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Ramping Up Ambition on Waste Methane and Just Transition in Indonesia

Recommendations for Indonesia's Second NDC

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Executive Summary

In 2025, the Government of Indonesia (GoI) is scheduled to submit its Second Nationally Determined Contribution (NDC). This presents a crucial opportunity for the government to enhance its ambition regarding emissions mitigation in the waste sector and to mobilize significant climate finance specifically for methane emissions.

Waste is a major contributor to greenhouse gas (GHG) emissions in Indonesia. Globally, the waste sector accounts for approximately 20% of anthropogenic methane emissions, but in Indonesia, waste is the largest contributor at 56% of methane emissions, making it the second largest contributor to the total annual GHG emissions at 15%. This high contribution is primarily due to the inadequate collection and treatment of organic waste. Indonesia generates approximately 32 million tons of waste annually, with food waste making up the largest share at around 39.6% and garden waste at 12.5%, totaling over 50% organic waste. The country is noted as the largest food waste generator in Southeast Asia.

The current approach in Indonesia's Enhanced Nationally Determined Contributions (ENDC) from 2022 heavily favors end-of-pipe measures like landfill gas (LFG) recovery and utilization, waste-to-energy (WtE) incineration, and refuse-derived fuel (RDF). WtE incineration and RDF are particularly emphasized, targeting 14.8 million tons of municipal solid waste. These technologies are considered unsuitable for Indonesia's wet, organic-dominated waste. Furthermore, WtE incineration is emission-intensive and, along with LFG recovery, only switches methane emissions to carbon dioxide, undermining long-term climate goals. These approaches also negatively impact the livelihoods of waste pickers who rely on access to recyclable materials.

Indonesia's Long-Term Strategy for Low Carbon and Climate Resilience 2050 (LTS-LCCR) acknowledges food loss and waste (FLW) but the ENDC (published in 2022) currently lacks specific interventions for FLW prevention. The LTS-LCCR also presents emission scenarios for the waste sector that prioritize WtE incinerator and RDF, projecting significant capacity for these technologies by 2050, which conflicts with the dominance of organic waste and risks suboptimal methane reduction.

Adding to the urgency is the GoI's nationwide plan, announced in March 2025, to close 343 out of 550 open dumping sites. While addressing unsafe conditions, this plan raises concerns about displacing approximately 600,000 waste pickers and potentially leading to increased reliance on WtE incineration and LFG recovery facilities. The plan also puts significant pressure on local governments, who bear the primary responsibility for waste management but often lack adequate budget allocation due to waste management not being classified as an essential service under National Law Number 23 Year 2014 on Local Government (UU 23/2014).

This policy brief proposes six key recommendations for the Second NDC (due in 2025) and supporting policies to drive rapid and just implementation. These recommendations aim to capitalize on global methane momentum, align strategies with Indonesia's waste composition, ensure a just transition, and unlock necessary finance.

This policy brief offers six key recommendations as follows:

1. **Establish source separation and separate organic waste collection & treatment as a core strategy** prioritized above all others, as it is a precondition for successful downstream organic waste treatment.

2. **Prioritize strategies that follow the waste hierarchy,** focusing on organic waste and waste methane. This means shifting from end-of-pipe measures to upstream measures, including increasing targets for organic waste treatment (like composting, BSF, and biodigesters), integrating FLW prevention, and replacing WtE, RDF, and LFG with methods like biologically active landfill cover.

3. **Integrate a just transition in the dumpsite closure plan** to ensure that affected communities, particularly waste pickers, are not left behind. This requires meaningful consultation and enabling waste pickers to participate in organic waste treatment initiatives.

4. **Increase participation and boost leadership in international spaces and forums** to mobilize climate finance. This includes joining the Climate and Clean Air Coalition (CCAC) as a state member as well as initiatives like the Lowering Organic Waste Methane (LOW-M) Initiative, the Reducing Organic Waste Methane (ROW) Declaration, and CCAC's Methane Roadmap Action Program (MRAP) and Targeted Expert Assistance (TEA) service. All of which can signal Indonesia's commitment and attract funding.

5. **Set up institutional and governance capacity as the preconditions for successful Second NDC implementation.** This involves reclassifying waste management as an essential service with mandated budget allocation, distributing the financial burden across national and subnational levels, as well as banning untreated organic waste from dumpsites.

6. **Build supporting environments for local governments to treat organic waste** properly and sustainably. This includes enforcing source separation implementation, creating a stable and appealing market for producer and offtaker, and improving financing accessibility at the implementation level.

By implementing these recommendations, Indonesia can attract external and domestic funding, streamline implementation, configure best practices, and ensure a just transition for those impacted by dumpsite closures.

List of Abbreviation

Bappenas	The National Development Planning Agency *(Badan Perencanaan Pembangunan Nasional)*
BSF	Black Soldier Fly
CCAC	Climate and Clean Air Coalition
CO2-e	Carbon Dioxide equivalent
ENDC	Indonesia Enhanced Nationally Determined Contributions (2022)
FLW	Food Loss and Waste
GHG	Greenhouse Gas
GMP	Global Methane Pledge
GoI	Government of Indonesia
IFIs	International Financing Institutions
LFG	Landfill Gas
LTS-LCCR	Long Term Strategy for Low Carbon and Climate Resilience 2050
LOW-M	Lowering Organic Waste Methane Partnership
MSW	Municipal Solid Waste
NDC	Nationally Determined Contributions
RDF	Refuse-derived Fuel
ROW	Reducing Organic Waste Declaration
SIPSN	National Information System on Waste Management *(Sistem Informasi Pengelolaan Sampah Nasional)*
SLCP	Short-lived Climate Pollutant
UNEP	United Nations Environment Programme
UNFCCC	The United Nations Framework Convention on Climate Change
WTE	Waste-to-Energy

Overview of Indonesia's Waste Context

Enhanced Nationally Determined Contribution (ENDC) is Indonesia's latest NDC document, published in September 2022. The document is the updated version of the country's First NDC that was released in November 2016. Currently, the ENDC will be updated through the Second NDC submission towards the UNFCCC COP30 in November 2025. While updating NDC every five years is a mandate under the Paris Agreement, it also serves as a significant opportunity for the Government of Indonesia (GoI) to unlock climate finance to drive a just implementation, especially around organic waste and final disposal sites — which also locally known as Tempat Pembuangan Akhir (TPA). In the context of Indonesia, most of the nation's final disposal sites are operated using an open dumping system, or often called as dumpsites, rather than engineered landfills (e.g. controlled landfills, sanitary landfills). Therefore, in this policy brief, final disposal sites in Indonesia will be referred to as dumpsites rather than landfills. To understand opportunities the GoI can optimize for the Second NDC, there are several nuances in Indonesia that are worth noting.

The significance and the opportunity of organic waste in Indonesia

Indonesia generates 32 million tons of waste annually from 302 cities and regencies in 2024. Approximately 12.6 million tons (39.6%) of the waste generated is food waste, and 4 million tons (12.5%) is garden waste according to the National Information System on Waste Management (SIPSN) **(Annex 1)**.[1] The amount is in line with the UN Environment Programme (UNEP) report

[1] Ministry of Environment, 2025. *The National Information Waste Management System (SIPSN)*, Available at: https://sipsn.menlhk.go.id/sipsn/public/data/timbulan

that puts Indonesia as the largest food waste generator in Southeast Asia at 14.7 million tons per year.[2]

To date, the GoI has not integrated any mitigation pathway for food loss and waste (FLW). However, the National Planning Agency of Indonesia (Bappenas) took the first step in 2021 by developing a baseline report on the topic. In this report, 45 strategies were recommended with a national target of 35% reduction of food waste by 2030 in the consumer supply chain.[3] This methodological and holistic report serves as an opportunity for the GoI to integrate it into the Second NDC and develop a proper organic waste treatment policy in the future.

The waste sector is a major contributor to methane emissions —a short-lived climate pollutant (SLCP) 84 times more powerful than carbon dioxide, and accounts for an estimated third of global warming[4]—, which is mostly generated from the lack of adequate collection and treatment of organic waste. Globally, the waste sector is the third largest anthropogenic source of methane global anthropogenic emissions (20%), after agriculture (40%) and the fossil fuels sector (35%).[5] In contrast, in Indonesia, waste is the largest contributor of methane at 56%, which rocketed waste to also become the second largest contributor to the total annual greenhouse gas (GHG) at 15%.[6] Understanding the significance of waste pathways in methane emissions in Indonesia, the GoI must prioritize the development of a proper organic waste treatment strategy.

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[2] United Nations Environment Programme, 2024. *Food Waste Index Report 2024*. Nairobi. Available at: https://www.unep.org/resources/publication/food-waste-index-report-2024

[3] Kementerian Perencanaan Pembangunan Nasional/Bappenas Republik Indonesia, 2021. *Laporan Kajian Food Loss & Waste di Indonesia* [Report]. Available at: https://lcdi-indonesia.id/wp-content/uploads/2021/06/Report-Kajian-FLW-FINAL-4.pdf (Accessed: 10 April 2025).

[4] Intergovernmental Panel on Climate Change, 2013. *Climate change 2013: The physical science basis. Contribution of working group I to the fifth assessment report of the Intergovernmental Panel on Climate Change: Anthropogenic and natural radiative forcing*, p. 714. Available at: https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf.

[5] United Nations Environment Programme and Climate and Clean Air Coalition, 2021. *Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions.* Nairobi: United Nations Environment Programme.

[6] Climate Transparency Report, 2022. *Climate Transparency Report: Comparing G20 Climate Action,* p. 5. Available at: https://www.climate-transparency.org/wp-content/uploads/2022/10/CT2022-Indonesia-Web.pdf

Understanding the significance of waste pathways in methane emissions in Indonesia, **the GoI must prioritize the development of a proper organic waste treatment strategy.**

With the dominance of organic waste, there is an opportunity for the GoI to design strategies centered on organic waste and methane emissions. While it is well-known that methane is mainly generated at landfills[7], it is also generated throughout the waste management system from upstream to downstream[8,9]. Research also finds that at landfills, while methane is generated in all parts of the site for decades, it is generated more in active areas of landfill sites that still receive fresh food waste. **(Annex 2)**.[10] Therefore, managing organic waste has to happen from upstream to downstream. Adoption of source-separated organic waste collection, composting, mechanical recovery, biological treatment of residual waste, as well as biologically active landfill cover, are opportunities that can be capitalized on by the GoI. Taking this approach for organic waste will potentially reduce the methane emissions by an average of 95% and it fits better with Indonesia's waste composition.[11]

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[7] Rowlatt, J., 2021. 'Cutting methane gas 'crucial for climate fight", *BBC*, 6 May. Available at: https://www.bbc.com/news/science-environment-56933443 (Accessed: 20 April 2025).

[8] Nguyen, L., Quintana, A., Rowland, A. and Vegh-Gaynor, G., 2023. *Methane emissions from the waste sector: Health impacts and mitigation opportunities*, p. 6. Available at: https://climateandhealthalliance.org/wp-content/uploads/2023/08/MethaneReport-Waste-FINAL.pdf

[9] Nordahl, S.L., Preble, C.V., Kirchstetter, T.W. and Scown, C.D., 2023. 'Climate Implications of Increased Renewable Natural Gas Use in California', *Environmental Science & Technology*, 57(6), pp. 2235-2247.

[10] Mafira, T. et al., 2025. *Policy Brief: Measurement and Reduction Methane Emissions in Landfills in Indonesia.* Jakarta: Dietplastik Indonesia, YPBB & PPLH Bali.

[11] Tangri, N., Viella, M., Moon, D. and Naayem, N., 2022. *Zero Waste to Zero Emissions: How Reducing Waste is a Climate Gamechanger* [Report]. Global Alliance for Incinerator Alternatives. Available at: https://www.no-burn.org/zerowaste-zero-emissions (Accessed: 10 April 2025). doi: 10.46556/MSTV3095

Another study in Bandung discovered that prohibiting untreated organic waste into landfills can curb GHG emissions in the waste pathways by 90% compared to the current mixed-waste approach. The approach is also 75% more effective compared to the incineration approach that swaps methane emissions for carbon dioxide. Given the finding, in GHG emissions lens, an approach that revolves around diverting untreated organic waste from entering the landfill is more worth exploring than the highly coveted waste-to-energy (WtE) incinerator.[12]

Main waste management legal framework in Indonesia

National Law Number 18 Year 2008 on Waste Management (UU 18/2008)

The anchor for Indonesia's waste management lies in UU 18/2008. It provides guiding principles for the GoI in setting up waste management. In Article 3, the law established core values of waste management in Indonesia. It underlines justice, sustainability, and collaboration.[13] Bottom line, at its core, the GoI is mandated by law to provide a waste management system where everyone can actively participate and is not done at the expense of certain groups and of future generations' public health and environment. Thus, abiding to these values in delivering a waste management system is a must, as not adhering to it is a violation of the law on top of a violation of trust.

UU 18/2008 also elaborates on the reason for establishment. It acknowledges that methane is a source of harm that has to be anticipated by the GoI. Two key points that the law emphasizes are the absolute need to shift away from downstream/end-of-pipe measures and the importance of adequate budget allocation for waste management.[14]

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[12] YPBB, 2023. *Banning Organic Waste as A Solution to The Regional Waste Management Crises and Climate Change Mitigation Measures* [Policy Brief]. Available at: https://ypbb.web.id/wp-content/uploads/2024/11/YPBB-Policy-Brief-on-Organics-Ban-to-Landfill-English.pdf (Accessed: 10 April 2025).

[13] The Government of Indonesia, 2008. *Law Number 18 Year 2008 on Waste Management*. Available at: https://peraturan.bpk.go.id/Download/28462/UU%20Nomor%2018%20Tahun%202008.pdf.

[14] Ibid, p.27

1. **The first point recommends that the GoI develop a holistic system that is based on source separated waste collection that follows the waste hierarchy.**[15] It mandates that waste management should not overlook the larger picture of the system, as mentioned in the values above. Only if the system is well-developed from the upstream to the downstream that the threat of methane emissions will be significantly reduced.

2. **The second point focuses on the urgency to ensure organic waste is treated properly and can safely reenter the ecosystem.** In order to achieve so, commitment and adequate budget are required. Lacking the commitment and budget will result in intensive methane emissions, thus accelerating global warming. Therefore, this national law also mandated the GoI to provide a sufficient budget needed to properly treat organic waste through a holistic system as highlighted in the first point.

National Law Number 23 Year 2014 on Local Government (UU 23/2014)

As stipulated in the UU 18/2008, delivering a just and holistic waste management system is both cost-centered and cost-intensive process, which consequently requires a supporting instrument to ensure funding availability for implementation. However, the environment sector, which includes waste management, is scoped as a mandatory government affairs that are **not related to essential service** under the National Law Number 23 Year 2014 on Local Government (UU 23/2014). Its non-essential service status prevented waste management from receiving an adequate mandatory budget allocation at the subnational level. This situation prevented local governments from delivering a proper waste management service to their communities.

The current nationwide dumpsite closures situation also adds urgency to raise waste management as a mandatory and essential service under this law. It is a critical precondition that the GoI must set before forcing local governments to close their dumpsites. Without adequate access to funding, local governments cannot implement a proper waste management system that is based on source-separated waste collection and treatment,

[15] Climate and Clean Air Coalition, 2025. *Waste and Mitigation Hierarchy Infographic.* Available at: https://www.ccacoalition.org/resources/waste-and-mitigation-hierarchy-infographic

ensuring a universal and frequent collection service, and ultimately diverting waste from disposal sites. These services are not only essential but also labor-intensive and cost-centered. Without setting out this precondition, the GoI's plan to close 343 dumpsites nationwide will bring cities and regencies into a severe problem, where high ambitions are not met with sufficient means to achieve.

Latest development: nation-wide dumpsite closure and its implications

Entering the new leadership and going full throttle on the 2029 target to treat all waste, the GoI prioritized the zero landfill strategy, including dumpsites. In March 2025, the Ministry of Environment announced its nationwide plan to close 343 out of 550 dumpsites.[16] As many as 37 dumpsites have begun to close due to their negative impact on the environment.

The bold move by the GoI has raised concerns across the board including waste pickers, civil society organisations (CSOs), and local governments. The dumpsite closure plan raised concerns among at least 600,000 waste pickers as the plan threatens their livelihoods.[17] It is also likely that the plan will be followed with the implementation of WtE incinerator and landfill gas (LFG) facilities as projected in the GoI's Operational Plan: Zero Waste Zero Emission 2050 (ZWZE) roadmap and the Long Term Strategy for Low Carbon and Climate Resilience 2050 (LTS-LCCR) documents. The International Alliance of Waste Pickers highlighted that incineration and LFG schemes conflict directly with recycling and composting, since these technologies use recyclable materials —paper, cardboard, plastics—, which are waste pickers main source of livelihood, for its process.[18]

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[16] Hasyim, I., 2024. 'Penutupan TPA Open Dumping Diklaim Menumbuhkan Industri Baru Senilai Rp 127,5 Triliun', *Tempo,* 3 March. Available at: https://www.tempo.co/lingkungan/penutupan-tpa-open-dumping-diklaim-menumbuhkan-industri-baru-senilai-rp-127-5-triliun-1214190

[17] International Alliance of Waste Pickers, 2025. 'Indonesian Waste Pickers Call for International Solidarity', *GlobalRec,* 23 March. Available at: https://globalrec.org/2025/03/23/indonesian-waste-pickers-call-for-the-international-solidarity/

[18] Global Alliance of Wastepickers and allies, 2010. *Statement Durban* [Statement]. Available at: https://globalrec.org/archive/design/statement-durban_3c-print.pdf (Accessed: 10 April 2025).

From CSOs, they are concerned that even though the dumpsite closure policy aims to address unsafe and polluting conditions, relying on WTE incineration and LFG recovery can inadvertently create a new form of injustice for this vulnerable population by removing their access to materials for collection and sales. This is the case at Putri Cempo dumpsite, where waste pickers were prohibited from scavenging due to the area being privatized by the WtE incinerator operator.[19] Additionally, in the case of WtE incineration, the plant may introduce various toxic materials from the air emissions and ash to local communities, including waste pickers around the sites.[20]

The massive dumpsite closure plans also bring huge pressure to local governments, which hold the major proportion of the implementation in the waste sector. Waste management is a cost-driven and labor-intensive service that requires a long-term budget commitment, particularly to cover its operational costs. Yet, municipal budgets are constricted, as most are only capable of allocating 0.6% of their budget for waste management, a far cry from the recommended minimum of 3% of the regional budget to relieve a basic waste management service.[21] This situation is driven by the National Law Number 23 Year 2014 (UU 23/2014) that was previously explained, leaving the waste management as a non-essential sector and not having the adequate minimum budget. Moreover, local governments' fiscal capacity also plays a key role in determining budget availability for the waste management system.

This lack of budget allocation for waste management, as a cost-intensive public service, eventually fostered harmful practices of waste management such as disposal in rivers, open burning, and illegal dumpsites. This situation becomes murky as local governments are also mandated to cut non-essential budgets as a part of the nationwide budget efficiency

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[19] Christian, D.J. and Bintang, M.W.T., 2024. *Menabur Benih Kerusakan.* WALHI. Available at: https://www.walhi.or.id/uploads/2024-Rilis/%28ID%29%20MENABUR%20BENIH%20KERUSAKAN.pdf

[20] WIEGO, 2020. *Five facts about incineration.* Available at: https://www.wiego.org/wp-content/uploads/2020/02/WIEGO-Five-Facts-Incineration-English.pdf (Accessed: 10 April 2025).

[21] Violleta, P.T., 2025. 'KLH: Anggaran Pengelolaan sampah Perlu Capai 3 Persen Dari APBD', *Antara News,* 3 February. Available at: https://www.antaranews.com/berita/4622690/klh-anggaran-pengelolaan-sampah-perlu-capai-3-persen-dari-apbd (Accessed: 16 April 2025).

instruction.[22] Therefore, integrating the national and provincial levels for implementation is important to ensure the ambition is attainable through a mixed domestic funding pool and enhanced institutional capacity.

Dumpsite closure, while having the potential to precede the proper waste management system, is also vulnerable to unleashing unintended consequences as explained above and as mentioned by Indonesia Center for Environmental Law (ICEL).[23] Considering the potential negative collateral impacts raised by waste pickers, CSOs, and local governments, the dumpsite closure plan has to be enforced with complementary policies. These policies have to be rooted in the environmental justice principles and ensure just transition for the impacted communities such as waste pickers and informal waste workers.

The National Planning Agency of Indonesia (Bappenas) recommendations on food loss and waste (FLW)

In 2021, Bappenas released a report on FLW in Indonesia. The document covered from baseline estimate down to key strategies for the GoI to achieve FLW reduction across the value chain. Ultimately, with 45 strategies that are divided into 5 intervention themes, FLW is expected to be reduced from the projected 112 million tons to 49 million tons in 2045. While the report emphasized that a holistic system is required to manage FLW, there are two implementation strategies that are worth highlighting.

The first strategy is source separation of food waste. The strategy is incorporated to help organic waste treatment strategies' efficacy, not as the direct means to reduce food waste. The source separation will ensure that the food waste are in a proper condition and well-

[22] Tempo, 2025. 'Anti-Environmental Politics Disguised as Budget Efficiencies', *TEMPO*, 20 February. Available at: https://en.tempo.co/read/1977841/anti-environmental-politics-disguised-as-budget-efficiencies (Accessed: 16 April 2025).

[23] Hasyim, I. and Prima, E., 2025. 'Pemerintah Hentikan TPA Sampah Terbuka, ICEL: Mitigasi Diperlukan untuk transisi Yang Efektif', *Tempo*, 18 March. Available at: https://www.tempo.co/lingkungan/pemerintah-hentikan-tpa-sampah-terbuka-icel-mitigasi-diperlukan-untuk-transisi-yang-efektif-1221152 (Accessed: 16 April 2025).

separated, thus yielding the desired output and efficiency. In the report, this strategy is acknowledged as a high priority as mixed waste is recognized as the enabler of the FLW and methane generation.

The second strategy is the adoption of various approaches to treat food waste. The report is not fixated on one technology to treat FLW, but is open to options as long as it addresses the FLW and prevents it from being mistreated. This strategy also highlighted the importance of CSOs, indicating community-led implementation is desirable for this strategy. This strategy is also recognized as a high priority since this strategy intervenes FLW across the food supply chain and will be significant in reducing the methane emissions.

Climate finance opportunities for ramping up waste management system in Indonesia

In the international stage, the GoI is a signatory of the Global Methane Pledge (GMP) in November 2021 (UNFCCC COP26 - Glasgow, the United Kingdom) and a part of the inaugural cohort of the Lowering Organic Waste Methane (LOW-M) Partnership, launched in November 2023 (UNFCCC COP28 - Dubai, the United Arab Emirates) which gives positive signals on the country's intention on the international stage. At the UNFCCC COP29 Baku (Azerbaijan) in November 2024, however, Indonesia did not take part in the Reducing Organic Waste Methane (ROW) Declaration where more than 60 countries that accounts for the majority of waste methane emissions are committed to delivering a just and holistic solution in reducing the methane in waste pathways.

These collective global ambitions offer access for signatories to climate finance for implementation of the GMP, particularly in the context of NDCs and LOW-M. In the case of Indonesia, this opportunity is yet to be leveraged albeit signing GMP and joining LOW-M. The upcoming COP30 will be the next international stage for the GoI to showcase its commitment in reducing methane emissions and leveraging climate finance support through the submission of the latest round of NDC, which is the Second NDC for Indonesia. This brief will discuss strategies to be incorporated by the GoI into the Second NDC to mobilize climate finance to Indonesia.

Analysis for Indonesia Second NDC (2025)

To generate substantial recommendations for the Second NDC, an analysis on pertinent GoI's documents is required. In this part, a critical review of ENDC substances for the waste pathway and long term climate strategy document is conducted. Through this analysis, gaps from the ENDC and opportunities to be leveraged will be identified and can be considered for the Second NDC.

These gaps and opportunities that will be identified are mainly oriented to establish strong cues for climate finance. The Second NDC will be the entry point for IFIs in assessing the GoI's potential to receive climate finance in the future. The document is considered as the high level document that defines the country's ambition in reducing emissions. Therefore, in general, the stronger the ambition the more likely IFIs will provide climate finance support.

A brief history: previous Indonesia's NDCs submission to the UNFCCC

Indonesia submitted its First NDC back in November 2016, as a follow-up action to the Paris Agreement in COP21. In the first edition, there are 3 strategies introduced by the GoI to reduce emissions for the waste pathway **(Annex 3)**.

1. LFG recovery to reduce methane emissions;
2. Paper reduce, reuse, and recycle (3R) and composting; and
3. WtE incinerator and RDF implementation.

In September 2022, Indonesia submitted two new documents, the ENDC and the GoI's cover

letter on ENDC as the additional document. The ENDC serves as the update of the First NDC with more ambitious targets. The document not only increases its ambitions in each strategy, but also introduces a new strategy, which will be elaborated later.

In addition to the NDCs, there is another document that serves as a long-term low strategy to achieve the goal of the Paris Agreement. This document acts as a guiding framework that helps countries to plan pathways for achieving long-term climate goals, especially net-zero emissions by 2050. It also provides a vision for countries to align their short-term commitments NDCs with their long-term climate objectives. Therefore, NDC and the long-term low GHG emission development document are intertwined documents that cannot be separated.

While submission of the long-term low GHG emission development document is not mandatory for state members of the UNFCCC, the GoI has submitted it, titled "Long-Term Strategy for Low Carbon and Climate Resilience 2050 (LTS-LCCR)", back in July 2021. It holds the details and the climate resiliency plan in the long run.[24] Thus, it is important to use the LTS-LCCR as the benchmark in strategizing the Second NDC.

An overview of Enhanced Nationally Determined Contribution (2022)

In the ENDC (2022), the GoI introduced 3 sub-sectors with 6 mitigation pathways to unconditionally bring down emission levels from the waste sector to 256 million tons CO2-e in the year 2030 from the baseline GHG emission level in 2010. The sub-sectors are namely Domestic Solid Waste, Domestic Liquid Waste, and Industrial Waste. For the Domestic Solid Waste sub-sector, or equivalent to municipal solid waste sector, the strategies are **(Annex 4):**

1. LFG recovery and utilization, targeted to reduce 1.5 million tons of CO2-e;

[24] Government of Indonesia, 2021. *Long-Term Strategy for Low Carbon and Climate Resilience 2050.* Available at: https://unfccc.int/sites/default/files/resource/Indonesia_LTS-LCCR_2021.pdf

2. Waste utilization by composting and 3R (paper), targeted to treat 3.7 million tons of municipal solid waste (MSW) each and eliminate 4.8 million tons of CO2-e;
3. WtE incinerator/RDF implementation, targeted to treat 4.6 million tons of MSW and eliminate 1.9 million tons of CO2-e;
4. Utilization of waste to switch from landfill disposal to zero landfill disposal, targeted to treat 10.2 million tons of MSW and eliminate 6.2 million tons of CO2-e;

In NDC documents, countries register two scenarios. The first scenario is the unconditional mitigation scenario, referred to as Counter Measure 1 (CM1). This scenario means the target that the government can achieve independently, without any external assistance. The second scenario is the conditional mitigation scenario, referred to as Counter Measure 2 (CM2). This scenario means the target that the government can only achieve if it receives assistance from external sources, such as grants, donors, etc. Based on the explanation, the common sense is to have the CM2 higher than CM1, since CM2 receives additional help. In the case of the GoI's ENDC, both CM1 and CM2 are set at the same level **(Annex 4)**. This condition can lead to confusion to external parties as it can be interpreted that any form of assistance to Indonesia will be useless.

Three out of four strategies for the domestic solid waste sub-sector were heavily focused on end-of-pipe measures, including LFG recovery and utilization, WtE incineration, and production of RDF. WtE incineration is projected as the main means to treat waste, with 14.8 million tons of MSW targeted from strategy #3 and #4. Of these strategies, composting of MSW is only targeted for 3.7 million tons, sharing a similar target as paper "reuse, reduce, recycle" (3R) under strategy #2. Overall, the ENDC is heavily leaning towards WtE incineration and RDF, a technology that requires dry material with high-calorific value and does not fit the realities of the country's wet organic-dominated waste. Other current proposed strategies are also heavily downstream-focused, which may create perverse incentives to efforts at the top of the waste hierarchy. Thus, reviewing current strategies is crucial as fit-for-context and holistic strategies are essential for the Second NDC.

It is important to note that WtE incineration is the most emissions-intensive form of electricity production in the US[25] and the EU[26], with carbon intensities significantly higher than both conventional fossil-based power plants and the average electricity grid intensity. The three aforementioned end-of-pipe measures also jeopardize long-term climate stability, contradict net-zero pathways, and undermine the integrity of the Paris goals, as they swap methane emissions to carbon dioxide, switching a SLCP with a long-term one.[27]

LFG capture and utilization is another costly and inefficient technological option for treating waste methane. It has a high variety of mitigation efficacy and is subject to uncertainties about fugitive emission rates.[28,29,30] It creates a perverse incentive to maintain high rates of methane generation by landfilling organic waste that could have been returned to the soil, diverted to foodbanks, or kept in the food chain. Moreover, it also closes the access to livelihood for waste pickers around the final disposal sites, as the technology encloses the active sites and cuts access to recyclables as the main source of livelihood to these informal groups. Reflecting on the actual impact of current strategies towards GHG and just transition is mandatory to ensure that mitigation efforts in the Second NDC are not false solutions and to minimize the negative collateral impact.

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[25] Tangri, N., 2023. 'Waste incinerators undermine clean energy goals', *PLOS Climate.* Available at: https://doi.org/10.1371/journal.pclm.0000100 (Accessed: 10 April 2025).

[26] Vähk, J., 2019. *The impact of Waste-to-Energy incineration on climate* [Policy Briefing]. Zero Waste Europe. Available at: https://zerowasteeurope.eu/wp-content/uploads/edd/2019/09/ZWE_Policy-briefing_The-impact-of-Waste-to-Energy-incineration-on-Climate.pdf (Accessed: 10 April 2025).

[27] Global Methane Pledge, 2023. *Key messages on Methane for COP28 Headlines* [Online]. Available at: https://www.globalmethanepledge.org/sites/default/files/documents/2023-11/GMP%20key%20messages%20on%20methane%20at%20COP28%20-%20final%20for%20website.pdf (Accessed: 10 April 2025).

[28] Gonzalez-Valencia, R., Magana-Rodriguez, F., Cristóbal, J. and Thalasso, F., 2016. 'Hotspot detection and spatial distribution of methane emissions from landfills by a surface probe method', *Waste Management*, 55, pp. 299-305. doi: 10.1016/j.wasman.2016.03.004.

[29] Morris, J., 2010. 'Bury or Burn North America MSW? LCAs Provide Answers for Climate Impacts & Carbon Neutral Power Potential', *Environmental Science & Technology,* 44(20), pp. 7944–49. doi: 10.1021/es100529f.

[30] Smith, A., Brown, K., Ogilvie, S., Rushton, K. and Bates, J., 2001. *Waste management options and climate change* [Report]. AEA Technology. Available at: https://ec.europa.eu/environment/pdf/waste/studies/climate_change.pdf (Accessed: 10 April 2025).

Analysis on domestic solid waste sub-sector targets in the Enhanced Nationally Determined Contribution (2022)

The ENDC for the domestic solid waste subsector registered several strategies to curb methane emission, particularly composting and landfill gas capture. However, there are seven missed opportunities in these current strategies of ENDC, that can be updated in the Second NDC by the GoI:

1. **Absence of a dedicated target and/or section on methane.** Indonesia is a signatory of the GMP and the inaugural cohort of the LOW-M Partnership. Adding a dedicated target on methane in the Second NDC will bring the GoI to the center of the global stage. With the methane momentum and growing focus on SLCP, focusing on CO2-e as a measurement unit will not give a strong signal for methane-related finance opportunities to the relevant external donors. Connecting the ROW Declaration with NDCs may also help in providing a stronger signal to channel such financing opportunities for Indonesia's waste management reform.

2. **The composting strategy is targeted for municipal solid waste (MSW) and not specifically for source separated organic waste,** which raises questions, as composting of mixed waste MSW is not effective in generating co-benefits and poses a big risk of cross contamination from non-organic waste to the resulting compost. Source separated organic waste treatment is the only way to produce safe-to-use compost for various applications, including local food production. It also creates a safer environment for workers who handle waste management operations and better values for the products derived from organic waste treatment.

3. **Limiting organic waste treatment to composting while field implementation consists of a variety of methods to process the organic waste** (e.g. BSF and anaerobic digester). For

instance, community-based BSF practices[31] are already reported in Indonesia's first Biennial Transparency Report (BTR), which recorded 47.3 tons of organic waste fed to BSF by 287 community groups throughout the nation.[32] Furthermore, the GoI's ZWZE has identified the investment costs for BSF facilities including the detailed land requirement of 500m^2 for every 5 tons per day capacity. The plan also has already outlined the connection of BSF products to small industries as animal feed.[33] In the ZWZE document, biodigester technology is discussed as a strategy for managing both domestic and industrial liquid waste, often involving methane gas capture and utilization. Unfortunately, both the biodigesters and BSF practices, including those led by community groups, have not been included as part of ENDC. Unlocking the options means there will be more implementations that can benefit from the potential external support;

4. **Mixing interventions for organic waste and recycling in the same strategy.** Intervention needs to be made more specific to give clearer and stronger signals for climate finance. The current ENDC does not clearly separate the focus of the actual targets for treating organic waste, particularly on "composting and 3R for paper". Separating composting from paper recycling and other 3R measures will give stronger and clearer signals to IFIs to channel climate finance for their respective interest, such as waste methane reduction from organic waste;

5. **Lacking specific interventions on FLW.** While this has been stated in Indonesia LTS-LCCR, FLW prevention has yet to be mentioned in the ENDC, particularly in the waste and Agriculture, Forest, and Land Use (AFOLU) sectoral targets. FLW is a key subject that is gaining momentum at the global stage, thus, more financial support is being mobilized to act on this issue. Furthermore, Indonesia has a unique position as the biggest food waste generator in the Southeast Asia region, as highlighted in the UNEP Food Waste Index Report 2024. Integrating FLW into the Second NDC is also more seamless, as robust data

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[31] Diener, S. and Storey, D., 2025. *Transforming Organic Waste with Black Soldier Flies: A Guide for Decision-Makers, Entrepreneurs, and Implementers to Unlock the Organic Waste Potential of Black Soldier Fly Systems.* UNEP-convened Climate and Clean Air Coalition. Available at: https://www.ccacoalition.org/sites/default/files/resources/files/TEAP-Waste%20with%20BSF.pdf.

[32] The Government of Indonesia, 2024. *Indonesia's First Biennial Transparency Report.* Available at: https://unfccc.int/sites/default/files/resource/INDONESIA%20BTR1_SUBMIT%20FINAL.pdf.

[33] Ministry of Environment and Forestry Republic of Indonesia, 2024. *Indonesia's Zero Waste Zero Emission Operational Plan 2050*. Jakarta.

and well-defined strategic interventions are available in Bappenas's FLW Report in Indonesia.

6. **CM1 and CM2 have the same target of 3.7 million tons of waste for composting.** Setting both CM1 and CM2 targets at the same level does not give the right signal for IFIs and other international institutions that may provide various support and climate finance for delivering the mitigation measure. It basically tells the world that the GoI does not need any additional support to achieve its target and implement its proposed climate solutions in the waste sector. The CM2, which is for the reduction target with the help of international communities, must aim higher. The Ministry of Environment has stated that Indonesia's target is to achieve 100% waste treatment by 2029.[34] With this target as the ultimate goal, the CM2 in the Second NDC has to aim for 16.6 million tons of organic waste, as per the SIPSN and **can go as high as 35 million tons as per the GoI's LTS-LCCR document**, to be treated to align with the national target on top of being ambitious.

7. **Overshooting the target for WtE incinerator and RDF.** 14.8 million tons of MSW are targeted for the WtE incinerator and RDF in ENDC. This target will grow until 2050 based on the LTS-LCCR under the low carbon scenario **(Annex 5)**, peaking up to 40 million tons of MSW.[35] This amount is overshooting since according to SIPSN, for 2024, there is less than 3 million tons of waste in the "Others" category **(Annex 1)**, which covers anything else besides organic waste and recyclable material. This implies a highly likely scenario of organic waste becoming a feedstock for the facilities. Such an approach will not unfold well since WtE incinerators and RDF are not suitable for burning wet material with low calorific value. Moreover, the process of burning recyclables and "others" contradicts prevention and recycling efforts, emits carbon dioxide, contributes to the global temperature rise, and undermines the Paris Agreement. A substantial reduction or banishing of these targets for the Second NDC has to be a scenario that is considered strongly.

Raising ambition in Indonesia's Second NDC, particularly through higher CM2 targets and

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[34] Prihatini, Z. and Jatmiko, B.P., 2025. Pengelolaan Sampah Baru 39 Persen, KLHK Targetkan Tuntas 2029. *Kompas*. Available at: https://lestari.kompas.com/read/2025/03/10/174800786/pengelolaan-sampah-baru-39-persen-klh-targetkan-tuntas-2029#google_vignette

[35] Government of Indonesia, 2021. *Indonesia's Long-Term Strategy for Low Carbon and Climate Resilience.* Available at: https://unfccc.int/sites/default/files/resource/Indonesia_LTS-LCCR_2021.pdf.

clearer, more diverse mitigation strategies, is directly linked to unlocking greater climate finance potential. Setting a more ambitious CM2 target than CM1 for organic waste treatment sends a critical signal to international financiers that external support is both needed and welcomed, aligning with global expectations for differentiated ambition. Furthermore, incorporating a broader range of organic waste treatment methods—such as BSF and anaerobic digesters—beyond composting, allows Indonesia to tap into a wider spectrum of funding channels from institutions interested in various technological and climate outcomes. Specifying distinct mitigation pathways, such as separating organic waste from recycling strategies and introducing a dedicated methane reduction target, strengthens the investment narrative by providing targeted entry points for climate finance actors, particularly those focused on SLCPs like methane. This level of clarity and ambition positions Indonesia as a credible and attractive partner in the global climate finance landscape.

Recommendations for the Second NDC: **Ramping up Indonesia's Organic Waste Management Capacity to Drive Rapid and Just Implementation**

With the momentum building up globally on methane emission prevention, the scale of the methane issue in Indonesia, and the massive dumpsite closure plan, the GoI has to move fast in managing its organic waste. Solving half of the country's waste and closing dumpsites in a just manner will take interventions on multiple fronts to prevent unintended negative consequences. This paper proposes that significantly improving the NDC will become the cornerstone of a rapid and just implementation of organic waste management, while also building complementary policy infrastructures to ensure resiliency and sustainability.

Through the recommendations the paper proposes, the GoI will be enabled to:

1. **Channel external funding sources to Indonesia, particularly climate finance.** These funds are from IFIs such as the Asian Development Bank (ADB), the World Bank (WB), the CCAC, and the Official Development Assistance (ODA) institutions, targeting methane emission reductions. Channeling these funds will be substantial in implementing strategies and achieving targets set in the Second NDC;

2. **Unlock domestic funding sources.** With more domestic funding pools from the national and regional budget made available for waste management, strategy development and implementation can be done rapidly and achieving the goal set at the Second NDC will be more attainable;

3. **Streamline and drive more rapid implementation.** By establishing a well-connected plan from upstream (national level strategy) to downstream (subnational level implementation plan), implementation can be done in a more organized and rapid manner, thus accelerating the progress towards the set target;

4. **Configure implementation best practices.** While in the long-term these recommendations are to set up the institutional capacity, the interventions are also proposed to propel decentralized organic waste treatment and figure out the best practice in parallel;

5. **Just transition for dumpsite closure.** Incorporating active participation of communities, waste pickers, informal waste workers, and vulnerable groups, all of whom are the impacted communities of dumpsite closure, will minimize the negative consequences of the policy.

1
Establish source separation, separate organic waste collection and treatment as a core strategy

The Second NDC has to set the source separation and separate organic waste collection as the core strategy, prioritized above all strategies. While the strategy does not directly translate to prevent emissions (or not as significant as other strategies), it will be a precondition for other strategies' success. The quality and quantity of the organic waste (and recyclables) treatment strategies will be significantly influenced by the state of the waste when it is received, in which being separated at source will maintain the standard for the waste upon collection.

2

Prioritize strategies that follow the waste hierarchy and target organic waste as the major source of greenhouse gas emission from the sector

The Second NDC should prioritize strategies that have the biggest mitigation impact and generate the greatest co-benefits. This means shifting away from end-of-pipe measures to upstream measures following the waste hierarchy prioritization and focusing on organic waste and waste methane. There are several points that the GoI can consider to achieve this:

- **Introduce new mitigation pathways for FLW prevention.** Register interventions from the top part of the zero waste hierarchy, which is currently missing, particularly FLW prevention as a new strategy, as already outlined in LTS-LCCR by leveraging findings and recommendations from Bappenas's Report on Food Loss and Waste in Indonesia;

- **Increase existing ambitions on organic waste treatment:**

    - Increase the composting target in CM1 to better reflect the scale of the organic waste challenge in Indonesia, recognizing that the current ENDC CM1 target is far below the national organic waste generation data from the SIPSN;

    - Set the CM2 target for composting to be higher than the CM1, ideally 100% of the organic waste generated to align with 2029 target, to send a signal to external donors, particularly IFIs, to channel climate finance for supporting composting as one of many organic waste treatment approach in cities and municipalities in Indonesia;

    - Revise the target of composting from "municipal solid waste" to "organic waste" to ensure the accuracy between the waste type and the technology utilized.

- **Integrate other means of organic waste processing and not limit the Second NDC's ambitions to composting.** This includes BSF as an alternative feed for animals and digester as a renewable energy and soil nutrient sources, all of which will optimize the bioconversion efficiency. As the BTR and the GoI's Operational Plan: Zero Waste Zero Emission 2050 (ZWZE) reports show, these alternatives are already happening across the country and have already provided an impact on the ground in preventing methane emissions. Thus, with its proven concept, the GoI should leverage these as organic treatment options in the Second NDC strategies.

- **Create stronger and clearer intersectionalities linkage,** especially on organic fertilizer production and feed supplements for cattle, as already outlined in ENDC agriculture sector targets. This is linked to the fact that BSF usage as animal feed, organic waste treatment options that are capable of fertilizer production, and application of fertilizers in the waste sector are highly related to the agriculture sectors;

- **Switch downstream, emission-intensive, and methane-to-carbon swap measures with biostabilization and application of biologically active landfill cover (biocover).** Rather than attempting to recover methane through LFG, which has a high uncertainty and still generate a high amount of fugitive methane, or convert dumpsites and landfills into WtE incinerators and RDF facilities that will switch the emissions to carbon dioxide, the Second NDC should instead apply biologically active landfill cover (biocover) as the new strategy. This approach will be more effective to prevent methane emissions while focusing on organic waste reduction to landfills;

    - Put a moratorium on existing WtE incinerator, RDF, and LFG projects;

    - Repurpose WtE incinerator, RDF, and LFG area for organic waste and biocover treatment.

- **Prohibit final disposal sites from receiving untreated organic waste instead of full closure.** The strategy "landfill disposal to zero landfill in 2060" in ENDC has to be sharpened to specifically prohibiting untreated organic waste, which is the main

source of methane emissions, for the Second NDC. This strategy will be more effective in reducing emissions and achieve the GMP as well as the Paris Agreement compared to WtE incinerator, RDF, and LFG at dumpsites and landfills, all of which will only swap the emissions from methane to carbon dioxide.

3
Ensuring that no one left behind: integrate Just Transition in the nation-wide dumpsite closure plans

The GoI should ensure that reducing emissions from the waste sector, particularly from landfills, does not create unintended consequences for communities that rely on landfills and waste for livelihood, while ensuring organic waste prevention and treatment ecosystems are thriving. This is particularly relevant for waste workers and waste pickers who are reliant on the current make-take-dump system for sustaining their livelihood. Therefore, we recommend the following points to be integrated in the Second NDC:

- Just transition should be integrated to give signals that the GoI is committed to ensure a just and equitable process in closing dumpsites. This process may benefit from extra international support, thus integration in NDC is crucial;

- Provide support and guidance for local governments, many of which lack technical expertise, human resources, and funding for waste management;

- Explicitly integrate community and waste picker groups as implementers of the GoI's composting/organic treatment and FLW prevention targets in the Second NDC, to support an inclusive and just transition process in the waste sector as mandated in National Law on Waste Management (UU 18/2008) Article 3 and 12;

- Conduct a meaningful consultation process for the Second NDC, following NDC update and NDC Roadmap development with the local community, waste workers, and waste picker groups who are implementing as mandated in Minister of Environment and Forestry Regulation Number 12 Year 2024 (PermenLHK 12/2024);

- Establish decentralized organic waste treatment led by communities, waste pickers, and informal waste workers as one of the approaches in waste treatment.

On top of registering on-point strategies as recommended, the GoI also has to revisit and update the Second NDC in the next five years. This is necessary in order to ensure that the document is well-governed and updated as the national and local governments update the baseline data and/or ambition, which feeds into the GoI's national database on GHG emissions inventory as stated in the Ministry of Environment and Forestry Regulation Number 12 Year 2024.

Recommendations for Driving Successful Second NDC implementation

1

Increase the participation and boost leadership of Indonesia in international spaces and forums to mobilize climate finance for supporting the Second NDC implementation

The GoI's active participation in the international-level coalition, involving cities as climate leaders in the waste sector:

1. **Join the CCAC as a state member to foster collaboration and mobilize international support for reducing SLCPs,** including methane and black carbon, in Indonesia;

2. **Follow up on Indonesia's stated intention at COP28 in Dubai to join LOW-M initiative**[36] as the inaugural cohort by providing support for subnational governments (cities and regencies) to join and take part in the initiative. The participation will be beneficial to

[36] Global Methane Pledge, 2023. 'Lowering Organic Waste Methane Initiative (LOW-Methane)', *Global Methane Pledge.* Available at: https://www.globalmethanepledge.org/news/lowering-organic-waste-methane-initiative-low-methane

access climate finance to implement a robust plan to handle organic waste in their region;

3. **Sign the ROW Declaration to signify Indonesia's commitment to treating organic waste,** signaling Indonesia's ambitions for external donors and relevant international institutions, ultimately directing climate finance for waste methane reduction projects to Indonesia;

4. **Access CCAC's Methane Roadmap Action Programme (M-RAP)[37] and Technical Expert Assistance (TEA) service[38]** to be able to translate the Second NDC methane targets into a clear implementation roadmap and advance mitigation planning as well as implementation with the assistance of experts;

5. **Introduced a methane reduction pathway in the Second NDC** to show the GoI's leadership in fulfilling its commitment towards achieving the GMP, and signaling climate financiers to channel methane/climate funds for implementing organic waste treatment measures.

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[37] Climate and Clean Air Coalition, 2022. *Methane Roadmap Action Programme (M-RAP).* Available at: https://www.ccacoalition.org/projects/methane-roadmap-action-programme-m-rap

[38] Climate and Clean Air Coalition, 2025. *Technical Assistance Services.* Available at: https://www.ccacoalition.org/content/technical-assistance-services

2

Fulfill key preconditions for successful implementation of the Second NDC: institutional and governance capacity

The success of the Second NDC will only be as good as the implementation policies that follow it. While the implementation is mainly driven by local governments, it is significantly influenced by national level policies. Therefore, there are institutional and governance capacity at the national level that has to be established first as key preconditions to a proper implementation of the Second NDC. The key preconditions are as follows.

Prioritize and unlock more domestic finance sources to support the implementation of the Second NDC

1. **Update National Law Number 23 Year 2014 on Local Government (UU 23/2014)** Updating UU 23/2014 will unlock the domestic budget for waste management. This policy will serve as the footing for the proper waste management as local governments will now have the needed budget to provide the adequate service to its communities.

    - **Relieve local governments from heavy financial burden in delivering waste management service** by distributing budgets burden from local governments to both provincial and national governments. This will allow cities to focus their already-constrained public funds for the most essential waste management services, which is separate waste collection and some part of waste treatment within their geographical jurisdictions. By distributing implementation responsibilities between central, provincial, and city/regency levels, the processing target will be more attainable. This recommendation reflects on the status quo, where implementation currently relies heavily on the city/level government as mandated in National Law Number 18 Year 2018 on Waste Management (UU 18/2008) and UU 23/2014, thus limiting the efficacy of waste management due to the constrained budget and overscope. In the current state,

due to lack of capital, local governments cannot provide the required institutional and human resources to deliver a proper waste collection;

- **Set waste management status as an essential service.** By putting waste management as an essential service categorized in Article 12, clause 1 of UU 23/2014, national and local governments can allocate more budget for the service, and maintaining the required service level for organic waste handling. This recommendation reflects from the scarcity of budget for waste management across regions, making proper waste management not possible.

2. **Establish government-owned operators that can complement existing Environmental Agencies at the local level in delivering labor-intensive waste management operations.** In the existing institutional capacity, local environmental agencies cannot accommodate the human resources needed to operate the adequate waste management system. In order to accommodate the needs, Unit Pelaksana Teknis Daerah (UPTD) institutional format can become the answer as it can absorb lots of manpower and is not a for-profit institution. These two strengths of UPTD can be utilized by the local government to deliver the separated waste collection, enforce source separation, and manage organic waste properly. The formation of UPTDs across local governments is also an instrumental strategy in achieving the just transition for dumpsite closure. As the proper waste management is labor intensive, the job creation from the strategy will require a large amount of human resources. These needs can be fulfilled by communities negatively impacted by the dumpsite closure such as waste pickers and informal waste workers.

3. **Integration of key performance indicators** between government environmental bodies with non-environmental: by enabling collaboration, there will be more budget available to pursue emission reduction and generate a product with amplified impact where everyone co-benefits from it. This recommendation reflects on the common phenomenon where two or more bodies have a cross-cutting interest, but ends up ineffective due to lack of synergy.

4. **Integrate the co-benefits of the organic waste management system as part of provincial and city government performance indicators,** unlocking bigger public funds from various government departments and agencies to support the rapid implementation of organic waste management projects and help local governments that have small budget capacity on waste management;

Fulfill institutional and political preconditions for successful dumpsite closure and organic waste management by the local governments, community groups, and informal sector

The national government should provide adequate institutional and financial support for local governments to ensure dumpsite closure is followed by successful implementation of organic waste management projects at the local level. This will require synergy and commitment from various public institutions at the national, provincial, and cities/regencies.

In this regard, **the national government should secure long-term and strong political commitment from both provincial and local government leaders** on organic waste management to prevent unintended consequences of the nationwide dumpsite closure plan. A robust criteria for closing dumpsites in 343 locations should be developed. We recommend that subnational governments are only allowed to keep using their disposal sites as long as it complies to several criteria:

1. **The sites must not receive untreated organic waste in a time that is agreed between subnational and national governments,** in compliance with the 2029 target to treat all waste and NDCs targets. During the agreed time, subnational governments must significantly reduce its organic waste disposal gradually.

2. **Give incentives for local governments who commit to allocate more public funds for waste management, particularly source-separated organic waste treatment.** Given to local governments that utilized the funds for: (1) a source-separated collection system; (2) implementing organic waste treatment projects that follows the waste hierarchy; (3) improving landfill management, particularly on monitoring system for a proof of compliance (e.g. installing functioning weighing bridge, log book, and camera that can be accessed by the national government and public).

3. **Immediately close the dumpsites for subnational governments who do not commit to implement conditions outlined in point 2.** This will drive subnational governments to focus on upstream solutions based on source-separated collection systems, rather than on downstream interventions, which will only prolong the issues of dumpsites.

4. **Ensure local community groups, waste pickers and informal sectors in dumpsites that are planned to be closed are meaningfully consulted.** The output is to collaboratively develop a just transition plan for dumpsite closure by the subnational governments and affected communities.

5. **Support local governments to develop local regulations on waste emergency situations** as mandated by National Law Number 18 Year 2018 on Waste Management (UU 18/2008) to help cities have options to access emergency funds without waiting for dumpsite closure to happen. This model has been successfully executed in Presidential Regulation Number 97 Year 2017 on National Policy and Strategy on Household Waste Management and Waste Similar to Household Waste (Jakstranas), where the national government provides a template for subnational governments to develop their Local Policy and Strategy documents on municipal solid waste management.

3

Create supportive conditions for local governments to drive organic waste treatment implementation

Local governments are the key in driving implementation on the ground. In order to ensure that the Second NDC is well-translated to the ground, equipping local governments with the required instruments is equivalent to formulating strategies in the Second NDC. Recommendations here are scoped from collection to offtaking and actively involve relevant stakeholders to create a robust ecosystem in driving separated waste collection and organic waste treatment.

1. **Shift law enforcement capacity towards source-separated organic waste treatment implementation** to ensure a reduced amount of organic waste being thrown into the dumpsite, waterways, or discarded through open burning;

2. **Set up a priority program to pilot and scale up source-separated organic waste treatment, separated waste collection, and decentralized organic waste management projects** — including community-led and wastepicker-led projects;

3. **Develop a system that guarantees prices and offtakers for organic waste treatment products especially for small-scale operators** to boost and incentivize all initiatives on organic waste treatment, increasing the financial sustainability of these initiatives across both agriculture and waste sectors;

4. **Relieves some staffing constraints for operations in delivering waste management services by supporting local communities, waste pickers, and informal sector** who are already operating organic waste treatment services (e.g. small and micro enterprises, community-based BSF farmers). This can be done by providing: easier permit and license processing; access to higher quality equipment; technical and managerial capacity building; official contract with local government as service

provider; guarantee offtakers for products resulting from organic waste management; and/or access to clean source-separated food waste.

5. **Direct local development banks to provide accessible financing for organic waste treatment projects** with long tenure, simple procedures, and interest rates below market price.

6. **Encourage bulk generator and commercial areas to independently manage its waste** by providing certain incentives (e.g. waste service fee partial or full waiver, tax amnesty) and disincentives (e.g. business license suspension, charging higher waste service fee, temporary sealing of business premises), thus reducing the government's operational expense;

7. **Develop integrated national, subnational, and local governments masterplans, at least covering a 10-year plan that centers around source separation and decentralized organic waste treatment, to support a robust implementation plan of National Policy and Strategy on Household Waste Management and Waste Similar to Household Waste (Jakstranas).** Integrated masterplans will allow governments from the national to the city/regency level to:

    - Work in the same corridor, identifying clearer operational and financial responsibilities, and sharing a clarity on the ultimate target.

    - Identify needs to make a proper budget allocation to deliver waste management as an essential public service with facilities of: (1) universal waste collection; (2) source-separated waste collection system; (3) decentralized organic waste treatment

    - Support implementation in a more feasible and clearer process, particularly for local and provincial governments;

    - Inform the national government about potential finance needs to pitch for external donors/funders, particularly on climate and development finance;

Annexes

Annex 1. Indonesia Waste Composition in 2024 According to the National Information System on Waste Management (SIPSN)

Category	Percentage (%)	Tonnage (tons)
Food waste	39.6	12,672,000
Garden waste	12.49	3,996,800
Paper/cardboard	11.14	3,564,800
Plastic	19.53	6,249,600
Metals	3.44	1,100,800
Textile	2.51	803,200
Rubber/leather	2.13	681,600
Glass	2.37	758,400
Others	6.79	2,172,800

*Annual waste generation: +/-32,000,000 tons of MSW (Source: National Information System on Waste Management, 2025)

Annex 2. Methane Emissions Activity in Landfills in Indonesia

Parameters	**Regional Landfill Location**		
	TPA Bantargebang	**TPA Sarimukti**	**TPA Suwung**
Service Area (Jurisdictions)	Jakarta Province (with five cities as part of the province)	Bandung Metropolitan Area. including Bandung City. Bandung Regency. West Bandung Regency. and Cimahi City	Denpasar Metropolitan Area. including Denpasar City. Badung Regency and Tabanan Regency
Area (ha)	79	24.19	23.07
Share of Food Waste (% of total)	36.04	11.75	19.79
Share of Garden Waste (% of total)	10.87	50.50	13.82
Estimated Incoming Waste per Day 2020-2024 (tpd)	500-1,000	500-700	200-6—
Methane Emission - IPCC (tpd)	10	3	7
Methane Emission - MERIT (tpd)	3.33	1.77	0.83
CH4 emission in active area w/o soil cover (g/m2.hour)	0.698	0.936	0.100
CH4 emission in non-active area w/ soil cover (g/m2. hour)	1.536	0.050	0.276
CH4 emission in non-active area w/o soil cover (g/m2. hour)	0	0.246	0.450

(Source: MERIT Project, 2025, modified with additional information on service area)

Annex 3. First NDC Strategies for Municipal Solid Waste

Mitigation plan	Type of waste handled	Target (CM1)	Target (CM2)
LFG utilisation	MSW	10% of CH4	10% of CH4
Composting and paper 3R	MSW	22% of MSW in 2020 30% of MSW in 2030	22% of MSW in 2020 30% of MSW in 2030
WtE incinerator/ RDF implementation	MSW	Up to 3% of MSW in 2020 Up to 5% of MSW in 2030 Implementation in 7 cities	Up to 3% of MSW in 2020 Up to 5% of MSW in 2030 Implementation in 12 cities

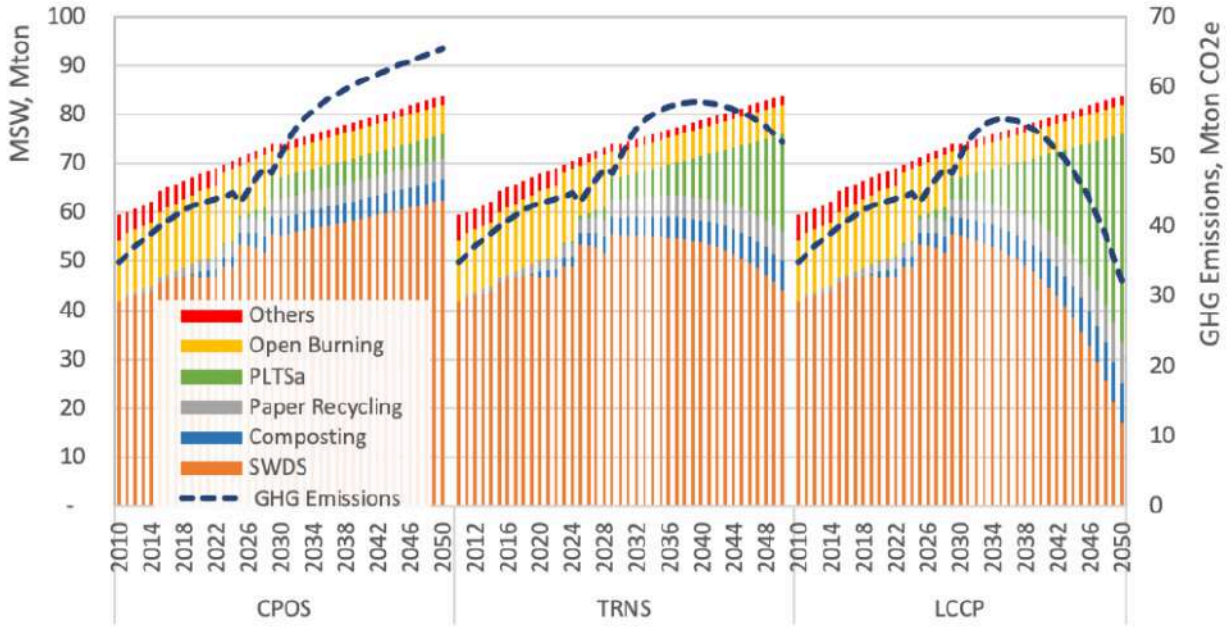
(Source: Indonesia First NDC, 2016)

Annex 4. Enhanced NDC Strategies for Municipal Solid Waste

Mitigation plan	Type of waste handled	Target CO2-e (CM1)	Target CO2-e (CM2)	Target waste treated (CM1) - ton	Target waste treated (CM2) - ton
LFG utilisation	MSW	1,500,000	1,500,000		
Composting & paper recycling	MSW	4,800.000*	4,800,000*	Composting: 3,700,000 Paper 3R: 3,700,000	Composting: 3,700,000 Paper 3R: 3,700,000
WtE incinerator/ RDF implementation	MSW	1,900,000	1,900,000	4,600,000	4,600,000
Zero landfill strategy	MSW	6,200,000	6,200,000	10,200,000	10,200,000

(Source: Indonesia ENDC, 2022)

Annex 5. Indonesia's Waste Pathway Emission Scenarios 2010-2050



(Source: Indonesia LTS-LCCR 2050, page 71, 2021)

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GAIA is a network of grassroots groups as well as national and regional alliances representing more than 1000 organizations from 92 countries. With our work we aim to catalyze a global shift towards environmental justice by strengthening grassroots social movements that advance solutions to waste and pollution. We envision a just, Zero Waste world built on respect for ecological limits and community rights, where people are free from the burden of toxic pollution, and resources are sustainably conserved, not burned or dumped. www.no-burn.org

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