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The Carbon Exchange Policy in Supporting the Green Banking Concept: An Indonesian Perspective

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ABSTRACT

This paper aims to analyze the success of applying the Carbon Exchange policy in supporting the green banking concept in Indonesia. The Indonesian Carbon Exchange is a commitment of the government to fight against climate change by ratified the Paris Agreement and legalized Financial Service Authority Regulation (FSAR) No. 14 of 2023 on Carbon Trade through Carbon Exchange, where the results of carbon trade will be reinvested for projects to decrease emissions. This research employed in-depth socio-legal method. Research results showed that based on these six banks' sustainability report of 2022, they have allocated funding to the Sustainable Business Activity Category sector which significantly increased from 2020 to 2022 as the banks' contribution to support the green banking concept. Thus, it is certain that the Carbon Exchange policy has an effective role in increasing the portfolio of banks' sustainable funding in the year 2023 as banks buy carbon units from companies that work in the Sustainable Business Activity Category sector. Based on the six green banking indicators of six banks, it was shown that carbon emission and paperwork or paperless aspects experienced an increase in 2022. Therefore, banks made efforts by buying carbon units from Carbon Exchange. Unfortunately, the green banking concept in Indonesia is yet to be measured precisely because it is still in the early stages of implementation. Therefore, support and collaboration from government, banking industry and society is an essential effort to accelerate Carbon Exchange policy.

1. INTRODUCTION

The Indonesian Carbon Exchange is an authentic contribution of Indonesia and the globe in cooperatively striving to fight against crises caused by climate change [1, 2]. The proceeds from the carbon trade are reinvested into efforts to preserve the environment, especially those to decrease carbon emissions [3, 4]. The establishment of the Indonesian Carbon Exchange was a historical moment for Indonesia in supporting the governmental strategies to achieve the target of decreasing greenhouse gas emissions, as ratified in the Paris Agreement [5, 6]. Indonesia's target is to decrease greenhouse gas emissions by 31.89% without any conditions and without international aid or by 43.2% with international support from its normal emission rate or Business as Usual by 2030 [7]. The main priorities in decreasing greenhouse gas emissions are the energy, transportation, and forestry sectors which encompassed 97% of the total emission decrease target from Indonesia's Nationally Determined Contributions (NDC) [8]. With the ever-rampant issues of climate change, Indonesia has the target to achieve Net Zero Emissions by or even prior to 2060. Apart from that, the Paris Agreement also aimed to inhibit the increase of the average global temperature to below 2℃ to 1.5℃ from the pre-industrialization temperature rate.

A group of countries that have succeeded in applying the Carbon Exchange is the European Union, which has been operating since 2005. Up to now, it is named the European Union Emission Trading Scheme (EU ETS) which became the first ETS policy in the world [9]. EU ETS encompasses the intensive energy industry (iron, steel, glass, oil refineries, chemicals, paper, and ceramic industries), the aviation sector, and the energy sector (electricity plants) with a total of 11,000 electric plants and factories [10]. However, it does not include the financial sector (small-scale relative contribution) and agriculture. EU ETS operates in 28 countries that are EU members, including Norway, Iceland, and Liechtenstein. Around 45% of the total greenhouse gas emission of the European Union is regulated by the EU ETS. ETS prioritizes the certainty of the target magnitude of emissions to decrease [11]. This is deemed more efficient and effective in encouraging the decrease of emissions [12].

Examining the success of the Carbon Exchange regulations initiated through the EU ETS inspired Indonesia to implement similar regulations as one of the basic steps for implementing the existing Carbon Exchange policy in Indonesia. One of the lessons learned from implementing the EU ETS is the market stabilization process. There was a surplus allowance in the carbon market which caused European Union Allowance (EUA) prices to fall. Shocks that occur in the market like that certainly need to be managed well. One of the instruments

used in the EU ETS for market stabilization is backloading, namely by delaying/reducing circulating emission permits by a certain amount at one time.

The instrument used in the EU ETS for market stabilization is backloading, namely by delaying/reducing circulating emission permits by a certain amount at one time. In line with the enactment of Law No. 4 of 2023 on the Development and Strengthening of the Financial Sector, the Republic of Indonesia's Financial Service Authority has the authority to regulate and supervise the carbon trade through the Carbon Exchange in Indonesia. Then, the Carbon Exchange is further regulated in the Regulation of the Financial Service Authority No. 14 of 2023 on the Carbon Trade through Carbon Exchange. Its technical regulations are stipulated in the Financial Service Authority Circulation Letter No. 12/SEOJK.04/2023 on the Establishment Methods of Carbon Trade through Carbon Exchange. The business permit of Carbon Exchange establishers has been granted to the Indonesian Stock Exchange (*Bursa Efek Indonesia*/BEI) by Indonesia's Financial Service Authority through Decision Letter No. KEP-77/D.04/2023.

Article 1 clause (8) of the Regulation of the Financial Service Authority No. 14 of 2023 on the Carbon Trade through Carbon Exchange explains that the Carbon Trade is a market-based mechanism to decrease greenhouse gas emissions through the sales transaction of Carbon Units. Meanwhile, Article 1 clause (9) explains that Carbon Exchange is a system which regulates Carbon Trade and/or Carbon Unit ownership records. In the Carbon Exchange, there are carbon sellers and buyers. Sellers in the Carbon Exchange are companies which produce a small amount of CO_2 emissions in their business practices [13]. Meanwhile, buyers in the Carbon Exchange are companies which produce a large amount of CO_2 emissions in their business practices [14]. Buyers may purchase carbon credits from sellers to lower their emissions. Carbon credits are permit certifications to produce a certain amount of CO_2 emissions [15, 16].

Based on data from Indonesia's State Electric Company (*PT PLN* (*Persero*)) and the Ministry of Energy and Mineral Resource, companies that have the potential to participate in the carbon trade this year are the 99 Coal-Based Steam-Powered Electricity Plants. This number equals 86% of all Coal-Based Steam-Powered Electricity Plants that operate in Indonesia. Apart from being participated by the electricity power plant subsector, the carbon trade in Indonesia will also be participated by other sectors that are priorities in fulfilling the NDC, such as the sectors of Agriculture, Forestry, Oil and Gas, Waste, and General Industries. Then, it will be followed by the Marine sector. This carbon trade is initiated by making sure that the carbon units traded have good quality, starting from the emission (Emission Trading System/ ETS) of the forestry and electricity power plant sectors [17].

Banks have a role as the motor which becomes the driving force of the state's economic wheel. Therefore, it is appropriate that in the era of climate change, banks provide optimum contribution [18]. As a strategy to win the market competition as well as to participate in environmental preservation, banks must interdependently adapt to the environment [19]. This is because banks manage various funding portfolios which are related to natural resources, starting from small/domestic industries to heavy-grade manufacturers. Therefore, the green banking practice can be used as a solution by considering several environmental criteria whilst providing credit to business sectors [20]. This can be carried out through the green banking practice of giving credit to business sectors that must consider some environmental criteria [21].

Law No. 32 of 2009 on the Environmental Protection and Management Article 43 clause 3 letter (c) regulates the development of environmentally friendly financial institutions and stock exchange systems. The Bank of Indonesia encourages the development of banks in an environmentally friendly direction by obliging all economic activities to participate in protecting environmental preservation. On the contrary, banks that violate these regulations must be imposed with criminal sanctions up to the revocation of environmental permits. Therefore, if banks do not pay attention to such regulations, there may potentially be an increase in credit, reputation, and legal risks. Banks' support is crucial to fund the energy and food resilience sectors to achieve energy and food independence and help decrease greenhouse gas emissions [22]. This can be extended to the sectors of transportation, service, housing, industry, creative economy, or other strategic sectors that emphasize the green principle [23].

Apart from that, the Regulation of the Financial Service Authority No. 51/POJK.03/2017 on the Application of Sustainable Finance for Financial Service Institutions, Emittents, and Public Enterprises also mandates the application of sustainable finance. Article 1 clause (8) explains that Sustainable Finance is holistic support from the financial service sector to create sustainable economic growth by aligning economic, social, and environmental interests [24]. However, no regulations that specially regulate the obligation to apply green banking have been enacted. Therefore, the government needs to issue a regulation that imposes firm sanctions for those who fail to apply green banking [25].

As a form of support towards the decrease of carbon emissions through the Carbon Exchange, banks cohesively became the first purchasers in the first Carbon Exchange trade in Indonesia [26]. These banks are PT Bank CIMB Niaga Tbk (CIMB Niaga Bank, Ltd.), PT Bank Mandiri (Persero) Tbk. (BMRI/Mandiri Bank, Ltd.), PT Bank Central Asia Tbk. (BBCA/Bank of Central Asia, Ltd.), PT BNI Sekuritas (BNI Finance, Ltd.), PT Bank DBS Indonesia (DBS Bank Indonesia, Ltd.), and PT BRI Danareksa Sekuritas (Danareksa Finance, Ltd.) that is part of PT Bank Rakyat Indonesia (Persero) Tbk. (BBRI/Bank Rakyat Indonesia, Ltd.). These banks purchased the carbon units in the Carbon Exchange to obtain the label of 'green banks' that commit to allocating sustainable funds.

In the first Carbon Exchange trade on Tuesday (September 26, 2023). The Indonesian Stock Exchange recorded the value of stock transactions which reached Rp 29.2 billion. This value encompassed a total Carbon Exchange volume of 459,953 tons of CO_2. The total daily transaction was 27 transactions [27]. Pertamina New and Renewable Energy (PNRE) became the provider of carbon units at the first Carbon Exchange trade by providing carbon units from Unit 5 of the Lahendong Project and Unit 6 of the Pertamina Geothermal Energy Limited Company (*PT Pertamina Geothermal Energy Tbk*). The potential trade of the Indonesian Carbon Exchange may reach Rp 3,000 trillion, where there are one gigatons of carbon dioxide (CO_2) potential carbon credits that may be gained [28]. The carbon effect policies may become a new initiation for banks in supporting the green banking concept that may potentially decrease carbon emissions as well as apply sustainable finance. What is the role of the Carbon Exchange

policies in supporting the green banking concept in Indonesia?

2. METHODS

This research employed in-depth socio-legal method [29, 30]. The data were collected through the statute approach and the data were analyzed using the qualitative method [31]. As data sources, this research used primary legal materials in the form of regulations related to Carbon Exchange and green banking. This research also used secondary legal materials which are books, journals, and reports on banks' sustainable finance related to the initiation of green banking through Carbon Exchange [32, 26]. Instead of only using data from statues in Law No. 32/2009 and FSAR No. 14/2023 it also uses data from periodic financial reports issued by banks. There are six banks selected for research, especially in implementing their Carbon Exchange policy. Apart from that, the reason of choosing these particular banks because these six banks were among the first to implement a Carbon Exchange policy and have also contributed to the purchase of carbon units which were launched by the government in September last year there are CIMB, Mandiri, BCA, BNI, DBS, BRI.

3. RESULT AND DISCUSSION

3.1 The role of Carbon Exchange policies in supporting the green banking concept in Indonesia

The green banking concept is closely related to the term green financing. Green financing is loans given by financial institutions to debtors that maneuver in the business sector that does not influence the environmental quality or the people's social condition. But green banking does not only focus on its funding [33]. It also focuses on other environmentally friendly programs [34]. There are five prioritized economic sectors that become subjects of funding from banks, namely forestry and peatlands, energy and transportation, agriculture, industries, as well as waste [35]. Banks that have the task in those prioritized sectors are hoped to be able to support the government's target of decreasing greenhouse gas emissions [36]. One of the roads that may be taken by banks in achieving green banking is by purchasing carbon units in Carbon Exchange to support the government's program in decreasing greenhouse gas emissions [37]. Then, the proceeds from this carbon trade will be reinvested into carbon projects that contribute to decreasing carbon emissions [38].

Then, Indonesia issued Law No. 32 of 2009 on Environmental Protection and Management. Article 43 clause 3 (c) regulates the development of environmentally friendly financial institutions and capital market systems. Apart from this law, the Bank of Indonesia has issued the Regulation of the Bank of Indonesia No. 14/15/PBI/2012 on the Asset Quality Assessment of Public Banks. The Bank of Indonesia encourages banks in Indonesia to consider the environmental feasibility factor when evaluating business prospects. This policy is a follow-up of the issuing of the Environmental Protection and Management Law and the Governmental Regulation No. 27 of 2012 on Environmental Permits (which have been amended with Governmental Regulation No. 22 of 2021 on the Establishment of Environmental Protection and Management). In order to respond the regulations regarding the development of environmentally friendly financial institution and capital market systems, financial institutions have begun to implement green banking in every aspect of their operational activities. One of the applications of green banking carried out by banks is by participating in purchasing carbon units on the Carbon Exchange.

Financial service institutions experienced an increase in demands after the enactment of the Regulation of the Financial Service Authority No. 51/POJK.03 of 2017 on the Application of Sustainable Finance for Financial Service Institutions, Emmitents, and Public Companies. Not only banks, but all financial service institutions must pay attention to the environmental factor as well as other factors in carrying out their business practices. In the Regulation of the Financial Service Authority, the Financial Service Authority insists financial service institutions issue obligatory annual reports on sustainability [39]. Concerning the regulation of green banking, Indonesia has not enacted a special regulation that stipulates the issue of the obligation to apply green banking. Thus, green banking is only a movement or a suggestion. In other words, it can be said that financial service institutions do not have to apply for the green banking program. Article 13 of this Financial Service Authority Regulation stipulates that the sanctions imposed are merely administrative in the form of admonition or written warning. There is no detailed explanation of the type of administrative sanction imposed. Even so, many banks in Indonesia have already gained awareness and they have committed to support the green banking program. They undergo support through the operational aspect and the funding aspect. Apart from that, they also support programs on environmental friendliness that contribute to decreasing greenhouse gas emissions and that utilize a low rate of carbon [40].

Referring to the policies that have been issued by the government to decrease greenhouse gas emissions as well as supporting green banking to achieve sustainable funding, banks in Indonesia collectively contribute to the sales of carbon units that were launched by the government last September. These banks are PT Bank CIMB Niaga Tbk, PT Bank Mandiri (Persero) Tbk. (BMRI), PT Bank Central Asia Tbk. (BBCA), PT BNI Sekuritas, PT Bank DBS Indonesia, and PT BRI Danareksa Sekuritas that is part of PT Bank Rakyat Indonesia (Persero) Tbk. The Carbon Exchange's existence may become a strategy for these banks to decrease their emissions so that they may impact the advancement of the green banking concept that is currently rampantly applied. These banks are:

1. PT Bank CIMB Niaga Tbk (CIMB Niaga Bank, Ltd.)

PT Bank CIMB Niaga Tbk actively participate in the launching of IDXCarbon as a purchaser of carbon units. It was part of its efforts to achieve *Net Zero* by 2050. Apart from that, this bank supports the decarbonization program that was planned by the Indonesian government through the Enhanced Nationally Determined Contribution (ENDC) Indonesia. CIMB Niaga has committed to achieving zero greenhouse gas emissions of scopes 1 and 2 by 2030, as well as achieving greenhouse gas emissions of scopes 1, 2, and 3 by 2050. This is applied to support the achievement of the target to decrease greenhouse gas emissions both in Indonesia and around the globe as well as to increase the performance of the bank environment. CIMB Niaga commits to actively participate in the sustainable ecosystem that focuses on fair transformation, collaboration, and transition. This is specially to support the

fulfillment of a low carbon economy, the Paris Agreement, the Indonesian government's Enhanced Nationally Determined Contribution, and the Sustainable Development Goals [41].

Figure 1 shows that funding of the Sustainable Business Activity Category of *PT Bank CIMB Niaga Tbk* in 2022 experienced a significant increase, reaching Rp 51,444,423 million. The percentage of Sustainable Business Activity Category funding towards the total credit also increased by 1% from 2021. Apart from that, there are three indicators of green banking that may be used as a reference to determine banks that have committed to green banking. The first is carbon emission which can be reviewed from the greenhouse gas emissions (scopes 1, 2, and 3) of CIMB Niaga Bank in 2022 which showed that there were equal to 27,583.18 tons of CO_2. Second, from the aspect of green rewards that can be reviewed from the rewards obtained. In this case, the CIMB Niaga Bank obtained 8 rewards. One of them was the IDX Channel Anugerah Inovasi Indonesia 2022 (The Indonesian Innovation Awards) in the category of internal process through the Hybrid Working Arrangement (HyWork) innovation. Third, green buildings can be assessed from the building used, where the *Graha* Building of CIMB Niaga Bank has been certified as a "Platinum" green building by the Singaporean Building and Construction Authority (BCA).

Fourth, from the reuse/recycle/refurbish aspect, which can be seen from the waste management in the Central Office of CIMB Niaga Graha in 2022. It carried out an initiative of waste sorting, where 23.22 tons of waste, comprising 23% of inorganic waste and 77% of organic waste were recycled. Fifth, paperwork or paperless, which can be perceived from the CIMB Niaga Bank's usage of paper, which reached 36,168 kg. Sixth, the green investment aspect can be reviewed from the green investment activities. It showed that the CIMB Niaga Bank has provided various funding, including issuing green bonds with the value of Rp 32,990 million. The CIMB Niaga Bank has purchased carbon units in Carbon Exchange, where the Carbon Exchange may decrease carbon emissions and increase investment in sustainable projects. Therefore, the Carbon Exchange is categorized as an indicator of carbon emission and green investment.

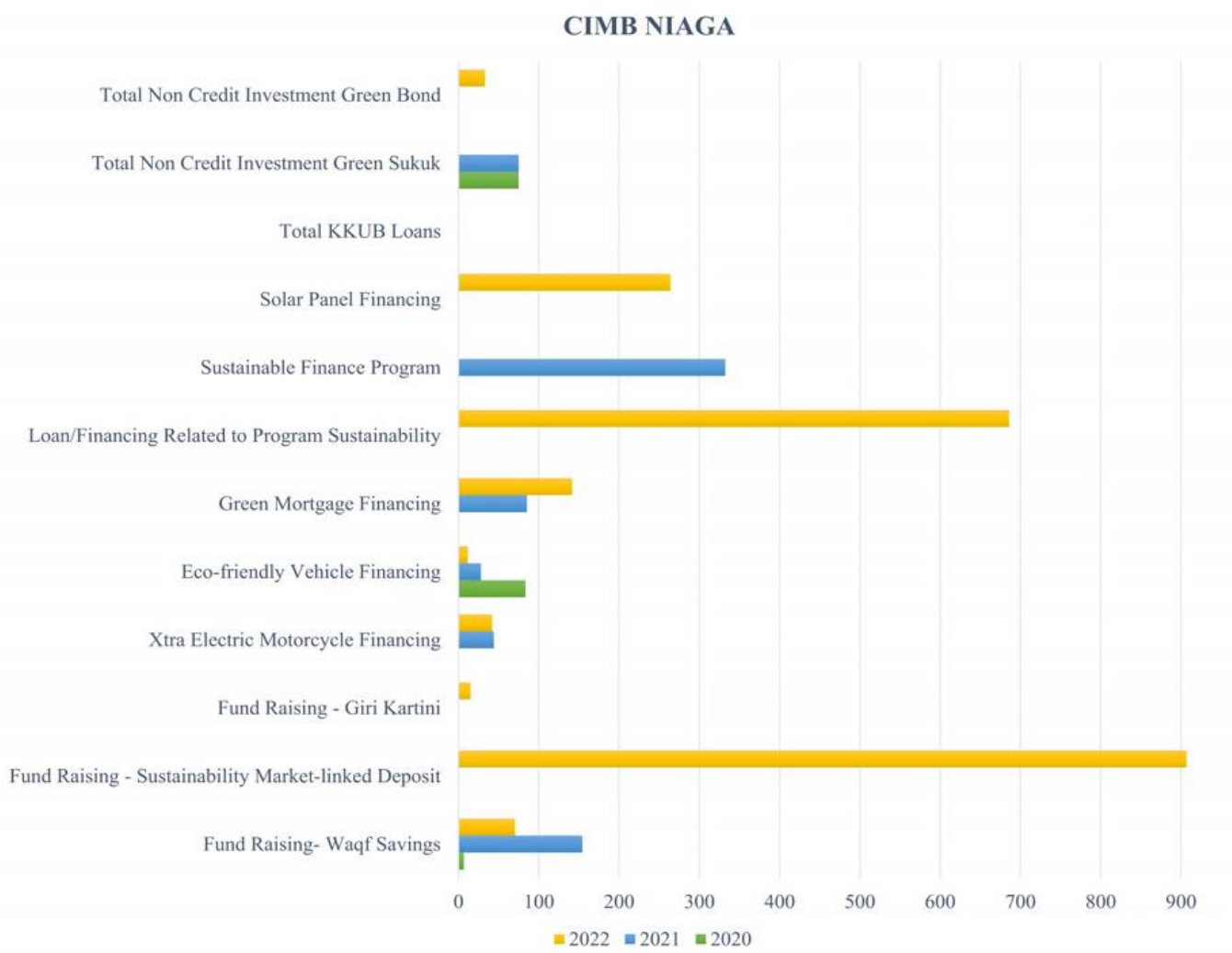

Figure 1. Sustainability report CIMB Niaga
Source: Analyzed by the authors from bank's sustainability report

2. PT Bank Mandiri (Persero) Tbk. (BMRI/Mandiri Bank, Ltd.)

At the initial stage, this state-owned bank, *PT Bank Mandiri* (*Persero*) *Tbk.* (*BMRI*), has purchased around 3,000 tons of CO_2 to support the government's efforts to decrease the Indonesian national emissions. With the assumption that the carbon credits were sold at the price of Rp 69,600 to Rp 77,000 per carbon unit, thus BMRI spent around Rp 208.8 million to Rp 231 million. Mandiri Bank has a commitment to the business and operational aspects by emphasizing ESG with the vision of "Becoming Indonesia's Sustainability Champion for

a Better Future" through three sustainability pillars, namely Sustainable Banking, Sustainable Operation, and Sustainability Beyond Banking. Mandiri Bank commits to achieving "Lead Indonesia Transition to Low Carbon Economy", "Net Zero Emissions in Operations by 2030" and "Catalyzing for Social Impact to Achieve SDGs". Per June 2023, Mandiri Bank has allocated a sustainable portfolio with a value of Rp 242 trillion or equal to 25% of the total portfolio with a green financing portion of Rp 115 trillion [42]. From Figure 2, the Sustainable Business Activity Category funding of *PT Bank Mandiri (Persero) Tbk* which is categorized as green financing in 2022 was Rp 106 trillion or 11.4% of the total credit. This amount experienced an increase of 10.6% from 2021. Meanwhile, in the case of credit allocation, Mandiri Bank has allocated sustainable financing according to the Sustainable Business Activity Category in the Regulation of the Financial Service Authority with an amount of Rp 228.7 Tn or 24.5% of the total credit. This rate increased by 11.6% compared to year 2021.

Apart from that, there are six indicators of green banking that may be used as a reference to determine whether or not a bank has committed to green banking. The first is carbon emission which can be seen from the intensity of fossil fuel, solar generator, cooler, and business trip (scopes 1, 2, and 3) usage carried out by Mandiri Bank, where it emitted 303,787 tCO_2 emissions in 2022. Second, green rewards can be reviewed from the rewards that Mandiri Bank obtained in 2022. It obtained 10 rewards, one of which was the Top CSR Award 2022 with the category of Top Leader on CSR Commitment 2022 and Top CSR Award 2022 (Star 5) organized by Top Business. Third, the aspect of green building has been carried out by Mandiri Bank, where the Sentra Injoko Mandiri Building has obtained the Gold Design Recognition green building certificate.

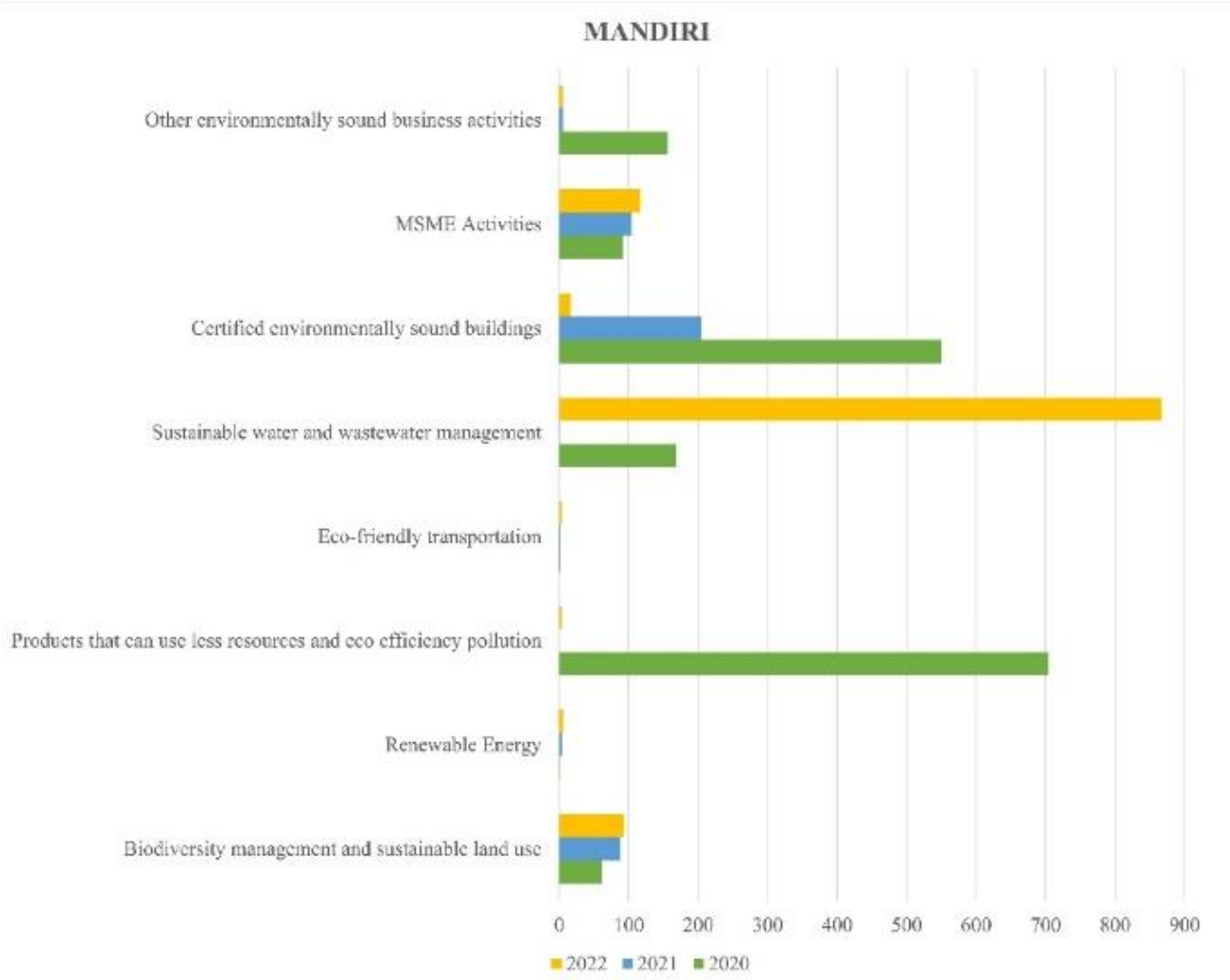

Figure 2. Sustainability report Mandiri
Source: Analyzed by the authors from bank's sustainability report

Fourth, the aspect of reuse/recycle/refurbishment can be reviewed from the waste management Mandiri Bank has implemented. It has succeeded in managing 62 tons of inorganic waste. Meanwhile, the volume of organic waste processed by the biodigester machine was 1,129 kg. Fifth, the aspect of paperwork or paperless, where Mandiri Bank utilized 1,336 tons of paper. This amount has decreased by 19.6% compared to the previous year. This achievement was supported by digital banking and the operation of customers' paperless administration [43]. Sixth, the aspect of green investment, can be seen from the green investment activities. It showed that Mandiri Bank has carried out various funding. Moreover, it has also issued sustainability bonds with a total demand order of more than US$ 2.5 billion during the book-building process. Thus, there was an exceeding demand of more than 8.3 times the plan for the amount of bonds that were to be issued. This showed that there was a positive perception and appreciation from foreign investors towards the work

program and business prospects of Mandiri Bank in the future, especially related to sustainable finance. In February 2022, Mandiri Bank issued the first ESG Repurchase Agreement (Repo) in Indonesia, which was one of the first movers in Southeast Asia. A transaction amounting to US$ 500 million was used to fund or refund green and social business activities with criteria based on the Sustainability Bond Framework of Mandiri Bank. Mandiri Bank has allocated funds with a total of Rp 208.8 million to Rp 231 million to buy carbon units in the Carbon Exchange, which aims to decrease carbon emissions and increase investment in sustainable projects. Thus, Carbon Exchange is included in the indicator of green banking, namely carbon emission and green investment.

3. PT Bank Central Asia Tbk. (BBCA/Bank of Central Asia, Ltd.)

PT Bank Central Asia Tbk. (*BBCA*) which participated in the pioneering trade of IDXCarbon showed its commitment to keep on contributing to the current climate change control. Although the main aim of BCA bank's participation in purchasing carbon units on the exchange is of course to gain profits, this participation shows that BCA also has a strong commitment to participate in the success of the government's program to preserve the environment through the green banking program. Therefore, this company understands that this policy requires support from all parties, including that of private companies. Per June 2023, BCA's credit allocation in the sustainable-based sector or the Environment, Social and Governance (ESG) sectors increased by 6.9% year-on-year (yoy), reaching Rp 181.2 trillion. This amount contributes up to 24.3% towards the total funding portfolio. One of the sustainable funding of BCA flows to the sector of renewable energy with a total energy capacity of 210 MW. BCA has also allocated consumption funding for motorized electric vehicles with an amount of Rp 751 billion per June 2023 [44].

From Figure 3, *PT Bank Central Asia Tbk.* (BBCA)'s total funding of the Sustainable Business Activity Category in 2022 reached Rp 183.2 trillion, which increased by 14.9% year on year and contributed 25.4% towards the total BCA portfolio. Apart from that, there are six indicators of green banking that may be used as a reference to determine banks that have committed to green banking. First, carbon emissions, which can be reviewed from the greenhouse gas emissions produced by BCA (scopes 1, 2, and 3), reached 142,720 tons of CO_2 eq in 2022. Second, green rewards, can be seen from the rewards that have been obtained by BCA. It obtained a total of 25 rewards, one of which was from Forbes in the category of World's Best Bank 2022 Best Bank in Indonesia, 1st Rank. Third, green building, which can be reviewed from the building used, where BCA has BCA Foresta. This green building of BCA has obtained a certification from the Green Building Council Indonesia. It has also become the first winner of the Subroto Award in the Energy Efficiency Sector from the Ministry of Energy and Mineral Resources.

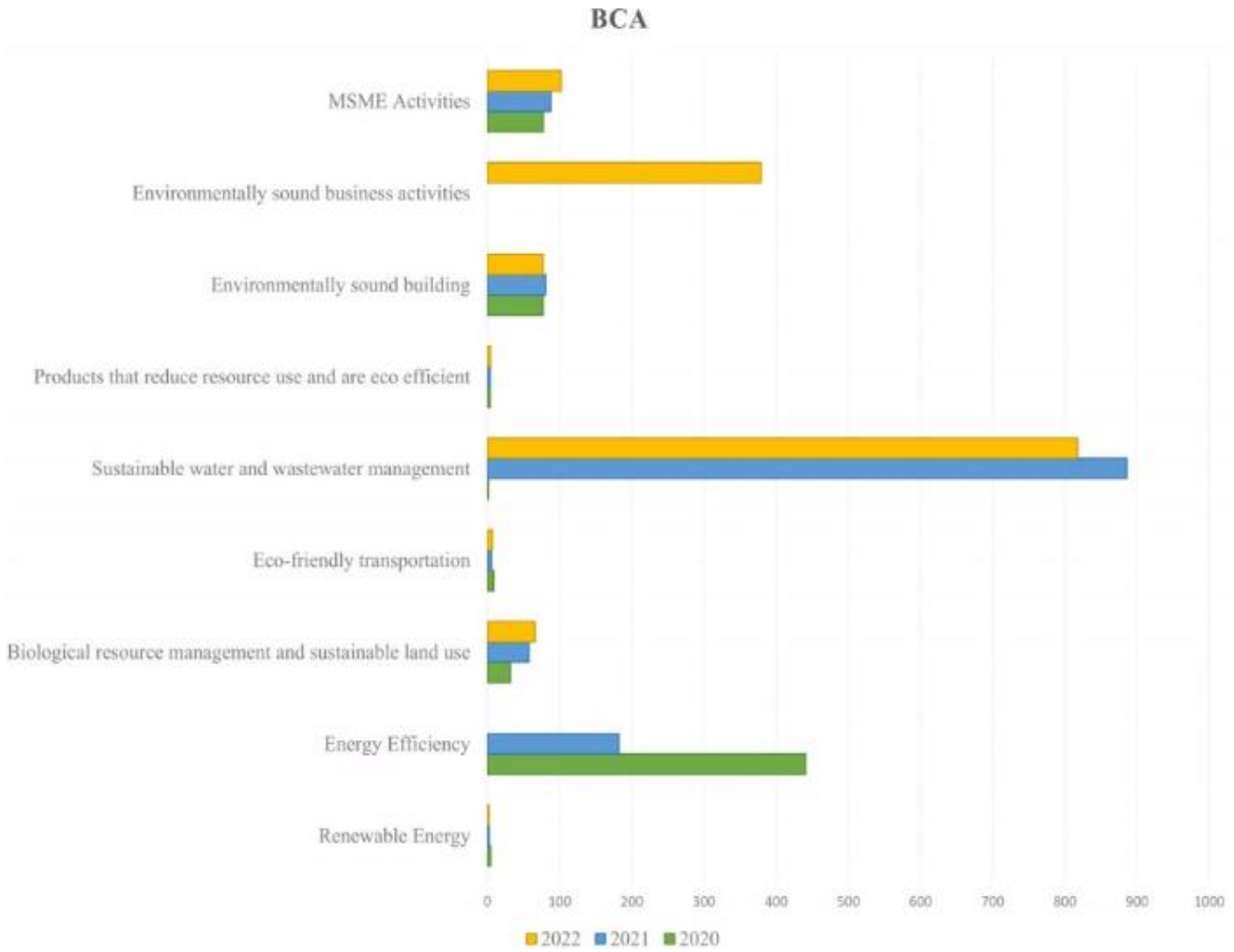

Figure 3. Sustainability report BCA
Source: Analyzed by the authors from bank's sustainability report

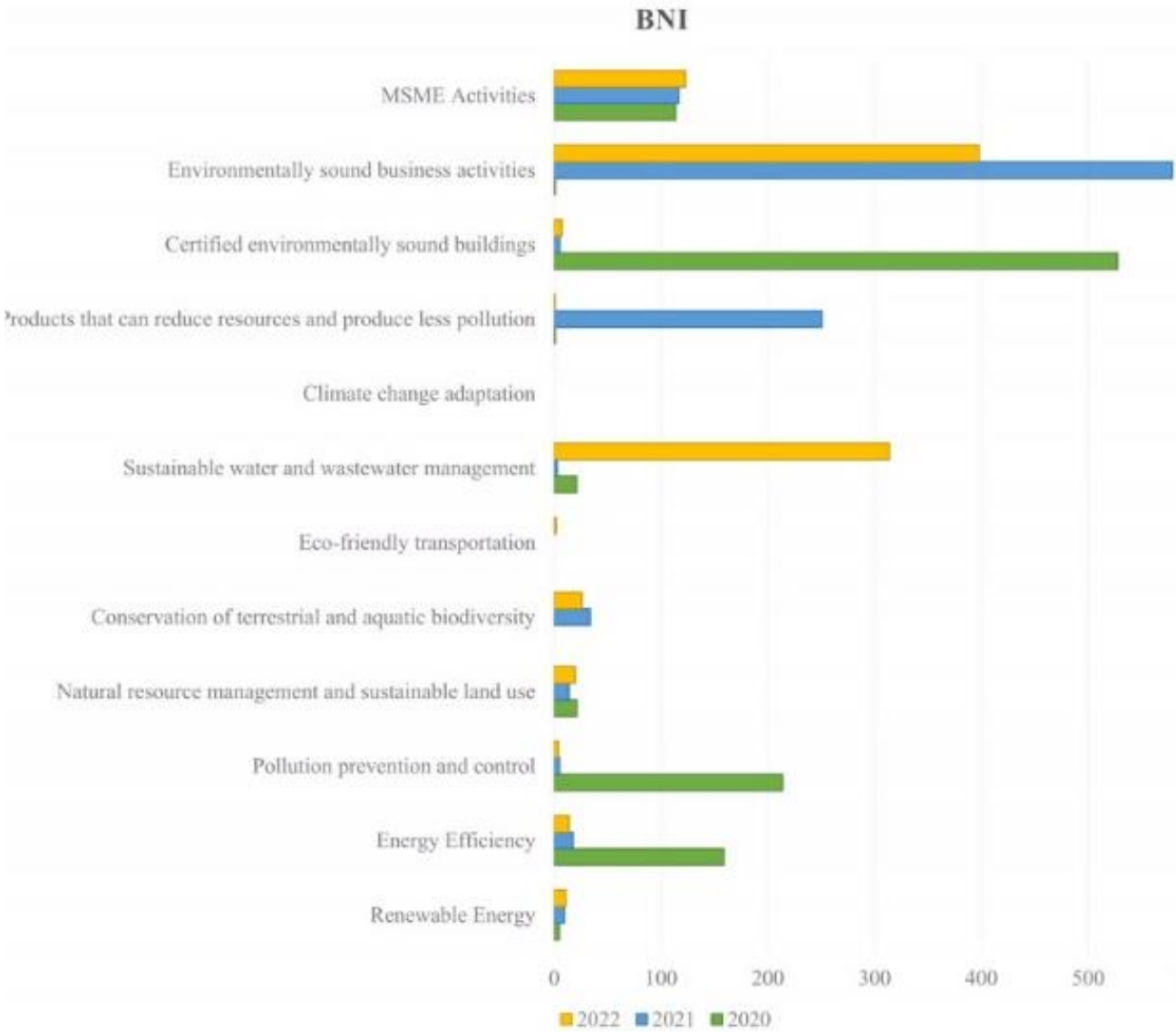

Figure 4. Sustainability report BNI
Source: Analyzed by the authors from bank's sustainability report

Fourth, reuse/recycle/refurbish, which can be reviewed from the waste management carried out by BCA, where it managed a total of 518.1 tons of waste. Fifth, paperwork or paperless, which can be viewed from the usage of paper, which reached 296 tons in 2022. Sixth, green investment, which can be reviewed that BCA has funded various sectors in the Sustainable Business Activity Category, one of which is green bonds with an amount of Rp 379 billion. BCA has purchased carbon units in the Carbon Exchange, which is an effort to decrease their carbon emissions as well as to invest in funding sustainable projects to fight against climate change. Therefore, Carbon Exchange can be categorized as an indicator of carbon emission and green investment.

4. PT Bank Negara Indonesia Tbk. (Persero) (BNI/Bank Negara Indonesia, Ltd.)

Through its subsidiary business, namely, PT BNI Sekuritas (BNI Finance), a state-owned bank, PT Bank Negara Indonesia Tbk. (Persero) (BBNI) or BNI has purchased 40,000 carbon units at the first stage. This purchase was a form of support for the government's efforts to decrease emissions. If calculated, the opening price of the Carbon Exchange on the first day was Rp 69,600 and the closing price on the same day was Rp 77,000. This means that BNI spent Rp 2.78 billion to Rp 3.08 billion for carbon units. The carbon units purchased by BNI Sekuritas are Indonesia Technology Based Solution (IDTBS) carbon units which are categorized in the Energy, Waste Industrial Process, and Product Utilization sectors sold by Pertamina. This was BNI's advanced step in applying sustainable finance. As a pioneer of green banking in Indonesia, BNI will always proactively cooperate with the Ministry of State-Owned Business Enterprises to keep on socializing various green economy practices in Indonesia [45].

It was found in Figure 4, and the Sustainable Business Activity Category funding of *PT Bank Negara Indonesia Tbk.* in 2022 was Rp 182,934 billion, where there was a 28.5% rate of total credit increase from 2021 with an amount of Rp 172,386 billion.

Then, there are six indicators of green banking that may be used as a reference to determine whether or not certain banks have committed to undergo green banking. The first is carbon emission which can be reviewed from the total greenhouse gas emissions produced by the usage of fossil fuel, electricity, and business trips (scopes 1, 2 and 3), where BNI has 13,691,012.79 tons of CO_2 eq. The second is green rewards which can be seen from the rewards obtained by BNI in 2022.

In that year, it obtained 9 rewards, one of which was a Gold Rank, Asia Sustainability Report Rating 2022 by the National Center for Sustainability Reporting (NCSR). Third, green buildings, which can be reviewed from environmentally friendly buildings with an energy-saving concept. In 2022, 2022 Plaza BNI obtained certification of building design from the Green Building Council Indonesia (GBCI) with the platinum category.

The fourth is, reuse/recycle/refurbish, which can be reviewed from the waste management carried out by BNI by recycling paper used in 2022, which reached 191.60 tons. The fifth is paperwork or paperless, which can be seen from the paper usage by BNI in 2022, which amounted to 142,245.10 kg. The sixth is green investment, where BNI has carried out funding to various Sustainable Business Activity Category sectors. Apart from that, in July 2022, BNI also issued green bonds with an amount of Rp 5 trillion. They became a capital to strengthen the green portfolio. The funds obtained from the general offers to the green bond will be used to newly fund or refund environmental friendliness projects [46]. BNI has also issued sustainability bonds with an amount of USD 5,000,000. BNI has spent Rp 2,78 billion to Rp 3,08 billion to purchase carbon units in the Carbon Exchange that contribute towards the decrease of carbon emissions as well as fund sustainable projects. Thus, the Carbon Exchange is included in the indicator of carbon emission and green investment.

5. PT Bank DBS Indonesia (DBS Bank Indonesia, Ltd.)

DBS Bank Indonesia supports the achievement of a sustainable economy. It became one of the first buyers of carbon units in the launching of IDXCarbon. DBS Bank Indonesia commits to run its Environmental, Social, and Governance (ESG)-based business for a better world. As a contribution to green banking, DBS Bank Indonesia has contributed to green funding. It has allocated a sustainable credit facility with an amount of Rp 5.5 trillion by the end of 2022. It also cooperates with private companies and state-owned business enterprises in various sectors. DBS Bank Indonesia has also strived to decrease carbon emissions in work environments through the paperless policy. Moreover, several of its branches have used solar panels. Then, it applies "Zero Waste to Landfill" waste management in all of DBS Bank Indonesia's operational buildings, cooperating with Waste4Change as a partner. This has successfully decreased the carbon emissions from what was originally 5,135 tons (tCO_2e) to 4.845 tCO_2e [47].

Available data showed that in 2022, DBS Bank Indonesia allocated Sustainable Business Activity Category funding with a total credit/funding of sustainable business activity of Rp 1,121,336 million (Figure 5). This was a significant increase from 2021 when the total funding for sustainable businesses was only Rp 200 million. The total percentage of credit/funding of sustainable business activity on the bank's total credit/funding increased by 2.03%.

Apart from that, there are six green banking indicators that may be used as a reference to determine whether or not a bank has committed to green banking. First, carbon emissions, which can be seen from the carbon emission produced by DBS Bank Indonesia, which was 4,845 tCO_2e. Second, green rewards, which can be seen from the awards obtained by the DBS Bank Indonesia in 2022, where it obtained 8 awards. One of the awards it obtained was from Forbes as World's Best Bank, 2nd Country Winner. Third, green buildings, which can be seen from banks' environmentally friendly buildings. Unfortunately, in 2022, DBS Bank Indonesia does not have any buildings with such a certification.

Fourth, reuse/recycle/refurbish. This can be seen from the waste management conducted by DBS Bank Indonesia, which reached 94.68 tons. Fifth, paperwork or paperless which can be seen from the usage of paper in 2022, where DBS Bank Indonesia decreased the paper consumption by 7 tons from the previous year. Sixth, green investment, where DBS Bank Indonesia has funded various sectors from the Sustainable Business Activity Category. In 2022, the number of ESG Thematic Fund and Green Bond subscriptions was SGD 125 million and SGD 54.4 million each. DBS Indonesia also provides Green Saving, which is a saving product dedicated to donating 50% of its interests to a Social Enterprise partner of DBS Indonesia, Krakakoa, to support sustainable business. In 2022, the balance of the Green Savings reached Rp 249 billion, with 1,600 new customers. As a pioneering purchaser in the Carbon Exchange, DBS Bank Indonesia contributes to decreasing carbon emissions as well as funding sustainable projects. Thus, it can be categorized as an indicator of carbon emission and green investment.

6. PT Bank Rakyat Indonesia Tbk (BRI/Bank Rakyat Indonesia, Ltd.)

PT Bank Rakyat Indonesia Tbk (BRI) bought 4,000 tons of emission certificates. This was in line with the commitment of BRI to decrease emissions as well as encourage carbon absorbment in Indonesia. This was hoped to help BRI achieve NZE 2060, which was also shown through the allocation of sustainable funding. Up to now, BRI has provided sustainable funding to the Micro, Small, and Medium Entreprises sector and the green sector. For the credit in the green sector, BRI has allocated funding with an amount of Rp 79.4 trillion in the second quarter of 2023. From the funding aspect, BRI issued green bonds in 2022 with an amount of Rp 5 trillion and sustainability bonds in 2019 with a total of US$ 500 million. From the operational aspect, BRI has also carried out a transition by utilizing electric vehicles. BRI has owned 97 electric cars and 90 electric motorcycles as the office's operational vehicles in August 2023 [48].

From the available data in Figure 6, it was shown that the Sustainable Business Activity Category funding of *PT Bank Rakyat Indonesia Tbk* (BRI) in 2022 has allocated credit with a total of 67.5% of the total credit to the Sustainable Business Activity Category. This amount has increased by 13.1% yoy compared to in 2021. Apart from that, there are six indicators of green banking that may be utilized as a reference to determine whether or not a bank has committed to green banking. The first is the carbon emission that can be analyzed from the carbon emissions produced by BRI (scope 1, 2, dan 3) with an amount of 11,608,089 tons of CO_2e. The second is green rewards which can be seen from the awards that BRI has obtained in 2022. BRI obtained 110 awards, one of which is the ICAII 2022: Special Awards "Integrated Green Economy Program" on August 24, 2022, from IDX Channel with a category of ESG in Jakarta, Indonesia. The third is green building. This can be seen from the building used by BRI, namely the BRILiaN Tower at Plot 62 Gatot Subroto Street, South Jakarta, which obtained a greenship certificate in the gold category from the Green Building Council Indonesia (GBCI).

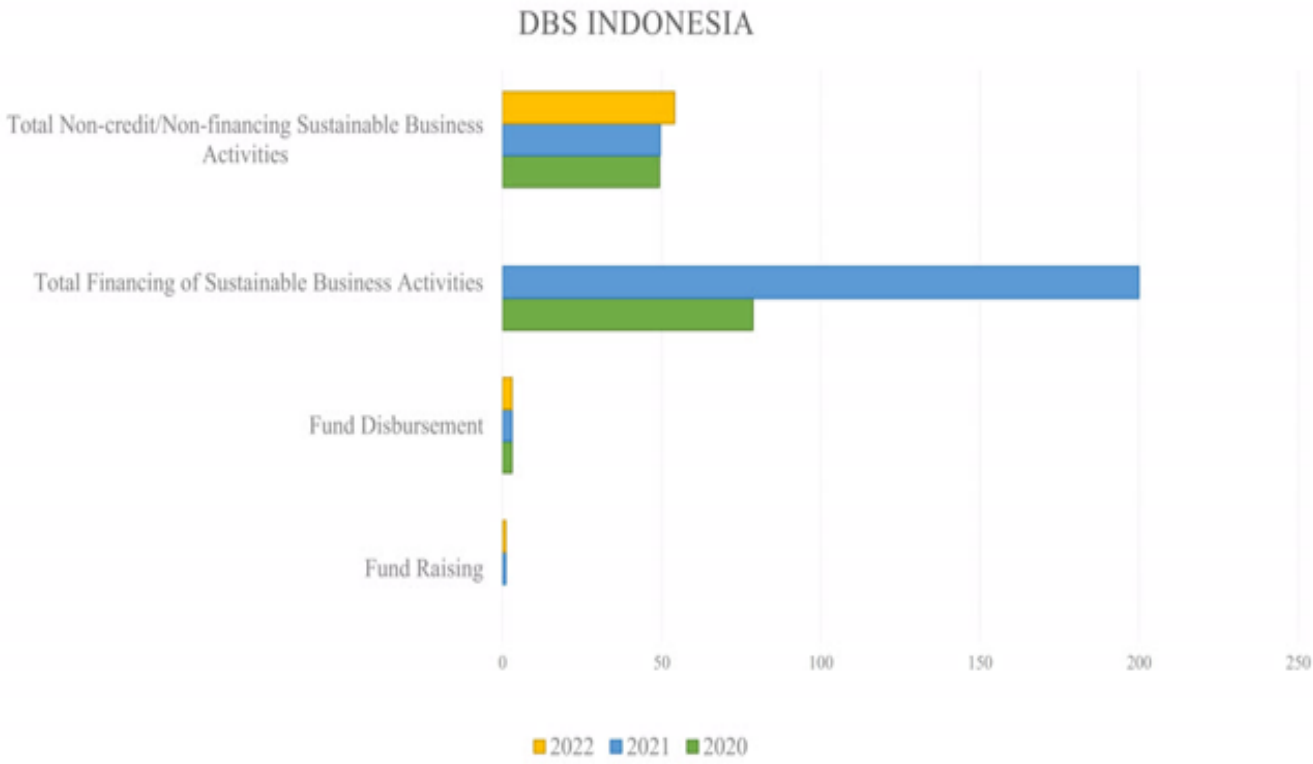

Figure 5. Sustainability report DBS Indonesia
Source: Analyzed by the authors from bank's sustainability report

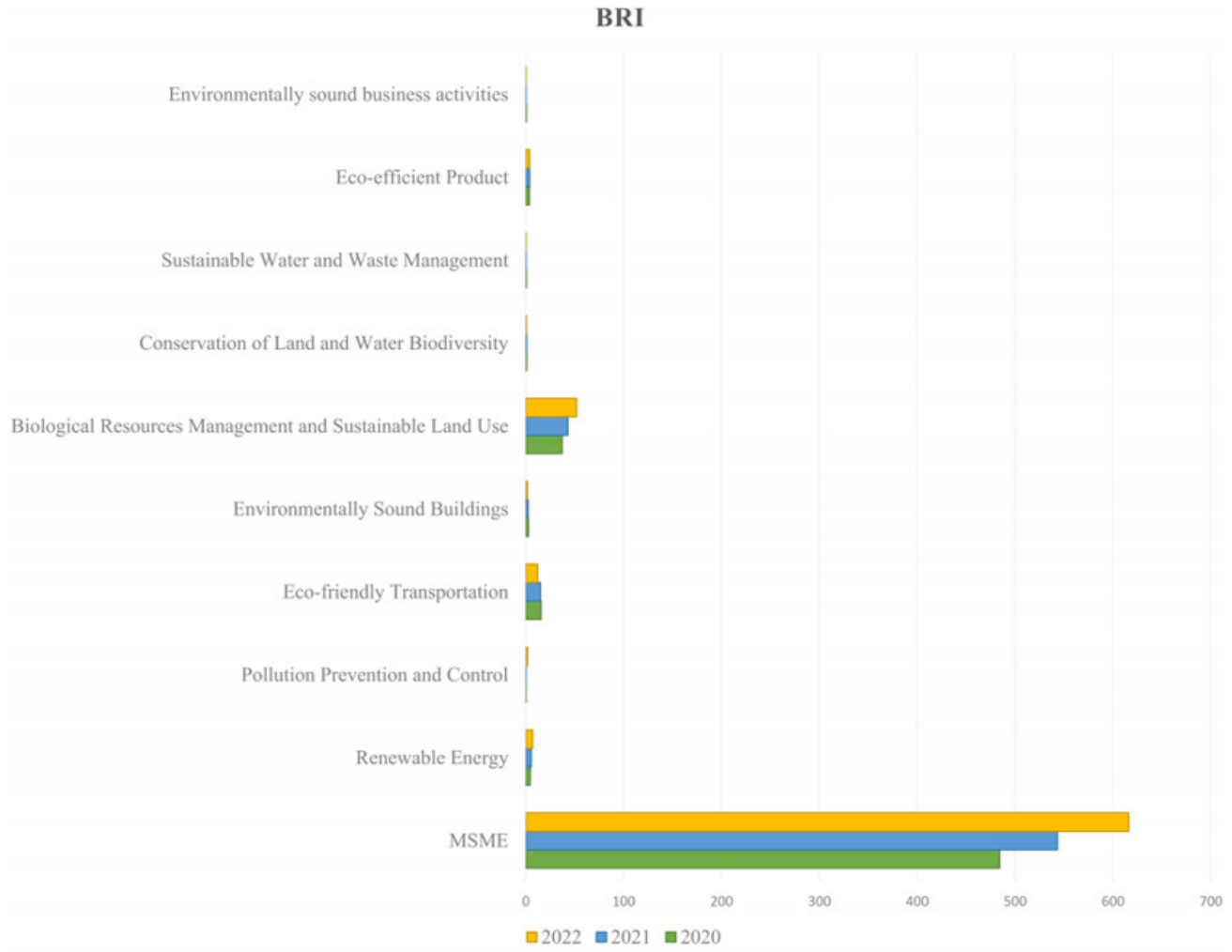

Figure 6. Sustainability report BRI
Source: analyzed by the authors from bank's sustainability report bank's

The fourth is reuse/recycle/refurbish, which can be reviewed from the waste management carried out by this bank. BRI has recycled 237,957.5 kg of waste. The fifth is paperwork or paperless, which can be seen from the usage of paper carried out by BRI. It used 248.72 kg of paper in 2022. The sixth is a green investment, which can be reviewed from the activities of green investment where BRI carried out Sustainable Business Activity Category funding. In July 2022, the first stage of Green Bond issuing has been carried out and it has obtained proceeds with an amount of Rp 5 trillion. Meanwhile, the allocation of bond proceeds usage since 2022 was Rp 4 trillion for the green sector and Rp 1 trillion for the Micro, Small, and Medium Entreprises sector. BRI has also brought emission certificates in the Carbon Exchange with an amount of 4,000 tons with the goal to decrease carbon emissions as well as fund sustainable projects. Thus, the Carbon Exchange is categorized in the green banking indicator, namely carbon emission and green investment.

The Sustainable Development Goals (SDGs) is one of the commitments to achieve in Indonesia. To support this, the government has issued policies on carbon trade through the Carbon Exchange. In this policy, business owners or companies that have succeeded in decreasing carbon emissions below the threshold are determined to obtain a permit to sell carbon credits to other business actors that have emissions above the determined threshold. Because of that, with this policy, it is hoped that business owners may make efforts to decrease carbon emissions through various means so that they may sell carbon credits [49]. The Carbon Exchange encourages companies or business owners to decrease their business activities that result in high carbon emissions by decreasing waste, maximizing repetitive usage of products, changing the business practices to renewable energy and more environmentally friendly alternative technologies by prioritizing Environmental, Social and Governance (ESG) [50]. Carbon Exchange becomes a facility for business owners or companies to compete in decreasing emissions so that they may sell carbon credits that they have succeeded in owning [51]. The proceeds from the trade in the Carbon Exchange will then be reinvested to fund projects to decrease carbon emissions so that the Carbon Exchange contributes to achieving the Sustainable Development Goals (SDGs) that have been planned by Indonesia [52].

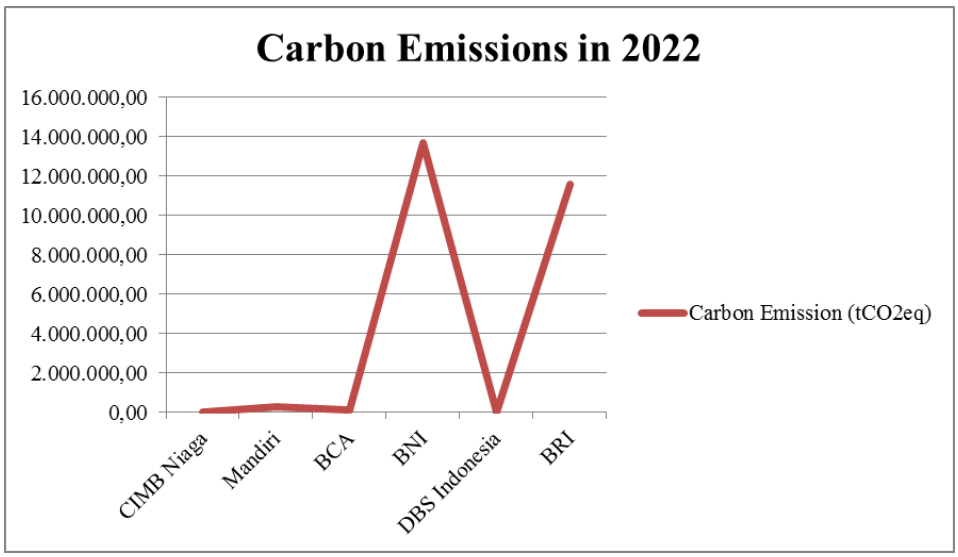

Figure 7. Carbon emissions in 2022

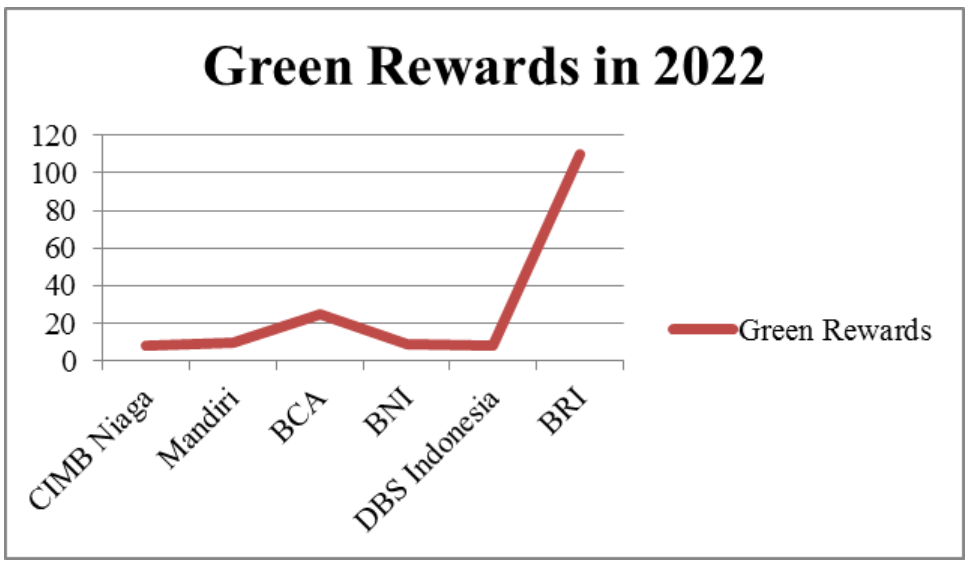

Figure 8. Green rewards in 2022

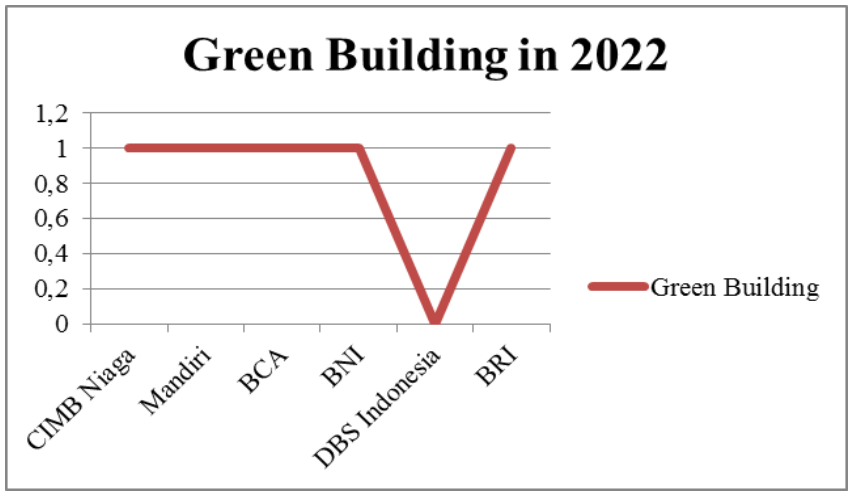

Figure 9. Green building in 2022

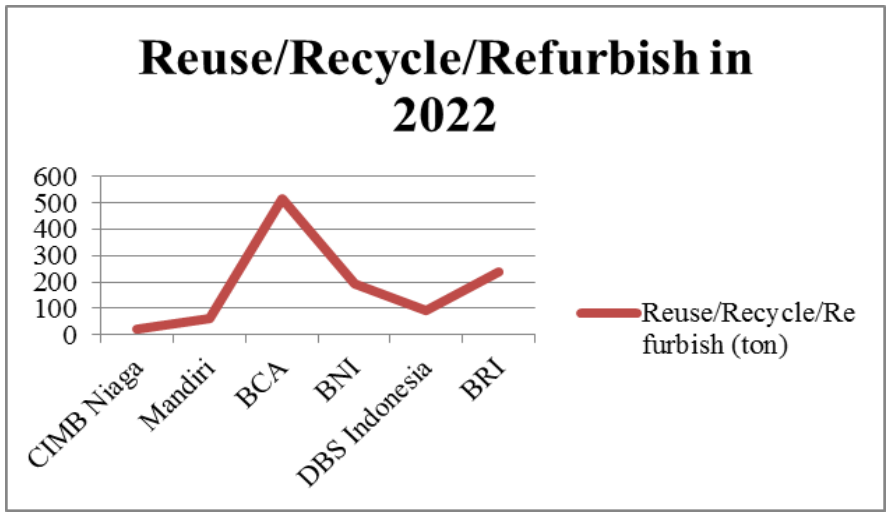

Figure 10. Reuse/Recycle/Refurbish in 2022

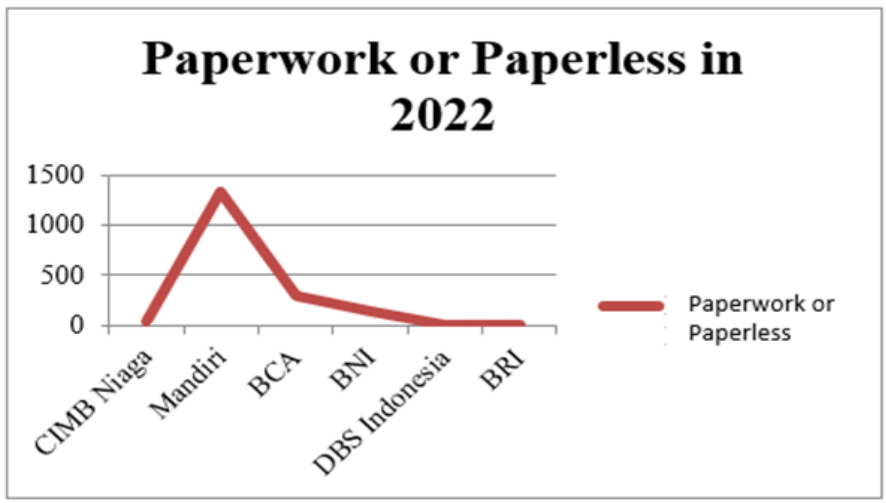

Figure 11. Paperwork or paperless in 2022

These six banks have contributed by becoming pioneering buyers in the Carbon Exchange. Figure 7 to Figure 12 show that they have committed and taken an active role in supporting the governmental program in facing climate change. They have also supported the government's commitment to Net Zero Emission 2060. Carbon Exchange actually has a rather significant role in supporting the green banking concept, where banks buy their carbon units to increase their portfolio in sustainable funding as banks buy carbon units from companies that manuveur in the Sustainable Business Activity Category sector. This means that the Carbon Exchange can initiate green banking. But it will be even better if other banks that have committed to green banking participate in the trade of Carbon Exchange.

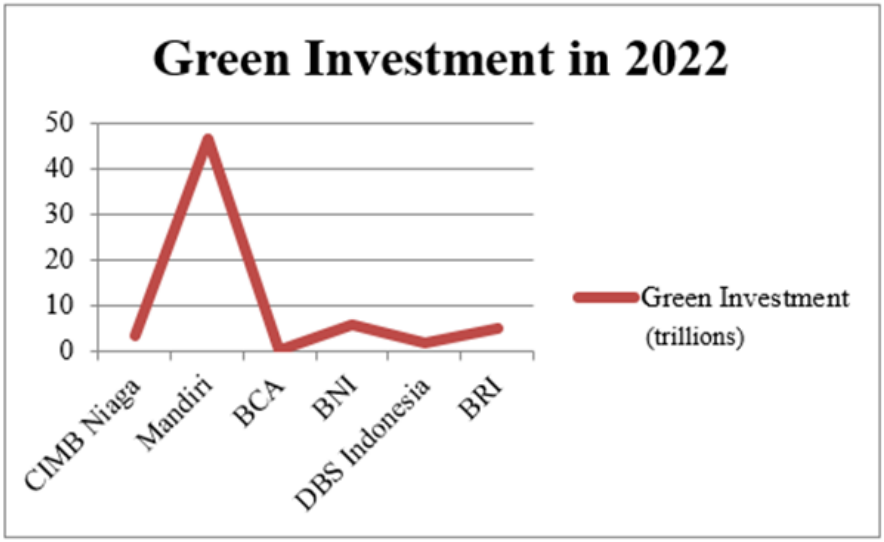

Figure 12. Green investment in 2022

These six banks have contributed by becoming pioneering buyers in the Carbon Exchange. Figure 7 to Figure 12 show that they have committed and taken an active role in supporting the governmental program in facing climate change. They have also supported the government's commitment to Net Zero Emission 2060. Carbon Exchange actually has a rather significant role in supporting the green banking concept, where banks buy their carbon units to increase their portfolio in sustainable funding as banks buy carbon units from companies that manuveur in the Sustainable Business Activity Category sector. This means that the Carbon Exchange can initiate green banking. But it will be even better if other banks that have committed to green banking participate in the trade of Carbon Exchange.

It can be seen from the banks' sustainability report in 2022 that before the existence of a Carbon Exchange policy, these six banks allocated sustainable funding to the Sustainable Business Activity Category sector which has experienced an increase from 2020 to 2022. Apart from that, banks have issued green sharia bonds, green bonds, and sustainability bonds. Banks do not actually emit a great amount of carbon emissions, but they have other goals in purchasing carbon units. First, to gain profit or revenue. Banks hope that by buying carbon units, they may attract the interest of customers to ask for credit in funding their sustainable projects so that banks may obtain profits from the credit that they provide. Second, reputation or good image. The reputation or good image of a bank will increase as it will obtain the green bank label by buying carbon units so that it can obtain the interest of investors that are interested in the environment to fund sustainable projects. Third, the law. Banks have followed the policy enacted by the government and the Financial Service Authority in an effort to decrease carbon emissions as well as apply sustainable finance so that banks are exempted from sanctions. For the regulations on green banking, the government needs to make special regulations that oblige the application of green banking, so that this concept can optimally be carried out [53].

Apart from that, the graphics on the six green banking indicators from the six banks show that carbon emissions and paperwork or paperless experienced a steep increase in 2021 amid the COVID-19 pandemic [54]. Thus, many customers undergo online transactions, which is certainly highly reasonable to happen.

In order to make this policy to be less challenging in the future collaboration from many sectors is an obligatory from the government, the financial sector and public choice supposed to be in line with green banking policy. The government should provide robust legal framework to develop the development of green banking policy and through Carbon Exchange policy. The financial sector especially banking industry should have strong commitment to participate and contribute in Carbon Exchange policy. Ultimately public also have a huge contribution in making this policy to be consider as way of life, people should choose the green financial product over the other. However, the policy which is manifested by the involvement of banks in the Carbon Exchange is still at an early stage and yet it is challenging there is a strong commitment from the banks to implement this policy.

4. CONCLUSIONS

The sustainable reports of banks in 2022 showed that before the policy of Carbon Exchange, the funding of the Sustainable Business Activity Category from 2020 to 2022 increased. Thus, it can be made sure that the Carbon Exchange policy also has an effective role in increasing the banks' portfolio of sustainable funding in 2023 to support the green banking concept. This is because banks buy carbon units from companies that work in the Sustainable Business Activity Category sector. There are six indicators of green banking that may become the reference to determine banks that have committed to green banking, namely carbon emission, green rewards, green building, reuse/recycle/refurbish, paperwork or paperless, and green investment. The graphics on the six green banking indicators from the six banks show that carbon emissions and paperwork or paperless experienced a steep increase in 2021 amid the Covid-19 pandemic. Because of that, to decrease carbon emissions and paperwork or paperless, they carry out efforts by buying carbon units in the Carbon Exchange. Even though this is challenging stage and the result is not yet defining the strong commitment from financial sector is substantial. Apart from that, there are three main reasons why banks buy Carbon Exchange, namely profits, reputation, and law. In order for this policy to be successful, there needs collaboration from various parties such as

government by enacting robust regulatory framework that support this Carbon Exchange policy, also from financial sector to actively take part in this policy and also public to always support this policy and choosing green financial product.

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