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Implementation of Domestic Waste Management Policy in Batam City: Weimer And Vining Perspective

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Abstract: : Batam confronts difficulties in home garbage management, characterized by a rise in unregulated waste. The Batam City Government has promulgated Batam Mayor Regulation No. 5 of 2023, which outlines regional policies and strategies for the management of household waste and household-like waste, serving as a guideline for domestic waste management. Nevertheless, the current circumstances indicate that the waste issue remains unresolved. This study seeks to analyze the determinants affecting the execution of this policy, utilizing the policy implementation theory framework proposed by Weimer and Vining (2010), which explores policy logic, support, critical components, and the capacities of implementers. This research employs a qualitative methodology, including data collection methods such as in-depth interviews, observations, and document analysis at the Batam City Environment Agency. The study's results indicate that, logically, the policy has not yet fulfilled its aims. Political backing is present; yet, financial and technological assistance remain constrained. Critical components, including the transport fleet, are not in optimal shape, and landfill infrastructure is also inadequate. Roles are divided among the implementers. Proposed recommendations include regular oversight and evaluation by environmental management agencies concerning policy execution, enhancement of waste handling and management infrastructure, and augmented support and stakeholder engagement through public-private partnerships and corporate social responsibility involvement in domestic waste management.

Keyword: Policy Implementation, Domestic Waste, regional policie

INTRODUCTION

Indonesia confronts persistent difficulties in plastic and general waste management, evidenced by significant mishandling, excessive generation, and considerable contributions to marine litter (Oposa & Baker, 2024; Aryani & Purwanto, 2021; Setiabudi et al., 2022). The national and regional policy framework consists of a combination of legal statutes, ministerial regulations, action plans, and local ordinances focused on waste reduction, collection, recycling, and producer responsibility; however, enforcement, coverage—particularly

traditional markets and rural areas—and integration among stakeholders are inconsistent (Maskun et al., 2023; Oposa & Baker, 2024; Suasono et al., 2023; Setiabudi et al., 2022).

Moreover, waste management has become a critical issue in metropolitan environments. The rapid acceleration of urbanization and population growth presents a major obstacle for local governments across Indonesia regarding waste management. Municipal governments face difficulties in handling the escalating volume of garbage, which adversely impacts the environment and quality of life, leading to heightened pollution, health hazards for inhabitants, and the deterioration of natural resources. These situations highlight the imperative for effective and sustainable waste management strategies to prevent further negative consequences. Law No. 18 of 2008 on Waste Management regulates national waste management. The Indonesian government strengthened its waste management rules with the issuance of Presidential Regulation No. 97 of 2017, which addresses the National Policy and Strategy for the Management of Household and Household-like Waste. Similarly, some provinces and municipalities in Indonesia have enacted policies pertaining to trash management, including mandates on garbage segregation, recycling programs, and sanctions for improper waste disposal (Abdillah, 2023; Al Qadar et al., 2023).

These policies have revolutionized waste management practices that formerly depended on traditional methods, specifically collection, transportation, and disposal at final disposal sites (TPA—Tempat Pembuangan Akhir), into source-oriented waste management based on the 3R (Reduce, Reuse, Recycle) framework. This method promotes communities to segregate garbage at its origin, repurpose recyclable items, and properly dispose of non-recyclable waste (Pamuji, Nasihuddin, Muslichah, et al., 2022). Furthermore, Indonesia has implemented several novel waste management techniques, such as waste-to-energy conversion, community-oriented trash management, Black Soldier Fly (BSF) technology, recycling advancements, and waste banking systems. These strategies are deemed effective in minimizing waste production in urban environments while simultaneously enhancing community engagement (Abdillah, 2023; Al Qadar et al., 2023; Lestari & Setyaningsih, 2019; Pamuji, Nasihuddin, Muslichah, et al., 2022; Ramang et al., 2023; Sutisno et al., 2023; Syafrudin et al., 2021).

Numerous studies demonstrate that waste management issues are affected by several factors, including inadequate stakeholder participation and support (Al Qadar et al., 2023; Qomariyah & Hamid, 2023; Nur Aini et al., 2022; Lestari & Setyaningsih, 2019; Salampessy & Febryano, 2019), insufficient understanding and awareness among communities and policy implementers (Abdillah, 2023; Pamuji, Nasihuddin, Muslichah, et al., 2022; Pamuji, Nasihuddin, Sukirman, et al., 2022; Qomariyah & Hamid, 2023), lack of regulatory clarity (Abdillah, 2023; Pamuji, Nasihuddin, Muslichah, et al., 2022; Pamuji, Nasihuddin, Sukirman, et al., 2022), and limited resource availability (Qomariyah & Hamid, 2023; Syafrudin et al., 2021; Wulandari et al., 2021). This study demonstrates that numerous variables influence policy implementation, originating from both individual and group levels (Subarsono, 2023). Consequently, these elements influence policy performance and dictate the efficacy of implementation in practice. Therefore, a comprehensive understanding of the elements affecting waste management is crucial for devising more effective and sustainable methods. Despite the existence of distinct waste reduction policies in each Indonesian region, their implementation requires enhancement (Aziz & Arifin, 2024).

Batam City is one of the Indonesian towns and regencies that continues to encounter waste management challenges and has gotten admonitions from the Ministry of Environment and Forestry (Aprionis, 2025), Although waste management policies are in place, their execution in Batam City remains suboptimal. Refuse remains dispersed in public spaces (Arjuna, 2025b; Meilina, 2024), the establishment of additional final disposal sites has not occurred due to land limitations, and the revitalization of existing final disposal sites has not

been achieved (Gunawan, 2025). Community engagement in 3R-based trash management has not realized the anticipated results , as many residents remain unaware of the benefits of reducing, reusing, and recycling, leading to continued littering and ineffective waste disposal practices (Nurahman, 2025).

Numerous prior studies have investigated the implementation of waste management policies in Batam City, including an analysis of a sub-district that revealed suboptimal execution of these rules (Batubara et al., 2020). Socialization is necessary due to the community's lack of understanding of the 3R idea. A separate study evaluating waste reduction initiatives pursuant to Batam City Regulation No. 11 of 2013 determined that waste reduction efforts were negligible, as waste sorting was not commonly implemented and the assistance from waste disposal sites (TPS—Tempat Pembuangan Sampah), 3R, and waste banks was minimal (Solihin & Mulda, 2019). Further investigation into waste management in Batam City also indicated restricted policy execution owing to the lack of trash segregation (Mukhalladun & Khairina, 2023). The studies indicate that the implementation of waste management policies in Batam City has not achieved optimal levels, largely due to several issues, including insufficient community engagement (Lesna Nainggolan et al., 2023; Mahirah et al., 2022; Sirait et al., 2021). Nonetheless, no specific research has been conducted on the execution of domestic waste management policies under Batam Mayor Regulation No. 5 of 2023, which pertains to the Management of Household Waste and Household-like Waste Management, currently serving as the principal framework for domestic waste management in Batam City. Moreover, several research projects have exclusively investigated the execution of waste management strategies inside a singular subdistrict, neglecting to consider the entirety of Batam city. The implementation of theory differs, although Weimer and Vining's (2010) theory has not been utilized. This study provides empirical uniqueness by analyzing the execution of Batam Mayor Regulation No. 5 of 2023 at the city-wide level, rather than focusing on a specific region or policy. Furthermore, conceptual innovation is attained by employing Weimer and Vining's (2010) theory to discern elements affecting the execution of residential waste management regulations in Batam City.

The above discussion indicates that home waste management in Batam City has been inadequately executed, despite a clear policy framework. This study analyzes the determinants of policy implementation through the lens of Weimer and Vining's (2010) theory, which delineates four principal variables: (1) policy logic, referring to the coherence between policy objectives and targets, (2) support for policy implementation, encompassing political, financial, and technological backing, (3) critical policy elements, including resources and commitment, and (4) implementer capacity in executing policy both technically and administratively. This theoretical framework allows researchers to foresee and address challenges during implementation by connecting policy implementation and policy design and highlighting the necessity of ensuring that policy design is pragmatic and consistent with operational conditions (Weimer & Vining, 2010). In conjunction with this hypothesis, it will be advantageous for policymakers to foresee issues and devise more effective policies.

METHOD

This study utilizes a qualitative research methodology to elucidate the waste management system and determine the determinants affecting the execution of residential waste management policies in Batam City. Data were gathered from eight informants: three workers of the Batam City Environmental Agency (*Dinas Lingkungan Hidup, DLH)* and five members of the waste bank management committee in Batam City. Research informants were chosen by purposive sampling aligned with the research goals. The selection criteria for research informants included individuals with expertise in domestic waste management policies in Batam City, those acquainted with the workflow or execution of these policies, and

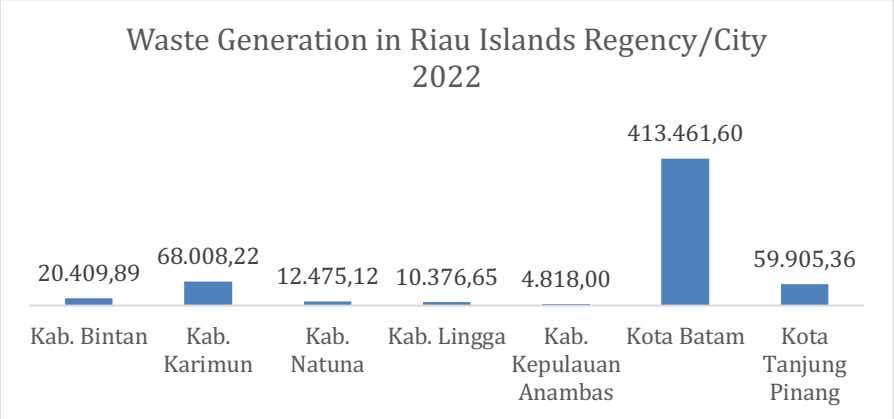
individuals directly engaged in policy implementation. This ensured that the informants provided complementary perspectives on the policy execution process. Data collection employed methodologies such as in-depth interviews, observation, and document analysis concerning waste management at home in Batam City. The instruments employed for data collection included a research-variable-specific interview guide, an observation guide, and assorted papers related to domestic trash management in Batam City.

The information acquired during the study was subsequently analyzed utilizing the data analysis methodology articulated by Huberman and Miles (1994), which concurrently integrates four components of data collection and analysis: (1) the data collection phase, (2) the data condensation phase—namely, the sorting and processing of data in alignment with the research questions, (3) the data presentation phase, and (4) the verification and conclusion-drawing phase. The researcher employed data triangulation for data verification (Denzin, 1978). Data triangulation was performed by juxtaposing the outcomes of interviews with each informant, observational results, and pertinent documents to validate the information acquired and to ascertain that data saturation was achieved—indicating that no additional information could modify the existing findings.

RESULTS AND DISCUSSION

Waste has emerged as a significant source of issues in Batam City . To comprehend the waste conditions in Batam City before the implementation of Batam City Mayor Regulation No. 5 of 2023, data on waste generation from 2021 and 2022 are provided as the timeframe prior to the execution of Jastrakda. In 2021, Batam City produced an average of 870 tons of garbage daily, culminating in a yearly total of 317,906.39 tons. In 2022, this figure rose to 1,133.05 tons per day, resulting in an annual waste generation of 413,461.60 tons (Figure 1). Batam City is the foremost contributor to total garbage creation among the regencies and cities in the Riau Islands Province.

Figure 1. Waste Generation by Regency/City in the Riau Islands Province in 2022



Source: National Waste Management Information System (SIPSN), 2025

According to SIPSN data, the waste composition in Batam City in 2020 was predominantly food waste, comprising 49 percent, followed by plastic trash at 19 percent and paper or cardboard waste at 10 percent. The predominant source of trash inputs was households, which constituted 71.96 percent. The second-largest source emerged from industrial zones, accounting for 10.93 percent, followed by office areas at 9.49 percent. The Batam City Environmental agency, in collaboration with the nine districts of Batam City, oversees trash management, specifically trash transportation. Each district is tasked with the collection of rubbish from residences and its transportation to a temporary waste disposal site. Thereafter,

the Batam City Environmental Agency conveys the waste from the disposal site to the Telaga Punggur Final Disposal Site. Table 1 delineates the quantity of waste transportation fleets possessed by the Batam City Environmental Agency and the nine districts within Batam City for the year 2022.

Table 1. Fleet Data for 2022

No	Sub-districts	Pick Up	Compactor	Dump-truck	Amroll Truck
1	Batam City	2	5	21	5
2	Sekupang	1	1	6	6
3	Batu Ampar	1		4	3
4	Lubuk Baja	1	1	14	4
5	Bengkong			6	6
6	Nongsa			3	2
7	Sei Beduk		1	1	5
8	Sagulung		1	10	7
9	Batu Aji	1	1	7	4

Source: DIKPLHD Batam City, 2023

The waste transportation operations in Batam City culminate at the Telaga Punggur Final Disposal Site, the sole final disposal facility in the City. The facility later manages the waste using open dumping, controlled landfilling, and sanitary landfilling techniques. The facilities and infrastructure for waste management at the Telaga Punggur Final Disposal Site have been recognized as necessitating expansion due to the ongoing increase in trash generation(Dinas Lingkungan Hidup Kota Batam, 2023). TThe restricted capacity of the Telaga Punggur Final Disposal Site underscores the necessity for downstream waste management and the use of technology solutions, such as recycling programs and waste-to-energy systems, to effectively handle the increasing volume of waste generated.

In 2021, the waste transportation percentage in Batam City was 73.50 percent, rising to 75.05 percent in 2022. The Batam City Environmental Agency, the entity tasked with garbage management in Batam City, sponsored public outreach initiatives concerning waste management in 2021 . The Vice Governor of the Riau Islands Province and the Mayor of Batam City participated in these outreach initiatives (Mediacenter, 2021). Community involvement in waste management is evidenced by the proportion of waste processed through the 3R methodology. In 2021, the percentage of waste managed by 3R practices attained 7 percent. This proportion rose to 13.26 percent in 2022. According to the Batam City waste recycling report, there were 212 Waste Bank Units (BSU – Bank Sampah Unit) in Batam City in 2021, with a processing capacity of 1.744 tons per day. In 2022, the quantity of BSU units remained constant, while the processing capacity escalated to 2.042 tons per day. In 2021, there was a solitary waste disposal site 3R facility with a processing capacity of 1.037 tons per day, a statistic that remained constant in 2022 (DLH Kota Batam, 2021).

Batam City Mayor Regulation No. 5 of 2023, known as the Regional Policy and Strategy of Batam City (Jastrakda – Kebijakan dan Strategi Daerah), governs domestic waste management as a systematic, comprehensive, and sustainable endeavor, incorporating both waste reduction and management policies (Pemerintah Kota Batam, 2023). This policy's implementation is funded by the Regional Revenue and Expenditure Budget. This ordinance allows Batam City to handle home garbage in alignment with local conditions. The entities engaged in the execution of this policy comprise the Batam City Environmental Agency, representing the Batam City Government in waste management, sub-district and district administrations across Batam City, the Municipal Police, the Regional Revenue Agency, the

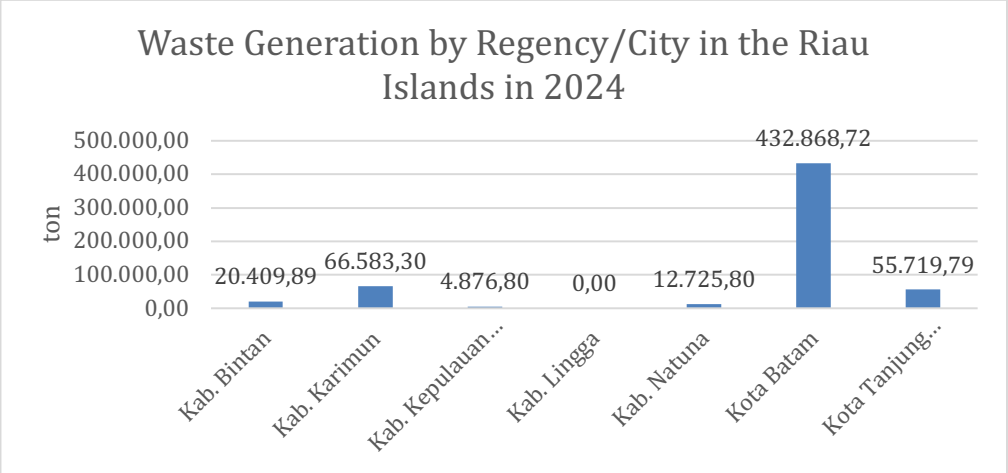
Department of Human Settlements and Spatial Planning of Batam City, the Regional Development Planning, Research, and Innovation Agency of Batam City, and other pertinent ministries. The execution of this policy also entails the involvement of the Batam City Regional House of Representatives Commission III, together with the mayor and deputy mayor of Batam City.

The strategy stipulates that waste reduction include the minimization of waste generation, waste recycling, and waste reuse, aiming for a target of 30 percent. Trash management encompasses the entire process from trash sorting to ultimate processing, aiming for a target of 70 percent (Pemerintah Kota Batam, 2023). Several policy initiatives on trash management have been formulated in Batam City. The primary objective is to enhance coordination and collaboration between the central government and local authorities. The second objective is to enhance community engagement via communication, information, and education. This method entails trash segregation via waste bank units, compost facilities, and 3R Final Disposal Site resources, engaging the community as a key policy implementer. The third objective is to enhance law enforcement. The fourth aspect is the execution and advancement of investment, operational, and maintenance strategies. The fifth strategy involves the implementation of eco-friendly domestic waste management systems. Finally, the establishment and advancement of incentive and disincentive systems in home trash management. The use of these reward and disincentive systems is anticipated to enhance the discipline of Batam City inhabitants in controlling domestic garbage.

Waste management in Batam City has become increasingly important following the government's decision to make waste a primary focus, as conveyed during the handover of office of the mayor and deputy mayor of Batam City on March 3rd, 2025 (Mediacenter, 2025). he Batam City Government has prioritized waste management strategy and has initiated a public reporting system for improper garbage disposal in Batam City. The Deputy Mayor of Batam City has been diligently performing site assessments in several areas within Bengkong District to recommend them as interim final disposal sites (Rizka, 2025). The Riau Islands Ombudsman has emphasized trash-related concerns in Batam City, notably regarding garbage services and the sluggish rate of waste transportation (Meilina, 2024). The Ombudsman recommended enhancements to trash management, including the optimization of waste transportation fleets with support from other authorities, such as the Municipal Police and Directorate of Security, to mitigate dispersed waste (Gudangberita.co.id, 2025; Oktarian, 2025). Commission III of the Batam City Regional House of Representatives convened a hearing meeting with the Batam City Environmental Agency and the twelve district heads of Batam City. The discussion addressed waste-related issues, specifically garbage transportation and management at the Telaga Punggur Final Disposal Site, which is facing a deficiency of heavy machinery (AriraNews.com, 2025)

Since the adoption of Jastrakda in Batam City in 2023, the KPIs for waste reduction are waste limitation, waste reuse, and waste recycling. Currently, waste management in Batam City has concentrated exclusively on trash transportation. Moreover, the garbage volume in Batam City continues to be substantial. In 2023, daily trash production was 1,159 tons, culminating in an annual total of 423,054.13 tons. In 2024, daily production rose to 1,186 tons, leading to an annual total of 432,868.72 tons. In 2024, Batam City continued to be the predominant source of garbage creation in comparison to other cities and districts in the Riau Islands Province, with a consistent composition primarily consisting of domestic waste.

Figure 2. Waste Generation by Regency/City in the Riau Islands Province in 2024



Source: National Waste Management Information System (SIPSN), 2025.

In 2024, waste transportation in Batam City remained under the jurisdiction of the Batam City Environmental Agency in partnership with nine districts. Moreover, third-party entities known as transporters execute trash transportation in industrial regions and designated zones. Currently, Batam City designates 540 task force individuals as garbage transport workers. The task force troops are structured so that each truck unit comprises four crew members and one driver. The Head of the Waste Management Division stated that garbage transport workers do not require specific skills, training, or prior experience. They are merely obligated to possess adequate physical strength to lift refuse and to be indifferent to trash odors. Nonetheless, for administrative reasons, task force personnel must still provide educational certificates, without any limitations on the level of education.

It is known that in 2024 there was an addition of waste transportation fleets in several districts, including Sekupang District, Batu Ampar District, Lubuk Baja District, Nongsa District, Sei Beduk District, Sagulung District, and Batu Aji District. The Ombudsman highlighted that most of the fleets used in Batam City are old or in damaged condition (Gudangberita.co.id, 2025). As of March 2025, the Batam City Environmental Agency had received 16 new fleets units consisting of 14 arm roll trucks and 2 dump trucks. These fleets units were procured using the 2025 budget allocation (Yuliandra, 2025). In addition, the Batam City Environmental Agency borrowed heavy equipment from the Department of Highways and Water Resources and the Department of Public Housing and Settlement Areas. The Head of UPT Punggur Final Disposal Site stated that no specific technology is used in waste transportation.

Table 2. Fleet Data for 2024

No	Subdistrict	Pick Up	Compactor	Dumptruck	Arm Roll Truck
1	Batam City	2	5	21	6
2	Sekupang	1	1	7	6
3	Batu Ampar	1		5	3
4	Lubuk Baja	1	1	15	3
5	Bengkong			6	7
6	Nongsa			4	2
7	Sei Beduk		1	2	5
8	Sagulung		1	12	8
9	Batu Aji	1	1	8	5

Source: Batam City Environmental Agency, 2025

In order to monitor waste volume, the Batam City Environmental Agency implements a waste weighing on SOP at Telaga Punggur Final Disposal Site. This procedure consists of several steps: (1) incoming waste is weighed together with its load (referred to as the incoming weight), (2) unloading is conducted at the disposal site, 3) the empty waste transport vehicle is weighed after unloading (referred to as the outgoing weight), and (4) based on the empty vehicle weight, the amount of waste transported is determined (referred to as the net weight). The implementation of this waste weighing SOP provides accurately measurable data on waste generation. The application of this SOP requires approximately 15 to 30 minutes.

Telaga Punggur Final Disposal Site remains the only final waste processing site in Batam City. There has been no addition of new final disposal site in Batam City due to land availability constraints (Naim, 2016). Similarly, the use of specific technologies for waste processing has not yet been implemented due to tipping fee issues (Herry, 2025). The methods used for waste management also remain the same, namely open dumping, control landfill, and sanitary landfill. Waste processing at Telaga Punggur Final Disposal Site, which initially applied an open dumping system, defined as a waste management system that merely disposes of waste in open areas without any specific treatment, has received formal warnings that resulted in the closure of waste disposal zones (Arjuna, 2025a). This system was reprimanded by the Ministry due to its potential to cause negative impacts on both the environment and public health. According to the Head of the UPTD (Regional Technical Implementation Unit) Telaga Punggur Final Disposal Site, as of 2025, it is striving to implement a controlled landfill system, in which waste piles are covered or compacted with soil layers after reaching a certain period. The covering of waste with soil layers at Telaga Punggur Final Disposal Site is scheduled to be carried out once every two weeks.

In 2023, the percentage of waste transportation in Batam City increased to 77.51 pecent, while in 2024 it rose again to 79.44 percent. The increase in waste transportation from 2021 to 2024 has reached the achievement indicator targets planned by Batam City. The achievement indicators for waste management had previously been adjusted in 2023.

Table 3. Comparison of Targets and Realization of Domestic Waste Management in Batam City 2021-2024

Years	**Domestic Waste Management Target at City Level (Tons/Year)**	**Target in Percentage**	**Realization**	**Realization in Percentage**
2021	299,024	74%	233,663	73.50%
2022	301,827	73%	310,313	75.05%
2023	304,598	72%	327,916	77.51%
2024	307,336	71%	343,336	79.44%

Source: Batam City Mayor Regulation No. 5 of 2023 on the Management of Household Waste and Household-like Waste and the Jastrakda Reports for 2021-2024, 2025.

There was an increase in the proportion of waste managed through the 3R approach in 2023, reaching 16.53 percent. In 2024, this figure increased again to 17.54 percent (Nurahman, 2025). The number of BSU in 2023 declined to 143 units, with a total processing capacity of 2,281 tons per day. In 2024, the number of BSU units increased again to 154 units. With regard to 3R Final Disposal Site facilities, in 2023 there was only one unit with a waste processing capacity of 490 tons per day. The number of 3R Final Disposal Site facilities in 2024 remained the same, consisting of only one unit. Public outreach activities conducted by the Batam City Environmental Agency in 2023 and 2024 were limited due to budget efficiency measures. Staff members of the Batam City Environmental Agency stated that in 2023 there were only 50

outreach activities, while in 2024 the number decreased to 20 activities. The number of outreach activities declined further in 2025, with only 12 activities conducted. These outreach activities continued to be accompanied by the Vice Governor of the Riau Islands Province and the Mayor of Batam City. In addition, there were community service activities in Batam City that focused on socialization of independent waste management at the neighborhood association level, showing that initially, community members were resistant to independent waste management due to the perception that it would increase their workload. However, through persuasive approaches and the demonstration of the benefits of waste management, communities gradually became able to participate actively in waste management activities (Asmarawati & Wibowo, 2024).

Table 4. Budget Allocation for Activities of the Batam City Environmental Agency, 2021-2024

Years	Budget Amount (in Billions)	Amount of Waste Management Budget
2021	87,8	93,93%
2022	87,5	80,63%
2023	91,8	80,95%
2024	60	-

Source: Batam City Environmental Agency, 2025

Based on table 4, the budget allocated to the Batam City Environmental Agency increased continuously from 2021 to 2023. However, the portion of the budget used specifically for waste management decreased over time. In 2024, the total budget declined to 60 billion rupiah due to budget allocations being redirected toward infrastructure development in Batam City. This budget reduction had an impact on fleet procurement activities and outreach activities related to waste management in Batam City (TERASBATAM.ID, 2024). This condition was also confirmed by staff of the Batam City Environmental Agency regarding the decline in the number of outreach activities.

Batam City has implemented a prohibition on improper waste disposal along with corresponding sanctions, however, scattered waste an even illegal dumping sites are still frequently found in inappropriate locations, such as along roadsides. Although regulations regarding fines for violations have been enacted, improper waste disposal continues to occur (Pratika & Hidayat, 2024). The regulation used as the legal basis for imposing fines is Batam City Regional Regulation No. 11 of 2013 on Waste Management.

Based on the research findings, waste conditions in Batam City indicate that daily waste colume continues to increase, and Batam City remains the largest contributor of waste in the Riau Islands Province. Although Jastrakda has been implemented in Batam City, policy implementation continues to face challenges. The waste management process cannot be separated from waste segregation at the source. This process is influenced by community behavior and motivation. Waste segregation in Batam City remains very limited when compared to the target of 30 percent. Similarly, landfill revitalization has not yet been undertaken, and outreach activities remain limited. These conditions indicate a gap between policy design and policy implementation practices in Batam City, highlighting the importance of reviewing the factors that influence the implementation of waste management policies. Policy implementation does not depend solely on policy design, but also on the organizational capacity to provide and utilize available resources, such as labor, funding, equipment, and facilities required to implement policies effectively (Weimer & Vining, 2010).

Policy Logic

Policy logic identifies the alignment between policy objectives and policy targets by examining the desired outcomes and achievement indicators. It is also necessary to identify the

existence of SOPs that serve as guidelines for policy implementation. The presence of regulations related to waste management is considered important, as such regulations provide a structured framework capable of guiding waste management efforts. Other perspectives suggest that policies related to waste management also enact clear responsibilities for various policy actors, set standards for waste processing, and enforce compliance (Abdillah, 2023).

The objective of Batam City Mayor Regulation No. 5 of 2023 on the Regional Policy and Strategy of Batam City in the Management of Household Waste and Household-like Waste, also referred to as Jastrakda, is to realize integrated and sustainable waste management in Batam City in alignment with national policy directions and regional development plans. This policy also serves as a directional target for waste reduction and waste management activities, as well as a guideline for local governments in formulating programs, activities, and budgets related to waste management. Under the Batam City Jastrakda, waste reduction consists of limiting waste generation, waste recycling, and waste reuse. The target to be achieved in 2024 is 28 percent, while by 2025 it is expected to reach 30 percent. Meanwhile, wasting management includes the process of waste segregation from upstream to final processing downstream. Waste management has a target of 71 percent in 2024, which is adjusted to 70 percent in 2025. Regarding to waste management, several policy directions have been planned in Batam City. First is to strengthening coordination and cooperation between the central government and local governments. Second is to strengthening community involvement through Communication, Information, and Education. Through this strategy, waste segregation is to be forced through waste bank units, composts houses, and 3R Final Disposal Site facilities, involving the community as one of the policy implementers. Third is to strengthening law enforcement. Fourth is the implementation and development of investment, operational, and maintenance schemes. Lastly is the implementation and development of incentive and disincentive systems in domestic waste management. The existence of these incentive and disincentive systems is expected to improve the level of discipline among the residents of Batam City in managing domestic waste.

According to Weimer and Vining (2010), policy logic should not be viewed solely through the lens of objectives and performance indicators, but must also emphasize the existence of a “chain of hypotheses” (Weimer & Vining, 2010). This implies that it is essential to examine and validate policy logic as a chain of cause and effect to determine whether a policy can be implemented. The absence of a strong and realistic logic can make it difficult for a policy to succeed. The Batam City Waste Management Agency (Jastrakda) assumes that waste management begins with source separation through the 3R approach, increased community participation, the need for investment support, and the use of technology to reduce waste generation, lower waste handling costs, and increase waste reduction targets. However, research findings indicate that these assumptions have not yet fully materialized in practice.

When examining the implementation of waste management since the enactment of Jastrakda in 2023 and 2024, it is evident that the waste management target in 2024 has exceeded the planned target (Table 3). According to the policy design, the percentage of waste management should decrease annually, while the percentage of waste reduction should increase annually. By 2024, Batam City should have been able to handle only 71 percent of its waste, accompanied by a waste reduction rate of 28 percent. This figure was intended to further decline in 2025 to 70 percent for waste management, while the waste reduction target was expected to increase to 30 percent. However, in Batam City, these targets have not been achieved as intended, as the waste reduction rate remains low at 17.54 percent in 2024 (Nurahman, 2025). A decline in waste management indicates that waste has been managed from upstream sources. However, in Batam City, community involvement in waste segregation at the upstream level through compost houses and 3R Final Dispose Site facilities remains limited. Similarly, public compliance in proper waste disposal remains low. Other aspects, such

as the implementation and development of investment schemes in Batam City, have also yet to materialize in actual waste management practices. This condition is attributed to the absence of a regional regulation governing tipping fees. This constraint has hindered the application of domestic waste management technologies. Consequently, these conditions affect the implementation of both waste reduction and waste management policies in Batam City.

Although the waste transportation target has exceeded the planned target, in practice, domestic waste in Batam City is not always collected by waste transportation fleets. Several illegal temporary waste disposal sites have been identified, with waste accumulating in various locations. In addition, not all residential waste is collected by the Batam City Environmental Agency, which ultimately leads some residents to dispose of waste at illegal waste disposal sites. Waste transportation is supposed to be conducted twice a week, however, in reality, waste is often collected only once a week. (Meilina, 2024). This situation is caused by limitations in the number of waste transportation fleets. As a result, even though SOPs clearly regulate waste transportation activities, the Batam City Environmental Agency continues to face difficulties in carrying out waste collection services. Residents living in a formal or slum settlements do not receive waste collection services. Although they are allowed to dispose of waste in the nearest bin containers, many of them still dispose of waste indiscriminately (Solihin & Parlindungan, 2018). Stricter supervision by the Batam City Environmental Agency is increasingly required to monitor waste accumulation (Irawati et al., 2025; Nurjanah, 2025; Ramadhan, 2025).

Based on the findings related to policy logic, the objectives and targets of the waste management policy, when assessed through achievement indicators, had not met the intended targets by 2024. Ideally, domestic waste management should decrease annually, however, in Batam City, the achievement levels have instead continued to increase. This condition is influenced by the still limited level of waste reduction in Batam City. Although SOPs related to waste transportation are already in place, the implementation of waste transportation has not been able to adhere to the planned schedule due to limitations in waste transportation fleets. Thus, while the logic behind the Jastrakda policy has been established in theory, in practice there remains a gap between the policy design and the capacity for implementation at the operational level. This gap indicates the need to reinterpret the policy logic proposed by Weimer and Vining (2010) within the framework of decentralized governance in Indonesia, where institutional capacity and local regulations act as mediators in shaping policy outcomes.

Support for Policy Implementation

According to Weimer and Vining (2010), support for policy implementation depends on both coercive and non-coercive incentive structures for each party involved in implementation, particularly frontline implementers or street-level bureaucrats, which include political support, funding, technology, and clear timelines (Weimer & Vining, 2010). The presence of strong policy support, coupled with government initiatives, can increase public participation in policy implementation (Sari et al., 2024). Clear legal authority and strong political support can strengthen implementers' positions when facing pressure; furthermore, other resources such as funding, technology, and clear work timelines must also be adequate. The presence of these supports can foster effective implementation.

Political support in policy implementation may originate from policy implementers, legislative sponsor staff, fixer (intermediaries), local interest groups, local administrations, or local program executives (Weimer & Vining, 2010). Based on the research findings, the Batam City Environmental Agency provides political support by implementing the Jastrakda policy, then Commission III of the Batam City Regional House of Representatives acts as legislative staff that oversees the policy implementation process and plays a role in resolving implementation-related issues. The *fixers* providing political support for this policy include the

Batam City Regional House of Representatives, the Department of Highways and Water Resources, the Department of Public Housing and Settlement Areas, and the Riau Islands Ombudsman (Ombudsman Kepri). Local interest groups that contribute political support include community groups engaged in outreach activities, as discussed in the result section. Furthermore, the Mayor and Deputy Mayor of Batam City provide political support as local program executives by designating waste management as one of the government's primary focuses.

Based on the research findings (Table 4), financial support has been affected by budget efficiency policies, which have prevented the Batam City Environmental Agency from procuring additional waste transportation fleets. These budget efficiency measures have not only affected waste transportation activities but have also impacted waste segregation efforts. Outreach activities related to waste bank programs have likewise been affected. Outreach activities for waste bank programs, which are expected to encourage community participation in waste segregation, declined in 2025 compared to previous years. The existence of waste banks in Indonesia can contribute to more interactive environmental resilience and play a role in disseminating prudent waste management behavior among the broader community (Abdillah et al., 2024). Therefore, a decline in the intensity of outreach activities for waste bank programs may hinder efforts to increase community participation in waste segregation at the source. Knickmeyer (Sari et al., 2024) explains that education and public awareness campaigns can encourage community participation in waste segregation. Without adequate understanding of the negative impacts of improper waste management, efforts to introduce waste management practices often fail. This is further supported by findings from community service activities, which indicate that relevant and accessible outreach is essential in waste management efforts (Adicita et al., 2022; Asmarawati & Wibowo, 2024). Activating community participation can reduce waste volume and create strong synergy between the government and the community in addressing waste-related problems (Zuhdi et al., 2024). This lack of funding aligns with Weimer and Vining's (2010) theory regarding resources. Without adequate resources, policymakers will struggle to implement policies. Budget constraints undermine the effectiveness of non-coercive incentives, such as training and outreach programs, which should otherwise motivate community participation through waste banks.

Based on the research findings, it is evident that there is no utilization of technology in waste transportation or in downstream waste management. This condition is constrained by budget efficiency policies and the absence of a tipping fee policy. The absence of technology and tipping fees indicates that the systemic support assumed by Weimer and Vining (2010) has not yet been established, leaving frontline staff unable to improve their effectiveness. A clear implementation timeframe is defined as the determination of when each action should be carried out, thereby creating a structured and detailed timeline for policy implementation (Weimer & Vining, 2010). In waste management activities that focus on waste transportation, clear SOPs are already in place to regulate the sequence of waste management activities. When viewed from the Jastrakda policy, particularly the waste management policy, annual targets and programs have been clearly defined.

Based on the findings related to support for policy implementation, it is known that political support exists from policy implementers, legislative staff, *fixers*, local interest groups, and local program executives. Financial support has decreased due to budget efficiency measures, resulting in limited support for waste transportation activities. In terms of technology, no specific technology is utilized by the Batam City Government. Lastly, a clear implementation timeframe is already in place, as indicated by the existence of SOPs and the Batam City Jastrakda. Theoretically, these findings confirm the relevance of Weimer and Vining's (2010) theory in the Indonesian context by examining the existing level of support.

This may explain why public participation in waste management remains low despite the existence of political commitment.

Essential Elements of Policy

The essential elements of policy are defined as the availability of facilities and infrastructure used for domestic waste management. Facilities are defined as equipment or tools that are directly used in waste management activities. Meanwhile, infrastructure refers to supporting facilities or systems required to ensure that waste management activities operate effectively. According to Weimer and Vining (2010), the success of policy implementation depends heavily on the ability to bring together all the necessary elements from various stakeholders. The more diverse the elements that must be addressed, the more complex the policy implementation becomes (Weimer & Vining, 2010).

Although the number of waste transportation fleets was increased in 2024, not all available fleet units are in optimal condition for use in waste transportation. As a result, this condition continues to hinder the performance of domestic waste management in Batam City. Furthermore, additional fleets were procured again in 2025, both for waste transportation and heavy equipment at Telaga Punggur Final Disposal Site.Considering that waste management does not only involve waste transportation but also includes waste segregation, the infrastructure for waste management in Batam City remains limited, as there is currently only one final disposal site. The procurement of a new final disposal site is still constrained by land permitting issues. In addition, 3R waste disposal site facilities have not yet made a significant contribution, as they are only capable of managing 490 tons of waste per day due to incentive-related constraints. Meanwhile, the number of waste banks in Batam City has continued to increase.

Within the essential policy elements, the identification of commitments among policy implementers is also observed. These commitments may occur between government entities, between the government and the community, or between the government and the private sector. The commitment between the government and the community was verbally conveyed by the Mayor of Batam City for 2025-2030 period during the official handover speech, in which waste management was stated as one of the main priorities of the Batam City Government (Mediacenter, 2025). This commitment encompasses improvements in waste management facilities and infrastructure, the organization of sanitation teams, community involvement, and the implementation of supervision and incentive systems aimed at creating a clean and healthy environment.

Findings in Batam City illustrate the complexity of the elements involved in policy implementation as compared to theory. The waste collection fleet is managed by the Batam City Environmental Agency (DLH) and the sub-districts. Meanwhile, the landfill is managed by the DLH and other relevant agencies. On the other hand, 3R waste collection points and waste banks are managed by the community. The complexity of coordination among these actors requires the presence of fixers to mediate coordination among them. Although there is already a commitment, it is necessary to ensure that there is no tokenism or superficial compliance.

Issues related to the mismatch in the availability of facilities and infrastructures in waste management are not only experienced in Batam City but are also found in other regions (Dzuliazahra et al., 2022; Nur Aini et al., 2022; Syafrudin et al., 2021; Z, 2022). Inadequate facilities, particularly waste transportation fleets, result in waste accumulation along roadsides (Syafrudin et al., 2021) which also happened in Batam City. Other researchers have also noted that waste management infrastructure in Batam City has not functioned optimally (Justine et al., 2023), as domestically segregated waste is often recombined in waste trucks due to the absence of specialized vehicles. Given the limited infrastructure for waste management in

Batam City, support from 3R-based waste management is necessary. The 3R concept can be implemented by communities to strengthen understanding and application of household waste management at the source (Wulandari et al., 2021). Recycling activities accompanied by composting can also lead to a reduction in the volume of waste sent to final disposal site (Ramang et al., 2023). Waste-related problems require collective efforts involving the government, industry, and the community (Sari et al., 2024). Partnership between public and private sectors can enhance education and public awareness regarding waste management. Collaboration between the government and the private sector is considered a potential solution to limitations in government resources, including human resources, financial capacity, and other elements (Safi & Ekowanti, 2022; Zuhdi et al., 2024). This approach aligns with waste management issues in cities such as Surabaya and Pekanbaru, where challenges related to waste volume and the creation of clean urban environments have been addressed through cooperation with the private sector via the application of waste processing technologies that yield rapid and significant outcomes.

Based on the explanation above, it is evident that there has been a failure in the process of assembling the essential elements of policy in Batam City, consistent with the theory of Weimer and Vining (2010). The essential elements of policy in Batam City are already in place, although there are some shortcomings. For instance, the infrastructure—in this case, the waste collection fleet—is available in every subdistrict, albeit in a less-than-optimal condition. However, regarding infrastructure, the Batam City government has provided assistance in the form of a fleet, and a new fleet has also been provided using the 2025 budget. Unfortunately, infrastructure in Batam City remains very limited, so community participation, along with the government and the private sector, is needed in waste management using the 3R concept.

Implementer Capacity

According to Weimer and Vining (2010), there are three types of policy implementers, namely implementation managers, *doers*, and *fixers*. Implementation managers are defined as actors who assign specific tasks as modifications of existing SOPs to be applied by institutional personnel. In the context of domestic waste management, the party acting as the implementation manager is the Head of Waste Management Division (P2) of Batam City Environmental Agency, along with the staff withing the division. This division is responsible for managing waste-related issues in Batam City, both in terms of waste management and waste reduction. The enactment of SOPs and work flows related to waste management is also carried out by this division.

Doers are actors who directly implement policies in order to achieve the intended policy outcomes. In the waste management policy, which uses waste transportation as its primary performance indicator, the parties acting as *doers* are waste management task forces. The involvement of private entities in domestic waste transportation in Batam City can also be identified as *doers*, namely transporters who are responsible solely for transporting waste from industrial or commercial areas based on previously established agreements.

The final group of implementors consists of problem solvers or *fixers*, who play a role in providing clarification or negotiating between policy designers and policy implementers. In addition, *fixers* also contribute to the implementation process by assisting in securing the elements required for policy execution (Weimer & Vining, 2010). In the context of domestic waste management in Batam City, these actors can be identified as Commission III of the Batam City Regional House of Representatives, the Riau Islands Ombudsman, the Department of Highways and Water Resources, and the Department of Public Housing and Settlement Areas. Problems related to waste transportation are addressed collaboratively by these parties in coordination with the Environmental Agency of Batam City.

This finding confirms Weimer and Vining's (2010) theory regarding implementers' motivation, which states that the success of implementation depends heavily on the motivation of the implementers. If implementers consider the policy important and desire its success, they will mobilize energy and resources to achieve the policy's objectives. This further underscores the need for fixers to assist in implementation, overcome obstacles, and bridge various competing interests

However, considering that domestic waste management should not only consist of waste transportation but also includes waste segregation, waste collection, and waste processing, other actors that can be identified as *doers* are the residents of Batam City. Community contributions in Batam City remain low, particularly when viewed from the level of waste segregation activities, which are still perceived as inconvenient by the public. Although the Batam City Government has implemented waste segregation programs based on the 3R concept (Reduce, Reuse, Recycle) at the source, segregation practices remain minimal due to low public awareness regarding waste sorting (Justine et al., 2023). Low participation in waste segregation further exacerbates the increasing volume of waste, which continues to rise alongside urban activity growth, including population mobility and consumption patterns in Batam City that are dominated by single-use packaging (Environmental Agency of Batam City, 2024).

Furthermore, when examining the interaction between *fixers* and *doers* in relation to the domestic waste management policy in Batam City, it can be considered relatively effective. This is because each party has participated in providing solutions to waste management issues in Batam City. The Mayor and Deputy Mayor have also been actively involved in listening to public complaints related to waste issues. Proportional task distribution among agencies involved in the implementation of waste management policies can enhance public trust in the government (Kurnianingsih & Alamsyah, 2021). The analysis of interactions among implementors aligns with the approach proposed by Weimer and Vining (2010), which emphasizes the importance of understanding the behavior, motivation, resources, and political context of actors responsible for policy implementation. Therefore, policy implementation is not merely the execution of policy plans, but also involves navigating the capacity of implementors and the support required to overcome potential obstacles.

Based on the explanation regarding the capabilities of the implementers above, it can be concluded that there is already a division of roles among the implementers of domestic waste management policies in Batam City. However, support from the "doers"—particularly the community—remains low, necessitating further support from the "fixers." It is not possible to determine which group has the greatest influence on policy implementation, given that each group plays its own distinct role. Effective synergy among these three types of policy implementers can enhance the success of waste management policy implementation in Batam City.

CONCLUSION

Policies related to domestic waste management at the local level have been established through regulations on the reduction and management of domestic waste. Nevertheless, the implementation of waste management which uses waste collection as a benchmark still frequently faces issues such as litter. An analysis of the factors influencing the implementation of domestic waste management policies based on four variables from Weimer and Vining, yields the following findings:

1. The policy already has clear direction and objectives in accordance with national and local regulations. However, based on performance indicators, policy implementation has not yet met its targets. Domestic waste management should be decreasing annually, yet the volume of waste collected has actually been increasing. Standard operating procedures (SOPs) for

waste collection are in place, but waste collection operations have not been carried out according to the desired schedule due to limitations in the waste collection fleet.
2. Political support is present and demonstrated by several actors, including local governments and regulatory agencies. However, support in terms of budget allocation and technology remains limited, resulting in reduced socialization activities and minimal technological innovation in waste transportation.
3. Facilities in the form of waste transportation fleets are available in each district, although a significant portion of the fleets are aging. Infrastructure in the form of landfill facilities is limited, thereby hindering the efficiency of waste management. Nevertheless, there is a strong commitment from the government regarding waste management. Commitment from the community and the private sector is also required to enhance waste management capacity in Batam.
4. There is a division of roles among implementation managers, doers, and fixers. Each group works together to support the implementation of domestic waste management policies.
5. Based on the findings of research on factors influencing the implementation of domestic waste management policies, the following improvements can be made: Conduct regular supervision and monitoring by environmental management agencies to ensure that policies are implemented in accordance with the policy plan; Enhance waste management infrastructure and downstream waste handling to address issues of uncollected and accumulating waste; Increase stakeholder support and participation through partnerships with the private sector (public-private partnerships) and corporate social responsibility (CSR) initiatives in implementing domestic waste management. Additionally, conduct early education and waste sorting campaigns for the public to improve waste management at the source.

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