

The Impact of Singapore's Investment in Improving Waste Management Through Circulate Capital in Reciki Solusi Indonesia

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Abstract

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Environmental issues are currently a concern for many countries, and Indonesia is one of the countries that needs help in creating sustainable development. The Singapore's Foreign Direct Investment (FDI) to Indonesia has increased after the Bilateral Investment Treaty (BIT) where it affects the implementation of sustainable development investment in Indonesia. This research uses a qualitative approach, the library research is conducted to the data collect data which then analyze descriptively. The results of this study, that Foreign Direct Investment (FDI) and green economy on Singapore's investment through Circulate Capital in Reciki Solusi Indonesia, explained the development of economy status also impact on the environmental sector, called waste management. The Circulate Capital Ocean Fund (CCOF) for the purpose of maintenance then develop Reciki Solusi Indonesia of "Improving Collection and Recovery" play a greater role enhance partnership in several cities / districts in Indonesia then, it also impact on local community empowerment for more job vacancies which directly enhance the social welfare.

Keywords: Circulate Capital, Investment, Reciki Solusi Indonesia, Singapore, Waste Management

I. INTRODUCTION

This research began with interest of Singapore's Foreign Direct Investment (FDI) related to waste management in Indonesia it impacts on economic growth and the development of waste management. The point of Singapore's Foreign Direct Investment (FDI) through Circulate Capital to improve waste management at PT Reciki Solusi Indonesia. Singapore's increasing foreign investment to Indonesia is all to be addressed as it is an important object of research. In order to see the extent of Singapore's Foreign Direct Investment, which then contribute to sustainable development in Indonesia.

The debate on twenty-first century on huge increase of plastic waste may continue to debatable reality on industrialization it. Plastic is more flexible and naturally durable, it is material that meets most of the packaging industry's needs. Although plastic has been produced in large quantities for about 60 years, this growth rate has accelerated to reach 8.3 billion metric tons which most of them are single-use items that end up in the trash.¹

Environmental issues started to gain attention in 1972 when the United Nations Conference on the Human Environment was convened in Stockholm. The link between economic growth and environmental degradation was first raised internationally at this meeting. Environmental problems are cross-border because: (1) moving resources are not limited to one country; (2) marine-related activities, such as shipping, mining, and migration of alien species, may impact some countries; and (3) the sea is a medium that can spread pollutants relatively easily. People know that this issue needs to be addressed collaboratively because of the goals or influence of this movement, which involves many countries.²

Nations are currently looking into using plastic trash to create value-added products that are both economical and environmentally friendly in order to implement the ideas of sustainable growth, environmental preservation, and green development.³ The industrial economy has produced a lot of waste that cannot be absorbed and transformed naturally by the environment because of its rapid development. Therefore,

¹ Suman Nandy, Elvira Fortunato, and Rodrigo Martins, 'Green Economy and Waste Management: An Inevitable Plan for Materials Science', *Progress in Natural Science: Materials International*, 32.1 (2022), pp. 1–9, doi:10.1016/j.pnsc.2022.01.001.

² Desi Arisanti, 'Politik Indonesia Dalam Isu Lingkungan : Studi Kasus Kepentingan Indonesia Dalam KTTPerubahan Iklim Di Paris Tahun 2015', Proceeding 6th University Research Colloquium 2017: Seri Humaniora, Sosial, dan Agama, 2017, pp. 269–80.

³ Duo Pan and others, 'Research Progress for Plastic Waste Management and Manufacture of Value-Added Products', *Advanced Composites and Hybrid Materials*, 3.4 (2020), pp. 443–61, doi:10.1007/s42114-020-00190-0.

waste management, or waste recovery and recycling, is considered one of the main sectors of the green economy ⁴.

In Singapore, packaging waste (including plastic) makes up around a third of all waste generated. According to Zero Waste Nation, packaging waste has been identified as a top priority waste stream that must be addressed for Singapore to become a Zero Waste Nation ⁵. Singapore's success in managing both domestic and non-domestic waste serves as a compared to neighbouring countries, especially Indonesia, which has quite concerning waste management issues. In Indonesia, waste management is something to consider as new phenomenon, so there are still many things to learn regarding effective and efficient of waste management.

The Ministry of Environment and Forestry (KLHK) reports that Indonesians produce 2.5 liters of waste every day. With around 268 million people living in Indonesia, this country produces 670 million liters of waste every year. Fourteen percent of this amount is plastic waste ⁶. Waste management results from input data from 128 districts and cities throughout Indonesia in 2023 have been published on the official website of the National Waste Management Information System (SIPSN). As a result, 17.4 million tons of waste will be generated annually by 2023. A total of 11.6 million tons, or 66.47%, of the waste in this data has been managed. A total of 5.8 million tons or 33.53% of additional waste is currently uncontrolled ⁷.

The end-of-pipe approach, which involves collecting, moving, and disposing of waste at the final waste processing plant, is still used by individuals to manage waste. Large garbage piles at waste processing facilities produce methane gas (CH4), it raise gas emissions and increase higher risk of global warming. It is costly and time-consuming to allow garbage mounds to naturally decompose ⁸.

The need for technological improvement to process waste management requires knowledge and funding, both from the government and the private sector. Therefore, Indonesia has chosen to open up to Foreign Direct Investment (FDI) as one of the supports in improving waste management. This is because the benefits of

⁴ *Sustainable Entrepreneurship and Investments in the Green Economy*:, ed. by Andrei Jean Vasile and Domenico Nicolò, Advances in Business Strategy and Competitive Advantage (IGI Global, 2017), doi:10.4018/978-1-5225-2075-7.

⁵ R Hicks, 'Singapore's Zero-Waste Plan Aims to Raise Domestic Recycling Rate from 22 to 30 per Cent by 2030', 2019 <<http://www.eco-business.com/news/singapores-zero-waste-plan-aims-to-raise-domestic-recycling-rate-from-22-to-30-per-cent-by-2030/>> [accessed 13 May 2024].

⁶ CNN Indonesia, 'Indonesia Penyumbang Sampah Plastik Terbesar Kedua Dunia.', 2016 <<https://www.cnnindonesia.com/gaya-hidup/20160222182308-277-112>> [accessed 13 May 2024].

⁷ Nur Aini Rasyid, '10 Kota Indonesia Penghasil Timbulan Sampah Terbanyak Sepanjang 2023', *GoodStats*, 21 April 2024 <<https://data.goodstats.id/statistic/10-kota-indonesia-penghasil-timbulan-sampah-terbanyak-sepanjang-2023>>.

JzP80#:~:text=Sistem%20Informasi%20Pengelolaan%20Sampah%20Nasional,timbulan%20sampah%20ahunan%20yang%20dihasilkan.> [accessed 22 April 2024].

⁸ Salim, *Ratusan Bangsa Merusak Satu Bumi* (Kompas Penerbit Buku, 2010).

Foreign Direct Investment (FDI) do not only focus on capital financing but also include the transfer of knowledge and technology, which has a broader scope that can be absorbed by the local community and implemented sustainably. Based on the article ⁹ that TNCs, or foreign national companies, have the ability to have a positive impact on a country's environmental protection efforts by refusing to deal with or invest in violation of environmental standards. Utilizing economic tools to provide incentives to businesses to preserve the environment in order to achieve sustainable development in Indonesia, the Indonesian government has implemented various policies related to environmental conservation. In addition, ¹⁰ describe FDI typically has a sizable positive impact on economic growth, it has a notably detrimental effect on the secondary sector. This study suggests that foreign direct investment (FDI) has the potential to stimulate economic growth, but its exact structure will determine its impact. Therefore, it is the duty of policymakers to direct investment in the right direction and maximize its positive impact on economic growth.

Indonesia is one of Singapore's invest partner and which then to be highest investor in Indonesia for now. According to ¹¹ one of the supporters of this activity is the existence of Bilateral Investment Treaty (BIT). BIT was evidence of collaboration between Singapore and Indonesia in the investment sector, despite its termination. Nevertheless, in 2020, just prior to the Covid-19 outbreak, Indonesia and Singapore signed the agreement. Only US\$6.5 billion was invested by Singapore in Indonesia in 2019, but once the Bilateral Investment Agreement (BIT) between Indonesia and Singapore was ratified, the total amount of investment realized in 2020 rose to US\$9.8 billion. The private company Circulate Capital is proof of Singapore's investment, especially in the field of waste management. This company specializes in providing funding to businesses, associations and startups that handle and prevent plastic waste. To overcome the plastic waste crisis, Circulate Capital partners with multinational companies such as Danone, PepsiCo, The Coca-Cola Company, Procter & Gamble,

⁹ Sri Wartini, 'THE IMPACTS OF FOREIGN DIRECT INVESTMENT TO THE ENVIRONMENT IN DEVELOPING COUNTRIES: INDONESIAN PERSPECTIVE', *Indonesian Journal of International Law*, 13.2 (2016), doi:10.17304/ijil.vol13.2.650.

¹⁰ Saswata Chaudhury, Nitya Nanda, and Bhawna Tyagi, 'Impact of FDI on Economic Growth in South Asia: Does Nature of FDI Matters?*This Article Is an Outcome of a Project Supported by South Asia Network of Economic Research Institutes under 16th RRC.', *Review of Market Integration*, 12.1–2 (2020), pp. 51–69, doi:10.1177/0974929220969679.

¹¹ Fadhilah Nur Amalina and Afni Regita Cahyani Muis, 'Efforts of Indonesia and Singapore in Increasing Foreign Direct Investment (FDI) Cooperation Through Bilateral Investment Treaty (BIT) during the Covid-19 Pandemic', 5.1 (2022) <<https://ejournal.unida.gontor.ac.id/index.php/mediasi/article/view/10025>>.

Unilever, Dow, and Chevron Phillips Chemical through venture capital funding ¹². Reciki Solusi Indonesia is one of Circulate Capital's choices in investing its capital.

Foreign Direct Investment (FDI) in this case is used as a development tool to improve waste management in Indonesia, which depends on the decisions made by policymakers regarding the investment. One of them is Circulate Capital, a Singapore-based company engaged in the circular economy, whose investments in Indonesia can benefit the Indonesian natural ecosystem. Reciki Solusi Indonesia, as the recipient of the investment, has many advantages, especially in waste management, such as the transfer of knowledge and technology, the addition of integrated waste disposal sites in areas urgently facing waste issues, and so on, which essentially enhance the company's activities and effectiveness in managing waste in Indonesia.

In this research green economy also has an important else, where a green economy is an economy where public and private investments in energy and resource efficiency, pollution and carbon emission reduction, biodiversity preservation, and ecosystem services become the main drivers of economic growth and job creation. This will require significant increases in funding for industries that can minimize environmental hazards and deficiencies or enhance the Earth's natural capital. Supported by national policy reforms, international policies, and market infrastructure development, these sectors include renewable energy, low-carbon transportation, energy-efficient buildings, clean technology, better waste management, improved freshwater supply, sustainable agriculture, forestry, and sustainable fisheries ¹³.

Seeing the increasingly rapid development of Foreign Direct Investment (FDI) in the environmental sector and its significant impact on Indonesia's economic growth, there is a need for further research regarding the role of Foreign Direct Investment (FDI) in providing a positive impact to environment, such as investment in the waste management. Therefore, in this research the researcher attempted to study and analyse the impact of Singapore's investment in improving waste management through Circulate Capital at PT Reciki Solusi Indonesia.

II. METHODOLOGY

This research uses qualitative methods in conducting research. According to Moloeng, qualitative research aims to comprehend phenomena about what research subjects experience, such as behaviour, perceptions, motivations, actions, and so forth, holistically and through verbal and linguistic descriptions in a particular context that

¹² Heriyanto, 'Dua Pelaku Usaha Daur Ulang Bakal Dibiayai Circulate Capital', *Berita Satu*, 20 March 2020, Ekonomi edition <<https://www.beritasatu.com/ekonomi/610861/dua-pelaku-usaha-daur-ulang-bakal-dibiayai-circulate-capital>> [accessed 22 April 2024].

¹³ E H M Ahmed, *In The Economy of Green Cities* (Springer, 2013).

naturally employs a variety of natural methods ¹⁴. The choice of qualitative methods in this research aims to describe and explore the phenomenon under study, and to confirm the results of this research whether Singapore investment through Circulate Capital can really improve waste management at Reciki Solusi Indonesia. The qualitative research method in this research is carried out by describing phenomena related to the topic, then analyzing them using the research concept that has been determined by the author.

In this research, the author collected data, namely literature studies. Library research is a process of collecting library information about the object of research from various sources, such as indexes, reviews, journals, and reference books, as well as abstracts of research results ¹⁵. The classification of these literature sources is secondary literature/data. The author uses secondary literature sources to collect data in this research. The object of research focuses on the impact of Singapore's investment with the concept of Foreign Direct Investment (FDI) and green economy on improving waste management through Circulate Capital at Reciki Solusi Indonesia.

III. RESULT AND DISCUSSION

The effect of foreign investment on human capital emphasized in the case of greenfield foreign investment (especially to reduce unemployment number in the host country) as these investments usually result in new job creation and higher productivity. One type of foreign investment that is most welcomed by host countries is greenfield projects ¹⁶. In order to, develop national economic growth, especially in achieving sustainable development through projects that have goals for social and environmental interests. Foreign Direct Investment (FDI) in the green economy is one form of climate action that to deal with climate change.

The trade-off between social and economic efficiency puts pressure on companies to choose short-term projects that prioritize social responsibility and environmental protection. The projects selected usually require significant capital investment and a long duration. It takes time to see the benefits of green investments. Therefore, financial constraints are a major factor influencing businesses' decisions to invest in green projects ¹⁷. However, this does not encourage countries in the world to implement the green economy achieve sustainable development. The funding provided by developed countries today is not only profit-oriented, but also environment.

¹⁴ L J Moleong, *Metode Penelitian Kualitatif* (PT. Remaja Rosdakarya, 2017).

¹⁵ P D Sugiyono, *Metode Penelitian Kualitatif Untuk Penelitian Yang Bersifat: Eksploratif, Interpretif Dan Konstruktif*. Edited By Y. Suryandari (ALFABETA, 2020).

¹⁶ Nazmi Zeqiri and Hykmete Bajrami, 'Foreign Direct Investment (FDI) Types and Theories: The Significance of Human Capital', International Conference on Management, Business and Economics, 2016, pp. 43–59.

¹⁷ Thi Thanh Tu Tran and others, 'The Factors Affecting Green Investment for Sustainable Development', *Decision Science Letters*, 2020, pp. 365–86, doi:10.5267/j.dsl.2020.4.002.

Figure 1. Market Size of GSS+ from 2017 until 2023

Source: Climate Bonds Initiative

Aligned GSS+ issuance increased to USD870bn in 2023



Based on the figure above, the value of funding towards GSS+ (Green, SLB, Social, Sustainability) in 2023 financing is 871 USD. This is an increase of 6.3% compared to 2022 which only amounted to 842 USD. The peak of funding occurred in 2021 which reached 1000 USD, even so in 2023 it managed to increase compared to the previous year. So it can be concluded that this funding will continue to grow along with the activities of countries in the world in climate action.

a. Singapore Sustainable Development Investment

According to a joint by Bain and Temasek, private sector investments for Southeast Asia's green economy transition rose 20% to US\$6.3 billion (US\$8.58 billion) in 2023 from US\$5.2 billion the year before. For the first time since the report's initial release in 2020, it ranked the then Southeast Asia nations' decarbonization progress based on criteria such emission levels, regulatory frameworks, targets established, and net zero roadmaps. Singapore's score increased to 55, a four-point improvement. The city-state was top pf the index overall. The impacts from Foreign Direct Investment (FDI) is the concern here. Starting from technological advances, increasing economic growth, creating jobs to environmental changes. In this case, Singapore takes a smart step in utilizing the situation, where Singapore seeks to increase economic growth based on the green economy¹⁸.

Singapore has achieved economic growth, friendly environment, and social inclusion at the same time, by the means of higher level for industrialization and urbanization. However, instead of continuing the current linear "take-make-dispose" paradigm, Singapore understands the implementation circular economy, where the main goal is reducing resource reside and consumption. This creative strategy aims to

¹⁸ EDB Singapore, 'Green Investments in ASEAN Rise 20% to US\$6.3 Billion in 2023, Bain, Temasek Report', 5 September 2024 <<https://www.edb.gov.sg/en/business-insights/insights/green-investments-in-asean-rise-20-to-us-6-3-billion-in-2023-bain-temasek-report.html>> [accessed 9 February 2025].

increase the value of resources while extending lifespan and eliminating waste from the resource ecosystem. At the same time Singapore has implemented circular economy techniques in several areas and closed several resource loops¹⁹.

The implementation of a green economy based on a circular economy that has a trickle down effect, such as building long-term environmental resilience, providing benefits to the environment and social welfare, as well as being a business and economic opportunity, because it can encourage the formation of new product added value. Singapore captures the development and good impact for economic and environmental sustainability²⁰. This development gives positive impact on business opportunities, especially engagement of sustainable development. Singapore is maximizing this opportunity by opening a market that is not only profit-oriented but also environmentally – oriented. It can also add value to businesses to expand markets in the climate action era. Circulate Capital is one of the companies engaged in the circular economy from Singapore whose existence is quite high, especially in waste management.

Investment management firm Circulate Capital is committed to creating a circular economy to deal with plastic pollution by making high-growth investments at the intersection of climate technology and infrastructure for plastic recycling. The world's first investment fund, Circulate Capital Ocean Fund I (CCOF I), was introduced in 2019 with the aim to avoid marine plastic pollution in South and Southeast Asia by investing in recycling and circular economy opportunities that have the potential to create competitive returns. Launching in 2021, the second fund, Circulate Capital Ocean Fund I-B (CCOF I-B), invests alongside CCOF I in recycling value chains in South and Southeast Asia and in disruptive innovation through Circulate Capital Disrupt, the company's climate technology strategy. PepsiCo, Procter & Gamble, Dow, Danone, Chanel, Unilever, The Coca-Cola Company, Chevron Phillips Chemical Company LLC, and Mondelēz International are some of the companies included in the company's initial investors²¹. So the conclusion of the analysis is that Circulate Capital's main goal is to establish a company to achieve of sustainable economies in the South Asia and Southeast Asia region. The fund is also supported by various leading Multinational Corporation (MNC) in implementing Corporate Social Responsibility (CSR).

¹⁹ Erik Velasco, 'Circular Economy in Singapore: Waste Management, Food and Agriculture, Energy, and Transportation', *Urban Resilience and Sustainability*, 2.2 (2024), pp. 110–50, doi:10.3934/urs.2024007.

²⁰ Aloysius Hari Kristianto and Jones Parlindungan Nadapdap, 'DINAMIKA SISTEM EKONOMI SIRKULAR BERBASIS MASYARAKAT METODE CAUSAL LOOP DIAGRAM KOTA BENGKAYANG', *Sebatik*, 25.1 (2021), pp. 59–67, doi:10.46984/sebatik.v25i1.1279.

²¹ Circulate Capital, *Circulate Capital Achieves Third Close for Circulate Capital Ocean Fund I-B, Led by the International Finance Corporation (IFC) and Proparco*, 2022 <<https://www.circulatecapital.com/>> [accessed 8 February 2024].

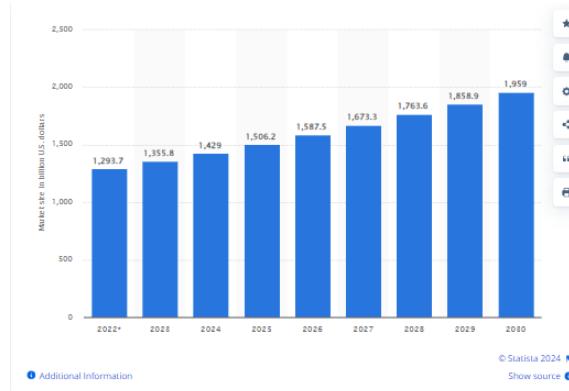
b. The Existence of Indonesian Waste Management

The complexity of waste streams and the increasing waste made a crucial challenge in recent decades. In order to choose the best option among several possibilities, the decision-making process for effective waste management often needs to consider many, often opposing factors. In addition to a thorough technical evaluation of risks, waste management also requires stakeholder discussions, public engagement, and consultation on suggested solutions and associated hazards. This is especially true for waste streams that require special handling and, in the case of radioactive waste management, broad public support and stakeholder consensus ²². The importance of waste management for a country gives impetus to the government in the process of improving this sector, the impact given by neglected waste if not managed properly is a threat not only to the country concerned, but also to neighboring countries to thin the ozone layer due to the presence of hazardous substances produced by the waste itself which threatens the security of the earth in the future.

The waste management is a process that actively reshapes our ideals and imaginations, and not just a need for human but also environment. Adequate waste services are now seen as essential to the management of businesses, cities, and refugee camps; they are also seen as an economic opportunity, an ecological necessity, and a fundamental human right ²³. The waste management is a long-term business because indirectly impacted on humans lives while they still produce or consume the need. This business is promising, in addition, there are several classifications of object that business to take care such as organic waste, inorganic waste, and hazardous waste.

Figure 2. Market Value Forecasts Waste Management from 2022 until 2030

Source: STATISTA



²² Charisios Achillas and others, 'The Use of Multi-Criteria Decision Analysis to Tackle Waste Management Problems: A Literature Review', *Waste Management & Research: The Journal for a Sustainable Circular Economy*, 31.2 (2013), pp. 115–29, doi:10.1177/0734242X12470203.

²³ Joshua Reno, 'Wsate and Waste Management', 44, 2015, pp. 557–72, doi:10.1146/annurev-anthro-102214-014146.

Based on the above figure by 2022, the global market for waste management is estimated to be worth USD 1.3 trillion. From 2023 to 2030, this market is expected to expand at a compound annual growth rate (CAGR) of 5.4%, reaching USD 1.96 trillion in the final year. Industrial waste, electricity, and hazardous waste processed in waste management. In terms of revenue, industrial waste has the largest market share.

Public-private partnerships and the creation of green infrastructure are emerging as important waste management system that which prioritize resource recovery and environment sustainability. The region's leadership in ethical and sustainable solid waste management methods is also a result of technological advances in waste sorting and recycling ²⁴. Collaboration in waste management plays important role in implementing the above strategies, the accuracy in choosing partners, especially for developing countries, so the right regulations to make decisions regarding partners who will assist in the process of improving waste management. The slightest mistake will cause instability, both for waste management and environmental balance to social welfare.

According to World Population Review data, Indonesia's population has reached 278.25 million as of October 24, 2023. This number ranks Indonesia as the fourth most populous country among the G20 countries ²⁵. To date, Indonesia's population has reached 279,390,258 by 2024 ²⁶. The analysis report concluded that Indonesia's population growth has increased considerably. Activities and population density have the potential to increase waste, such as development activities, trade, industry, and other things related to the lifestyle of the community concerned. The ineffective accumulation of waste and the lack of waste storage produce new problems for the environment, such as the emergence of water pollution, air pollution, to humans and ecosystems.

Figure 3. Recorded Waste Generation Volume in Indonesia (2019-2022)

Source: databoks

²⁴ Liudmyla Markina, Valerii Kovach, and Oleh Vlasenko, 'Analysis of The World Market of Waste Management', *Technology Audit and Production Reserves*, 77.3/3 (2024), pp. 36–43, doi:10.15587/2706-5448.2024.307321.

²⁵ Cindy Mutia Annur, 'Daftar Jumlah Penduduk Di Negara G20, Indonesia Peringkat Berapa?', 20 2023 <<https://databoks.katadata.co.id/datapublish/2023/10/24/daftar-jumlah-penduduk-di-negara-g20-indonesia-peringkat-berapa>> [accessed 8 May 2024].

²⁶ Diva Lufiana Putri and Rizal Setyo Nugroho, '20 Negara Penduduk Terbanyak Di Dunia 2024, Indonesia Nomor Berapa?', *Kompas.Com*, 25 April 2024, Tren edition <<https://www.kompas.com/tren/read/2024/04/25/180000765/20-negara-penduduk-terbanyak-di-dunia-2024-indonesia-nomor-berapa>> [accessed 8 May 2024].

?page=all#:~:text=Posisi%20keempat%20negara%20dengan%20penduduk,279.390.258%20jiwa%20pada%202024.> [accessed 8 May 2024].



According to the figure above, the waste generation in Indonesia in 2019-2022 has increased significantly, it can be seen that the volume of waste generation peaked in 2022 at 37.73 million tons. If this continues to increase, it will cause concern for the sustainability of the Indonesian ecosystem, which results not only in the environment but also in the social situation of the community. Therefore, there is a need to improve waste management in order to create a sustainable ecosystem for the safe of the earth in the future.

The Indonesian government is gradually implement a comprehensive MSWM concept that integrates various levels of society and government, from households to cities/nations, in order to improve waste management in the country. Additionally, this concept must also be integrated with all of waste management, from the source of waste to the landfill ²⁷. The complexity of waste management in Indonesia is increasing due to urbanization and the agglomeration of communities in urban areas ²⁸. Currently, the issues that often arise in solid waste management is the increasing operational costs and the scarcity of land for waste disposal workplaces ²⁹. The waste management budget is less than what is needed. The cost of collecting waste from the community is the main source of income for waste management. The local government must seek additional funding sources for waste management because its income is smaller than the expenses incurred ³⁰. Therefore, the result of the analysis indicates that Indonesia needs to improve waste management effectively and efficiently through funding sourced from outside the region or abroad.

²⁷ Dian Andriani and Tinton D Atmaja, 'The Potentials of Landfill Gas Production: A Review on Municipal Solid Waste Management in Indonesia', 2019, pp. 1–15, doi:<https://doi.org/10.1007/s10163-019-00895-5>.

²⁸ Ferdinand and others, 'Household Waste Control Index towards Sustainable Waste Management: A Study in Bekasi City, Indonesia', *Sustainability*, 14.21 (2022), p. 14403, doi:10.3390/su142114403.

²⁹ Ayu Arni Sarah, Sari Hasibuan Hayati, and Asteria Donna, 'Environmental Management at the Household, the Case of Bekasi City', ed. by Hadiyanto, Maryono, and Budi Warsito, *E3S Web of Conferences*, 73 (2018), p. 07016, doi:10.1051/e3sconf/20187307016.

³⁰ Christia Meidiana and Thomas Gamse, 'The New Waste Law: Challenging Opportunity for Future Landfill Operation in Indonesia', 2010, pp. 1–10, doi:10.1177/0734242X10384013.

Therefore, additional funding from other resource than government is still needed. For instance, private companies, particularly those engaged in waste management, like Reciki Solusi Indonesia. This company is actively involved in waste management in Indonesia. This company focuses on managing waste according to its characteristics, where the results can be effective and efficient. In this regard, the company collaborates with various local governments to achieve integrated goals of process. Reciki Solusi Indonesia not only focuses on improving waste management but also collaborates with foreign companies with the same goal, which is the enhancement of sustainable development. Bhima Aries Diyanto, as the CEO of Reciki Solusi Indonesia, who has experience in Indonesian politics, concern work on value with his interest in water improvement and waste management issues. The Brantas River in East Java has become one of Bhima's targets in reducing disposable diaper waste by establishing cooperation between the public and private sectors. Reciki Solusi Indonesia is open to enhance the company's productivity, through Foreign Direct Investment (FDI) that not only involves the private sector on technology but also funding at Reciki Solusi Indonesia in term of systematic development of Indonesia's waste management through training with more advanced waste management systems experts. The result is expected to create resources that will continue to be active in the process of sustainable waste management.

c. The Impact of Singapore's Investment in Improving Waste Management Through Circulate Capital in Reciki Solusi Indonesia

There is a strong and diverse bilateral relationship between Singapore and Indonesia. Since 2014, most of Indonesia's investment portfolio has been held in Singapore³¹. The bilateral cooperation has been very beneficial for Indonesia and Singapore. Investment and technical advancements are expected to provide longterm benefits for both countries. Sharing knowledge and technology has also become a component of economic cooperation between Singapore and Indonesia. In order to enhance economic competitiveness in the region, both countries have conducted some strategies fields including innovation, research, and technology development. The Minister of Trade and Industry of Singapore, Gan Kim Yong, and Zulkifli Hasan have decided to explore the possibility of collaborating in new sectors, services trade, and the green economy³².

This is reinforced by a report issued by the Minister of Foreign Affairs of the Republic of Indonesia, Retno Marsudi, which stated that although Singapore's investment in Indonesia was only worth US\$6.5 billion in 2019, the ratification of the

³¹ Eng and Co. LLC and Melli Darsa & Co, *Doing Business in Indonesia & Singapore – What Investors Need to Know*, 2020.

³² Syifa Syahrani and others, 'Indonesia – Singapore Economic Cooperation: Increasing Economic Progress and Regional Development', 01.07 (2024), pp. 254–63.

Bilateral Investment Treaty (BIT) by both countries increased the total realization of investments in 2020 to US\$9.8 billion ³³. Based on John Dunning's statement mentioned in the previous chapter that Foreign Direct Investment (FDI) helps a country's economic growth, the analysis shows positive results regarding the existence of the Bilateral Investment Treaty (BIT) between Indonesia and Singapore, so both gain equal benefits, especially in making investments. The ease within it can be utilized by each country to enhance economic development. Especially for Indonesia, which requires support and assistance from developed countries to escalate economic development, such as Singapore.

As explained, Indonesia's lack of waste management facilities requires funding, both from the government and non-governmental sources. Therefore, a solution is needed to achieve sustainable development investments becomes one of the ways that can be applied to support the creation of a systematic waste management system in Indonesia. Therefore, Singapore, as the first developed country in ASEAN, becomes an important actor in supporting the region by providing waste management investments through one of its circular economy companies, Circulate Capital.

By developing models with the highest potential and reproducing their success, Circulate Capital invests through two complementary strategies: the recycling supply network and the waste management supply chain. The recycling supply chain is transformed by these solutions. New reusable materials and alternative delivery methods, among other disruptive developments with significant technology transfer potential, drive "leaps forward" towards circularity ³⁴. The strategy is realized through several methods, one of which is the Circulate Capital Ocean Fund (CCOF). The Circulate Capital Ocean Fund is a program conducted by Circulate Capital that provides funding to selected partners who meet environmental aspects towards sustainable development.

The implementation of a green economy has made Circulate Capital interested and invest its capital in Reciki Solusi Indonesia, where this has led to an increase in waste management productivity by enhancing or distributing/opening Integrated Waste Disposal Sites (TPST). Indonesia's maritime wealth, which has largely been polluted by waste, has become a strong motivation for Circulate Capital Ocean Fund (CCOF) to participate in addressing marine pollution through the systematic improvement of waste management at Reciki Solusi Indonesia.

In 2021, Circulate Capital invested in Indonesia in 2 (two) companies, one of which is Reciki Solusi Indonesia. Circulate Capital stated that a total of \$7.5 million was given to these two companies, but unfortunately, it did not specify how much

³³ Amalina and Muis, 'Efforts of Indonesia and Singapore in Increasing Foreign Direct Investment (FDI) Cooperation Through Bilateral Investment Treaty (BIT) during the Covid-19 Pandemic'.

³⁴ Circulate Capital, *2023 Circulate Capital's Year in Review*, 2023.

funding each company received ³⁵. However, since the start of this investment on December 14, 2021, there have been many advancements made by Reciki Solusi Indonesia in handling Indonesia's waste management, and this shows that the investment made by Singapore through Circulate Capital gives a positive impact to improve the productivity of Reciki Solusi Indonesia in waste management, which is one of the implementations of the green economy in Indonesia.

The relevance between the concept of FDI and the Green Economy lies in the aspect of funding aimed at environmental sustainability, where in this study, Foreign Direct Investment (FDI) in the field of waste management has a positive impact on the sustainable development of a country, not only affecting economic growth but also enhancing the ecosystem. Effective and efficient waste management provides benefits in the quality of the environment for the community. Environmental sustainability can continue to improve with sustainable waste management productivity because there will be no new pollution if waste is controlled. Thus, Foreign Direct Investment (FDI) in the environmental context helps to, improve the quality of a country's environment, such as Indonesia, which has quite concerning waste management issues. Singapore's Foreign Direct Investment (FDI) through Circulate Capital provides significant opportunities for enhancing waste management productivity at Reciki Solusi Indonesia.

Since its establishment in 2019, Reciki has had 2 (two) Material Recovery Facilities (MRF) in Lamongan (East Java) and Badung (Bali), both of which were built in collaboration with its partner, Danone AQUA ³⁶. In this case, both Material Recovery Facilities (MRF) focus on reusing plastic bottles by recycling or composting as waste, to will be recycle than used by 2025.

However, after Circulate Capital's investment in Reciki Solusi Indonesia at the end of 2021, the productivity of waste management at both locations improved. The Material Recovery Facilities (MRF) in Lamongan, East Java successfully managed 60 tons of waste per day, and the Material Recovery Facilities (MRF) in Bali managed 120 tons of waste per day. Where this is evidenced by the achievements of Reciki Solusi Indonesia at the Tempo Circular Economy Award 2022 ³⁷. Reciki Solusi Indonesia has become one of the Indonesian waste management companies that assist the government in addressing the national waste problem through Material Recovery Facilities (MRF) in partnership with city/regional governments, because Circulate

³⁵ Circulate Capital, *A Platform for Impact and Returns (Circulate Capital: 2021 Year In Review)*, 2021.

³⁶ Abdillah M Marzuqi, 'CCOF Suntik Dana Untuk Startup Pengelola Sampah Reciki', *Media Indonesia*, 14 January 2022, Humaniora edition <<https://mediaindonesia.com/humaniora/464450/ccof-suntik-dana-untuk-startup-pengelola-sampah-reciki>> [accessed 21 November 2024].

³⁷ Reciki Solusi Indonesia, *Reciki Receives Tempo Circular Economy Award 2022*, 21 December 2024 <<https://www.reciki.co.id/post/reciki-receives-tempo-circular-economy-award-2022>> [accessed 21 November 2024].

This is proved that active collaboration of Reciki Solusi Indonesia with several local governments and other partners are engaged for green economy, including by signing of a cooperation agreement between the Bangkalan government, Resinergi, and the Indonesia Packaging Recovery Organization (IPRO), where the Material Recovery Facilities (MRF) are located in Bangkalan, East Java, and named TPST Mlajah Bangkalan. This MRF has a significant capacity in waste management, namely 100 tons per day ³⁸; Another MRF in East Java is located in Ponorogo, named TPST Mrican Ponorogo, which processes 100 tons per day and to process household waste, particularly plastic that will be recycled or converted into Refuse Derived Fuel (RDF) and organic waste ³⁹; And the latest one is in West Java, with Cirebon being the chosen location where in February 2023, Reciki Solusi Indonesia, together with the Cirebon Regency government, signed an MoU for the development of a Waste Management Site (TPST) with a capacity of 500 tons per day ⁴⁰.

Reciki Solusi Indonesia has successfully empowered 30% of women in senior management positions and representation in the workforce in 2022. Role of women give huge impacts on climate action to be as innovators, leaders, entrepreneurs, workers, suppliers, and consumers related to increasing productivity, socio-economic sustainable development, including efforts for adaptation and mitigation of climate change. Indirectly, the participation of women create welfare for the communities. In addition, Reciki Solusi Indonesia improve waste management through domestic development, and also has the opportunity to learn from other waste management companies. Funding from Circulate Capital in South and Southeast Asia provides benefits for partners, where partners can exchange knowledge and technology in systematic waste management. India, which is part of South Asia, has several companies engaged in waste management and collaborating with Circulate Capital, one of which is NEPRA.

Reciki Solusi Indonesia is able to fulfill its goal of preventing plastic pollution with the aid of Circulate Capital. By leveraging funding and accelerating to become a best-in-class solution provider in many Indonesian cities, the waste processing specialization has the potential to dramatically boost plastic recovery and recycling

³⁸ Reciki Solusi Indonesia, *Penandatanganan MoU Reciki Dengan IPRO Di Kabupaten Bangkalan* (10 July 2022) <<https://www.reciki.co.id/post/penandatanganan-mou-reciki-dengan-ipro-di-kabupaten-bangkalan>> [accessed 14 November 2024].

³⁹ Jatim Newsroom (Dinas Kominfo Jawa Timur), 'Setiap Hari, Pemkab Ponorogo Olah 100 Ton Sampah Di TPA Mrican', 30 May 2023 <<https://kominfo.jatimprov.go.id/berita/setiap-hari-pemkab-ponorogo-olah-100-ton-sampah-di-tpa-mrican>> [accessed 21 November 2024].

⁴⁰ Reciki Solusi Indonesia, *Reciki Dan Pemkab Cirebon Menandatangani MoU Untuk Mengatasi Permasalahan Sampah* (11 February 2023) <<https://www.reciki.co.id/post/reciki-dan-pemkab-cirebon-menandatangani-kerjasama-untuk-mengatasi-permasalahan-sampah>> [accessed 14 November 2024].

across the country. As a result, the investment made can help scale the circular economy in Indonesia, facilitate partnerships along the value chain, spur future investment, construct world-class operations, improve livelihoods, upend the status quo, and create value-added markets. More than a dozen issuers on the Indonesia Stock Exchange (IDX) have demonstrated market maturity and capital market acceptance, indicating that Indonesia is a very potential market. In addition to helping Reciki Solusi Indonesia, Circulate Capital has targeted revenue related to this investment. As a major producer and consumer of plastic, Indonesia can address the plastic waste challenge to create a more circular and sustainable material value chain, which is estimated to generate an annual value of up to US\$9.3 billion⁴¹.

According to Islam, the provision of life is to achieve the aim humans fulfillment and also worship Allah SWT. All human good deeds is only for worship to Allah SWT, will get a good reply too. Including taking care of earth⁴². The implementation of Foreign Direct Investment (FDI) in the environmental sector, particularly in waste management, as one of the proofs that humans consistently do good to achieve good results for the natural environment with all its benefits, such as the Circulate Capital Ocean Fund (CCOF). The concept of a green economy symbolically explains that the Foreign Direct Investment made by Singapore through Circulate Capital's investment via the Circulate Capital Ocean Fund (CCOF) in Reciki Solusi Indonesia reaffirms that funding is not only profit oriented but also aims to reduce environmental risks, resource scarcity, and pollution, while simultaneously improving human welfare. Reciki Solusi Indonesia has a significant opportunity to manage the Circulate Capital Ocean Fund (CCOF) to enhance Indonesia's waste management through knowledge, maintenance, and the development of facilities that support management in each regions. The community is also participate in enhancing environmental quality, thereby maintaining social conditions well.

⁴¹ Circulate Capital, *Circulate Capital Strengthens Indonesia Commitment with the Appointment of DondiHananto as Associate Investment Partner, SEA, and Head of Indonesia* (6 February 2025) <<https://www.circulatecapital.com/wp-content/uploads/2025/02/2025025-Circulate-Capital-appoints-Dondi-Hananto-Press-release.docx.pdf>> [accessed 9 February 2025].

⁴² Mustakim, 'PENDIDIKAN LINGKUNGAN HIDUP DAN IMPLEMENTASINYA DALAM PENDIDIKAN ISLAM(AnalisisSurat Al-A'raf Ayat 56-58 Tafsir Al MisbahKarya M. Quraish Shihab)', 2.1 (2017), pp. 1-27.

IV. CONCLUSION

Based on research, the impact of Singapore investment through Circulate Capital in waste management at Reciki Solusi Indonesia has a positive effect. The bilateral relationship between Indonesia and Singapore has improved in the economic field, especially after the restoration of the Bilateral Investment Treaty (BIT), which indirectly enhances the investment climate and increases the value of investments for the continuity of economic growth. Indonesia's limitations in developing waste management facilities present an opportunity for Singapore to invest through the Circulate Capital Ocean Fund (CCOF) in Reciki Solsui Indonesia, align with the green economy concept. This aligns with Islamic teachings that command the preservation and protection of the earth without causing corruption.

The impact of Foreign Direct Investment (FDI) made by Singapore through Circulate Capital's investment via the Circulate Capital Ocean Fund (CCOF), by using the green economy concept at Reciki Solusi Indonesia, which has the strategy "Improving Collection and Recovery," has proved Indonesia's waste management to support the enhancement of management in each region. The community participates to improve environmental quality, leading to social welfare, such as the empowerment of local communities. Because Islam is built on the foundation of cleanliness, and no one will enter paradise except those who are clean.

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