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Recommendations for Sustainable Waste Management Technology in Palembang City

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Abstract. Industrial waste includes various types of materials that are no longer useful, economically valuable, or desirable in an operational context. Industrial waste management requires a special approach, the potential environmental and health impacts that can be caused. The waste management technology used depends on the type of waste generated, which is already known by the people in Palembang City is a waste management technology that is not so complex in its process. How far the people of Palembang City know the technology and its application needs further research. The purpose of this research is to review the literature and identify waste sources, policies, technologies, inhibiting factors, and assessment of waste management technology. The research method used a case study systematically and holistically to gain a comprehensive understanding with steps; determining research design, case selection, data collection and analysis, preparation of findings, and evaluation, reflection and recommendation of sustainable waste management technology. The results of the study recommend sustainable waste management technology in Palembang City which includes: (a) waste sources come from households, offices, businesses, markets, public facilities and areas, (b) waste management policies are located in Government Regulations: Law, Perpres, Permen and Perda, (c) waste management technology is still not integrated and operates in open dumping, (d) inhibiting factors; institutional aspects, financing, regulations, community participation, technical operations, and (e) the execution of zero waste management and comprehensive waste management technology recommendations that are sustainable and environmentally friendly are highly recommended.

Keywords: Waste management, technology, sustainable.

INTRODUCTION

South Sumatera Province records that waste production in the region reaches 1,180 tonnes per day, but only 800-900 tonnes per day are transported to landfills. Currently, the amount of household and industrial waste production reaches 1,300 tonnes per day. This waste problem also occurs in the city of Palembang, namely the accumulation of waste everywhere (Miriya Argatha et al., 2023). The waste problem in Palembang city has entered the emergency category along with the increasing population density. Waste production is

increasing, while the land to accommodate it is getting limited. Based on data from the city's Department of Environment and Hygiene (DLHKK), Palembang city produces 800-850 tonnes of waste per day, even during the weekend it can reach 900 tonnes per day. In accordance with the Metropolitan City standard, which is a waste generation rate of 0.0035 m3 / person / day, Palembang City with a population of 1,471,443, produces 5150.05 m^3. But the waste that can be transported at this time is 5,710 m^3. So the amount of waste that has not been served is 452.52 m^3 (Alfansyah et al., 2024).

The average daily waste generation is 4,698 m^3. Only about 54-58% of this waste can be managed from the total waste. The low level of waste management is due to the limited infrastructure and facilities owned by the Market Office and the City Cleanliness Office. For organic waste under certain conditions can produce methane gas which has an impact on the greenhouse effect which, if not addressed, can endanger the environment (Deselta & Nugroho, 2021).

Waste collection and transportation facilities in Palembang City to the landfill are managed by 44 Dump Trucks (each Dump Truck can transport 6 m3 of waste per haul). There are 22 Arm Roll trucks spread across the city, while there are 14 Convertor Trucks. Waste management is still very low due to the limited number of waste collection facilities that can only manage half of the total amount (Nurdin et al., 2024). Another major problem is the limited facilities and infrastructure owned by the Market Office and the City Hygiene Office to sort and distinguish the types.

Certain inorganic materials that can be repurposed include plastic wrappers from food, bottles and cups, cans, glass items, and various types of paper, such as newspapers, high-visibility sheets, or cardboard. This type of refuse can serve as business waste or be utilized as scrap that can be traded to produce different items. (Setyono & Sinaga, 2021; H Setiawan & M Rinamurti, 2021). Organic and inorganic waste in Palembang City that can be processed is collected by residents in one place, the waste bank. The results of the collection of waste that has been sorted will then be deposited to the place of making waste crafts or to the waste collector. From the stages of waste processing that are generally carried out in landfills are land filling and stockpiling, sorting. The 3Rs, land filling and *upcycling* processes require special equipment/technology and methods. To find out the technology used, its effectiveness, further studies need to be carried out to explore and know to what extent waste management technology has developed (Novianti et al., 2023; Andini et al., 2022). Proper and efficient waste disposal is crucial for upholding environmental hygiene, safeguarding public health, and preserving nature. Waste management involves processes

like minimizing waste creation at the origin, categorizing, gathering, moving, treating, and responsibly and sustainably disposing of waste at the end. (Setiawan, D. 2020*)*.

Waste management technologies are diverse and constantly evolving to improve efficiency and reduce environmental impact (Setiawan et al., 2025). Here are some of the main technologies used in waste management: source reduction, physical and mechanical treatment, thermal technology, biological treatment, recycling, advanced and modern technology, hazardous waste management and treatment, landfilling, wastewater treatment.

Waste management involves a series of stages designed to handle waste in an efficient and environmentally friendly way (Diva Y.P.P. & Syadzadhiya Q. Z. N., 2023). The following are the main stages in waste management: source reduction, segregation, collection, transportation, processing, disposal, monitoring and evaluation, and education and public awareness.

The main roles of society in production and reduction are: responsible consumption choices, household waste management, environmental education and awareness, participation in waste reduction programmes, encouraging innovation and green technology, and leading by example.

Technology assessment is a process of systematic evaluation and analysis of a technology to assess various aspects such as effectiveness, efficiency, cost, environmental impact, social impact, and potential benefits and risks associated. The main objective of technology assessment is to provide comprehensive and evidence-based information to support decision-making regarding the development, implementation, or replacement of the technology (Siregar, R., & Siregar, H., 2021). The following are some of the main aspects that are usually analysed in technology assessment: effectiveness, efficiency, cost, environmental impact, social impact, safety and risk, potential benefits, technical feasibility, and regulation and compliance (Susdarwono, 2020).

METHODS

The research approach used was a case study model. Waste management recommendations require a systematic and thorough approach to gain a comprehensive understanding of conditions, challenges, and potential solutions (Anwar, M., Murah., Zainuddin, M. 2021). Waste characteristics data were collected through the following methods: (1) Field observation: the survey team made direct observations at strategic locations, such as landfills, temporary shelters, and public areas, to monitor waste collection and disposal patterns. (2) documentation study: secondary data was obtained from official

documents, such as reports from DLH Palembang City, academic studies, and publications related to waste management.

Waste characteristics data from secondary sources: (a) local government reports: waste management statistics from DLH Palembang City. (b) research and scientific publications: academic studies relevant to waste characteristics in urban areas. (c) non-governmental institution data: contributions from non-governmental organisations (NGOs) or organisations working in the environmental field.

DISCUSSION

Analyse the distribution of waste types (organic and inorganic), volume per capita per day, and waste management trends. This information is the basis for planning more efficient waste management strategies in Palembang City, including efforts to increase public awareness and implementation of the 3R system (Reduce, Reuse, Recycle) or management for hazardous and toxic waste, (Nursabrina, A., Joko, T., & Septiani, O. 2021; Utami & Syafrudin, 2018). The data collected in this study are organised and summarised as follows:

1. Data on waste characteristics and sources in Palembang City

Based on data from DLH South Sumatera Prov. (2023), waste generation is 900.28 tonnes/day with the following composition: food waste 53%, wood-twigs 5.5%, paper-cardboard 14%, plastic 17%, metal 1.5%, fabric 4%, rubber-leather 4%, and others 1% (SIPSN, https://sipsn.menlhk.go.id/sipsn/public/data/komposisi). The composition of household waste is 55.17%, offices 9.58%, commerce 5.81%, markets 19.4%, public facilities 3.73%, areas 3.99%, and others 2.32%.

2. Waste management policy in Palembang City

Palembang City has established various policies to manage waste effectively and sustainably (Table. 1). The findings regarding the recognition of waste management strategies in Palembang City are as follows. (Rony Kurniawan et al., 2024; Miriya Argatha et al., 2023).

3. Waste management technologies available for waste management in Palembang city.

Palembang City has implemented various technologies in waste management to improve efficiency and environmental sustainability. Table 2 describes several technologies related to waste management in Palembang City that are available implemented and become a reference in waste management in South Sumatra Province.

4. Factors inhibiting the implementation of waste management technology in Palembang City

The implementation of waste management technology in Palembang City faces a number of challenges and inhibiting factors, both from technical and non-technical aspects. The following are the main factors that become obstacles Table. 3).

Table 1. Local Government Policies related to Waste Management

Policy Source	Relevance to Waste Management
1. Regional Regulation (Perda) of Palembang City Number 3 Year 2015	The local regulation regulates the management of household and similar waste. It aims to protect and maintain the environment and guarantee the right of everyone to live in a healthy environment. The Perda covers the scope, principles, objectives, duties and authorities of the city government, waste management policy, waste management implementation, management and transportation institutions, rights and obligations, licensing, incentives and disincentives, disaster mitigation, cooperation and partnerships, financing and compensation, community roles, complaint and dispute resolution mechanisms, prohibitions, supervision and complaints, administrative sanctions, investigators, criminal provisions, and transitional provisions.
2. Regional Regulation (Perda) of Palembang City Number 3 of 2020	The amendment of Perda Number 3 Year 2015, regulates the management of household waste and similar waste with adjustments to the development and needs of more effective waste management.
3. Regulation of the Mayor of Palembang City Number 72 Year 2018:	The Regulation sets out the policies and strategies of Palembang City in the management of household and similar waste. This regulation covers aspects of waste collection, transport, processing, and final processing in a comprehensive and integrated manner.
4. Regulation of the Mayor of Palembang City Number 42 Year 2023:	The regulation regulates the management of waste disposal sites in the site plan. The aim is to ensure the provision of TPS that is safe for health and the environment, which fulfils criteria such as segregation into at least three types of waste, sufficient location and capacity, easily accessible, enclosed, and has a collection and transport schedule.
5. Waste Bank Programme	The Palembang City Government has initiated a waste bank programme in all sub-districts. This programme aims to increase community participation in waste management by sorting and recycling waste, as well as providing economic benefits for the community.
6. Integrated Waste Management Site (TPST) and Recycling Waste Service (LSDP) programmes	Through the TPST/LSDP programme, the community is encouraged not to litter but to sort it directly, separate organic and inorganic waste, and recycle waste that can be reused.

Table 2 Waste Management Technology in Palembang City

Waste Management Technology	Description Technology (Programme)
1. Integrated Waste Management Sites (TPST) and Recycling Waste Services (LSDP).	This programme encourages the community to sort waste directly, separate organic and inorganic waste, and recycle waste that can be reused. Through TPST/LSDP, the collected waste is processed into valuable products such as organic fertiliser, paving blocks, and plastic seeds, (Source: Bako Humas Palembang)
2. Waste Power Plant (PLTS)	Palembang is collaborating with PT Indo Green Power to build a facility that converts waste into electrical energy. The project is expected to process 1,000 tonnes of waste per day and produce electricity with a capacity of 20 MW, which can meet the needs of around 16,000 neighbourhoods, (Source: Antara News).
3. Reduce, Reuse, Recycle Waste Management Sites (TPS 3R)	Each village is encouraged to have TPS3R equipped with compost shredding and sieving machine technology. This innovation enables local waste management, reduces the volume of waste brought to landfill, and produces products such as compost and other recycled materials, (Source: PT. PUSRI).

5. Assessment of waste management technology (principles, methods and waste management) in Palembang City.

The following is an assessment of waste management technology in Palembang City which includes principles, methods, and management of waste management (Table 4.).

Table 3. Factors inhibiting the implementation of waste management technology

Inhibiting Factors	Description
1. Funding and Investment Limitations	- High Initial Investment Cost: Modern technologies such as Waste Power Plant (PLTS) require a large initial investment, including for facility construction, equipment purchase, and supporting infrastructure. - Limited Local Government Budget: Funding for waste management often competes with other priority needs such as infrastructure, education, and health. - Lack of Private Partnership: There is still a lack of private sector involvement in waste technology investment and management.
2. Lack of Community Awareness and Participation	- Culture of Littering: People do not fully understand the importance of sorting and managing waste at the household level. - Low Understanding of Technology: Education on the benefits of waste management technologies such as TPS3R or waste banks has not been evenly distributed across all levels of society.
3. Infrastructure Limitations	- Lack of Adequate TPS and TPS3R: Not all areas in Palembang City have waste management facilities that meet the standards. - Limited landfill capacity using the landfill method which is often overcapacity. - Limited Operational Technology: Waste processing machinery and equipment such as shredders or waste-based power plants are often not available in sufficient quantities.
4. Technical Constraints	- Lack of Expert Labour: Advanced technology requires trained labour, while the availability of human resources with technical expertise is limited. - Maintenance Issues: Waste treatment technology equipment and machinery often suffer from maintenance problems due to lack of spare parts or maintenance costs.
5. Unoptimal Regulations and Policies	- Lack of Law Enforcement: Existing regulations such as the prohibition of littering are often not consistently enforced. - Lack of Adequate Incentives: The government has not fully incentivised communities or businesses to engage in technology-based waste management.
6. Social and Cultural Factors	- Reliance on Traditional Systems: Many communities are still used to traditional waste management systems, such as burning or dumping waste into rivers. - Community Resistance: The construction of waste management facilities such as solar power plants or landfills often face resistance from the surrounding community because they are considered to pollute the environment.
7. Environmental Challenges	- Complexity of Waste Composition: The mixture of organic, inorganic, and hazardous waste complicates processing with certain technologies. - Increase in Waste Volume: Population growth and economic activity increase the amount of waste generated, so existing technologies are often overwhelmed.

Table 4. Assessment of Waste Management Technology in Palembang City

Aspects of Technology Assessment	Description
1. Principles of Waste Management	a. 3R Principle (*Reduce, Reuse, Recycle*) - Reduce: Reducing the volume of waste from the source, especially plastic and inorganic waste. - Reuse: Encouraging the reuse of usable materials, such as plastic bottles and cardboard boxes. - Recycle: Utilisation of waste with economic value, such as recycling plastic waste into plastic seeds or organic waste into compost. b. Circular Economy Implementing a circular concept, where waste is not only disposed of but processed into new resources, such as energy from waste (PLTS) or value-added products such as paving blocks. c. Sustainability Emphasising environmental sustainability by reducing the use of landfills that produce methane gas, and increasing processing based on environmentally friendly technology.
2. Waste Management Methods	a. Waste Collection - TPS3R system: Integrated waste management centres in each neighbourhood to sort organic and inorganic waste. - Waste Bank: People deposit their segregated waste and receive financial incentives. b. Waste Collection Waste that is not processed at TPS 3R or waste banks is transported to the landfill. This is done using a specialised fleet designed to prevent environmental pollution. c. Waste Processing - Composting: Organic waste such as food waste and leaves are processed into compost using simple technology such as compost bioreactors. - Recycling: Plastic, metal, and paper waste are recycled into new products such as plastic beans or building materials. - Waste-to-Energy (PLTS): Waste is processed into electrical energy through burning waste with modern technology such as incinerators. The PLTS project in Palembang is planned to process 1,000 tonnes of waste per day to generate up to 20 MW of electricity. - Sanitary Landfill: The landfill in Palembang City uses the sanitary landfill method to manage non-recyclable waste. However, the landfill capacity is limited and needs to be reduced by other treatment technologies.
3. Waste Management	a. Policy and Regulation - Perda Number 3 Year 2020: Community-based waste management, waste reduction from the source, and enforcement of sanctions for violators. - Perwali No. 72/2018: Household and similar waste management strategies by involving the community. b. Community Participation Community education through waste bank programmes, socialisation in schools, and plastic waste reduction campaigns. Involvement of local communities in small-scale waste management at TPS 3R. c. Cooperation with Private Sector Palembang City is collaborating with companies such as PT Indo Green Power in the construction of solar power plants and modern waste processing facilities. d. Monitoring and Evaluation System The city government conducts regular evaluations of the performance of TPS, waste banks, and landfill to ensure the effectiveness of management.

Waste has various forms, waste can be classified based on its source, nature, or composition. Waste management in Palembang city is currently still low, as seen from (a) waste generated is disposed of uncontrollably, into rivers, burned, which produces shortlived climate pollutants (SLCP). (b) the number of waste banks and TPS3R (Waste Processing Sites with the principles of Reduce, Reuse, Recycle) is also still low. (c) the organic fraction is still mixed in the TPS. (d) processing through composting in all TPS3R in the Palembang area needs to be improved because it still experiences various obstacles (e) proper waste handling through reduced disposal, reduced open burning, and increased composting practices are still lacking to help reduce greenhouse gas emissions significantly, (Alfansyah, M. A., Fitriani, H., and Hadinata, F., 2024). Table 5. the following are the types of waste based on several categories (Murdiyanto et al., 2024; Anam et al., 2023; Astuti & Irawan, 2021):

Table 5. Assessment of Waste Management Technology in Palembang City

Category	Description
1. By Source	a. Household Waste: Waste generated from household activities, such as food waste, plastic, paper, bottles, and cans. b. Commercial Waste: Waste from business activities, such as offices, shops, restaurants, markets, and hotels. Examples: cardboard, plastic packaging, and food waste. c. Industrial Waste: Waste generated from industrial production activities. Examples: scrap metal, chemicals, and factory residue. d. Construction Waste: Waste from building or demolition activities, such as concrete rubble, wood, asphalt, and metal. e. Agricultural Waste: Waste from agricultural activities, such as straw, leaves, twigs, and livestock manure. f. Electronic Waste: Waste of electronic devices such as televisions, mobile phones, computers, and batteries.
2. By Nature	a. Organic Waste: Waste that is easily decomposed naturally by microorganisms (biodegradable). Examples: Food scraps, Leaves, Fruits. b. Inorganic Waste: Waste that is difficult to decompose naturally (non-biodegradable). Examples: Plastic, Glass, Metal, Styrofoam. c. Hazardous and Toxic Waste (B3): Waste that contains hazardous and toxic materials that can pollute the environment. Examples: Medical waste (syringes, masks), used batteries, toxic chemicals.
3. By Composition	a. Wet Waste: Waste with high moisture content, generally derived from organic matter. Examples: food and vegetable waste. b. Dry Waste: Waste with low moisture content, usually inorganic. Examples: paper, cardboard, plastic, and cans.
4. Based on Decomposition Time	a. Rapidly Degradable Waste: Waste that can be decomposed in a short time by microorganisms. Examples: leaves and food waste. b. Non-degradable Waste: Waste that takes a long time to decompose. Examples: plastic, glass, and metal.
5. By Production Location	a. Municipal Waste: Waste generated from activities in urban areas, such as markets, shopping centres, and roads. b. Rural Waste: Waste generated from activities in rural areas, generally dominated by organic waste such as straw and leaves.

The Ministry of Home Affairs issued a policy on the stages of waste management mechanisms. Each stage of waste management is generally part of the authority of the local government, especially the regency/city. Stages from the source of waste-collection-temporary storage-transportation-processing will process waste in the form of composting houses, waste banks, TPS3R, thermal (inseneration/pyrolysis, gasification/carbonisation) and TPST. In the landfill processing stage, controlled landfill, sanitary landfill, and

environmentally friendly technology (PLTSA) are used. While the regional waste management mechanism includes; source (household, business, social, industrial, public), containerisation (unsegregated and segregated), temporary storage (TPST and TPS3R), transportation by distinguishing inorganic from recycled and organic transported by dump truck/compactor truck), final processing (organic waste is disposed of to landfill and inorganic is processed in industry then the residue is disposed of to landfill).

Palembang City has two landfills, namely Sukawinatan Landfill and Karya Jaya Landfill, Karya Jaya Landfill cannot be used because the facilities are not yet adequate while Sukawinatan Landfill has not been able to continuously manage energy from methane gas and only carry out 3R management (Deselta, A., and Nugroho, A., 2021). From some of the problems that are still faced and factors that hinder waste management in Palembang City, it is necessary to propose recommendations for modifications to waste handling by communities/institutions and the development of sustainable waste management technology, which is in line with the institutional model in regional waste management. Regional cooperation in waste management can be implemented at all stages of waste management in the region. The implementation of regional cooperation is expected to increase the efficiency and effectiveness of waste management services in the region. The mechanism also allows the region to transfer the risk of managing waste in the region.

To overcome these obstacles, the Palembang City government can take several steps as solutions that can be implemented such as: increase public education about the importance of sorting waste, mobilising partnerships with the private sector for funding and technology development, providing incentives for businesses and communities involved in waste management, increasing the capacity of experts through training and technical expertise development, collaborative efforts between the government, community, and private sector will be the key to the successful implementation of effective waste management technology in Palembang.

For implementation challenges such as (a) Infrastructure limitations: Not all areas have TPS3R or waste bank facilities. (b) Public awareness: There are still many people who have not sorted waste from home. (c) Limited Funds: Modern technology such as PLTS requires high costs, and funding from the APBD is often insufficient. The recommendations are (a) Optimisation of TPS3R and Waste Bank: Increase the number of TPS3R and waste banks in all sub-districts with incentives for communities. (b) Acceleration of PLTS Project: Accelerate the construction of PLTS to reduce dependence on landfill and generate clean energy. (c) Education and Campaign: Intensive campaign on the importance of household-

based waste management, especially in densely populated areas. (d) Strategic Partnerships: Attract investment from the private sector and international institutions to develop technology-based waste management infrastructure. (e) Strengthening Regulations: Strict law enforcement against waste management violations and incentivising businesses that contribute to sustainable waste management.

Operational techniques based on SNI 19-2454-2002 outlines the methods for managing urban waste, which encompasses the fundamental aspects of planning for: (1) The area served (2) The level of service (3) Operational methods, which include: a) Collection of waste b) Collecting waste c) Transferring waste d) Transporting waste e) Processing and sorting waste f) Ultimate disposal of waste. Efforts to sort and recycle waste should be implemented as extensively as possible from the point of collection to final disposal. (Abu & Marasabessy, 2023; Abu & Marasabessy, 2023; Adlan et al., 2023).

Ecobrick-based plastic waste management technology programmes can begin by building a shared commitment between communities and stakeholders. The programme involves various activities such as training, socialisation and production of *ecobricks* (Sisdianto et al., 2024). With this participatory approach, communities are invited to understand the adverse effects of plastic waste while being trained to process it into useful ecobricks. The primary aim of this initiative is to enhance community understanding, encourage residents to engage actively in handling plastic waste, and establish a clean and sustainable surroundings. (Majida et al., 2023). For organic waste processing technology, the concept of eco-farming system is applied. Eco-farming, as part of sustainable agriculture, is based on ecological principles that emphasise the harmonious relationship between organisms and their environment (Naryono et al., 2024; Anwar et al., 2021). Vegetable waste has great potential to be utilised as biogas feedstock due to its nutritional content, such as carbohydrates, proteins, and fats (Marcelino et al., 2023).

Zero waste management is an innovative approach that aims to create an efficient cycle of renewable resources. This concept encourages a fundamental change in the way society views waste, transforming it from something worthless to a valuable resource. The zero waste approach involves the implementation of waste reduction, recycling and wise waste management strategies, (Novianti, Rina Dian., Sudarti., Yushardi. 2023).

Every step of waste management needs to apply technology. Technology can be understood as the application of science to create solutions that facilitate human work, increase efficiency, and generate added value (Susdarwono, 2020). Within a manufacturing environment, technology encompasses advancements like automation, machine learning,

extensive data analysis, and interconnected devices. These technologies not only speed up the production process but also provide better insights in strategic decision-making.

The Palembang City Government has implemented various policies to address waste issues, including via the execution of the Local Waste Management Regulation and the establishment of waste management initiatives rooted in the community. However, the challenges in implementing waste management policies are still enormous. There are still problems related to public awareness in sorting waste, the lack of supporting infrastructure, and the lack of adequate budget allocation to support existing programmes (Setiawan et al., 2023; Pranata et al., 2021). This shows that waste management efforts in Palembang City require a more integrated and strategic approach.

The application of contemporary technology in managing waste is progressively emerging as a significant solution to this issue. Technologies such as *waste-to-energy* processing, automated recycling, and the utilisation of digital technology in waste management. These technologies not only help reduce environmental impacts, but also open up economic opportunities, such as the creation of renewable energy and high-value recycled materials (Setiawan et al., 2024; Hasianetara et al., 2021).

Waste generated in Palembang City mostly consists of organic waste, plastic, paper, and other materials. Due to the inadequate management of waste, a significant amount is disposed of in landfills or even contaminates rivers and nearby areas. Without proper management, piles of waste can cause more serious environmental problems, such as water pollution in the Musi River, which is an icon of the city and a source of life for the surrounding community. The identification of suitable sustainable waste management technologies is very important and is expected to manage waste more effectively and provide environmental, social, and economic benefits for the community (Sisdianto et al., 2024; Andini et al., 2022). Waste management, encompassing the gathering, movement, processing, and elimination of waste to reduce harmful effects on human well-being and the ecosystem, has developed to incorporate the concepts of the circular economy, which emphasises waste reduction through recycling and reuse of materials (Peng et al., 2023; Nursabrina et al., 2021). Teaching and social engagement regarding the significance of effective waste disposal is also key in building awareness and active participation from the community. With a good understanding, people can be more proactive in reducing waste production, sorting waste, and supporting recycling programmes. This will contribute to the creation of a cleaner and healthier environment, and support sustainable development (Kusmendar et al., 2023; Chisholm et al., 2021).

CONCLUSION

The research conclusions are; (a) sources of waste in Palembang City come from households, offices, businesses, markets, public facilities, areas, (b) waste management policies are located in local regulations: Law and PerPres, PerMen, Perda, (c) waste management technology available for waste processing is still not integrated and operates in *open dumping*, (d) factors inhibiting the application of sustainable waste management technology by considering 5 aspects of an integrated system, namely: 1) waste management institutions are not yet clear between regulators and operators, 2) financing still faces obstacles, 3) waste-related regulations are still limited nationally and regionally, law enforcement is still weak, 4) community participation is still low, and 5) technical operations of collection, transfer, transportation, and disposal / processing, (e) recommendations for sustainable waste management technology (principles, methods and waste management) such as *zero waste* management and *integrated* waste management have great potential to become a city with sustainable and environmentally friendly waste management.

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