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Potential Carbon Tax Imposition in Boosting Low-Carbon Green Economic Activity

(Case Study on PLTU Paiton Unit 1,2 and 9 2019-2021)

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Abstract: *One effort to combat global warming is the implementation of carbon tax as form of compensation for carbon emissions emitted by polluters, with goal of reducing carbon emissions and changing mindset of emission producers to increase efficiency in producing emissions from their industrial and switching to green economy. The purpose of this research is to determine potential of carbon tax in increasing low-carbon green economy. Coal-fired power plants will be the first to be taxed under the Carbon Tax. The Paiton Coal-fired Power Plant Company Units 1, 2, and 9 in 2019-2021 are sample in this study. This study's data analysis is a descriptive qualitative, which involves cross-referencing data on Carbon Tax rate with data on disclosure of carbon emissions from coal-fired power plants, which is then analyzed with supporting references from laws, presidential regulations, and scientific journals. The Carbon Tax will force individuals to consider consequences of polluting actions. Carbon tax policy allows for economic distortions, the implementation must be done at the right time and with a fair mechanism. The proceeds from carbon tax will be used to fund community's welfare sector as well as development of renewable energy. The Carbon Tax Mechanism should based on fairness principles.*

Keywords: Carbon Tax, Emissions, Green Economy, Low Carbon, Potential

I. INTRODUCTION

Climate change continues to occur today, the main cause of which is carbon emissions. The existence of excess carbon emissions will cause the onset of global warming which is very dangerous for the survival of living things on earth. Global warming is when the average temperature of the earth's atmosphere, sea and land increases from normal conditions (Leu, 2021). Activities in the business industry that cause negative impacts on the environment are called negative externalities. One of the efforts in overcoming negative externalities is the enactment of a green economy. Simply put, a green economy is defined as something that is low carbon, efficient in resources and socially inclusive. Green economies are also important in addressing the impacts of climate change that are closely related to goals in equity, improving social welfare, and significantly reducing the risk of environmental damage and ecological scarcity (UNEP, 2008).

In responding to negative externalities that will ultimately affect the economy, fiscal policy becomes a solution by imposing taxes and or providing subsidies. The Carbon Tax can be defined as a levy on taxpayers on the carbon content of fossil fuels where the Carbon Tax is considered equivalent to the CO2 tax. This is because almost all the carbon produced in fossil fuels will eventually be released as CO2 (Christensen & Olhoff, 2018). Carbon pricing aims as a measuring tool to determine the external costs of greenhouse gas (GHG) emissions produced, so that environmental damage caused by carbon emissions can be taken into account and charged. The price in carbon imposed by polluters on society is a form of compensation for carbon emissions emitted. This carbon pricing is one of the efforts to reduce carbon emissions because the emission producers will try their best to reduce the burden of mandatory levies by increasing efficiency in producing emissions from their industrial activities.

Based on the Nationally Determined Contribution (NDC) Indonesia has set a target to reduce emissions by 29% by 2030 independently and by 41% with international assistance by 2030, thus achieving the net zero emission target by 2060. Indonesia's commitment to reducing emissions can be achieved through the imposition of a Carbon Tax. In addition, the Carbon Tax is a means for Indonesia not to rely on fossil fuels and then replace them with renewable and environmentally friendly fuels. This is done considering the deteriorating environmental conditions and the impact on public health. There are pros and cons to the imposition of a Carbon Tax. However, according to Law Number 7 of 2021 concerning Harmonization of Tax Regulations Article 13, as well as Presidential Regulation Number 98 of 2021 concerning the Implementation of NEK, Carbon Tax needs to be implemented in Indonesia in order to achieve the emission reduction target by 2030.

II. LITERATURE RIVIEW

2.1 Potential Carbon Tax

According to the Big Indonesian Dictionary, potential is an ability that has various possibilities or expectations to be further developed, both in the form of strength, power, and abilities obtained directly from society through a long process.

The Carbon Tax is one of the policies of countries in overcoming the negative externalities caused and is a derivative of the implementation of the pigouvian tax. This Pigouvian tax is intended as a tax levy on each unit of production from polluting sources in an amount proportional to the effect of the damage caused. This compensation will be taxed for activities that emit CO2, namely those that use hydrocarbon fuels (oil, natural gas, and coal) and distribute them to cleaner activities in the form of incentives/stimulus/subsidies (ddtc.co.id, 2020)

The existence of this taxpayer policy is expected so that the public can consider and think about all the consequences of activities that cause negative externalities or carbon emissions. Therefore, the enactment of the Carbon Tax is as a derivative of the Pigouvian tax implementation which is expected to be able to reduce or minimize the formation of negative externalities of carbon emissions by imposing additional fees or levies on related activities that have the potential to cause negative externalities for the environment.

To make Indonesia reach its target point of reducing greenhouse gas emissions by 29% by 2030, all parties must be involved in starting it. The existence of a Carbon Tax should provide a considerable potential in instilling awareness in the community in reducing or modifying activities that emit greenhouse gases by switching to more environmentally friendly technologies so that it can help the Indonesian government to carry out climate resilience actions that have been designed.

2.2 Theory of Calculating Potential

This analysis of the carbon tax potential calculation is intended to find out how much power the Carbon Tax has in increasing low-carbon green economic activity. With the existing potential, it will be compared with the mechanism for imposing a Carbon Tax so that it can be known the potential generated when the Carbon Tax takes effect which then becomes the hope of increasing green economic activity in Indonesia. As for how to calculate tax potential according to Harun (2003: 6) in a research journal by Supriadi et al., (2020) namely:

Y1 X Tax Rates

Information:

Y1= E – (F x G)

Description:

Y I = Basis for Imposition of Carbon Tax
E = Total GHG emissions (tCO2)
F = GHG upper limit (tCO2)
G = Gross electricity production (Mwh)

2.3 Subjects, objects and taxpayers of Carbon Tax

The subject of Carbon Tax regulated in Law Number 7 of 2021 Harmonization of Tax Regulations (UU HPP) Article 13 paragraph (5) of the HPP Law includes individuals or entities that buy carbon-containing goods and/or carry out activities that produce carbon emissions. While the object of the Carbon Tax is the purchase of goods or activities that produce a certain amount of carbon emissions. The basis for the imposition of a Carbon Tax is not carried out solely on all emissions emitted by all economic activities carried out, but is taken into account when emissions that exceed the predetermined emission threshold. The Carbon Tax in Indonesia is planned to be implemented gradually. In the first phase of the implementation of the Carbon Tax, it will concern the coal steam power plant (PLTU Acronym in Indonesia) sector with the enactment of a tax scheme based on emission limits (cap and tax), this means that residual emissions that exceed the threshold will be taken into account as the basis for the tax.

2.4 Carbon Tax Rates and Collections

The imposition of a Carbon Tax is calculated based on emissions that exceed a predetermined threshold. In Chapter VI Article 13 of the HPP Law, the Carbon Tax rate is set to be greater than or equal to the price of carbon in the carbon market with a minimum rate of Rp. 30/kgCO2e. The existence of regulations that set an Upper Limit on Emissions (BAE) for a sector subject to Carbon Tax must be set in advance by the Ministry of Energy and Mineral Resources. In the Ministry of

Energy and Mineral Resources Records reported from the CNBC Indonesia website, 2022 there are 3 classification groups for determining the Carbon Tax for coal steam power plants (PLTU Acronym in Indonesia). First, the power plant has a capacity greater than 400 MW. The emission limit value is set at 0.918-ton CO2 per megawatt hour (MWh). In second place, namely PLTU with a capacity of 100-400 MW, with an emission limit value of 1,013-tons of CO2 per MWh. In third place, the Mine Mouth Power Plant is 100-400 MW, with a limit value of 1.94-ton CO2 per MWh. While the PLTU with a capacity of <100 MW has not been able to apply cap, trade and tax because the PLTU with this capacity is still the backbone of the electricity system outside the islands of Java and Sumatra.

2.5 Basic Principles of Carbon Tax

Mentioned from the United Nations Handbook on Carbon Taxation for Developing Countries, the United Nations (UN) in 2020 issued guidelines on policy and administrative aspects in designing and implementing a Carbon Tax for developing countries. The guidelines also contain basic environmental principles that form the basis for implementing the Carbon Tax, including:

a. The Polluter Pays Principle
   The polluter principle of paying means that the polluter must bear the cost of pollution, which is then transferred to society as a whole through a tax mechanism. This principle aims to utilize economic instruments to optimize the internalization of environmental costs.
b. The Principle of Prevention
   This precautionary principle emphasizes that the state is responsible for carbon-related activities occurring in its control area and must ensure that its activities do not cause environmental damage to other countries.
c. Precautionary Principle
   The implementation of the Carbon Tax means that the state has recognized that in the long run there is a risk of environmental damage, the Carbon Tax is a preventive measure taken by the country that implements it.
d. The Principle of Common but Differentiated Responsibilities
   This principle considers that environmental damage is a shared responsibility of each country, but the level of involvement is relatively adjusted to the social and economic development of each country.

2.6 Carbon Tax Implementation Plan in Indonesia

Indonesia can be said to have enormous carbon potential. The electricity network spread across Indonesia is still dominated by coal-fired power plants, the use of transportation with fossil fuels is also seen increasing. Currently, there are several crucial issues that need to be formulated and explained by the government regarding the plan to implement a Carbon Tax in Indonesia, including the basics and indicators of determining the amount of Carbon Tax which is a negative sentiment from business actors because it is feared that it will cause fears that have the potential to increase prices and become a burden on the community.

The government in Law Number 7 of 2021 Harmonized Tax Regulations (HPP Law) concerning Harmonization of Tax Regulations which regulates one of them regarding the Carbon Tax. The carbon tax in Indonesia that will be implemented for the first time is in the Coal Steam Power Plant (PLTU Acronym in Indonesia) sector at a rate of IDR 30 per kilogram of carbon dioxide equivalent (CO2e). When compared to the draft Law on General Provisions and Tax Procedures (RUU KUP), which is IDR 75 per kilogram of CO2e, this rate is lower. The tariff of Rp30/kg CO2e is considered too low because the tariff is still far from the recommendations of the World Bank and International Monetary Fund for developing countries, which ranges from US$ 35-US$ 100 per ton or around Rp507,500-Rp1.4 million per ton.

2.7 Green Economy

The Green Economy was formulated as a more specific way to elaborate the concept of sustainable development. The United Nation Environment Programme (UNEP) defines a green economy as an effort to improve well-being by avoiding increased greenhouse gas emissions and climate change through low-carbon economic activities, resource efficiency, and being socially inclusive. The main thing of the various concepts about the green economy is that it is possible in reaching the point of stable improvement in human well-being carried out without harming the environment or depleting the surrounding natural resources. When viewed from the side of the environment today, the economy that is running has grown at the expense of the environment, awareness in protecting the environment is very necessary considering that it is also in our own interests.

2.8 Green Economy Principles

The green economy was formed to emphasize the environmental side of sustainable development. The green economy strategy to be carried out must be in line with other development goals. Low Emission Development Strategy (LEDS) is a strategy used to achieve sustainable development targets through the application of the green

economy concept which will be designed later. LEDS also known as Low Carbon Development Growth Plan (LCGP) is a plan in achieving the low carbon growth target point. Through this low-carbon development concept, it will be used to provide an overview of plans for national development or strategies where economic growth should be based on low-emission principles and think about long-term climate resilience. This implemented green economy seeks to support an economy with low carbon emissions, efficient in the use of resources and able to be socially responsible for its relationship with society.

2.9 Green Economy Policy Strategy in Indonesia

The green perspective is not unfamiliar to Indonesia. Quoted through the website of the Ministry of Energy and Mineral Resources of the Republic of Indonesia, the Minister of Energy and Mineral Resources emphasized that Indonesia's development strategy refers to 4 pillars of development, namely pro-growth, pro-job, pro-poor and pro-environment. This reflects that the economic development goals in Indonesia are not only focused on promoting growth, but also pay attention to environmental sustainability and poverty reduction in society. The strategy revealed by President Joko Widodo in the WEF Press Release (presidenri.go.id), to achieve a green economy, first of all, through low-carbon development will be demonstrated by the National Medium-Term Development Plan (RPJMN Acronym in Indonesia) 2020-2024. Second, the Net Zero Emission policy. Issuance of a roadmap to achieve Net Zero Emission by 2060, including a net sink of the forestry and land sectors by 2030. Third, the provision of a series of green stimuli aimed at encouraging further implementation of the green economy in the future.

The current government has also prepared plans in financing for conservation and restoration, especially through the establishment of the Environmental Fund Management Agency. In addition, the government has also issued a green sukuk which contains an innovative financing scheme to finance the entire development agenda that is environmentally friendly and low in emissions.

III. METHOD

3.1 Research Design

The Researcher use a qualitative approach with a descriptive method. The writer uses a qualitative approach because want to get an understanding of the problems raised in this study. This qualitative approach will be supported by data obtained through carbon emission disclosure data at the Paiton Coal-fired Power Plant units 1, 2 and 9 with data derived from literature, books, regulations and the internet.

3.2 Subject of Research

The subject of this study was the Paiton coal-fired power plant company units 1,2 and 9 in 2019-2021 which revealed their carbon emissions in a sustainability report. The author's consideration in determining the subject of this study is because the Paiton Coal-fired Power Plant company is one of the largest coal-fired power plants in Indonesia and is the first stage sector in the implementation of the Carbon Tax in Indonesia.

3.3 Data Types and Sources

The data source used in this study is secondary data. In this study, the authors took secondary data obtained from related company websites in the form of carbon emission disclosure data and other data related to the study. The data type in this study is secondary data with external data types. The data collection is carried out by searching using a computer and can be accessed via the internet with https://www.ptpjb.com/?p=home website.

3.4 Data Collection Techniques

1. Indirect Observation

Indirect observations were made by the author by collecting carbon emission disclosure data in sustainability reports, an overview and development of the Paiton Coal-fired Power Plant company units 1,2 and 9 for the 2019-2021 period by accessing directly to the company's website https://www.ptpjb.com/?p=home.

2. Literature Studies

This study was conducted by reading, studying and reviewing laws, government regulations, literature, articles, journals and the results of previous research related to research in this research.

3.5 Data Analysis Techniques

The data analysis technique that will be used in this study is to present numbers and explanations in detail to find out the potential for it to be imposed, namely by checking data on the Carbon Tax rate with data on the disclosure of carbon emissions of the Paiton Coal Power Plant units 1,2 and 9 which are then analyzed with supporting references from scientific articles and journals so that information can be obtained in explaining how

much potential the Carbon Tax has in changing the Economic actors are turning to low-carbon green economic activity. The techniques used by the author in managing data and analyzing data are as follows:

1. Collecting Data Through Corporate Sustainability Reports
The initial stage of this study is to collect data on the total emissions produced, the capacity of the coal-fired power plant and the total electricity production generated through the Paiton Unit 1,2 and 9 PLTU Company Sustainability Report accessed through the https://www.ptpjb.com/?p=home website.
2. Managing Data by Calculating Carbon Taxes
After the data is collected, the next step is to calculate the amount of potential Carbon Tax revenue in each unit of PLTU Paiton 1,2 and 9 years 2019 to 2021.
3. Analyzing the Potential of Carbon Taxes
The next stage is to analyze the potential of the Carbon Tax with supporting references from Laws, Government Regulations, articles and scientific journals so that information can be obtained in explaining how much potential the Carbon Tax has in changing economic actors to switch to low-carbon green economic activities.
4. Reducing the Carbon Tax Mechanism According to Tax Regulations
After that, the next stage is to reduce the data by summarizing, choosing the main things and focusing on the important things according to the Carbon Tax topic so that it can provide a clearer picture to analyze the carbon tax mechanism data according to tax regulations.
5. Analyzing the Potential of Carbon Taxes Related to the Green Economy
The next stage is to analyze the potential of Carbon Tax related to the green economy with supporting references from laws, government regulations, articles and scientific journals so that information can be obtained in explaining the magnitude of the potential of carbon tax on climate change control with increasing green economic activity.
6. Drawing Research Conclusions
The final stage is the drawing of research conclusions. Drawing conclusions is carried out by comparing the results of calculating the potential of Carbon Tax with the mechanism for imposing a Carbon Tax conceptually so as to answer the formulation of research problems.

IV. RESULT

4.1 Company Overview

PLTU Paiton is a steam power plant located in Binor Village, Probolinggo Regency, East Java. The power plant consists of 9-units with different managing companies. According to Rachmanoe Indarto, who is the Director of Coal Plant Operations of PT PLN Nusantara Power, the Paiton PLTU complex is the largest power plant complex that is able to meet around 15 percent of Java-Bali's electricity needs thanks to its capacity of 4,700 megawatts.

Paiton Generation Units 1, 2, and 9 are units managed by PT Pembangkit Jawa-Bali (PJB) with the main fuel of coal imported from Kalimantan Island with HSD used as the first ignition fuel (firing). PLTU Paiton units 1 and 2 have a total capacity of 800MW. There is also in the same area there is a Paiton power plant unit 9 with a capacity of 660 MW. This power plant is part of an effort to support energy savings and development for power plants to fuel by utilizing coal whose reserves are abundantly available in the country.

Generally, steam power plants receive inputs in the form of raw materials in the form of coal and water. Furthermore, the output produced is in the form of electrical energy, combustion steam, and residues. The working principle of coal steam power plants is the use of coal-burning steam to drive turbines that rotate electric generators. Coal is burned in a reservoir filled with water. The boiling water is then heated to a high-pressure steam. The presence of high pressure then makes the turbine rotate. The rotation of kinetic energy in the generator will produce electrical energy. After that, the power generated by the generator will be directly connected to the electrical installation and flowed to the consumer.

4.2 Potential Carbon Tax

The term "externality" is used to describe the inevitable impact of the activities of the business industry. The continuous negative impact will harm the earth and all living things and potentially increase global temperatures so that the enactment or prohibition of certain behaviors by the government can reduce these negative impacts. The implementation of the Carbon Tax is expected to encourage the shift to renewable energy sources that are better for the environment. In addition to helping mitigate climate change, Carbon Taxes can increase government tax revenues and improve energy efficiency for consumers and businesses. The basic amount of carbon emissions is used to calculate the potential revenue from the Carbon Tax (Saputra, 2021).

The Carbon Tax is also used as an instrument of climate control in achieving sustainable economic growth according to the polluter pays principle. The carbon tax potential analysis is intended to find out how much influence the Carbon Tax has in transforming economic actors to switch to low-carbon green economic activities. After conducting a carbon tax potential analysis, it will be possible to estimate what plans and actions will be taken to maximize the existing potential. Tax potential is a potential that is measured by calculating the multiplication of research object data with the Carbon Tax rate. So that then the results of the amount of potential revenue from the carbon tax will be obtained.

PLTU Paiton units 1 and 2 have a total capacity of 800MW. There is also in the same area there is a Paiton PLTU unit 9 with a capacity of 660 MW. Both have a capacity of >400MW so that the Upper Limit of GHG set is 0.918 with a Carbon Tax rate of Rp. 30,000 / tCO2.

Year	Unit PLTU	Total GHG Emission (tCO2)	Gross Electricity Production (Mwh)	Basis for Imposition of Carbon Tax	Carbon Tax
2019	Unit 1&2	5.592.634,76	5.453.760,28	586.082,823	Rp 17.582.484.688,80
2020	Unit 1&2	4.813.716,86	4.664.380,73	531.815,350	Rp 15.954.460.495,80
2021	Unit 1&2	5.557.835,77	5.275.090,92	715.302,305	Rp 21.459.069.163,20
2019	Unit 9	4.358.338,07	4.345.854,91	368.843,263	Rp 11.065.297.878,60
2020	Unit 9	4.395.766,63	4.225.489,45	516.767,315	Rp 15.503.019.447,00
2021	Unit 9	4.192.336,97	4.000.837,00	519.568,604	Rp 15.587.058.120,00

Sources: Data processed, 2022

Based on the results of the Carbon Tax calculation above, PLTU Paiton unit 1&2 experienced a decrease in Carbon Tax in 2019-2020 of Rp. 1,628,024,193 and experienced an increase again in 2020-2021 of Rp. 5,504,608,667.40. At PLTU Paiton unit 9 continues to increase, in 2019-2020 the increase was Rp. 4,437,721,568.40 and in 2020-2021 it increased by Rp. 84,038,673. It can be concluded that the average Carbon Tax for the last three years paid by PLTU Paiton unit 1&2 is Rp. 18,332,044,782.60 and in unit 9 is Rp. 14,051,791,815.20

The carbon tax is one of the derivatives of the Pigouvian tax which adds fees or taxes for environmentally damaging activities so that it is expected to reduce the negative effects of carbon emissions (Maghfirani et al., 2022). Economic actors will think carefully before acting if there is a binding tax policy. This happens because they have to see all the effects of the actions performed. Thus, the imposition of a carbon tax based on the Pigouvian tax is expected to reduce the negative impact of carbon emissions by imposing additional fees or taxes on related activities.

The implementation of the Carbon Tax means that controlling the price of carbon is expected to directly reduce the level of emissions resulting from industrial activities. However, the government needs to make a more detailed plan to make it happen by adjusting the state of the country both in terms of tariffs, objects imposed, and also other related matters. For efficient taxes, the rate must be set according to the same level of damage due to carbon emissions. This is done to ensure that the Carbon Tax is implemented fairly and balanced by considering the losses it causes and the impacts it causes.

When a Carbon Tax is imposed on fossil fuels, the majority of prices will inevitably rise. Based on economic principles, when prices rise, the demand for these goods will fall. Similarly, the imposition of a Carbon Tax on fossil fuels will certainly make them more expensive so that it is expected to reduce the use of carbon fuels and reduce CO2 emissions. Carbon Tax can be used as an impetus so that Indonesia's fossil fuel use is no longer excessive, seeing that the fossil fuel reserves contained by the Indonesian earth are no longer surplus (Darajati et al., 2022).

One of the most important things that must be carefully prepared is to know when the timing and momentum of enacting this policy carbon tax policy can cause economic distortions. If the price of these goods or services rises due to the carbon tax, this will affect the level of consumption of the people. Therefore, the Carbon Tax still needs to be reviewed considering that Indonesia is also in the process of recovering its economy after the Covid-19 pandemic which has slowed down the country's economic growth. Reduced levels of public consumption will slow down Indonesia's economic recovery (Maghfirani et al., 2022). This demands that the Carbon Tax policy must be made fairly in line with the structure of the Indonesian economy (Pandey et al., 2022)

The imposition of a Carbon Tax will basically give rise to various polemics because it has the potential to reduce economic growth, reduce social welfare and can even damage industrial competitiveness (Selvi et al., 2020). The government hopes that by imposing a Carbon Tax, it can reduce greenhouse gas emissions and at the same time can improve people's welfare. Carbon tax revenues can be used to finance important things such as education, health care, public transportation, and green industry, while supporting the development and innovation of new renewable energy (Salim & Sidiq, 2022). The implementation of the Carbon Tax is also expected to change the behavior of economic actors to switch to low-carbon green economic activities.

The implementation of the Carbon Tax needs to be supported by its implementation because as follows first, the carbon tax has fulfilled two tax functions in Indonesia, namely the regulatory function (Regulator) and the budget function (source of funds for the government). It is said to have fulfilled both functions because the carbon tax will eventually be used by the government as a tool to show the seriousness of improving the current climate disaster and it is hoped that carbon emissions in Indonesia can decrease (Darajati et al., 2022). The Carbon Tax needs to be socialized in order to get support from both related parties and the general public. This is done so that many people understand how Carbon Tax works and what its purpose is.

According to research by Redshaw (2020) in in the research journal by Darajati et al., (2022), the Carbon Tax also has some flaws in its implementation plan. First of all, imposing a carbon tax that is so quickly carried out when Indonesia is still recovering from the economic crisis will only add to the problem of the country's economic burden. Second, large companies with a lot of capital ultimately want to focus on lowering production costs rather than looking for ways to switch to New and Renewable Energy (NRE). Third, carbon tax policies will cause carbon leakage, which is when businesses in certain industrial sectors or subsectors move their production to other countries with less stringent emission restrictions.

Uncertainty on a global scale clearly has the potential to affect domestic circumstances which can have an impact either directly or indirectly on the management of aspects of sustainability performance such as environmental, social, and governance issues. This makes PT Pembangkitan Jawa-Bali PJB as the managing company of PLTU Paiton units 1,2 & 9 realize the need for periodic sustainability performance reviews that take into account economic, social, and environmental issues. Some sustainability-related issues that must be addressed include the construction of new electricity generation powered by renewable energy sources and the use of biomass as a fuel source.

The existence of global uncertainty made PJB decide to focus on sustainability performance by implementing long-term strategies and policies that are always updated following the company's developments. PJB is responsible for risk management carried out by considering sustainability risks, such as the possibility of widespread environmental changes around the Generating Unit and the prospects in the development of NRE.

The imposition of a Carbon Tax will certainly increase the burden of PJB financing, in view of uncertainty and long-term policies related to the sustainability performance of PJB remains committed to utilizing the potential of NRE. This is done because the development of the electricity industry in Indonesia is increasingly competitive and faces challenges, as well as the opportunity to innovate due to the increasing market need for power plants with NRE sources. Although there is still a financing burden from the Carbon Tax, the NRE development efforts carried out will still have a good impact on the company because over time in the development of NRE will reduce the emissions produced so that the burden of the Carbon Tax will be reduced.

4.3 Carbon Tax Mechanism

Before the Carbon Tax was enacted, a more mature system was needed because this policy allowed for a trade-off between protecting the environment and economic growth. The thing that needs to be considered in the formulation of the Carbon Tax is how the government can present a mechanism that can support the implementation of the carbon tax, so that its application can be effective and effective in answering real problems that exist in the community, as well as keeping environmental principles fulfilled in the industrial era. Carbon taxes have the potential to change the behavior of households and industries to reduce the use of high-emission energy. In order for this goal to be achieved, in making a carbon tax design, the things that need to be considered according to are related to the tax basis, tax rate, income distribution, impact on consumers and ensuring emission reduction (Ratnawati, 2016).

The government issued Presidential Regulation Number 98 of 2021 which is intended as the basis for implementing NEK and as a guideline for reducing GHG emissions through policies, steps, and activities to achieve the Nett Zero Emission target by 2060 through NDC and controlling GHG emissions in national development. The main points of regulation in the implementation of NEK include the levy on carbon, which is a levy on the amount of carbon emissions whose regulation for its implementation is carried out in accordance with the provisions of laws and regulations. In its implementation, the government will pay attention to the right

transition so that the implementation of this carbon tax remains consistent with the momentum of post-pandemic economic recovery.

The subject of Carbon Tax regulated in Law Number 7 of 2021 Harmonization of Tax Regulations (UU HPP) Article 13 paragraph (5) of the HPP Law includes individuals or entities that buy carbon-containing goods and/or carry out activities that produce carbon emissions. While the object of the Carbon Tax is the purchase of goods or activities that produce a certain amount of carbon emissions. As for what is meant by "goods containing carbon", that is, it refers to goods that have the potential to emit carbon emissions. On the other hand, "activities that produce carbon emissions" are activities that produce or emit carbon emissions and give rise to negative externalities.

The basis for the imposition of a Carbon Tax is not carried out solely on all emissions emitted by all economic activities carried out, but is taken into account when emissions that exceed the predetermined emission threshold. The Carbon Tax in Indonesia is planned to be implemented gradually. In the first phase of the implementation of the Carbon Tax will concern the coal steam power plant (PLTU) sector with the enactment of a tax scheme based on emission limits (cap and tax), this means that residual emissions that exceed the threshold will be taken into account as the basis for the imposition of taxes.

In Chapter VI Article 13 of the HPP Law, the Carbon Tax rate is set to be greater than or equal to the price of carbon in the carbon market with a minimum rate of Rp. 30/kgCO2e. The existence of regulations that set the Upper Limit of Emissions (BAE) for a sector subject to Carbon Tax has been stipulated in the Ministry of Energy and Mineral Resources Record reported from the CNBC Indonesia website, 2022 that there are 3 classification groups for determining the Carbon Tax for coal steam power plants (PLTU). First, the power plant has a capacity greater than 400 MW. The emission limit value is set at 0.918 tons of CO2 per megawatt hour (MWh). In second place, namely PLTU with a capacity of 100-400 MW, with an emission limit value of 1,013 tons of CO2 per MWh. In third place, the Mine Mouth Power Plant is 100-400 MW, with a limit value of 1.94 tons of CO2 per MWh. While the PLTU with a capacity of <100 MW has not been able to apply cap, trade and tax because the PLTU with this capacity is still the backbone of the electricity system outside the islands of Java and Sumatra.

The price of Rp30/kg CO2e is still considered too low because the tariff to be applied is still far from the recommendations of the World Bank and International Monetary Fune. Based on Indonesian conditions, the application of the recommended tariff is to use the equation marginal benefit of abatement = marginal cost of abatement. Referring to these similarities, the ideal tariff so that Indonesia can achieve the emission reduction target as set in the NDC is Rp300,000/ton CO2e (Ratnawati, 2016). The transition to a green economy inevitably requires substantial financing, technology transfer, and adequate human resource support. However, in creating certainty of emission reductions, Indonesia still does not allow it to automatically increase tariffs when carbon prices rise. The Constitution in Indonesia has not been able to accommodate this. To change the carbon tax rate, the Ministry of Finance as the party that manages the carbon tax must obtain permission from the legislature and take a long time. In addition, automatic tariff increases can be put aside first because the carbon tax is still new and needs adjustments so that adaptation in behavior change becomes a more priority (Ratnawati, 2016).

The carbon tax is an effort for the government to reduce carbon emissions by encouraging changes in the behavior of economic actors to switch to a green economy so that this policy is considered to have the potential to support the development of new renewable energy innovations. With the carbon tax, the price of new renewable energy can compete with the price of fossil energy and carbon-based fuels (tax impact journal). In its implementation, the Carbon Tax is principled on three things, the first is the existence of justice between polluters and the damage caused. Second, pay attention to the affordability aspect for the benefit of the wider community. Then the third, pay attention to the readiness of the sector so as not to burden the community. The existence of these three principles is the basis for the government in formulating the Carbon Tax mechanism.

To see how effective the imposition of a Carbon Tax is, the government can review the results of the carbon tax policy within a period of several years. This is done because there is no global certainty in the future so that the review carried out can illustrate how the conditions of change have been made. The government continues to put climate change as a priority considering that the economy is currently also facing global risks due to economic recovery after the Covid-19 pandemic. To achieve the expected results through the Carbon Tax, this policy mechanism must be in accordance with the principles of the green economy, namely suppressing economic growth that is more environmentally friendly through NRE and does not burden the community. PT PJB as a subsidiary of PT PLN can shift the basic paradigm of electricity production from fossil fuel-oriented to high-priority NRE penetration. This action will be in line with the Government of Indonesia's future energy mix targets as stated in the ratification of policies and strategies. One way to decarbonize electricity in the world is to replace fossil fuel-based energy with energy from new and renewable energy sources. Currently, PJB is again innovating by implementing full firing biomass as a substitute for coal, using palm shells.

The company's energy management steps are also aimed at supporting the achievement of the realization of a common ideal, namely the Sustainable Development Goals. PJB has three main agendas, namely diversifying the main energy sources that are more environmentally friendly, developing solar energy sources for commercial development, and saving energy internally within the company. To ensure wise and measurable energy management efforts, PJB conducts periodic evaluation supervision by conducting energy audits by external parties every 3 (three) years and periodic reporting to the Ministry of Energy and Mineral Resources (ESDM).

V. Conclusion

Carbon taxes demand that individuals consider the consequences for pollution actions taken because carbon taxes will charge a fee equivalent to damage or pollution caused by carbon emissions. The timing and momentum of enacting a carbon tax urgently needs to be considered. This is because the carbon tax will have the potential to cause economic hampering or economic distortions while Indonesia is still recovering due to the Covid-19 pandemic. Although there is a polemic in the carbon tax, this policy is considered capable of reducing emissions in Indonesia. The carbon tax implemented is expected to be able to change the mindset of economic actors to switch to green economic activities. Carbon tax revenues will be used to finance the development and innovation of new and renewable energy and to finance other sectors that support people's welfare. The carbon tax will encourage economic actors to make efforts to develop NRE with the aim of reducing the emissions produced and reducing the cost of carbon taxes in the future. The formulation of the calculation of the carbon tax on coal-fired power plants is based on the emission limit tax scheme (cap and tax), this means that residual emissions that exceed the threshold will be taken into account as the basis for the tax to be charged at a rate of Rp. 30,000 / tCO2. Carbon taxes allow for a tradeoff between protecting the environment and economic growth so that in its mechanism, the government is principled on fairness, affordability and increment. The carbon tax mechanism must be in accordance with the concept of a green economy that suppresses the growth of environmentally friendly sustainability without hampering the economy.

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