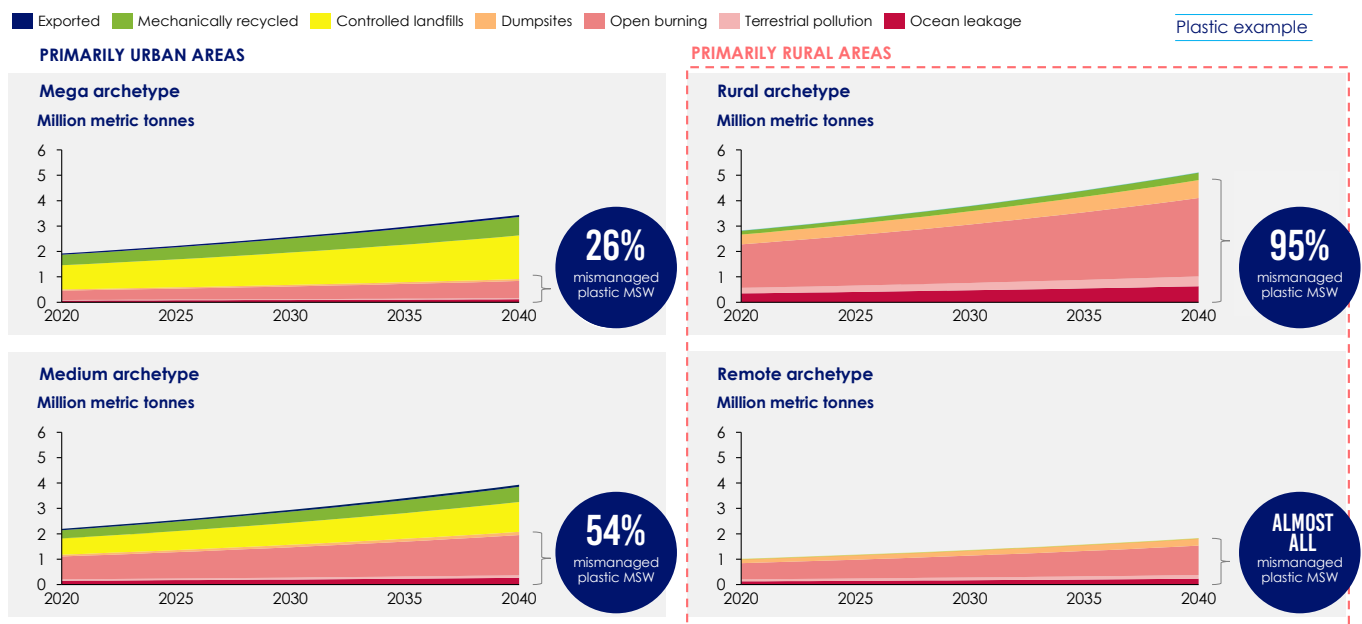
2.1 THE CASE FOR STABLE GOVERNANCE

There is a striking difference between mismanaged waste levels in urban areas versus rural areas in Indonesia (SEE FIGURE 3). NPAP divides regions into four archetypes: Mega, Medium, Rural and Remote. In urban areas categorised as Mega and Medium, 26% and 54% of waste is mismanaged respectively, while in rural areas such as Rural and Remote archetypes, between 95% to almost 100% of waste is mismanaged (i.e., dumped in the environment or burned). The reason for this comes down to a difference in how waste systems are governed and coordinated between urban areas and rural areas.

district “kecamatan” also comes in two types: urban wards called “kelurahan” and rural villages called “desa”. Kelurahan and desa have materially different governance structures (SEE TABLE 1).

Unlike kabupaten that are comprised of kelurahan (in urban areas) and desa (in rural villages), dense, urban kotas are comprised entirely of kelurahan, in which the local leader “lurah” is appointed by the mayor. They have no asset ownership and are financially dependent on the regency/city because they do not have budget planning or execution authority. As a result, waste systems in these regions are coordinated more centrally.

FIGURE 3. PROPORTION OF MISMANAGED WASTE PER ARCHETYPE



Source: SYSTEMIQ

Note: The results for rural and remote are largely driven by the assumption that all government disposal in these archetypes are not controlled landfills, but rather dumpsites.

2.1.1 INDONESIA’S GOVERNANCE COORDINATION

Administratively, Indonesia is divided geographically into provinces, districts (regencies and cities), sub-districts, villages, wards and RWs and RTs. There are two types of government administrative entities in districts levels – cities called “kota” and more rural districts called regencies or “kabupaten”¹³. The administrative level below the sub-

In contrast, villages (desa) have more decentralised authority. Their leadership (village head) is elected by the community, and they operate autonomously and can manage their own revenue and assets. They plan their budget and infrastructure development independently including that for waste management. However, villages (desa) are still dependent on regency government for policy, regulations, law, development targets and funding.

TABLE 1. KELURAHAN VS DESA GOVERNANCE STRUCTURE

	Kelurahan – urban ward	Desa – rural village
City type	Dense and urban	Less dense and more rural
Total wards nationally	8,488	74,953
Average ward size	5,943 (outside of Java) – 12,586 (Java)	1,645 (outside of Java) – 4,366 (Java)
Regency type	City (all) and regency (some)	Regency only
Leadership	Appointed by Regents (Bupatis) in regencies and Mayor (Walikota) in cities	Elected by community
Independence	Highly dependent on regency	Primarily independent, fully autonomous
Asset ownership	No asset ownership	Asset ownership (land, buildings)
Waste responsibility	Mostly Environmental (DLH) – full system	Community – collection from household, managing TPS3R; DLH - transferring waste from TPS3R to landfill, managing landfill

Source: SYSTEMIQ analysis based on Ministry of Home Affairs data

Waste responsibility varies significantly between cities and urban wards (kelurahan) and regency villages (desa). Most often in urban areas comprised of kelurahan, the regency/city's Dinas Lingkungan Hidup (DLH) or Environmental Agency is responsible for end-to-end waste management, similar to municipalities in most Organization for Economic Co-operation and Development (OECD) countries. They collect waste from households and handle it until it is disposed into a landfill.

However, in rural areas (i.e. villages or desa), while legally regency governments have authority for waste management, they hand over a large portion of the responsibility to local “communities”¹⁴. These communities are then responsible for collecting waste from households and transferring it either to transfer stations (TPS) or integrated waste processing centres/materials recovery facilities (TPST/TPS3R). DLH is only responsible for collecting the waste in larger trucks from these aggregation points and from main roadways, markets and other public facilities and transporting it to a dedicated landfill (TPA).

While there is no definitive legal definition for “communities”, they generally refer to local village governments representing between 750 to 9,000 households, resulting in a highly decentralised waste handling system. There are nearly 75,000 villages across Indonesia – expecting each one to have the technical ability, political motivation and funding access to set up and operate its own local waste handling system has not worked, nor is it an operationally efficient approach. As a result, more than 90% of waste is being burned or dumped in the environment in these regions.

Therefore, solving low waste handling levels involves solving for the challenges inherent in rural “community” led waste systems.

2.1.2 WASTE SYSTEM PHASES: PREDICTABLE EVOLUTION OF WASTE SYSTEM OVER TIME

In addition to SYSTEMIQ's own Project STOP and Bersih Indonesia's experience of building waste management systems, a comprehensive study was conducted to identify the key levers in enabling high handling of waste. The analysis focused on 10 peer countries to Indonesia with high and low waste handling rates, and highlighted that when waste management systems are evaluated over time and across countries, they tend to evolve in similar ways, at least in the early stages of their development (SEE FIGURE 4). The 10 countries have been divided into five phases of waste system governance. Early-stage waste systems (Phase 1) tend to start very informally, primarily with patches of ad hoc community and small hauler-based waste handling. In these early stages, in countries such as Myanmar, waste collection is small scale and unorganised with handling levels below 40%.

In the next evolutionary jump (Phase 2), there is greater government coordination and regulations. Generally, two separate waste systems emerge – one in urban areas that tends to be delivered more centrally and a separate system in rural areas continuing to follow a more decentralised, community-based model. In both

systems, waste governance is tied to individual political leader motivation and technical competency. Where there are passionate leaders, pockets of excellence can be found, but generally hard-won waste systems can easily be destabilised with political elections. Countries such as Indonesia (with differing waste governance in urban *kelurahan* versus rural *desa*), Pakistan, India and Bangladesh all share these characteristics and tend to have a hard time breaking past national waste handling levels above 60%.

In Phase 3, nations figure out how to secure stable, sufficient waste system funding and start investing in new waste system infrastructure to bring waste management to regions without it. With stable funding, stable governance structures start forming and far more professionally managed waste systems develop, especially in urban areas. For example in Thailand, waste handling in urban areas can reach 80%, with the lowest handling levels continuing in rural areas often still dependent on a decentralised, leader-driven community model.

In Phase 4, waste handling levels in rural areas start to catch up with those in urban areas and both have far more professionally managed waste systems, independent from political elections. There is also often a shift in requiring households to responsibly manage their waste either from stronger implications/enforcement for dumping and burning their waste or from a regulatory shift in classifying waste management as an essential service that each citizen has a right and responsibility to use. In countries such as Malaysia, South Africa and Jordan in this phase, waste handling level can reach above 90%.

Phase 5 sees waste systems become nearly universal. Further, more advanced development stages see countries branch off into an innovative range of professionally managed waste system models.

2.1.3 GOVERNANCE SHIFTS

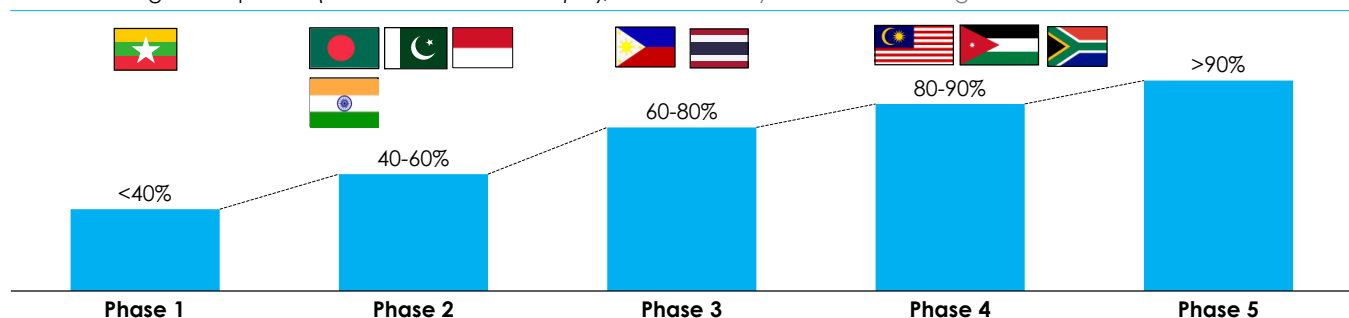
The above journey outlines three particularly important governance shifts that lead to full national waste handling coverage (SEE FIGURE 5): (1) governance setup, (2) governance coordination, and (3) authentic incentives against dumping and burning waste.

Governance setup pertains to whether the waste system is individual dependent or system dependent. An individual-dependent system is when the waste system's success depends on an individual political leader's motivation and skills level, which makes the system fragile to political changes and pressures. In order to protect votes, political leaders are often hesitant to raise household collection fees to sustainable levels, to enforce financial fines or jail sentences for waste dumping or burning, or to create more disciplined productivity for waste system workers. Alternatively, a system-dependent operator's success is no longer reliant on any one individual leader's motivation but rather a series of robust, embedded processes and regulatory protections. These waste systems are stronger because performance is guaranteed, regardless of whether there is political commitment from an individual leader or when there are leadership changes.

Governance coordination pertains to whether the waste system is community-led or institutionally coordinated. A common challenge with community-led waste collection systems (i.e. village-led haulers or small, private haulers), is that the community is given responsibility for waste collection yet does not have the financial resources, institutional capacity or technical knowledge to do so. In addition, given their size, community-led waste systems rarely take advantage of economies of scale, unless they develop time intensive inter-village agreements that negotiate tipping fees, and other cross-village considerations. An institutional-coordinated waste system

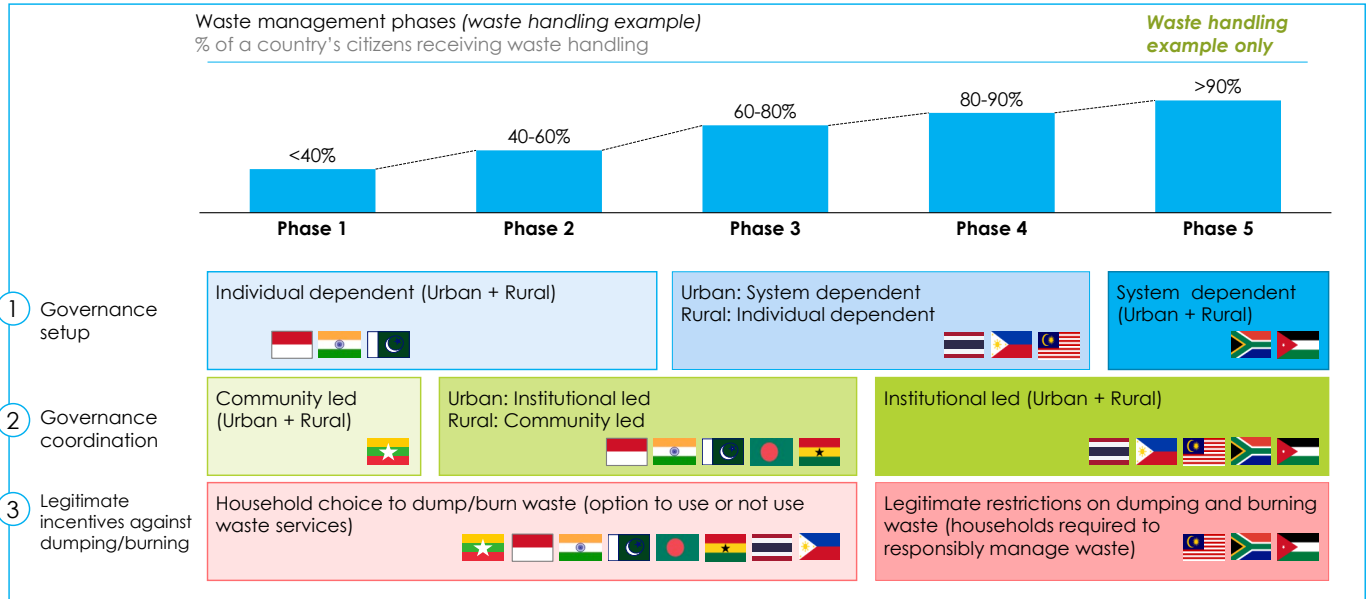
FIGURE 4. WASTE GOVERNANCE PHASES

Waste management phases (waste collection example), % of a country's citizens receiving waste collection



Source: SYSTEMIQ analysis based on Whiteman, A., Webster, M. and Wilson, D. C. (2021) "The nine development bands: A conceptual framework and global theory for waste and development"¹⁵.

FIGURE 5. GOVERNANCE SHIFTS ON WASTE SYSTEM OUTCOMES



Source: SYSTEMIQ analysis based on Whiteman, A., Webster, M. and Wilson, D. C. (2021) "The nine development bands: A conceptual framework and global theory for waste and development".

is where the government (e.g. reGENCY/city government, municipality) has full responsibility of coordinating waste management delivery across its regional boundaries so there are no gaps in coverage. In an institutionally coordinated waste system, the reGENCY/city or municipal government may still partner with community-based or private waste operators but it has the responsibility to ensure successful delivery regardless of sub-contracted waste operator performance.

Authentic incentives against dumping and burning waste pertains to whether the citizens have an option to dump or burn waste which is often free and without any social consequence (a household's choice to use or not use waste services) or there are legitimate restrictions on dumping and burning and therefore households are required to responsibly manage their waste. This can take the form of legitimate implications for dumping and burning through regulatory enforcement or by classifying waste management as an essential service provided by a government for all citizens. Either way, the aim is to strongly incentivise households to manage their waste responsibly.

These three governance components, when addressed, help countries build stronger, more robust waste systems and materially improve their waste handling levels.

2.1.4 INDONESIA'S WASTE SYSTEM PHASE

Contextualising Indonesia's waste system development, the country is on the upper level of Phase 2. This is because

despite the development of strong waste regulations and active coordination of waste services, the governance between urban and rural areas are still divided, and the success of the waste system is still dependent on individual leaders, and not separate from political cycles. As a result, a good waste service in a village that has been built by a committed head of the village could instantly change when that leader is replaced.

Also, regulations that prohibit dumping and burning of waste are in place in both national law (Law 18/2008 on Waste Management) and in most of local reGENCY/city regulations. However, enforcement of the regulations have not been effective, and therefore there is minimal penalty for households who dump or burn their waste. Waste management is also not classified as a Mandatory Basic Service, so there is less priority with government delivery or funding leading to lower service levels and coverage. However, the regulations cannot be enforced effectively if people do not have access to waste service, or the service is inadequate. But even if there is access to waste services, with no legitimate penalties, many households choose not to use the waste services in place which charge a collection fee, when the alternative of dumping or burning waste is free.

These trends can be seen in waste systems across Indonesia, whether on a village or reGENCY level, and any successful system is mainly due to the commitment, motivation and capacity of an individual leader(s), whether it is the reGent/mayor, official of environmental agency or head of village. As a result of the current governance setup, it is

difficult at this level to (1) build robust waste systems, and (2) scale them quickly across the nation.

2.1.5 INDONESIA COMPARED TO PEER COUNTRIES WITH HIGH AND LOW WASTE HANDLING LEVELS

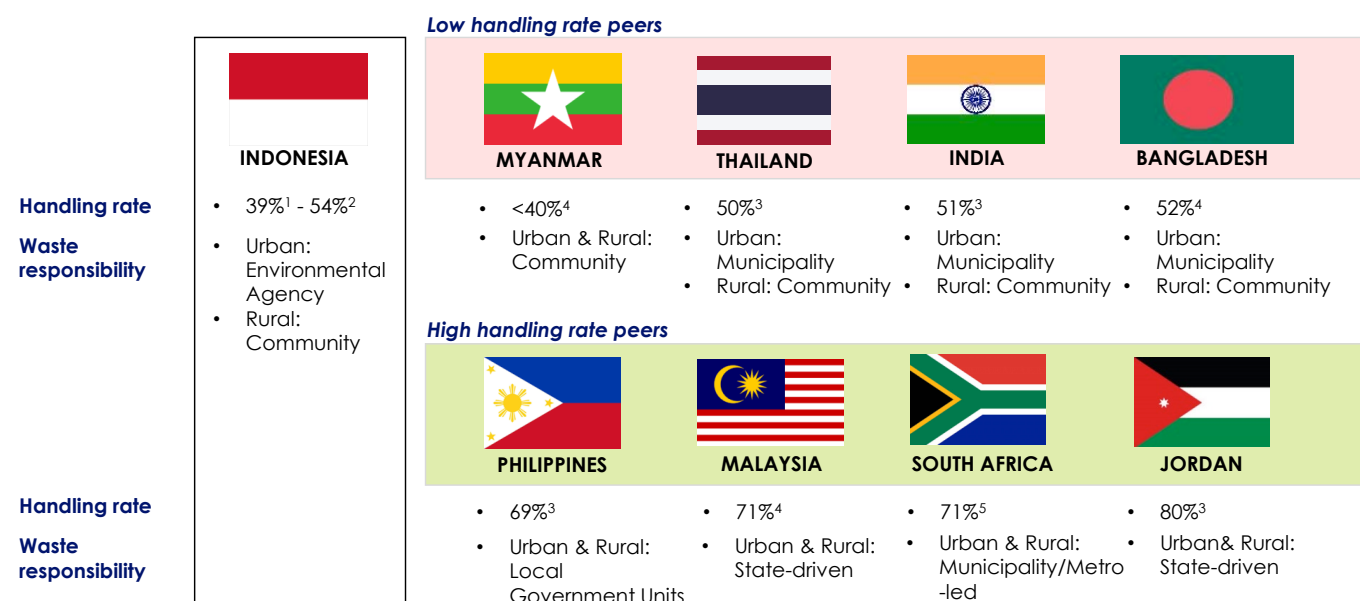
When Indonesia is compared to peer countries with similar waste handling levels, the same waste governance patterns are evident in India, Pakistan, and Bangladesh (SEE FIGURE 6). It differs significantly, however, from governance patterns in the likes of the Philippines, Malaysia, South Africa and Jordan, all with higher waste handling levels.

In India, a country with 51% waste handling coverage¹⁶, their waste governance setup is also divided between urban and rural areas¹⁷. In urban areas, municipalities are responsible for waste management operations from collection to disposal. In rural areas, however, village heads are responsible for the same operations and, similar to Indonesia, waste handling levels here are at their lowest. In both areas, the waste system is still dependent on individual leaders, whether a commissioner or village head. As a result, there is a high variance of waste system performance across regions in India with some having very robust systems and others, especially in rural areas, underperforming.

In South Africa, a country with 71% waste handling coverage¹⁸, waste management is dependent on a system rather than individual leaders. Governance setup in South Africa is more integrated compared to countries with low handling levels, in which both urban and rural areas is under the auspices of the municipality¹⁹. Additionally, the regulatory framework for waste management enables a more coordinated and integrated approach. For example, municipalities (local municipalities and metros) are tasked constitutionally with providing safe, universal collection and disposal of waste in both urban and rural areas. The regulatory framework is also sufficiently flexible to maximise private sector participation in delivering parts of waste services such as collection. The country is increasingly exploring public-private mechanisms across municipalities and metros to increase performance and reduce costs.

In the Philippines, with 69% waste handling coverage²⁰, local government units (LGUs)²¹ are responsible for waste collection, transport and disposal of solid waste in both urban and rural areas. In addition, waste management also has a designated commission directly under the President's Office, with the inclusion of representatives from all the relevant divisions from all agencies to prescribe policies for the achievement of the waste management law and oversee the implementation of waste plans. Furthermore, a legal accountability mechanism, the Anti-Red Tape Act, was established to ensure citizens can keep government officials accountable to deliver public

FIGURE 6. WASTE GOVERNANCE PEER COUNTRY ANALYSIS



1. NPAP Analysis; 2. KLHK data <https://sipsn.menlhk.go.id/sipsn/>, accessed on 7 June and 12 July 2021; 3. Waste Atlas, <http://www.atlas.d-waste.com/>; 4. SYSTEMIQ Analysis; 5. SYSTEMIQ Analysis; 5. Rodseth C, Notten P, Von Blottnitz H., A revised approach for estimating informally disposed domestic waste in rural versus urban South Africa and implications for waste management. S Afr J Sci. 2020;116(1/2), Art. #5635, 6 pages. <https://doi.org/10.17159/sajs.2020/5635>.

services, including waste management. This system-dependent waste management reduces the risk of a lack of continuity and the Anti-Red Tape Act ensures robust monitoring and an evaluation.

With 71% waste handling coverage, Malaysia has a dual system where the waste system is divided between the jurisdiction of the Federal government (federal), and the state and local level government (non-federal). In the federal states, the Ministry of Housing and Local Government (KPKT) coordinates between federal and state governments, and local authorities on the implementation of national solid waste management, and public cleansing policies. A designated federal agency called the Solid Waste Management Corporation (SWCorp) was also established to enforce national policies on SWM and public cleanliness. In non-federal states, waste management is delivered by the respective state-level departments and authorities, as well as local authorities (PBT) i.e. a city, municipal or district council. In both systems, waste management is still under the jurisdiction of the government, however, the federal system has a more top-down, and centralised structure. In terms of performance, federal states have a significantly higher waste handling rate compared to non-federal states, which can go up to 100%. One of the reasons for this can be attributed to the effective partnering with private sector concessionaires to deliver universal collection service. The SWCorp has the role of managing and monitoring the implementation of these concessionaires.

These peer country case studies provide an insight on the different governance approaches other peer countries use. By observing the governance approaches from countries with high handling levels, three things can be summarised: (1) governance setups of waste management are designed to be tied to the system rather than individual leaders, (2) governance coordination tends to be more centrally managed and linked up, and (3) when enforcement mechanisms are in place, these ensure accountability and effective monitoring.

2.2 RECOMMENDATIONS FOR IMPROVING WASTE MANAGEMENT GOVERNANCE

For Indonesia to achieve its waste management targets, three governance shifts are necessary. Firstly, governance setup needs to be dependent on a system separate from political elections for continuity. Secondly, full governance coordination needs to be given back to regency/city's Environmental Agencies (DLH) to allow for better

coordination and delivery. Finally, law enforcement of dumping/burning of waste needs to be strengthened and eventually DLH need to provide universal access to waste services. To do this, three overarching recommendations are proposed:

1. Mainstreaming Badan Layanan Umum Daerah (BLUD) to solve governance setup challenges,
2. Move community-based to institutionally coordinated waste management systems to solve governance coordination challenges, and
3. Categorise waste management as a Mandatory Basic Service to provide citizens with adequate access to waste services so that enforcement of the law against dumping/burning waste can be effective.

2.2.1 MAINSTREAMING BADAN LAYANAN UMUM DAERAH (BLUD) TO SOLVE GOVERNANCE SETUP CHALLENGES

Indonesia has 10 legal structures available for managing waste systems ranging from community systems (community led (KSM) and village-owned enterprises (BUMDes and BUMDes Bersama)) to regency/city government's environmental agency structures (UPTD, BLUD and BUMD) and non-governmental structures (Yayasan, Koperasi and Limited Company (PT)) (SEE TABLE 2).

To build a stronger, more robust system with independent financial management that could be coordinated across multiple kelurahan and villages, ideally Indonesia should consider using a waste system governance structure in regency/city level with the following criteria:

1. **Allows for coordination of waste system across a full regency or kota** (rather than village level) to ensure few gaps in waste system coverage;
2. **Can legally accept funds from multiple revenue sources including:**
 - government funding,
 - household and business waste collection fees,
 - waste monetisation from recycling sales, compost sales,

- complementary funding from private sector through Corporate Social Responsibility (CSR), Packaging Recovery Organisation (PRO) or similar mechanisms.
 - Grants, loans, etc.
- 3. Waste system funds can be transparently and independently managed from the regency treasury** with a separate bank account from other government revenue so funds can be tracked and verified.
- 4. All funds collected for the waste system are used for the waste system.**
- **Addresses governance coordination issues:** Waste systems can be coordinated centrally at the regency/city level through BLUDs. BLUD could partner/sub-contract services to different waste operators e.g. KSM, BUMDES or private operators.
 - **Separates the roles between BLUD as the operator and DLH as the regulator:** Allows separation of the regulator function from the waste delivery function for better delivery accountability.
 - **Focuses on integrated management:** It can manage waste management from collection, sorting, transport to disposal at both TPST and TPA.

From the 10 existing waste governance structures in Indonesia (SEE TABLE 2), BLUD²⁴ is the best option because it:

- **Fulfils the criteria for an ideal waste governance:** It can (1) cover the whole regency/city, (2) be financially more sustainable because it can legally accept multiple revenue sources, and (3) is able to independently manage and fully utilise revenues for waste management.
- **Addresses the governance setup challenges:** It is (1) institutionally more independent and professional, and (2) detached from political change and individual leader dependency.

- **Functions as a central waste bank and an off-taker:** BLUD can be the off-taker for recycled waste from TPST/3R, waste bank, and the informal sector – enabling low value plastics to be sold off in large volumes, and thereby bringing greater revenue opportunities into formal waste systems.

Currently – Kelompok Swadaya Masyarakat (KSM) and Badan Usaha Milik Desa (BUMDES) are the most common governance structures being used by communities/villages. However, each entity is only intended to cover one village and KSMs cannot receive regular government funding.

TABLE 2. EXISTING WASTE GOVERNANCE STRUCTURES IN INDONESIA

Strengths In between Weaknesses

Governance system	KSM	BUMDes	BUMDes Bersama	Desa Adat	DLH/UPTD	BLUD	Koperasi	Yayasan	BUMD	Private (PT/CV etc)
Governance level and ownership	Community	Village business	Village business collective	Traditional village (Bali only)	Government (DLH)	Government (DLH)	Individuals	Individuals	Government (min 51% shares)	Private
Coverage	Mostly 1 village	1 village	Multiple villages	1 traditional village	The whole regency	The whole regency	Unlimited	Unlimited	The whole regency	Unlimited
Village funds	NO, unless requested by village head for grant support	Yes - treated as BUMDES capital	YES	NO. there is a separate Desa Adat funds in Bali.	NO	NO	NO	NO	NO	NO
Regency budget	NO	NO	NO	NO	YES - through DLH	YES - through DLH	NO	NO	YES	NO
Waste/retribution fee	YES	YES	YES	YES	YES - through Bupati regulation but goes to regency account	YES, through Bupati regulation goes to BLUD account	YES	NO	YES	YES
Sales revenue	YES	YES	YES	YES	NO, they cannot involve in sales activities	YES, goes to BLUD account	YES	NO	YES	YES
Private sector EPR	YES	YES	YES	YES	NO, they can only receive grant, goes to regency account	YES, goes to BLUD account	YES	YES	YES	YES
Private sector CSR	YES	YES	YES	YES	YES, but mostly non-financial	YES	YES	YES	YES	YES
Process	Simple and short	Simple and short	Simple but could take long for villages to agree	Simple and short	Complicated and long, requires Bupati regulation	Complicated and long, requires establishment of UPTD first	Simple and short	Simple and short	Complicated and long, requires approval of Bupati and parliament	Simple and short. Longer if foreign owned

2.2.2 CHALLENGES IN SETTING UP A BADAN LAYANAN UMUM DAERAH (BLUD)

Every regency/city's government's environmental agency (Dinas Lingkungan Hidup/DLH) has a division called *bidang persampahan* or waste management division. Some regencies/cities also establish a specialised unit called UPTD (Unit Pelaksana Teknis Daerah) as a waste operator separating DLH's role as a regulator. However, DLH and UPTD cannot independently manage revenues from waste management (e.g. retribution fees). All revenues go to the regency/city general account (APBD) and are treated as the regency/city revenues. It is then up to Bupati/mayor to decide what to do with the revenue. BLUD has financial autonomy to manage its budget. This makes BLUD a better option for the sustainability of the system.

That said, unfortunately BLUD is administratively burdensome and time intensive to set up. First a UPTD needs to be established, which can take six months or more, then the UPTD needs to apply to convert into BLUD system processes, which can take up to eight months or more.

In the process of working towards a BLUD, given an UPTD needs to be started first and cannot manage its waste system funding independently, a community organisation (KSM) structure needs to be established in parallel to take on this independent fund management role. The KSM then needs to be linked to the UPTD governance structure. Once requirements are met to establish a BLUD, ideally the KSM team will join forces with the UPTD team to create one BLUD organisational structure, a clunky but doable workaround.

While there have been many examples of BLUDs being used in healthcare and other sectors, so far there is only one BLUD in the waste management sector (BLUD Intan Hijau in Banjar Regency). Therefore there is a need to establish several pioneering pilot projects using the BLUD governance structure for waste management for other regencies and cities to learn from in order to break through initial stakeholder resistance. BLUD governance is planned for pilots in Malang (supported by Bersih Indonesia program) and Jembrana (supported by Project STOP Jembrana) regencies.

To expedite the mainstreaming of BLUDs, there are staged recommendations.

In the short-term, three activities are proposed:

1. Socialise the benefits of a BLUD waste governance model to regencies and cities.
2. Create BLUD guidelines and a toolkit to make establishing BLUDs easier for cities and regencies.
3. Pilot between one and three conversions of UPTD to BLUD to provide a proof of concept for future cities.

In the long-term, three policy changes are proposed to solidify and strengthen the BLUD establishment processes:

1. Enable the immediate application of the BLUD financial system once an UPTD is established, by:

- Adding an additional article after Article 36 in MoHA Regulation 79/2018: "For public service operators/public service providers who fall into the category of Mandatory Non-Basic Service such as environmental affairs (waste), the Minimum Service Standard (SPM) that was referred to in the administrative requirements in Article 36 point d, are Minimum Technical Service Standard (SPMT)."
- Adding a new article or clause in MoHA Regulation 79/2018: "Local Agencies (Dinas/Badan Daerah) that will or are in the process of establishing an UPTD for the provision of goods and/or public services can, in parallel, apply for the application of the BLUD." This is to enable the immediate application of the BLUD system once the UPTD is established.
- Adding a new clause in MoHA Regulation 12/2017: "Local Agencies (Dinas/Badan Daerah) that will or are in the process of establishing an UPTD for the provision of goods and/or public services can, in parallel, apply for the application of the BLUD." This is to enable the immediate application of the BLUD system once the UPTD is established.

2. Separate the DLH waste regulator role and BLUD operator roles.

3. Strengthen the BLUD legal basis through:

- Adding an article on the set up of waste management UPTD in MoHA Regulation No. 12/2017 on Guidelines of Establishment of UPTD (MoHA 12/2017), similar to the article on the set up of health UPTD (article 23), and

- Adding waste management in the explanation section of Government Regulation (PP) 23/2005 on BLU. As this regulation provides legal basis for application of BLUD on UPTD, the addition of waste management in the explanation section will provide a legal basis for the revision of MoHA 12/2017 to mandate the application of BLUD system on waste management UPTD.

Inputs to consider: During focus group discussions, several stakeholders proposed that more pilot BLUD projects are undertaken to gain further insight into the pros and cons of this governance model for coordinating waste systems. In addition, stakeholders encourage DLH agencies to make sure other agencies are involved in the decision making of budget processes of city/regency governments waste systems.

2.2.3 EVOLVE COMMUNITY-BASED WASTE MANAGEMENT SYSTEMS TO INSTITUTIONALLY COORDINATED SYSTEMS

In most of the regency/city regulations (Perda) on waste management, waste collection responsibilities are fragmented between regency/city and community (village/RT/RW). For example, in Banyuwangi Regency regulation, the community (waste operator institution) is responsible for waste collection from the sources to the transfer station (TPS), while the regency government is responsible for transporting waste from TPS to landfill (TPA). For example, in Jembrana Regency, the community or the institution that is established by village (desa or kelurahan) is responsible for transporting waste from households to a transfer station (TPS) or an integrated waste processing facility (TPST), while the regency government is responsible for transporting waste from TPS/TPST to TPA, and transporting waste from public, social and other facilities from the source or TPS/TPST to TPA.

The articles on regency/city regulations that divides waste collection responsibility between regency/city and community is taken from articles from the Ministry of Home Affairs (MoHA) Regulation (Permendagri) No. 33/2010 article 7 (1). These outlines:

- Waste from households to TPS (transfer stations)/TPST (MRF) is the responsibility of the waste management

institution established by RT/RW (sub-neighbourhood/neighbourhood - smaller units under a village).

- Waste from TPS/TPST to TPA is the responsibility of the regency/city government.
- Waste from residential, commercial, industrial, special areas, from the source of the waste to TPS/TPST and/or TPA (landfill), is the responsibility of the management of those areas.
- Waste from public, social and other facilities from the source of the waste and/or from TPS/TPST to TPA is the responsibility of the regency/city government²⁸.

Even more interestingly, the Permendagri 33/2010 (MoHA 33/2010) was revoked in 2016 and is no longer valid, but most regency/city regulations still refer to it and operate with a division of waste responsibility between regency/city and community.

In view of this, it is proposed that the responsibility for waste management coordination shifts from being community-based to institutionally coordinated under the city/regency government, and a new Ministry of Environmental and Forestry (MoEF) Regulation is issued, with two key changes under the new regulation:

1. Move community-based waste management systems to institutionally coordinated systems and put the responsibility for end-to-end waste management, particularly waste handling, with the regency/city government. Regency/city government are still able to establish partnership with the existing waste operators including community-based or private sector waste operators to deliver waste handling services but full responsibility should be held by the regency/city government.
2. Involve the community/village in behavioural change for waste reduction at the source through 3Rs – reduce, reuse and recycle which includes organic processing at the source.

Importantly, if regencies and cities take full responsibility of coordinating waste services across their regions, they need to have sufficient financial resources to do so. Strategies to increase the amount of operating and infrastructure funding into waste management is covered in detail in Chapter 3.

2.2.4 CATEGORISE WASTE MANAGEMENT AS A MANDATORY BASIC SERVICE TO EFFECTIVELY ENFORCE THE LAW ON DUMPING/BURNING WASTE

Regulations against dumping and/or burning waste exist in the Waste Management Law and local regulations but the enforcement has not been effective. An enforcement of laws against dumping and/or burning waste can be effective if waste service access is adequate. For this to happen, waste service status must be strengthened and enshrined at the highest levels of the regulatory framework.

Based on the government's Law No. 23/2014, there are two types of government services that regency and city governments are responsible for: Mandatory and Optional. Regency and city governments are obliged to implement Mandatory Service, while Optional Service are only implemented by the regency and city government according to their preferences.

Mandatory affairs are divided into two categories: Mandatory Basic Service and Mandatory Non-Basic Service. According to the law, Mandatory Basic Service consist of those that are related to basic services. They are divided into six categories: education, health, public work, public housing, public welfare and social. Mandatory Non-Basic Service consist of services that are not related to basic services, and are divided into 18 categories: manpower, women empowerment and child protection, environment, civil registry, community and village empowerment, etc. Waste management falls under environment in Non-Basic Services.

Services categorised under Mandatory Basic Service have higher priority on the local government agenda compared to those listed as Mandatory Non-Basic Service. Because waste management is part of the Mandatory Non-Basic Service, it often has a lower priority and therefore less budget is allocated to the sector. This results in a poor waste management service for the citizens of the respective regency/city.

It is recommended that waste management to be re-categorised as a Mandatory Basic Service through revision of Law No. 23/2014 on Local Government so that:

1. Local government prioritise waste management and increase budget allocations.
2. There is a minimum standard for waste service through Standar Pelayanan Minimal (SPM).
3. More effective enforcements of the law prohibiting dumping/burning waste are introduced.
4. The right of every citizen to have a healthy environment and good waste management service is fulfilled, as mandated in the Constitution (UUD 45) and Law No. 18/2008.

In parallel, law enforcement of regulations regarding dumping/burning waste needs to go hand in hand with:

- Campaigns and proper information on the reduction of waste at source (the 3Rs – reduce, reuse and recycle).
- An accountability system e.g. the public has a mechanism to complain when waste service is not available or adequate, and governments can be held accountable for non-delivery.
- Effective regulations and adequate resources to enforce anti-burning and anti-dumping laws.

Inputs to consider: Stakeholders raised the concern that if waste management becomes a Mandatory Basic Service, the proportion of budget allocated to all public services may be disrupted. Hence, there needs to be an in-depth evaluation into the impact of making waste management a Mandatory Basic Service, and more thought about how to mitigate financial ramifications to other services.





CHAPTER 3: STABLE, SUFFICIENT WASTE SYSTEM FUNDING

3.1 THE CASE FOR STABLE, SUFFICIENT WASTE SYSTEM FUNDING

The Government of Indonesia (GoI) has committed to reach a 70% reduction of marine plastic debris²⁹, 30% waste reduction at source³⁰ and 70% waste handling for all waste by 2025. Reaching these targets will require a one-off financial commitment of **Rp 54-67 trillion (USD 3.8-4.8 billion)** for capital infrastructure (e.g. TPST construction, bins, conveyor belts, trucks, tricycles, etc.) to set up new waste systems, as well as **Rp 7-12 trillion per year (USD 490-825 million)** in ongoing operating costs (e.g. worker salaries, electricity, fuel, equipment maintenance). The exact amount required will be dependent on the waste system design; specifically, whether linear or circular waste systems are built and the size and therefore economies of scale reached by each waste system.

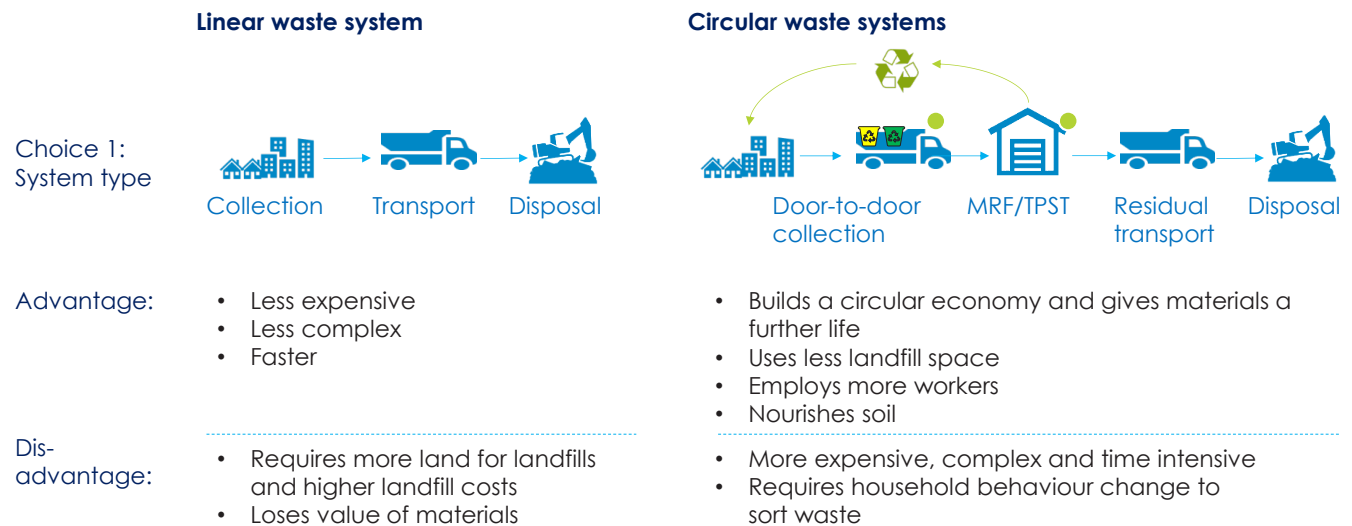
The importance of securing sufficient, stable waste system funding cannot be overstated. Finding this money will be a challenge but it is possible. This chapter explores how.

3.2 CIRCULAR VESUS LINEAR

The GoI has committed to the transition towards a circular economy. The design of the country's waste systems is an important element in this transition. Waste systems can be built in a linear collect-to-landfill model or a circular collect-sort-recycle-process-dispose model (SEE FIGURE 7). Linear and circular waste systems have differing levels of complexity, cost and reliance on landfills. Knowing these trade-offs is important.

While effective circular waste systems are approximately 10% more expensive over a 10-year lifetime, they offer numerous advantages: they use significantly less landfill space; they give materials a second or third life requiring less virgin material production; they reduce health issues from mixed waste; they increase employment levels from the additional waste sorting and processing; and they nourish soil from composting and organic fertiliser.

FIGURE 7. CIRCULAR AND LINEAR WASTE SYSTEM COMPARISON



3.2.1 CIRCULAR VERSUS LINEAR SYSTEM COST BREAKDOWN ANALYSIS

Circular waste systems are more complex than linear waste systems (SEE FIGURE 8). In order to enforce household separation, households need to be trained to sort their waste with ongoing behaviour change campaigns, and given two and sometimes three waste bins – for organic, non-organic and residual waste (as opposed to one waste bin for linear systems). Often collection vehicles are modified to separate organic and non-organic waste, or vehicles work on different organic and non-organic collection timings, so more vehicles are required. In addition, sorting facilities need to be constructed (TPSTs and TPS3Rs) and often equipped with conveyor belts, balers, forklifts, etc. Larger numbers of workers are also necessary to sort out waste once it arrives in sorting facilities and for processing organic waste into compost and fertiliser. Organic waste also needs a great deal of space for processing. Markets then need to be identified and managed for selling both non-organic and organic materials.

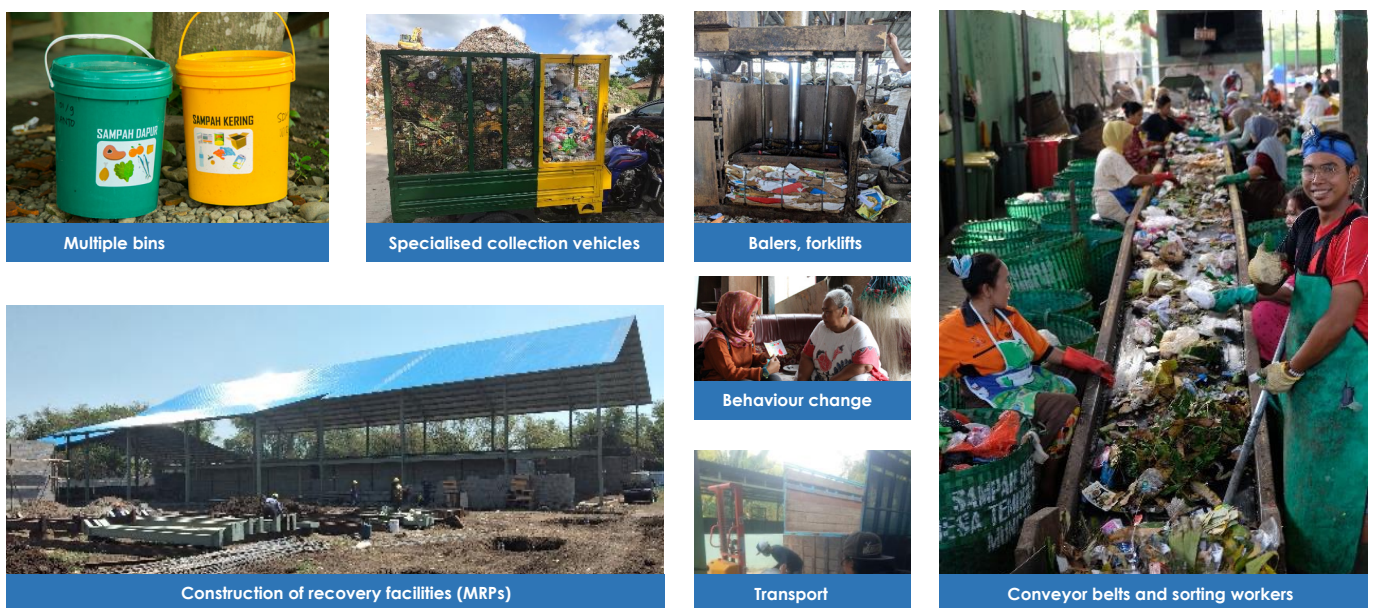
Despite the considerable additional complexity, interestingly, circular waste systems have cheaper overall CAPEX costs, as long as 50% or more of waste is recycled or processed and diverted from landfills. This is due to the significantly lower landfill disposal costs than linear systems. In addition, while circular OPEX costs are more expensive, some of the additional costs can be mitigated through

additional recycling and compost revenue streams.

The total CAPEX needed for circular waste systems to achieve 80% waste handling by 2025 is approximately USD 3.8 billion – 21% lower than the total CAPEX needed for linear system (approx. USD 4.8 billion)³¹ – assuming at least 50% of waste is recycled or otherwise processed (e.g. compost or fertiliser) and therefore diverted from going to landfill (SEE FIGURE 9). Landfills require a great deal of land and are expensive to construct and maintain. If circular waste systems are built, but most of the waste still ends up in landfill, they are far more expensive than a linear waste system given the extra processing costs required.

The total OPEX needed for circular waste systems to achieve 80% waste handling by 2025 is approximately USD 825 million per year (average between 2017 and 2025), compared to a linear system which needs approx. USD 490 million per year. However, there is a potential of approx. USD 170 million in additional revenue from material sales in circular waste systems, mitigating at least some of the OPEX costs and bringing the total circular OPEX needed to USD 655 million (SEE FIGURE 10). Moreover, disposal costs in the circular system are cheaper than linear. Combining with other potential revenue, such as household and business collection fees (retribution fees), the net annual OPEX needed for circular system would be approx. USD 373 million, 79% higher than OPEX net needed for linear system which is approx. USD 208 million³².

FIGURE 8. CIRCULAR AND LINEAR WASTE SYSTEM CAPEX COMPARISON

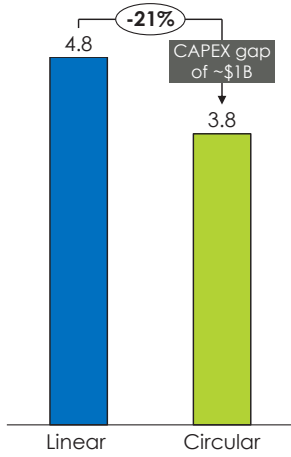


All pictures from Project STOP in Pasuruan, Jembrana and Muncar

FIGURE 9. CIRCULAR AND LINEAR WASTE SYSTEM CAPEX COMPARISON

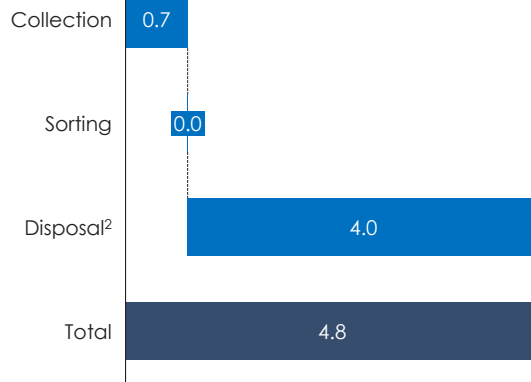
Total waste system CAPEX to reach 80% handling

Billion USD, 2017-2025¹, % difference



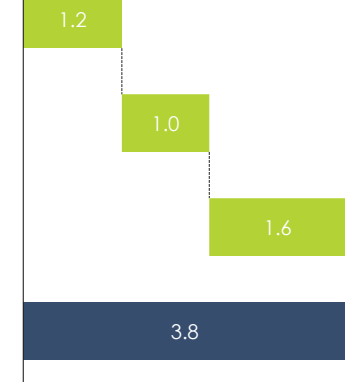
Linear: CAPEX at 80% handling

Billion USD, 2017-2025¹



Circular: CAPEX at 80% handling

Billion USD, 2017-2025¹



CAPEX investment required calculated by multiplying \$/tonne annualised CAPEX by the total lifetime and the intended capacity by 2040, excludes cost of recycling facility; (2) For disposal, it was assumed that all new disposal will require CAPEX despite some existing capacity leftover due to the need to upgrade current disposal operations; (3) Asset depreciation assumptions: Sanitary Landfill (9 years), TPS3R (sorting station) (10 years equipment, 20 years building), Trucks (10 years), Tricycles, equipment (5 years). Source: SYSTEMIQ Analysis

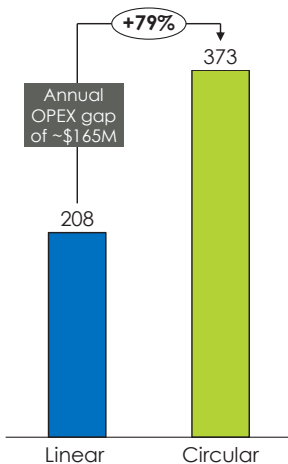
In summary, in the long run, circular waste systems are roughly 10% more expensive than linear systems (SEE FIGURE 11)³³, but provide far more benefits from an environmental, health and socio-economic aspect. On the contrary, linear waste systems would have negative consequences and additional costs including the extra land required for landfills and dumpsites, environmental

and health implications from overloaded landfills and dumpsites, and leakage of pollutants including chemical laden leachate to the groundwater and ocean, and toxins and heavy metals from landfill fires into the air. The additional benefits from circular waste systems significantly outweighs the additional costs incurred, even if they are harder to quantify.

FIGURE 10. CIRCULAR AND LINEAR WASTE SYSTEM CAPEX COMPARISON

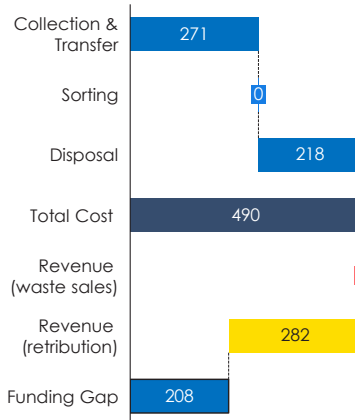
Net annual OPEX at 80% waste handling

Million USD, % difference



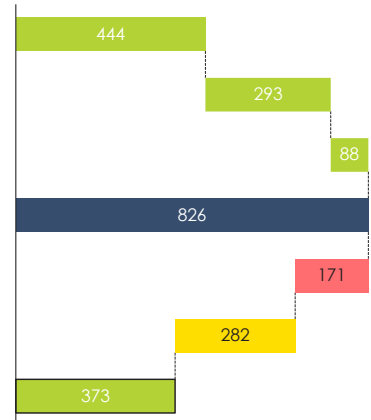
Linear: OPEX/year at 80% handling

Million USD per year, 2017-2025 avg



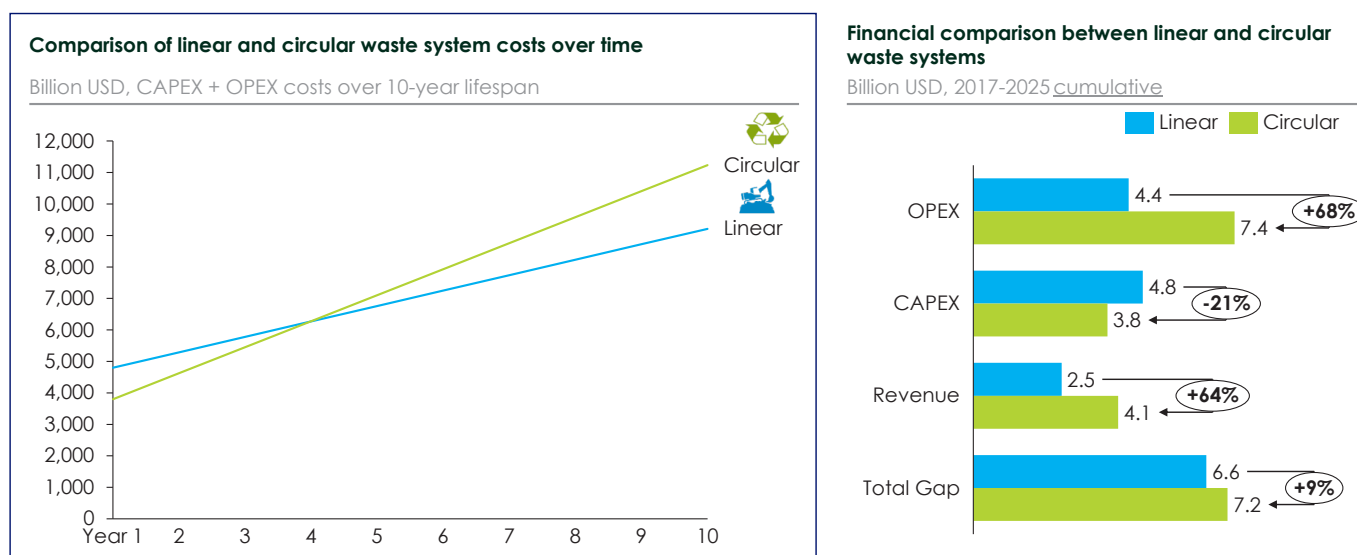
Circular: OPEX/year at 80% handling

Million USD per year, 2017-2025 avg



Note: Revenue in the circular system is derived from the average amount of waste sorted into TPS3R as well as prices and capture rates at TPS3R for organics and inorganics, taken from Project STOP. Retribution revenue may not reflect reality and is estimated using IDR 8,000 per household (hh) per month in urban and IDR 2,500 per hh per month in rural, applied to all population in Indonesia.

FIGURE 11. SUMMARY OF CIRCULAR AND LINEAR WASTE SYSTEM CAPEX & OPEX COMPARISON



3.3 WASTE SYSTEM SIZE

There is a second design question that will have a significant impact to the CAPEX and OPEX required – what is the optimal waste system size to adopt? Comparing three different waste system designs – small, decentralised waste systems; medium-sized systems with some aggregation; and large centralised waste systems – can help provide an answer (SEE TABLE 3).

Small, decentralised waste systems: This system is the most common waste system seen today in Indonesian villages (desa) – the community-based waste system. These usually serve a single village of between 700 and 2,500 households, usually with one material recovery facility (TPS3R). Badan Usaha Milik Desa (BUMDES) and KSM are the most common governance structures adopted. Automation is still very rare, but it does exist in some cases. The number of workers employed for a waste system this size is around 35 people or less.

TABLE 3. WASTE SYSTEM SIZE

	Small, decentralised (Phase 2)	Medium, some aggregation (Phase 3)	Large, centralised (Phase 4/5)
Governance coordination	Community/village led	Village Co-op led/ kecamatan led	Regency/Kota led
Governance type	BUMDES, KSM	BUMDESMA, UPTD->BLUD	UPTD->BLUD
Phase	DB 1 & 2	DB 2 & 3	DB 4 & 5
Project example	Rumah Kompos Padang Tegal	Project STOP Pasuruan, Jemberana	Bersih Indonesia Malang
TPST/3R size	1 TPS3R/ 2,500 people	1 TPST/ 60,000 people	1 TPST/ 400,000 people
Automated	Sometimes	Yes	Yes
No. workers/TPST/3R	~35	~65	~250

Medium-sized waste systems with some aggregation:

These systems may serve multiple villages of between 40,000-70,000 people. Joint village agreements need to be negotiated. These systems can use village-based governance (BUMDEs, KSM), joint-villages enterprise (BUMDESMA) or even be led at regency level through an Environmental Agency UPTD or BLUD. Some sorting automation is common (e.g. conveyor belts and balers), given efficiencies needed to serve a larger population. Project STOP waste systems in Pasuruan and Jembrana are examples of this waste system size.

Large, centralised waste systems: The third system is a larger, fully institutionalised system which collects and processes the waste of 400,000 or more people across dozens and even hundreds of villages and sometimes multiple sub-districts. Given the size and scale, such waste systems are generally coordinated at a more centralised regency or city level through the regency/city government's Environmental Agency, ideally using UPTD or BLUD governance structures. Due to the large volume of waste, these systems almost always use automation, and sometimes even advanced automation such as trommels and optical sorters. An example of this system is the upcoming Bersih Indonesia circular waste management programme, serving 2.4 million people in Malang Regency.

3.3.1 WASTE SYSTEM SIZE CAPEX AND OPEX COMPARISON

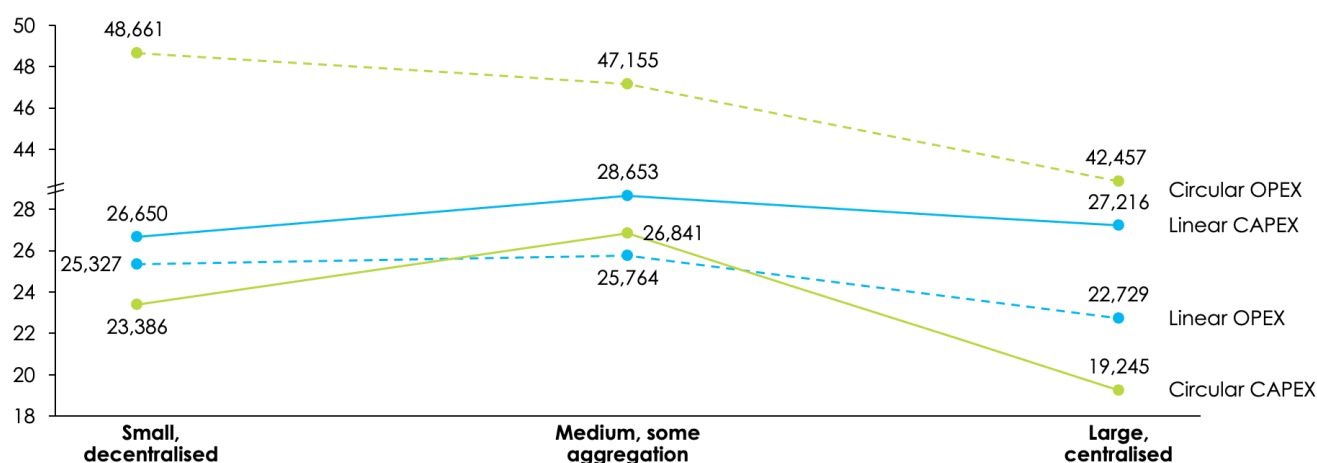
When calculating the aggregate cost for CAPEX and OPEX for all three systems, it becomes apparent that as waste systems take advantage of economies of scale, they first get more expensive and then less expensive than small, decentralised systems (SEE FIGURE 12).

The inversed U-shape trend can be explained by the principle of economies of scale. In smaller community systems, simple structures are used for sorting waste often without any automation, which keeps costs down. However, these predominantly manual systems result in inefficiencies that can be captured in larger systems. Medium-sized systems require larger, more complex buildings and often introduce some automation with conveyor belts, balers and even weigh bridges. This additional equipment allows far more waste to be processed than the more manual waste systems but will require a larger initial investment and a higher processing cost per tonne will be incurred. As systems reach higher economies of scale though, the extra expenses in facility and equipment costs are offset by significant efficiencies gained in the volumes of waste that can be processed. This substantially improves profitability by reducing the cost per tonne and increasing the recovery rate of valuable materials in the waste streams.

FIGURE 12. WASTE SYSTEM SIZE COST COMPARISON

Linear versus Circular CAPEX and OPEX

Units in IDR per capita per year, 2017-2025 baseline



Note: A linear system cost is composed of collection and landfilling activities, while circular includes sortation as well. On per tonne basis, circular system is expected to cost significantly more than linear system, however revenue generation and economic creation are only possible through a circular system.

Besides cost per tonne, two additional benefits accrue as waste systems take advantage of larger economies of scale: (1) the system becomes more economically stable as a result of better end-to-end management in the value chain, due to more professional waste system management, synergies and enhanced integration across operations, and (2) assets are less prone to be abandoned as they will be more centralised and financially self-sustaining.

All system sizes have advantages and disadvantages, and can be the right solution depending on the particular context and needs of the respective area.

3.4 CHALLENGES AND OPPORTUNITIES IN COVERING THE FUNDING GAP

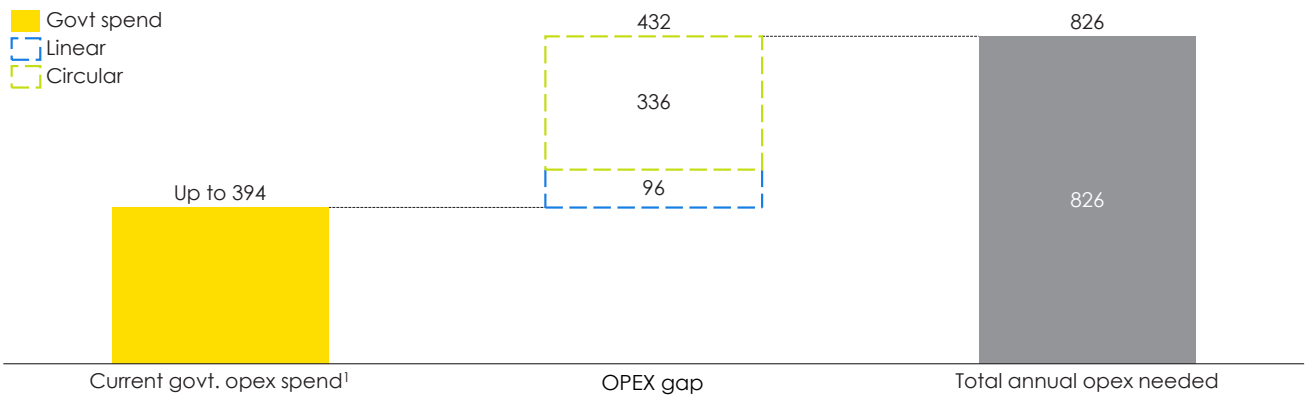
3.4.1 OPEX GAP

As mentioned earlier, between **Rp 7-12 trillion per year (USD 490-825 million)** is needed to cover ongoing waste system operating costs e.g. worker salaries, electricity, fuel, equipment maintenance (SEE FIGURE 10). Today, an estimated USD 400 million is invested by government into operating costs, leaving a gap per year of USD 100-400 million, depending on whether linear or circular waste systems are built (SEE FIGURE 13).

FIGURE 13. OPEX FUNDING GAP

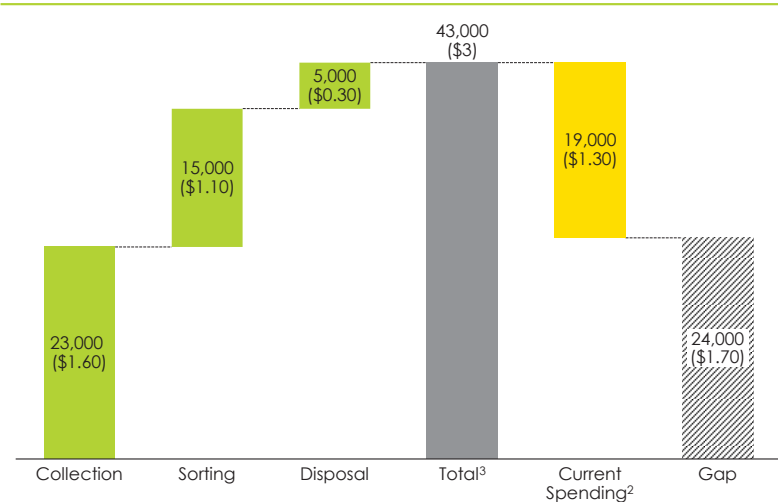
Annual operating costs (OPEX) for circular system

USD million per year for 80% collection, average 2017-2025



Annual opex costs for circular system per capita¹

IDR (USD)/capita annually, average 2017-2025



	National	Urban	Rural
Per capita	43K (\$3)	50K (\$4)	37K (\$3)
Per tonne waste collected	388K (\$28)	452K (\$32)	341K (\$24)

- Based average spend from FITRA + SYSTEMIQ studies on 60 regencies/cities samples plus 3 STOP regencies and using samples from 12 regencies/cities on the average proportion of CAPEX and OPEX. Spending includes revenues from retribution fees.
- Based on 2040 Population Forecast, <https://www.worldometers.info/world-population/indonesia-population/>; 1 USD = IDR 14,000.
- Including retribution fee and non-retribution subsidy. Taken from APBD, based on FITRA + SYSTEMIQ studies on 60 regencies/cities samples plus 3 STOP regencies (mostly 2019).
- Weighted average of circular OPEX from three waste system size.

In per capita terms, the ideal OPEX to achieve 80% waste handling rate by 2025 is approximately IDR 43,000 (\$3 USD) per person per year. Currently, the average spending by local governments is 50% of that, roughly IDR 19,000 (USD \$1.30) per capita per year, leaving a gap of approx. IDR 24,000 (USD \$1.70) per capita per year. While substantial, ways can be explored to cover this financial gap.

3.4.2 CAPEX GAP

To reach national waste handling targets, a one-off CAPEX investment of **Rp 54-67 trillion (USD 3.8-4.8 billion)** in capital infrastructure (e.g. TPST construction, bins, conveyor belts, trucks, tricycles, etc.) is needed. This equates to approximately IDR 22,000 (\$1.60) per person. The current average spending by local governments is approx. IDR 5,000 (USD \$0.40) per capita per year, leaving a gap of IDR 17,000 (USD \$1.20) per capita per year (SEE FIGURE 14).

This is a harder gap to fill. Currently CAPEX funding is primarily invested through the local regency/city government's budget (APBD), as well as national government funding through the Ministry of Public Works. Additionally, there are USD billions available for investment into waste management through various development bank infrastructure loans (e.g. KFW Green Infrastructure fund). But besides landfill construction, these are often not accessed because of the difficulties of loan payback for

net cost waste collection activities and the requirement for multi-city implementation given preferred loan sizes. Currently there is no reliable way of bringing private sector investment into supporting waste infrastructure, although some countries are exploring plastic credits for this purpose.

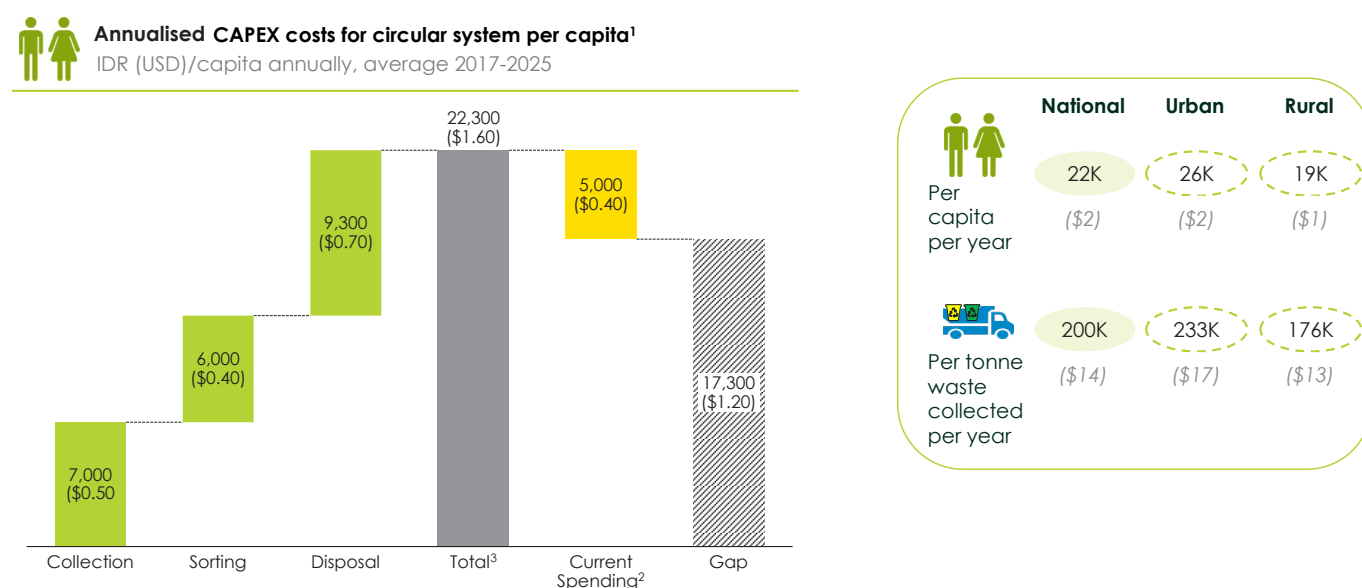
3.5 POTENTIAL FUNDING SOURCES TO COVER THE FUNDING GAP

There are generally four revenue sources preferred by the GoI to cover the funding gap for both OPEX and CAPEX: **(1) Retribution fees** (household and business waste collection fees), **(2) Government funding**, **(3) Waste monetisation** (e.g. recycling and compost sales), and **(4) Complementary funding from the private sector** (seen in other countries but not yet in Indonesia at scale).

3.6 RETRIBUTION FEES

Retribution fees are fees collected by the government for various public services provided by the government, including waste management. The money goes to the local government's budget (APBD). Waste fees, on the other hand, are fees collected by waste collection operators which end up in the respective operator's account, be it a community or private waste operator.

FIGURE 14. ANNUALISED CAPEX COSTS



1. Based on 2040 Population Forecast, <https://www.worldometers.info/world-population/indonesia-population/>; 1 USD = IDR 14,000.
 2. Including retribution fee and non-retribution subsidy. Taken from APBD, based on FITRA + SYSTEMIQ studies on 60 regencies/cities samples plus 3 STOP regencies (mostly 2019).
 3. Weighted average of circular CAPEX from three waste system size.

Retribution fees could make up the lion's share of the waste system revenue for OPEX and some CAPEX (SEE FIGURE 15)³⁷. However, there are a few challenges with the current retribution fees or waste fees in general:

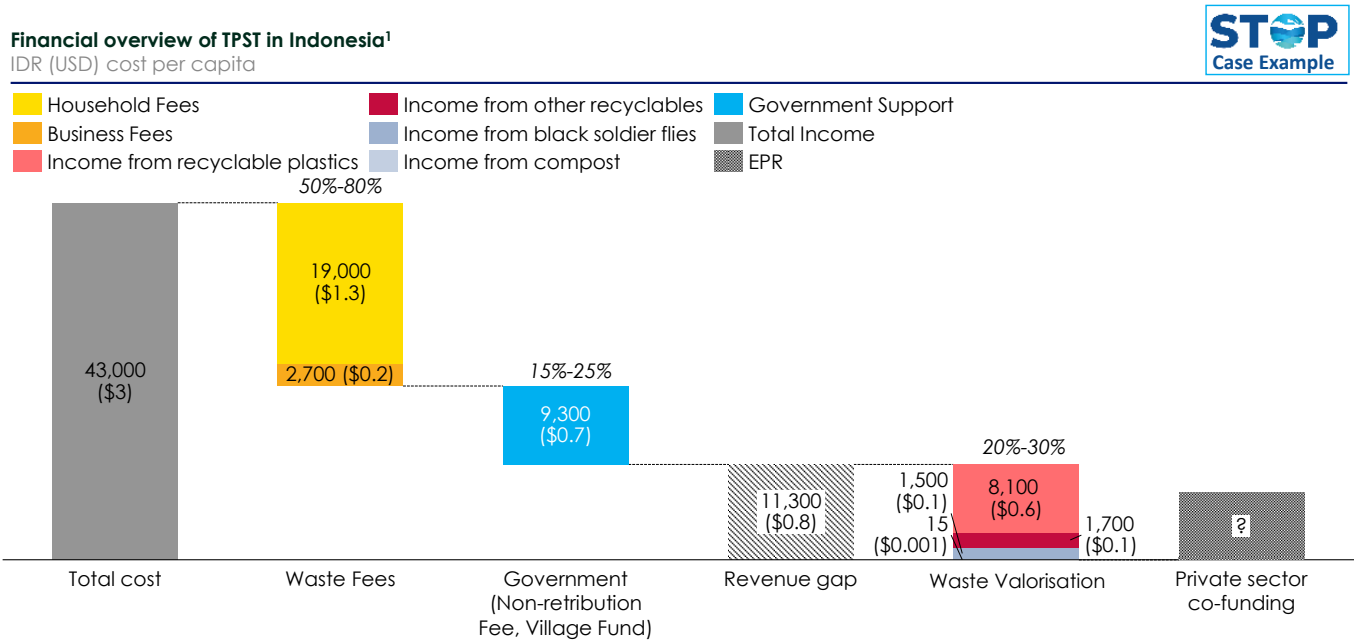
3.6.1 NEW RETRIBUTION FEE LEGISLATION: PERMENDAGRI (MOHA REGULATION) NO. 7/2021

1. Most regional regulations (Perda) set very low waste retributions fees, e.g. Kabupaten Jembrana (Rp 5-15k (USD \$0.40-1.10) per month), Kabupten Banyuwangi (Rp 1-3k (USD \$0.10-0.20) per month), Kabupaten Pasuruan (Rp 1-2.5k (USD \$0.10-0.20) per month).
2. In most cases, retribution fees (as well as collection fees by community-based or private sector waste operators) are collected manually, door-to-door using cash payments, requiring extensive use of time, and resource.
3. Given many small cash payments, there is a lack of financial transparency which may lead to a high risk of corruption.
4. Revenues from retribution fees go to APBD/local treasury, not directly to DLH or a waste system, and therefore are not necessarily allocated to waste management.
5. There is considerable payment rate volatility leading to cash flow challenges, and overall financial instability.

A new legislation issued in January 2021, Permendagri (Ministry of Home Affairs) Regulation No. 7/2021 (MoHA 7/2021) on the Procedures in Calculating Retribution Fees in Waste Handling, could strengthen the contribution of retribution fees as the backbone of the waste system funding. The regulation provides a formula for regencies and cities to calculate the optimal amount to charge households and businesses for waste collection services, based on the ideal cost for waste handling minus government subsidy from the non-retribution waste budget. However, under the regulation, revenues from retribution fees would be channelled to the APBD with the prioritisation for waste management, providing no guarantee for the full utilisation of the retribution fees collection for the waste system. In contrast, the BLUD governance system enables revenues to be channelled directly to the BLUD account, not the APBD, guaranteeing the full utilisation of the revenues from waste collection fees³⁸ for the waste system.

It is recommended that there is further socialisation of Permendagri No. 7/2021 to regency and city governments. Many of them are still not aware of the regulation, and if they have heard of it, they still do not understand how to calculate it. In view of this, there needs to be more support to the local governments, through:

FIGURE 15. FINANCIAL OVERVIEW OF A TPST IN INDONESIA BASED ON PROJECT'S STOP MUNCAR



Note: Model taken from STOP Project in Tembrokrejo, Muncar, which covers 31,215 people; Data from last 3 months ending March 2020; Disposal not included as it is covered by DLH separately; Project STOP P&L across multiple cities.

- Greater socialisation of the new regulation with local governments.
- Providing local governments with an easy to use retribution fee calculator in Excel as well as training sessions to ensure the local government understands how to effectively apply a retribution fee calculator for their unique circumstances.

retribution fees are attached onto another well-established utility or payment system (e.g. electricity, property tax or a water bill), that already has a high payment compliance rate. If effectively implemented, this mechanism could materially increase funding for waste systems, help with retribution/waste fees transparency, and make it easier for households to adopt a new waste system for the first time (their alternative i.e. dumping or burning their waste, is free).

3.6.2 INDIRECT COLLECTION OF RETRIBUTION FEES

Despite the new regulation, challenges remain on how to collect the retribution fees. The current manual cash collection method is not an optimal system as it leads to payment volatility, low payment rates, little transparency, and also a cash-based system increases the risk of corruption. Based on the lessons learned in Project STOP Muncar-Banyuwangi, Jembrana, and Pasuruan, revenues from manual waste fee collection fluctuate significantly from month to month, which leads to unpredictable, unreliable revenues to cover regular cash-flow needs (SEE FIGURE 16).

To overcome this, an indirect retribution fee collection system could help maximise retribution volume, reliability and transparency. It relates to the mechanism in which

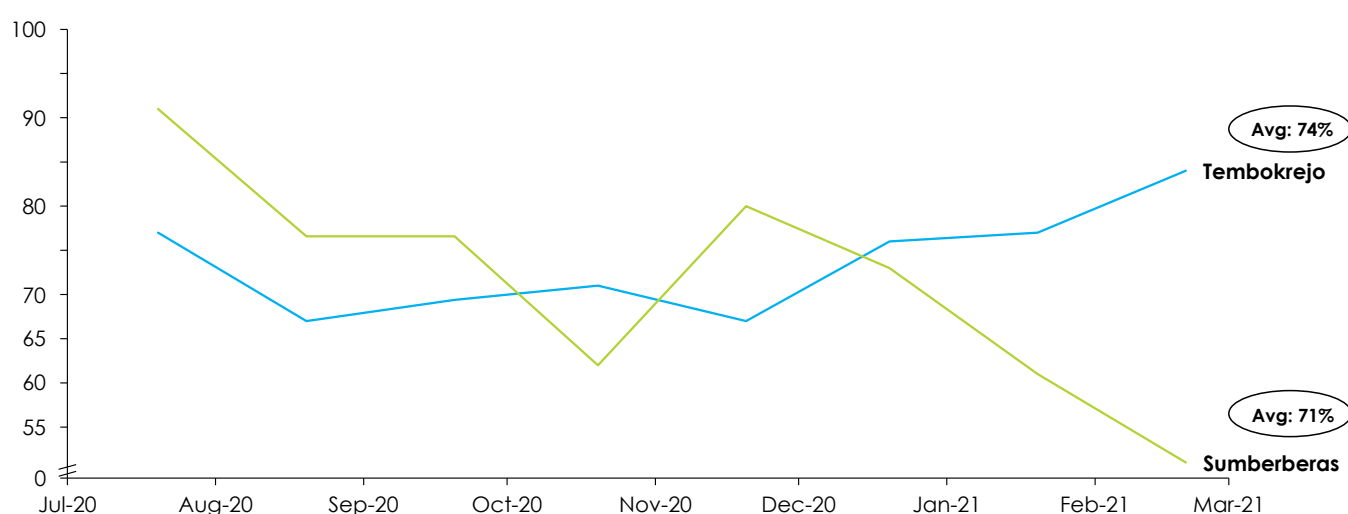
Currently, a partial implementation of this mechanism is being used in some regencies/cities who work with third parties such as a water company (PDAM) to enable customers to pay their waste retribution through their billing system, albeit separately. In comparison, the ideal indirect collection system this study is proposing is where the retribution fees are bundled together with the utility bill, not as a separate bill.

Bundling retribution/waste fees with other utility bills and/or property tax is a common approach globally – for example 15 South American countries use a combination of electricity, water and property tax payments to collect retribution/waste fees (SEE FIGURE 17). Also, in peer countries such as South Africa, Malaysia, and Thailand, waste retribution fees are collected through property/land tax. In Jordan, retribution/waste fees are collected with electricity bills. These approaches are tried and tested and offer numerous advantages over today's manual, volatile, cash-based retribution fee collection system.

FIGURE 16. WASTE FEE COMPLIANCE RATE IN PROJECT STOP MUNCAR

Waste fee compliance rate in Program STOP Muncar

% of households paying waste fee per month for two Muncar TPSTs



Note: A linear system cost is composed of collection and landfilling activities, while circular includes sortation as well. On per ton basis, circular system is expected to cost significantly more than linear system, however revenue generation and economic creation are only possible through a circular system.

3.6.3 RECOMMENDATIONS FOR RETRIBUTION FEES

For Indonesia to adopt the indirect retribution fees collection system, there needs to be: (1) exploration of the applicability of the system with Indonesia's legal and governance structure, and (2) a legal basis to formalise the approach. Hence, the following short and long-term recommendations are proposed to enable indirect retribution fees collection in Indonesia:

Short term Pilot indirect retribution fees collection:

- Pilot an indirect retribution fees collection through electricity bundling in partnership with PLN, in one to three large regencies/cities. This will kickstart the process and test the feasibility of indirect fees collection.

Long term Issue a sufficient and effective regulatory instrument to mainstream the mechanism nationally:

- Issue the right regulation (e.g. a presidential decree or joint ministerial regulation that states:
 - Regencies/cities must implement indirect retribution fees collection by establishing formal partnership with appointed utility entities (e.g. PLN, PDAM, etc.).

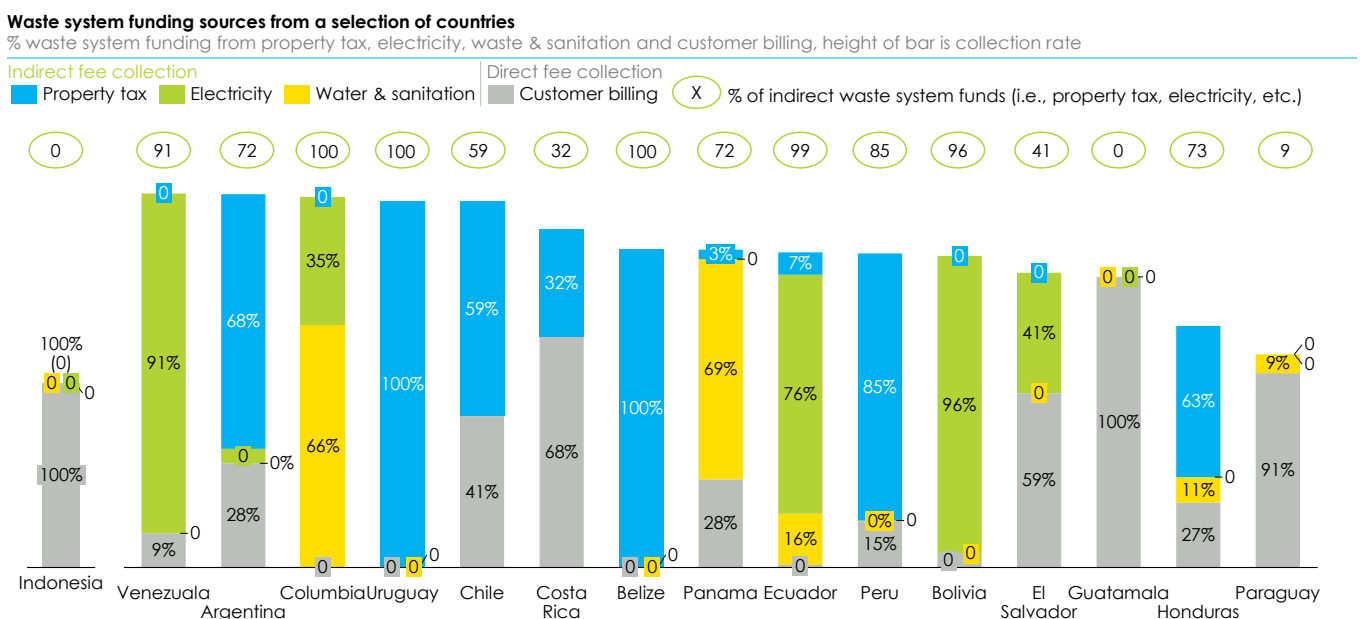
- Revenues from retribution fees must be dedicated to waste management funding for the respective regency/city.
- The decree should be followed by technical guidelines on partnership between the city/regency and the utility entities, data synchronisation, etc.).

3.7 GOVERNMENT SPENDING

Focusing on government spending, this study proposes an increase in money allocated for waste management from the annual budget (APBD) of the local government (regency/city government), as they bear the main responsibility in funding waste management implementation for both OPEX and CAPEX.

Regency/city revenues come from different sources including tax, retribution (including waste retribution fees), central government transfers and other legal sources – grants etc. Currently, the average proportion for waste management spending by regency and city governments is only 0.7% out of the regional budget (APBD). In cities, the average is higher at 1.2%, while in regencies it is around 0.4%³⁹. This is because waste management is part of the environment sector that is categorised as a Mandatory Non-Basic Service. It's not a priority when allocating money.

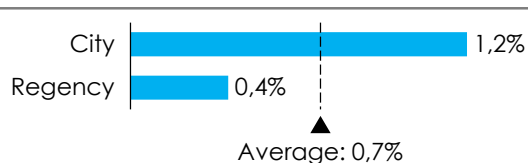
FIGURE 17. WASTE SYSTEM FUNDING SOURCES IN SELECT COUNTRIES



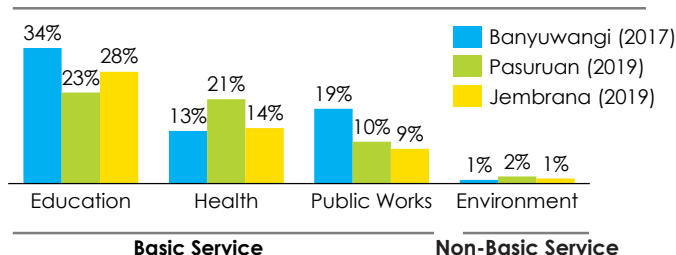
Source: IDB Solid Waste Management in Latin America and the Caribbean; www.iadb.org/agua

FIGURE 18. GOVERNMENT SPENDING ON WASTE MANAGEMENT, AND EDUCATION & HEALTH SPENDING COMPARISON**APBD (regency/city) allocation for waste management¹**

Average % of total APBD (2019)

**Basic Service vs. Non-Basic APBD allocation**

Average % of total APBD



1. FITRA + SYSTEMIQ Studies over 60 samples of regency/cities and 3 regencies of STOP Regencies (2019)

As explained earlier, there are two types of government services that regency and city governments are responsible for: Mandatory Basic Services and Mandatory Non-Basic Services. Waste management belongs under the environment heading and is categorised as a Mandatory Non-Basic Service.

Categories listed as Mandatory Basic Services usually receive higher prioritisation from the local government in terms of budget, and therefore usually have more money allocated to them than categories under Mandatory Non-Basic Services. As an example, this can be seen in the spending by three regencies where Project STOP is being implemented: Banyuwangi, Pasuruan and Jembrana. In all these three regencies (SEE FIGURE 18), the environment category only receives 1-2% of the budget allocation from APBD. In contrast, similar public service such as health, education and public works has a much higher budget allocation ranging between 9% and 34%. This is because they are classified as Mandatory Basic Services.

- If categorised as a Mandatory Basic Service, waste management will be prioritised in the annual budget (APBD) allocation.
- An increase in funding will result in an improved waste service, in line with the mandate of the Constitution (UUD 45) and Law No. 18/2008 to fulfil the right of every citizen to have a healthy environment and a good waste management service.
- Prioritising waste management in the budget allocation by categorising it as a Mandatory Basic Service will accelerate Indonesia's pathway to universal access to waste service.
- Prioritising the waste management budget allocation will also push the local government to maximise the revenue from retribution fees as one of the sources of APBD.

3.7.1 RECOMMENDATIONS FOR GOVERNMENT SPENDING

As the regency/city governments have the main responsibility in providing funding for waste management for both OPEX and CAPEX through its annual budget (APBD), one approach to increase the government spending on waste management is to categorise it as a Mandatory Basic Service and revise Law No. 23/2014:

3.8 WASTE MONETISATION

It is possible to monetise both organic and inorganic waste, particularly for OPEX. In doing so, regencies can improve the economics of their waste management systems, as well as reduce the flow of waste to landfill. However, substantial challenges still exist when it comes to maximising revenue from waste valorisation as currently there are limited options with many options costing more to process the waste than the revenue possible.

INPUTS TO CONSIDER:

- Stakeholders raised the concern that if waste management becomes a Mandatory Basic Service, the proportion of all public service in the budget allocation may be disrupted. Hence, there needs to be an in-depth evaluation into the impact of making waste a Mandatory Basic Service and how to mitigate ramifications to other services.
- To support the enablement of the governance and funding levers in regencies and cities, stakeholders recommended for the candidates running for the regent/mayor election and the elected ones to embed waste management into their vision and mission, and priority programmes.
- In order to support regional financial management as mandated in regulations related to regional financial management, both through Government Regulations (Peraturan Pemerintah) and MoHA Regulations (Permendagri), stakeholders also propose that planning and allocation of budget for assistance/fiscal instruments such as grant, social and financial assistances, must be based on performance and ecological indicators in each component/institution/organisation that receives the three assistance/fiscal instruments, and becomes a necessity for waste agencies/operators/institutions/organisations that manage waste management that meet the indicators to receive these instruments.

3.8.1 LOW VALUE PLASTICS AND OTHER NON-ORGANIC MATERIALS

Up to 85% of Indonesia's plastic waste, especially in rural areas, is "low/no-value" plastics – plastics that have minimal if any value in the recycling market, such as single-use sachets made with multilayer materials, polystyrene and thin films. For example, in Project STOP Pasuruan, low-value flexible plastics represent 88% of the plastic generated, 79% of the plastic sold and 44% of the total volume of material sold (paper and cardboard represent 32%). Even if a market does exist, waste pickers and other collectors generally avoid collecting these materials, given their low price versus weight ratio e.g. flexible prices range between IDR 200-2,000/kg (average IDR 1,750/kg), IDR 2,000/kg less than rigids, and take substantially more time to collect and sort. This results in substantially more time spent to achieve the same pay-out as the collection of higher value materials. Market volatility further reduces material attractiveness.

3.8.2 UNSUSTAINABLE RECYCLING ECONOMICS

Secondly, the economics of recycling most plastics is still unsustainable in Indonesia, like most other regions globally.

In 2017, only 10% of plastics generated in the country were recycled⁴⁰. To achieve a circular plastic economy, the recycling value equation needs to be solved. In STOP facilities, it costs USD 106/tonne to sort flexible plastics versus USD 35/tonne to sort rigid plastics – three times more. This is due to the flexible plastics' light weight and often small size requiring far more effort for an equivalent weight. In addition, rigid plastics fetch double the market price on average as flexible plastics (SEE FIGURE 19).

With more than 80% of plastics being flexible in most regions across Indonesia⁴¹ and costing significantly more to sort per tonne than rigids and having a substantially lower market value, it is not a good market position. In fact, all in, it costs nearly twice as much to sort plastics and other materials in most TPSTs as the revenue received for those materials. There is a significant cost to employing sortation workers, powering and maintaining conveyor belts and balers, and transporting materials to recycling markets. The value equation gets even more distorted when considering the substantial capital investment required to build material recovery facilities (TPS3Rs) and buy conveyor belts and baling equipment. By giving the responsibility to the private sector to bridge the gap between recycling revenue and costs, there will be a natural incentive to phase out low value plastics that are difficult and expensive to recycle.

3.8.3 PROCESSING ORGANIC WASTE WITHOUT A LOSS

Finally, there is limited valorisation options for organic waste, which is very moist and heavy. It can make up to 60-85% of municipal waste by weight, which puts undue strain on waste collection trucks and other processing equipment. Once in landfill, not only does organic waste lose any additional utility to nourish soil, it also releases harmful, fast-acting methane gas – a greenhouse contributor with 24 times the global warming potential of carbon dioxide.

Additionally, in most waste systems, organics are processed at a loss. The revenue derived from selling common organic products such as compost is simply not enough to cover the costs of production. This is often because comparable chemical fertilisers are subsidised by as much as 70-90% in Indonesia – while compost is not. Other organic processing methods for black soldier fly, biodigestion and fertiliser have additional complexity and minimal return trade-offs. Until this is solved, there is little

financial incentive to divert organics from landfill, unless other ways of subsidising these net loss activities can gain more wide scale adoption (e.g. voluntary carbon market).

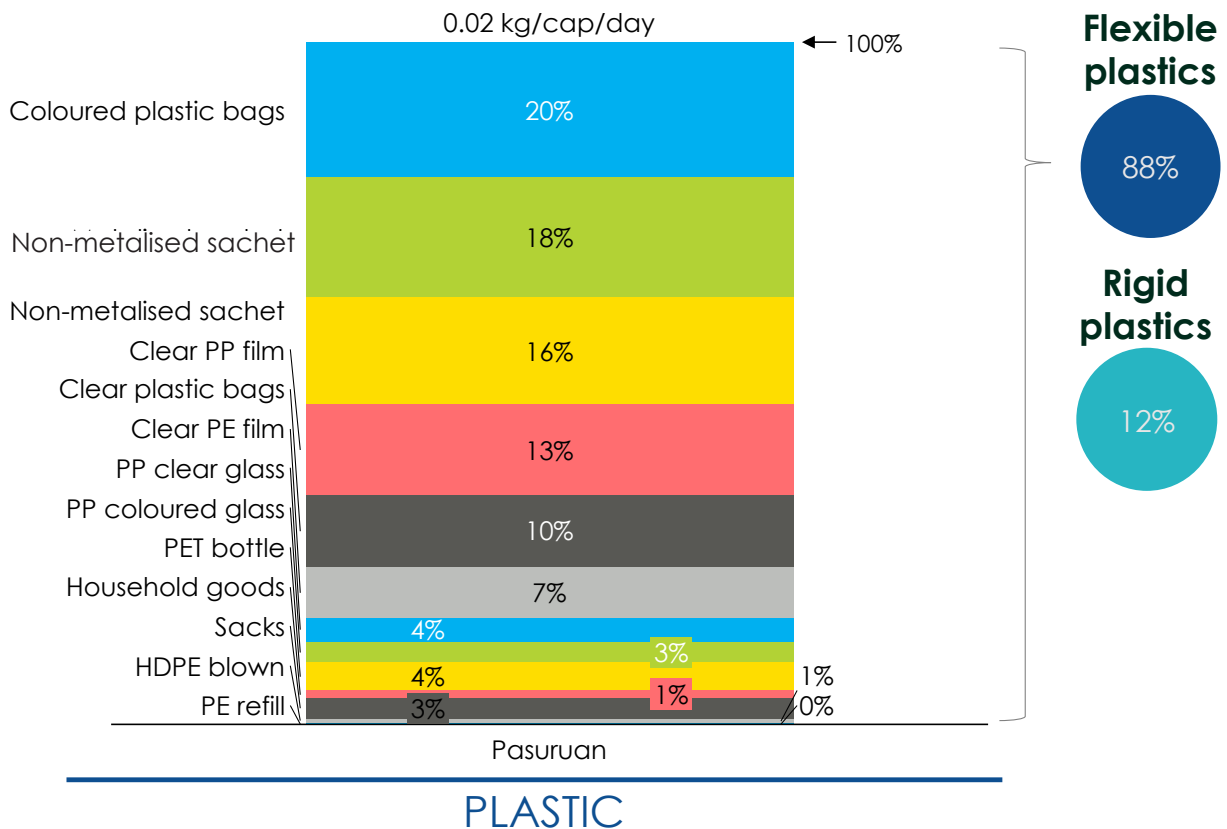
3.8.4 RECOMMENDATIONS FOR WASTE MONETISATION

While our research does not focus on waste monetisation, several recommendations (which include lessons learned from Project STOP) can be drawn upon to maximise revenues from material sales and waste valorisations:

Household Sortation. There needs to be more push for better household sortation to ensure what is collected has the highest value possible (dirty waste can be worth 60% less) and therefore a greater chance of being recycled and diverted from landfill.

FIGURE 19. BREAKDOWN OF PLASTIC WASTE GENERATION

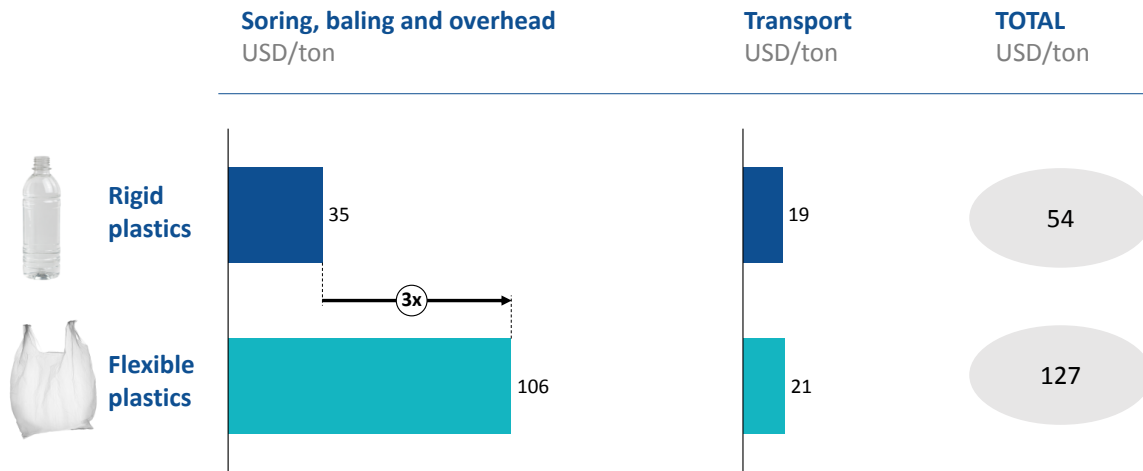
Sub-category breakdown of plastic waste generation



Source: SYSTEMIQ, Universitas Yudharta, Pasuruan, 2019

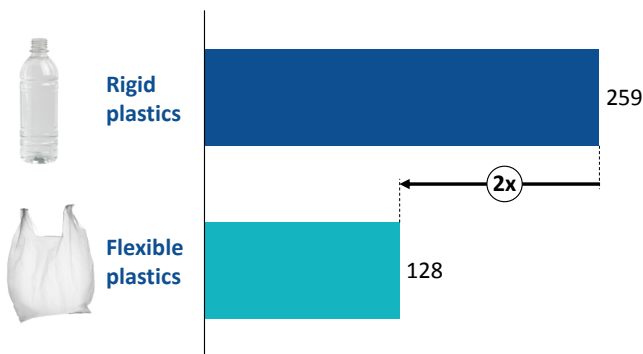
FIGURE 20. RECYCLING ECONOMICS OF FLEXIBLE VERSUS RIGID PLASTIC

Lower value flexible plastics are 3x more expensive to sort than rigid plastics...

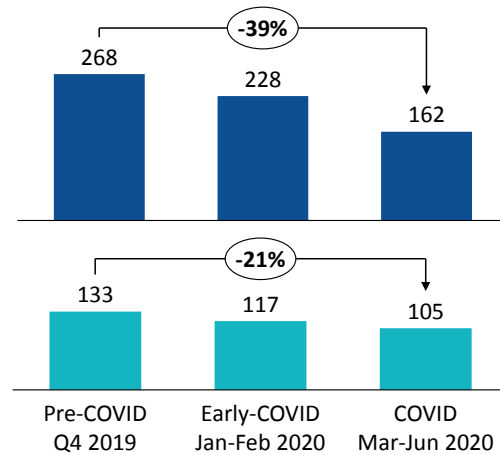


...yet worth 1/2 the value of rigids in recycling markets

Blended material value of rigid and flexible plastics in Muncar USD/tonne sold, average prices 2019-2020



COVID 19 impact on recycling price volatility USD/tonne sold, average prices 2019-2020



Source: SYSTEMIQ, Universitas Yudhart, Pasuruan, 2019, Assumptions: salary of 1,500,000 IDR/month, 26 days worked per month, Based on our current operational cost, performance levels and Muncar's location compared to Surabaya, 2. Cost of sorting includes 20% extra for overhead, baling, and landfilling 4. Weighted average of circular OPEX from three waste system size.

Buyer selection. To move up the value chains, local government (ideally through a BLUD governance system) can partner more extensively with waste brokers or aggregators to secure long term buying contracts and ideally better prices for the waste collected. By bypassing local junk shop buyers, and selling directly to aggregators, margins can improve up to 30%-100% depending on material type⁴².

Vertical Integration. By vertically integrating and producing more finished products, margins could increase. For example, low density polyethylene (LDPE) pellets are valued at 740% more than baled LDPE, and high-density polyethylene (HDPE) pellets are valued 176%

more than baled HDPE. However, again processing costs need to be calculated carefully to ensure the financial feasibility of the vertical integration business model.

3.9 COMPLEMENTARY FUNDING FROM THE PRIVATE SECTOR

There are significant opportunities for complementary funding from the private sector to fill the remaining gaps in the waste system costs for both OPEX and CAPEX, and these schemes should be explored in Indonesia. The

ones most ready for adoption with the support of various ministries are the Packaging Recovery Organisation (PRO)⁴³ system and Public Private Partnership (PPP) scheme. Additional nascent private sector co-funding mechanisms used in other countries, but not Indonesia, are Extended Producer Responsibility (EPR) and Plastic Credits.

3.9.1 PACKAGING RECOVERY ORGANISATIONS (PROS)

In many countries with high waste handling rates, private sector co-funding mechanisms for waste management are common, for example through Packaging Recovery Organisation (PRO) systems which have been implemented in India and other European countries. PRO is an entity, in most cases founded by multiple companies to combine their efforts to collect and recycle the packaging they put on the market as part of their collective responsibility for the take-back of their packaging. PRO takes an operational and/or financing role in the waste management and recycling system – typically financing waste system operators based on collection/recycling performance metrics.

PRO could complement OPEX funding needs and be channelled through TPS3R, TPST, waste bank or private

waste operators, including government-owned BLUDs. The PRO scheme is being tested voluntarily by private sector actor in Indonesia. In August 2020, six leading companies in PRAISE have founded the Indonesia Packaging Recovery Organisation (IPRO)⁴⁴, as an effort to collect and recycle packaging.

3.9.2 PUBLIC-PRIVATE PARTNERSHIPS

Public-Private Partnerships (PPP) are another potential scheme that involves the private sector, and should be explored, particularly for CAPEX. PPP, known as *Kerjasama Pemerintah dengan Badan Usaha (KPBU)*, is a cooperation between the government and private entities in the provision of infrastructure, using some or all of the resources from the private entities by considering the risk allocation between the two parties. An example of KPBU is the partnership between Surabaya City government and PT Sumber Organik in building and running a Waste to Energy (WtE) plant at Benowo Landfill, Surabaya. Under the partnership, PT Sumber Organik invests the CAPEX costs to build the infrastructures and provide the equipment, while also operating the plant, while Surabaya City government supplies waste and pays for the tipping fees. The partnership is signed for 20 years and at the end of the contract, the plant will be handed over to the Surabaya government⁴⁵.

Other complementary funding from private sector options being tested in other countries

There are several private sector co-funding schemes that are being tested in other countries, including Extended Producer Responsibility (EPR) and Plastic Credits. PRO systems, as explained earlier, are often tied to Extended Producer Responsibility (EPR) systems. EPR is a system based on the “polluter pays” principle where companies that put packaged products on the market, are responsible for the packaging throughout its whole life cycle, including waste management – financially, administratively and/or physically. In some EPR systems, the PRO manages implementation of EPR systems. EPR policies for packaging are designed differently in different markets, but the core is the same – companies are required to contribute to financing the cost of collection and recycling of their packaging. There are two types of EPR being implemented in other countries: (1) voluntary, where individual companies decide independently on taking measures to invest in projects; (2) mandatory, where all companies are required to participate. Indonesia does not yet have the legal basis to implement EPR systems.

There is also Plastic Credits, a new financial mechanism to incentivise the removal of plastic from the environment and the recycling of plastic into new products and packaging. Similar to Carbon Credits, a company takes responsibility for the plastic they put into the environment by purchasing Plastic Credits from projects that remove a similar amount of plastic from the environment⁴⁶ as the plastic they sell into the market each year. Each Plastic Credit represents a tonne of plastic waste that would otherwise not have been collected or recycled, and involves a transparent validation and verification processes. Plastic Credits are nascent in Indonesia and globally.

3.9.3 RECOMMENDATIONS

The significant potential for private sector participation to support complementary funding to fill the gaps in the waste system funding requires more exploration, both from existing mechanisms such as PPP or KPBU, and nascent ones such as the PRO system. Hence, with regards to Indonesia, the following is proposed:

- For OPEX: Explore potential private sector complementary funding through a PRO system by piloting formal and informal waste handling and recycling projects in one or more regencies/cities in partnership with the private sector. Explore the applicability of the mechanism in accordance with Indonesia's institutional and regulatory context.
- For CAPEX: The government could explore Public-Private Partnerships (PPP) or a Kerja Sama dengan Badan Usaha (KPBU) mechanism to maximise

funding from private entities. This would involve looking at current PPP initiatives and considering the requirements of the scheme and local government budget needs and adjustments.

Inputs to consider: Because private sector co-funding schemes are new, stakeholders propose a thorough consultation process with all the key stakeholders, including representatives from the private sector, government and informal sector, as well as NGOs and waste operators. It is also recommended for initial studies on each of these new mechanisms to be conducted, then shared and consulted with the government first to ensure a coherent understanding across key stakeholders.





CHAPTER 4:

CONCLUSION AND SUMMARY OF POLICY RECOMMENDATIONS

The Gol has shown immense commitment to solve Indonesia's waste management challenges, as demonstrated by the ambitious targets set in place (Chapter 1). To support the Gol achieve these targets, this report has addressed two root causes behind Indonesia's waste system challenges – waste system governance and funding – and identified strategies

(Chapter 2 & 3) to create an enabling environment for more robust, sustainable waste system growth across the country. Recommendations for achieving each of the two levers have been provided for the government and other stakeholders to reach Indonesia's national targets, particularly on achieving 80% waste handling as summarised below:

Governance Lever Recommendations	What are the expected governance outcomes?
<p>1. Mainstream BLUD in the short-term</p> <ul style="list-style-type: none"> • Socialise the benefits of a BLUD waste governance model to regencies and cities. • Create BLUD guidelines and a toolkit to make establishing BLUDs easier for cities and regencies. • Pilot between one and three conversions of UPTD to BLUD to provide a proof of concept for future cities. 	<ul style="list-style-type: none"> • Better understanding on the benefits of BLUD system for waste governance, and to provide guidelines on adopting BLUD system. • Faster process of BLUD system application on UPTD. • More robust and sustainable waste governance systems that are not dependent on individual leaders, and governance coordination that is coordinated at the regency/city level.
<p>2. Mainstream BLUD in the long-term:</p> <ul style="list-style-type: none"> • Enable the immediate application of the BLUD financial system once an UPTD is established, by: <ul style="list-style-type: none"> • Adding an additional article after Article 36 in MoHA Regulation 79/2018: "For public service operators/public service providers who fall into the category of Mandatory Non-Basic Service, such as environmental affairs (waste), the Minimum Service Standard (SPM) that was referred to in the administrative requirements in Article 36 point d, are Minimum Technical Service Standard (SPMT)". • Adding a new article or clause in MoHA Regulation 79/2018: "Local Agencies (Dinas/Badan Daerah) that will or are in the process of establishing an UPTD for the provision of goods and/or public services can, in parallel, apply for the application of the BLUD". This is to enable the immediate application of the BLUD system once the UPTD is established. • Adding a new clause in MoHA Regulation 12/2017: "Local Agencies (Dinas/Badan Daerah) that will or are in the process of establishing an UPTD for the provision of goods and/or public services can, in parallel, apply for the application of the BLUD". This is to enable the immediate application of the BLUD system once the UPTD is established. • Separate the DLH waste regulator role and BLUD operator roles. • Strengthen the BLUD legal basis through: <ul style="list-style-type: none"> a. Adding an article on the set up of waste management UPTD in MoHA Regulation No. 12/2017 on Guidelines of Establishment of UPTD (MoHA 12/2017), similar to the article on the set up of health UPTD (article 23), and 	

Governance Lever Recommendations	What are the expected governance outcomes?
<p>b. Adding waste management in the explanation section of Government Regulation (PP) 23/2005 on BLU. As this regulation provides legal basis for application of BLUD on UPTD, the addition of waste management in the explanation section will provide a legal basis for the revision of MoHA 12/2017 and MoHA Regulation 79/2018 to mandate the application of BLUD system on waste management UPTD.</p>	
<p>3. Institutionalise waste collection responsibility by issuing a new MoEF Regulation to:</p> <ul style="list-style-type: none"> • Move community-based waste management systems to institutionally coordinated systems and put the responsibility for end-to-end waste management, particularly waste handling, with the regency/city government. Regency/city government are still able to establish partnership with the existing waste operators including community-based or private sector waste operators to deliver waste handling services but full responsibility should be held by the regency/city government. • Involve the community/village in behavioural change for waste reduction at the source through 3Rs – reduce, reuse and recycle which includes organic processing at the source. 	<ul style="list-style-type: none"> • Local regulations (Perda) on waste management adopts an institutionalised-based waste management system where the regency/city government has the full responsibility for waste management particularly waste handling. • Community/village/RT/RW are involved in behavioural change for waste reduction at the source through 3Rs – reduce, reuse and recycle, not on waste handling.
<p>4. Categorise waste management as a Mandatory Basic Service:</p> <ul style="list-style-type: none"> • Propose to categorise waste management as a Mandatory Basic Service (currently Mandatory Non-Basic Service) by revising the Law No. 23/2014 on Local Government. • Enforcement of regulations prohibiting dumping/burning of waste, coupled with waste reduction campaigns, development of an accountability system where the public can report and make a complaint when waste service is not available or adequate, and effective regulations and adequate resources to enforce anti-burning and anti-dumping laws. 	<ul style="list-style-type: none"> • Strengthened enforcement of anti-dumping and burning regulations.

Funding Lever Recommendations	What are the expected funding outcomes?
<p>1. Further socialisation of MoHA 7/2021 to regency and city governments:</p> <ul style="list-style-type: none"> • Greater socialisation of the new regulation with local governments. • Providing local governments with an easy-to-use retribution fee calculator in Excel as well as training sessions to ensure the local government understands how to effectively apply a retribution fee calculator for their unique circumstances. 	<ul style="list-style-type: none"> • High awareness of MoHA 7/2021 across regency and city governments. • Regency and city governments are able to calculate their new retribution fees based on MoHA 7/2021.
<p>2. Explore the applicability of indirect retribution fee collection system with Indonesia's legal and governance structure:</p> <ul style="list-style-type: none"> • Pilot an indirect retribution fees collection through electricity bundling in partnership with PLN, in one to three large regencies/cities. This will kickstart the process and test the feasibility of indirect fees collection. 	<ul style="list-style-type: none"> • Increased funding for waste management from retribution fees. • Increased revenues from retribution fees through higher payment rates and more reliable collection system.
<p>3. Establish a legal basis to formalise indirect retribution fee collection system:</p> <ul style="list-style-type: none"> • Issue the right regulation (e.g. a presidential decree or joint ministerial regulation that states: <ul style="list-style-type: none"> • Regencies/cities must implement indirect retribution fees collection by establishing formal partnership with appointed utility entities (e.g. PLN, PDAM, etc.). • Revenues from retribution fees must be dedicated to waste management funding for the respective regency/city. • The decree should be followed by technical guidelines on partnership between the city/regency and the utility entities, data synchronisation, etc.). 	

Funding Lever Recommendations	What are the expected funding outcomes?
<p>4. Propose waste management to be categorised as a Mandatory Basic Service to:</p> <ul style="list-style-type: none"> Ensure waste management becomes a priority for budget allocation for the aim of achieving universal access to waste management services. 	<ul style="list-style-type: none"> Increased government spending on waste management.
<p>5. Maximise revenues from waste monetisation:</p> <ul style="list-style-type: none"> Household Sortation. There needs to be more push for better household sortation to ensure higher quality materials Buyer Selection. To move up the value chains, local government (ideally through a BLUD governance system) can partner more extensively with waste brokers or aggregators to secure long term buying contracts and ideally better prices for the waste collected. Vertical Integration. By vertically integrating and producing more finished products, margins could increase. 	<ul style="list-style-type: none"> Maximisation of revenues from waste monetisation.
<p>6. Explore complementary funding from private sector⁴⁷:</p> <ul style="list-style-type: none"> For OPEX: <ul style="list-style-type: none"> Explore potential private sector complementary funding through a PRO system by piloting formal and informal waste handling and recycling projects in one or more regencies/cities in partnership with the private sector. Explore the applicability of PRO system in accordance with Indonesia's institutional and regulatory context. For CAPEX: <ul style="list-style-type: none"> Explore Public-Private Partnerships (PPP) or a Kerja Sama dengan Badan Usaha (KPBU) mechanism to maximise funding from private entities. 	<ul style="list-style-type: none"> Unleashing complementary funding from private sector for waste system.

Achieving the above recommendations will not only require a concerted effort from government, businesses, communities, NGOs and other waste management stakeholders, they will also require a thorough and staged implementation. However, the report acknowledges a particular importance of policymakers in creating the enabling environment for the implementation of the key levers. A possible policy action roadmap for all the stakeholders is proposed in Appendix B, outlining potential next steps for the implementation of the recommendations on the key levers.

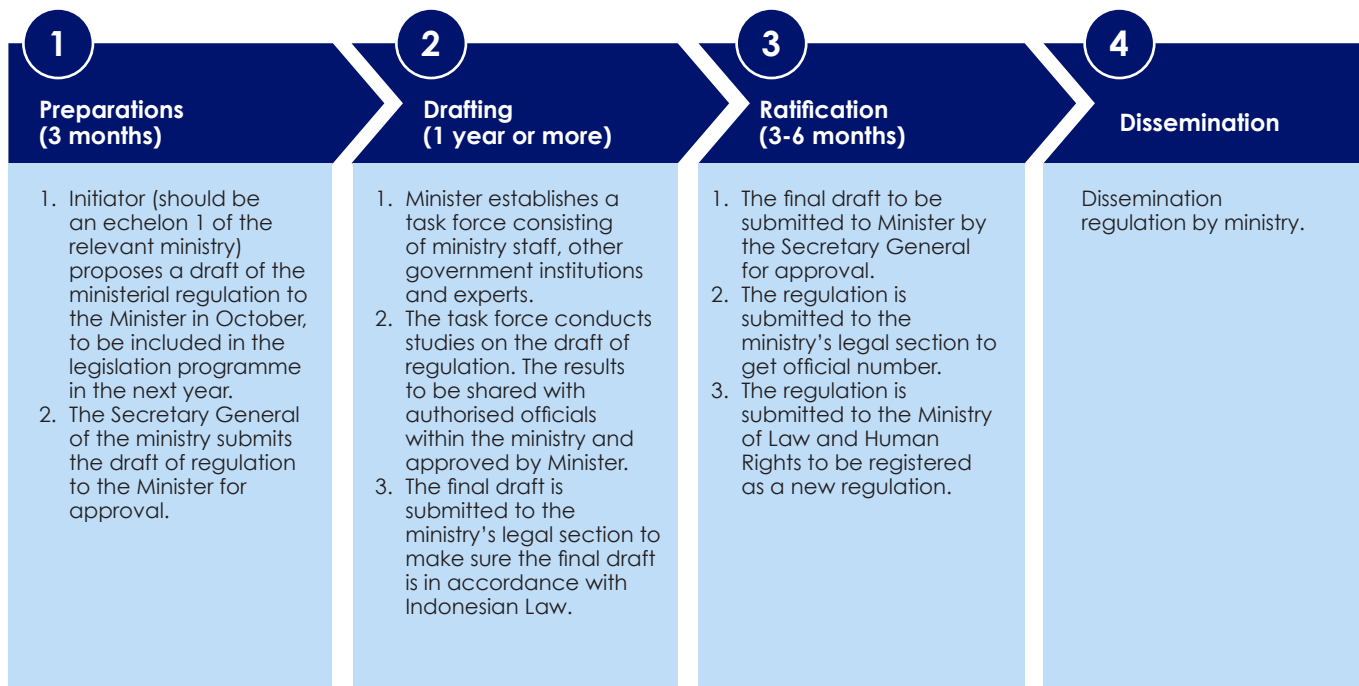
In conclusion, waste management is a complex issue to solve and Indonesia is not alone in solving it. Many

countries struggle with similar waste management challenges but still, nations with similar GDPs to Indonesia have also succeeded.

Achieving the targets within the set timeline will be challenging if a 'business as usual' approach is adopted. We need to do things differently if we expect different results. A break-through system change approach is needed. This report proposes a way forward to strengthen two fundamental levers to solve the waste challenges in Indonesia: **Stable, robust waste system governance** and **stable, sufficient waste system funding**. If addressed, these would pave the way for Indonesia to achieve its national targets.

APPENDIX

Process and timeline to issue a Ministerial Regulation:



Process to issue/revise a Law:

Process	Led/Coordinated by
1. Prolegnas/Program Legislasi Nasional - national legislation program, medium and annual term where ministries list their needs on drafting new laws. An exception outside of Prolegnas is for extra ordinary cases: conflict, natural disaster and emergency	Kemenuhumkam (Ministry of Law)
2. Academic paper	The initiating ministry and verified by Kemenuhumkam
3. The initiating ministry propose the draft of the law/revision	The initiating ministry
4. Draft of the law (Rancangan Undang – Undang/RUU)	The initiating ministry invites related sectoral ministries for discussion and led the discussion
5. Statement letter that committee meeting between ministries and/or non-ministries has been completed	The initiating ministry
6. Statement letter that process of harmonisation and synchronisation of the concept of the draft of the law from the minister has been completed	Kemenkumham
7. Draft of the law that has been approved by the President is submitted to legislative body of the House of Representative (Baleg) to be discussed with the House Representatives	Kemenkumham
8. Baleg/related commission examine of the draft of the law with other stakeholders including NGOs, academics, private sectors, etc.	Baleg/related commission
9. Law legalised and approved	President

ABOUT SYSTEMIQ

SYSTEMIQ is a certified B Corp* with offices in Jakarta, London, São Paulo, Amsterdam and Munich. The company was founded in 2016 to drive the achievements of the Paris Agreement and the United Nations Sustainable Development Goals by transforming markets and business models in three key economic systems: land use, materials, and energy. Since 2016, SYSTEMIQ has been involved in several system change initiatives related to waste management, and plastics and packaging in Indonesia, including Project STOP and Bersih Indonesia (a city partnership programme focused on eliminating plastic pollution in Indonesia), National Plastic Action Partnership (NPAP), and the Bali Partnership, among others. Working with partners across sectors, SYSTEMIQ aims to unlock economic opportunities that benefit business, society and the environment. To learn more, visit www.systemiq.earth.

(*B Corp - Certified B Corporations are a new kind of business that balances purpose and profit. <https://bcorporation.net/>)

ABOUT APKASI

APKASI is a regency government association in Indonesia that has the main purpose to facilitate the interests of regency governments in the implementation of regional autonomy through the role of advocacy, mediation and facilitation (e.g. capacity building, empowerment of regency service institutions, cooperation, etc.) with government and non-government institutions both domestically and internationally in accordance with applicable laws and regulations.

ABOUT APEKSI

APEKSI is a forum consisting of 98 cities in urban areas aiming at assisting its members in implementing regional autonomy and creating a climate conducive to the establishment of cooperation among regional administrations. In line with the spirit of decentralisation and democracy, APEKSI has helped its members to achieve improved social welfare through democracy, people's participation, justice and equal access for local diversity and potential.

ABOUT FITRA

The Indonesian Forum for Budget Transparency (FITRA) is an organisation engaged in the field of social control for the transparency of state budgeting processes. This non-profit organisation is autonomous and independent in carrying out its activities. FITRA was established to fulfil people's rights to be involved in the entire budgeting process, starting from the process of preparing, discussing and implementing the budget to its evaluation. FITRA together with the people aims to build a budget transparency movement to create a state budget that fulfils the people's welfare and justice. Efforts to build a budget transparency movement are pursued with full integrity, independence and innovation.

The final report and its content are the sole responsibility of SYSTEMIQ as represented by the undersigned:

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ACKNOWLEDGEMENTS

We are grateful for the generous support of the Royal Norwegian Embassy in Indonesia, who has funded the policy studies. We are also grateful to our thought partners, APKASI, APEKSI, and FITRA, for their partnership throughout the policy studies.

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We would also like to kindly thank the following individuals who have provided feedback and/or participated in the consultation process of the policy studies through FGDs or interviews. Neither they nor their institutions necessarily endorse the report's findings.

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ENDNOTES

- 1 National Plastic Action Partnership (NPAP) report entitled "Radically reducing plastic pollution in Indonesia: A Multistakeholder Action Plan".
- 2 KLHK data <https://sipsn.menlhk.go.id/sipsn/>, accessed on 7 June and 12 July 2021.
- 3 Ministry of Public Work - Direktorat Sanitasi, Ditjen Cipta Karya, data received by SYSTEMIQ on 6 and 8 July 2021
- 4 While not currently supported in Indonesia due to inexistence of legal basis, EPR and plastic credits are new financial tools some countries are using to bring private sector co-funding in to support financing the setup of new waste systems and operational costs, and are worth the Government of Indonesia exploring further.
- 5 Presidential Regulation (PerPres) No. 97/2017 on the National Policy & Strategy on Management of Household Waste and Household-like Waste.
- 6 Perpres No. 83/2018 on Marine Debris Management (Indonesia's Plan of Action on Marine Plastic Debris 2017-2025)
- 7 While the NPAP research focused on plastic waste, the number is derived from total waste management, indicating the same situation impacting overall waste generated
- 8 KLHK data <https://sipsn.menlhk.go.id/sipsn/>, accessed on 7 June and 12 July 2021.
- 9 TPSTs/TPS3Rs = material recovery facilities that sort waste into different categories for recycling and further processing
- 10 TPS3Rs data is limited to TPS3Rs built by the Ministry of Public Work only (2006-2019); TPSTs data includes TPSTs built by regencies/cities; Source of data from the Ministry of Public Work - Direktorat Sanitasi, Ditjen Cipta Karya, received by SYSTEMIQ on 6 and 8 July 2021
- 11 Data Program Adipura 2017, Pengelolaan Sampah Plastik, Dr. Novrizal Tahar, Direktur Pengelolaan Sampah.
- 12 SYSTEMIQ and its partners have built waste systems in Muncar and Pasuruan, East Java, Jembrana and are currently designing waste systems in Malang and Banyuwangi regencies.
- 13 Kabupatens can have both kelurahans (in dense urban areas) and desas (in more rural areas). Large cities generally only have kelurahan.
- 14 'Communities' are defined within legislation at waste management institutions owed by village, RW or RT governments with the responsibility of collecting waste door-to-door and transporting it to TPS (transfer stations).
- 15 Whiteman Andrew, Webster Mike, Wilson David. "The nine development bands: A conceptual framework and global theory for waste and development". *Waste Management & Research* volume 39 issue 10, 2021: 1218-1236. <https://journals.sagepub.com/doi/10.1177/0734242X211035926>
- 16 Waste Atlas, <http://www.atlas.d-waste.com/>.
- 17 See The Constitution (Seventy-fourth Amendment) Act, 1992, and Solid Waste Management (SWM) Rules, the Union Ministry of Environment, Forests and Climate Change, 2016.
- 18 Rodseth C, Notten P, Von Blottnitz H. "A revised approach for estimating informally disposed domestic waste in rural versus urban South Africa and implications for waste management". *S Afr J Sci.* 2020;116(1/2), Art. #5635, 6 pages. <https://doi.org/10.17159/sajs.2020/5635>
- 19 See National Environmental Management: Waste Act, 2008 (Act 59 of 2008).
- 20 Waste Atlas, <http://www.atlas.d-waste.com/>.
- 21 See Republic act no. 90003, an act providing for an ecological solid waste management program, creating the necessary institutional mechanisms and incentives, declaring certain acts prohibited and providing penalties, appropriating funds therefor, and for other purposes, January 26, 2001.
- 22 Moh, Y., & Manaf, L.A. (2017). "Solid waste management transformation and future challenges of source separation and recycling practice in Malaysia". *Resources Conservation and Recycling*, 116, 1-14.
- 23 See Solid Waste and Public Cleansing Management Corporation Act 2007.
- 24 BLUD is a system that can be applied by a technical implementation unit of a local government agency/body (UPTD/Unit Pelaksana Teknis Daerah) in providing service to public which has flexibility on financial management, as an exception to the conditions local government generally applies. (MoHA Regulation No. 79/2018 article 1 point 1)
- 25 Completed in partnership with MoHA, APKASI, and APEKSI in October-December 2020.
- 26 Completed and launched on June 2021 in partnership with MoHA, APKASI and APEKSI.
- 27 As of June 2021, activity was ongoing.
- 28 Ministry of Home Affairs (MoHA) Regulation No. 33/2010 on Waste Management Guidelines, article 7.
- 29 Perpres 83/2018

- 30 Presidential decree No. 97 year 2017.
- 31 Note: (1) CAPEX investment required calculated by multiplying \$/ton annualised CAPEX by the total lifetime and the intended capacity by 2040, excludes cost of recycling facility; (2) For disposal, it was assumed that all new disposal will require CAPEX despite some existing capacity leftover dues to the need to upgrade current disposal operations and significant; (3) Asset depreciation assumptions: Sanitary Landfill (9 years), TPS3R (sorting station) (10 years equipment, 20 years building), Trucks (10 years), Tricycles, equipment (5 years). Source: SYSTEMIQ Analysis.
- 32 Note: Revenue in the circular system is derived from the average amount of waste sorted into TPS3R as well as prices and capture rates at TPS3R for organics and inorganics, taken from STOP project. Retribution revenue may not reflect reality and is estimated using IDR 8,000 per hh per month in urban and IDR 2,500 per hh per month in rural, applied to all population in Indonesia.
- 33 Note: (1) Circular system will have better sanitary landfill system and lower amount directed at landfill. This implies lower utility/dependance on landfill which can increase the longevity of sanitary landfill. This means, less asset replacement cost in the long run. This has not been incorporated in the chart as the horizon is not long enough.
- 34 Note: A linear system cost is composed of collection and landfilling activities, while circular includes sortation as well. On per ton basis, circular system is expected to cost significantly more than linear system, however revenue generation and economic creation are only possible through a circular system.
- 35 Based average spend from FITRA + SYSTEMIQ studies on 60 regencies/cities samples plus 3 STOP regencies and using samples from 12 regencies/cities on the average proportion of capex and opex. Spending includes revenues from retribution fees.
- 36 Ibid.
- 37 Note: Model taken from STOP Project in Tembrokrejo, Muncar, which covers 31,215 people; Data from last 3 months ending March 2020; Disposal not included as it is covered by DLH separately; Project STOP P&L across multiple cites.
- 38 When collected by BLUD, the revenues will not be called retribution fees but "jasa layanan" or waste collection service fee".
- 39 FITRA + SYSTEMIQ Studies over 60 samples of regency/cities and 3 Project STOP regencies (2019)
- 40 <https://www.weforum.org/agenda/2020/01/here-s-how-indonesia-plans-to-tackle-its-plastic-pollution-challenge/>
- 41 Cities often have higher rigid plastic levels than regencies and therefore offer more attractive sorting and recycling economics.
- 42 Project STOP Muncar.
- 43 In many countries PRO is often referred to Extended Producer Responsibility (EPR)
- 44 <http://indonesiapro.org/>
- 45 Gyovany Manalu, Muhammad Farid Maruf, Kerjasama Pemerintah Kota Surabaya dan PT. Sumber Organik Pada Program Pembangkit Listrik Berbasis Sampah di TPA Benowo Kota Surabaya <https://jurnalmahasiswa.unesa.ac.id/index.php/publika/article/view/33385>
- 46 <https://www.plasticcollective.co/how-do-plastic-credits-work/>
- 47 While not currently supported in Indonesia due to inexistence of legal basis, EPR and plastic credits are new financial tools some countries are using to bring private sector co-funding in to support financing the setup of new waste systems and operational costs, and are worth the Government of Indonesia exploring further.



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