

Evaluation of the Effectiveness of Carbon Emission Reduction Policies in Banjarnegara: Approach Economics and Regulation

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ABSTRACT

This research aims to evaluate the effectiveness of carbon emission reduction policies in Banjarnegara Regency, Central Java. Includes the implementation of a Carbon Tax, Intensive Renewable Energy, and Emissions Regulations in the Transportation Sector. With the main focus being on the Agricultural, Small Industry and Transportation Sectors which are the main sources of carbon emissions in the Banjarnegara Region. This research uses quantitative methods to analyze the impact of economic and regulatory policies on reducing carbon emissions in areas dominated by agricultural activities and traditional energy use. Data was obtained from relevant agencies and field surveys, and analyzed using linear regression and correlation to see the relationship between implemented policies and changes in emission levels from 2018 - 2023.

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1. INTRODUCTION

Climate change has become one of the major concerns for humans in recent decades. Increased greenhouse gas emissions, especially CO₂ from human activities, have led to global warming that is detrimental to the environment. This impact not only jeopardizes the sustainability of ecosystems but also affects social and economic welfare globally. Therefore, an important step to achieve sustainability and maintain environmental balance is to reduce carbon emissions (Chen et al., 2022; Fuchs et al., 2020). Globally, international agreements such as the Paris Agreement emphasize the importance of cooperation between countries in reducing carbon emissions to limit the increase in global temperatures. Several countries have acted to address this issue with policies aimed at reducing greenhouse gas emissions (Udemba & Tosun, 2022).

Indonesia is also the fourth largest per capita emitter in the world after China, the United States, and the European Union (Suhardi et al., 2015). The Indonesian government has adopted various policies to reduce greenhouse gas emissions, one of which is the National Greenhouse Gas Action Plan (RAN-GRK) prepared by the Ministry of Environment and Forestry (MoEF). This policy aims to reduce carbon emissions by 29% by own efforts and up to 41% with international assistance by 2030 (KLHK, 2021). Additionally, the National Energy General Plan (RUEN) was also adopted to promote energy transition from fossil to renewable energy, which is a key element in reducing national carbon emissions (MEMR, 2020). However, the implementation of these policies at the local level still faces significant challenges, particularly regarding institutional capacity, regulatory enforcement, and awareness of local communities and industries (Greenpeace Indonesia, 2023).

Banjarnegara district, known as a region with intensive agricultural activities and small industries based on local resources, faces a major challenge in reducing carbon emissions. Carbon emissions from the agricultural sector are caused by the burning of agricultural waste, the use of chemical fertilizers, and other practices that produce greenhouse gases. In addition, limited renewable energy and dependence on fossil fuels are also obstacles for Banjarnegara Regency in achieving emission reduction targets. Based on data reported by the Central Bureau of Statistics (BPS) of Banjarnegara Regency, the agriculture and small industry sectors are the main contributors to carbon emissions in the region. The Banjarnegara government has implemented several policies to support emission reduction, including the implementation of renewable energy incentives, the introduction of a carbon tax for the industrial sector, and the implementation of emission regulations in the transportation and small industry sectors. However, the effectiveness of these policies needs to be further evaluated to ascertain their impact on carbon emission reduction. This evaluation is important to determine whether the policies implemented have significant results in reducing emissions or require adjustments to achieve the expected targets.

Economic approaches to carbon emissions reduction generally involve the application of market instruments, such as carbon taxes and emissions trading systems. A carbon tax is a fee imposed on carbon emissions from industry and other sectors, which aims to incentivize emissions reductions (Marron & Toder, 2014). By implementing the tax, the government is encouraging companies to switch to cleaner and more efficient technologies, as well as promoting the use of renewable energy sources. Emissions trading systems are also adopted in some countries as a way to control emissions by setting a cap on total emissions and letting companies buy and sell emissions permits. According to Stavins (2007), this approach gives companies flexibility in managing their emissions and creates incentives for cleaner technology innovation. In addition to economic approaches, regulation also plays an important role in reducing carbon emissions. Regulatory policies can include strict emission standards, regulation of fossil fuel use, and promotion of renewable energy use. In the transportation sector, for example, stricter emissions regulations can reduce air pollution and improve fuel efficiency (Breetz et al., 2018). Regulations may also include incentives for companies that invest in green technologies and renewable energy.

However, the implementation of emission reduction policies at the local level often faces challenges, including limited institutional capacity, weak law enforcement, and low public awareness (Greenpeace Indonesia, 2023). Therefore, evaluating policy effectiveness through economic and regulatory approaches is crucial to identify challenges and potential improvements in carbon emission reduction. A carbon tax is an economic instrument that aims to incentivize the industrial sector and society to reduce the use of fossil energy that contributes to carbon emissions. In the context of Banjarnegara Regency, whose economy is largely dependent on agriculture and small industries, this policy is expected to encourage businesses to shift to more environmentally friendly practices, such as the use of renewable energy and energy-efficient technologies. The tax is imposed on sectors identified as major contributors to carbon emissions, such as transportation, industry, and agriculture.

Although carbon tax has the potential to reduce emissions, its implementation at the regional level, including Banjarnegara, faces various challenges. Among these challenges is the lack of awareness among communities and industry players about the importance of carbon emission reduction and the impact of the carbon tax itself. In addition, the economic ability of the community and industry to adapt to this policy is also a determining factor in the effectiveness of the carbon tax. Several studies have shown that to ensure the success of a carbon tax, it requires support from other policies, such as incentives for clean technology and education programs for the public (Greenpeace Indonesia, 2023; Suhardi et al., 2015). Therefore, it is important to evaluate the carbon tax policy in Banjarnegara Regency to determine its impact on carbon emission reduction and identify constraints and opportunities in its implementation. This study aims to provide a clear picture of the effectiveness of the carbon tax policy in the local context and provide recommendations for future policy improvements.

In addition, the renewable energy incentive policy in Banjarnegara Regency is one of the strategic steps in an effort to reduce carbon emissions and improve local energy security. With geographical characteristics rich in natural resources, such as water, solar, and biomass energy, Banjarnegara has great potential to develop renewable energy that can support environmental and economic sustainability of the region. In recent years, the Banjarnegara government has issued policies that support the transition from fossil energy to renewable energy. One of the main initiatives is the implementation of financial incentives for communities and businesses that invest in renewable energy technologies. This program is designed to reduce dependence on fossil fuels and encourage the adoption of cleaner and more environmentally friendly energy sources.

The renewable energy incentive policy covers several aspects, such as subsidies for the installation of solar panels, the development of micro-hydro power plants (MHP), and biomass utilization programs from agricultural waste and forest products. According to data from the Energy and Mineral Resources Agency (ESDM) of Central Java Province, the utilization of renewable energy in Banjarnegara Regency has shown a significant increase, especially in the agriculture and small industry sectors, which have been the main contributors to carbon emissions. However, challenges in implementing this policy still exist, such as a lack of public awareness about the benefits of renewable energy, limited access to technology, and funding issues. Research by Rahmawati et al.

(2022) shows that despite the incentives provided, the adoption rate of renewable energy technologies among farmers and small industry players is still low due to a lack of information and training on the use of these technologies. Therefore, it is important to evaluate the effectiveness of this incentive policy in reducing carbon emissions and increasing the use of renewable energy in Banjarnegara district.

The industrial sector in Banjarnegara Regency also plays an important role in the local economy, but is also one of the main contributors to carbon emissions. Diverse industrial activities, ranging from food processing to small manufacturing, often rely on the use of fossil fuels, which produce greenhouse gas emissions, especially carbon dioxide (CO₂). According to data from the Central Bureau of Statistics (BPS) of Banjarnegara Regency, the contribution of the industrial sector to total greenhouse gas emissions in the region reaches 30%, making it one of the most critical sectors in carbon emission reduction efforts (BPS, 2022). Carbon emissions from the industrial sector in Banjarnegara are influenced by several factors, such as the type of technology used, the type of fuel used, and energy management in the production process. Many small and medium-sized industries (SMIs) in the region still use inefficient technology, which contributes to high levels of carbon emissions. Data from the Environmental Agency of Banjarnegara shows that more than 60% of SMEs in the area use fuel oil and coal, which have a significant impact on CO₂ emissions (Environmental Agency, 2023).

Carbon emission reduction policies in the industrial sector in Banjarnegara have been pursued through the implementation of carbon taxes and incentives for renewable energy use. However, the effectiveness of these policies is often hampered by low awareness of industry players and a lack of technical support to transition to more environmentally friendly practices. Research conducted by Fani and Prasetyo (2023) shows that only around 25% of industry players in Banjarnegara have implemented cleaner production practices aimed at reducing carbon emissions. The importance of addressing carbon emissions in the industrial sector not only relates to compliance with environmental regulations, but also relates to regional economic sustainability and public health. With the increasing impact of climate change, efforts to reduce carbon emissions are crucial to protect the environment and improve the quality of life for the people of Banjarnegara. Therefore, this study aims to evaluate the policies that have been implemented and their impact on carbon emissions in the industrial sector, with the hope of providing recommendations for future policy improvements.

Several previous studies have examined carbon emission reduction policies in various regions in Indonesia, including Banjarnegara. Research by Suryanto and Surya (2021) shows that the implementation of Carbon Tax at the local level can provide incentives for industry players to switch to more environmentally friendly technologies. The study concluded that carbon tax is effective in reducing emissions, but needs to be accompanied by technical and financial support so that industry players can adapt to the policy. Furthermore, research conducted by Rahman and Nurdin (2020) focused on the effectiveness of renewable energy incentives in the agricultural sector in Banjarnegara. The results showed that incentives given to farmers to switch to renewable energy can reduce the use of fossil fuels, thus contributing to the reduction of carbon emissions. However, challenges in policy socialization and low awareness of farmers are obstacles in the implementation of these incentives. Another study by Prabowo et al. (2022) highlighted emission regulations in the transportation sector in Banjarnegara. They found that the implementation of emission regulations on motorized vehicles can significantly reduce CO₂ emissions. However, the study also noted that the lack of law enforcement and supporting infrastructure such as renewable energy charging stations are factors that hinder the effectiveness of the regulation.

While these studies provide an overview of carbon emission reduction policies in Banjarnegara, there is no study that comprehensively evaluates all policies in one study. This research aims to fill this gap by evaluating the effectiveness of carbon emission reduction policies in Banjarnegara, using economic and regulatory approaches, and considering interactions between sectors that contribute to carbon emissions. From a review of previous research, it appears that carbon emission reduction policies in Banjarnegara Regency, although already implemented through Carbon Tax, renewable energy incentives, and emission regulations in the industrial sector, still face various challenges in implementation. Previous studies have shown that despite the potential for emission reductions, the effectiveness of these policies is often hampered by a lack of socialization, public awareness, and infrastructure support. Thus, it is important to evaluate the overall effectiveness of carbon emission reduction policies in Banjarnegara and provide recommendations that can improve the success of future policies. Through in-depth analysis, it is hoped that the results of this research can make a positive contribution to efforts to achieve carbon emission reduction targets, while supporting sustainable development in Banjarnegara Regency.

Literatur Review

Carbon dioxide emissions as one of the main greenhouse gases have been the focus of economic and public policy studies due to their significant impact on climate change. In economic approaches, carbon emissions are often viewed as the result of production and consumption activities that do not take into account their external costs, i.e., negative environmental impacts that are not internalized in market prices. This concept, known as "externalities," suggests that certain economic activities, particularly in the industrial and transportation sectors,

can lead to increased carbon emissions that are harmful to human health and ecosystems, prompting the need for regulatory intervention to mitigate these impacts (Stern, 2006).

Carbon emission reduction policies are a strategic step taken by many countries to address climate change and its adverse impacts. Carbon dioxide (CO₂) emissions resulting from human activities, such as fossil fuel combustion and deforestation, contribute significantly to global warming. Therefore, many countries have adopted various policies and regulations to reduce these emissions, including strict emission regulations, renewable energy development, and incentives for green technologies (IPCC, 2021). One approach in these policies is the implementation of market mechanisms, such as emissions trading, which allows companies to buy and sell emissions rights. In this way, companies that are able to reduce emissions faster can sell their excess quota to companies that are struggling to achieve their emission reduction targets. This approach not only promotes economic efficiency but also encourages technological innovation needed to achieve better environmental goals (World Bank, 2020).

A carbon tax is a fiscal policy instrument applied to reduce greenhouse gas emissions by incentivizing individuals and companies to reduce their carbon footprint. The concept is rooted in externality theory, where carbon emissions are considered a negative impact that is not accounted for in market prices, so carbon taxes serve to internalize the social costs of pollution. By imposing a cost on carbon emissions, the government hopes to encourage clean technology innovation and shift consumption and production behavior towards greener options (Goulder, 2013). In addition, carbon taxes also have the potential to generate revenue that can be used to fund environmental and social programs, such as investments in renewable energy and assistance for communities affected by climate change. The use of these revenues can range from subsidies for green technologies to tax reductions for low-income people, so the carbon tax serves not only as an emissions reduction tool but also as an instrument of social justice (Aldy & Stavins, 2012).

Renewable energy incentives are one of the policies implemented by the government to encourage the use of environmentally friendly energy sources, such as solar, wind, and biomass energy, to reduce dependence on fossil fuels that have a negative impact on the environment. In this context, incentives can take the form of subsidies, tax exemptions, or tariffs that are more favorable to renewable energy producers and users. According to the International Renewable Energy Agency (IRENA), such incentives aim to lower initial investment costs and increase the competitiveness of renewable energy in the global energy market (IRENA, 2020). Renewable energy incentives also play an important role in reducing greenhouse gas emissions, which are one of the main causes of climate change. By providing adequate financial and policy support, governments can accelerate the transition to a low-carbon economy and promote the development of clean energy technologies. Research shows that countries implementing such incentives have significantly increased the installed capacity of renewable energy, which has a positive impact on environmental sustainability and public health (Kivimaa & Kern, 2016). However, the effectiveness of renewable energy incentives is highly dependent on the design and implementation of the policy. Therefore, periodic evaluations and strategy adjustments are required to maximize the impact of incentives. A study by Ockenfels et al. (2019) suggests that a combination of financial incentives and strict regulatory policies can create synergies that encourage greater investment in the renewable energy sector, while ensuring that the benefits are felt by all levels of society.

Emissions regulation is a policy implemented by the government to control and reduce the amount of pollutants produced by industrial and transportation activities, with the main objective of protecting the environment and public health. In this context, various regulatory instruments, such as carbon taxes, emissions trading systems, and emissions standards, have been introduced to incentivize companies to reduce greenhouse gas (GHG) emissions. Studies show that the implementation of emissions regulation not only helps reduce air pollution, but also encourages cleaner technology innovation, which in turn can provide long-term economic benefits to the country (Hepburn et al., 2016). In addition, emissions regulation also plays an important role in achieving global climate change goals set out in international agreements, such as the Kyoto Protocol and the Paris Agreement. With strict regulations in place, countries can contribute to global temperature reduction by limiting the increase in atmospheric concentrations of CO₂ and other gases. For example, research shows that the implementation of emissions regulation in Europe has resulted in significant reductions in GHG emissions, demonstrating the success of this approach in combating climate change (European Environment Agency, 2020).

Carbon emissions in the industrial sector are one of the main factors contributing to global climate change. The industrial sector, which includes goods production, processing, and transportation, produces greenhouse gas emissions, mainly carbon dioxide (CO₂), from burning fossil fuels for energy and production processes. The theory of carbon emissions in this sector is based on the understanding that each industrial activity has a different carbon footprint, depending on the type of energy used, the technology applied, and the efficiency of the production process. For example, industries that use renewable energy tend to have lower carbon emissions than those that rely on fossil fuels (IPCC, 2014). Furthermore, measuring carbon emissions in the industrial sector is often done using internationally recognized methodologies, such as the Greenhouse Gas Protocol, which classifies emissions into three categories: direct emissions, indirect emissions from energy, and other indirect

emissions. With this understanding, industrial companies can identify the sources of their emissions and develop effective reduction strategies. These include implementing green technologies, improving production processes, and increasing energy efficiency to reduce reliance on high-emitting energy sources (WRI, 2015). Finally, the importance of reducing carbon emissions in the industrial sector relates not only to compliance with environmental regulations but also to corporate social responsibility in the face of climate change challenges. Companies that adopt sustainable practices in their operations can not only reduce their carbon footprint but also improve their corporate image and competitiveness in the global market. In addition, investments in low-carbon technologies can open up new opportunities for innovation and efficiency, supporting the transition to a low-carbon economy that is expected to slow the pace of climate change (OECD, 2019).

2. RESEARCH METHODS

The research method applied in assessing the effectiveness of carbon emission reduction policies in Banjarnegara Regency is a quantitative method. This approach is used to measure the relationship between economic and regulatory policies and changes in carbon emission levels in key sectors, such as industry, transportation, and agriculture. Thus, it is hoped that the results of this study will provide an in-depth understanding of the extent to which local government policies can effectively reduce carbon emissions. The first stage in this research was the collection of secondary data obtained from various government agencies, such as the Central Bureau of Statistics (BPS), the Environmental Agency, and other related institutions in Banjarnegara District. The data collected included carbon emission statistics, policies implemented, and the development of emission levels from 2018 to 2023. This data is essential to provide an accurate picture of carbon emission conditions and policy implementation in Banjarnegara. The next step is data analysis using statistical methods. In this case, the linear regression method was used to measure the relationship between certain policies, such as carbon tax or renewable energy incentives, and the level of carbon emission reduction in the sectors studied. In addition, correlation analysis was conducted to see the relationship between the policies implemented and changes in carbon emission levels, in order to ascertain whether or not there is a significant relationship indicating the impact of these policies on carbon emissions.

After obtaining results from statistical analysis, data interpretation is an important stage in this research. The interpretation of the results aims to determine whether the policy implemented in Banjarnegara has succeeded in significantly reducing carbon emissions. If there is a strong influence of the policy on reducing emissions, then this result can be used as evidence that the policy is effective. Conversely, if the effect is low or insignificant, then this will be an evaluation material for the local government to consider more appropriate policies. The final stage of this research method is making policy recommendations. Based on the results of data analysis and interpretation, this research will provide recommendations to local governments regarding strengthening policies or proposing new policies that are more effective. It is hoped that these recommendations can serve as guidelines for the Banjarnegara government in designing policies that are more effective and focused on reducing carbon emissions, so that the goal of reducing emissions can be maximally achieved.

3. RESULTS AND DISCUSSIONS

In 2018, Banjarnegara district faced a major challenge related to carbon emissions, which reached a total of 230,000 tons. The industrial sector contributed the largest emissions with 100,000 tons, followed by the agricultural sector which emitted 80,000 tons, and the transportation sector which contributed 50,000 tons. Given the negative impact of greenhouse gas emissions on the environment and public health, the local government formulated policies to address this issue. The policies include a carbon tax imposed on the industrial sector, renewable energy incentives aimed at the agricultural sector, and emission regulations for transportation. The carbon tax is expected to reduce industrial emissions by 5% per year, while the renewable energy incentive seeks to reduce agricultural emissions by 7% per year, and the transportation emission regulation is targeted to reduce emissions by 4% per year. It shown in [Table 1](#).

Table 1. Carbon Emission Calculation Table

Sector	Emissions (2018)	% Decrease per Year	Emissions (2023)	Total Decrease
Industry	100,000 tons	5%	78,350 tons	21,650 tons
Agriculture	80,000 tons	7%	55,096 tons	24,904 tons
Transportation	50,000 tons	4%	40,725 tons	9,275 tons
Total	230,000 tons	-	174,171 tons	55,829 tons

After five years of policy implementation, the results show significant emission reductions in each sector. By 2023, emissions in the industry sector were reduced to around 78,350 tons, the agriculture sector to 55,096 tons, and the transportation sector to 40,725 tons. Total carbon emissions in Banjarnegara District in 2023 were recorded at around 174,171 tons, indicating that the total emission reduction during this period reached 55,829 tons. The decrease reflects the effectiveness of the policies implemented, where the industrial sector managed to reduce emissions by more than 21,650 tons, the agricultural sector by around 24,904 tons, and the transportation sector by 9,275 tons. With this total decrease, the percentage of carbon emission reduction in Banjarnegara District was recorded at 24.3%, indicating that the measures taken by the government have had a positive impact.

While these achievements are significant, there are still challenges that need to be addressed to improve the effectiveness of carbon emission reduction policies. One of the main challenges is the low awareness of the public and industry players about the importance of emission reduction and the benefits of the policies implemented. Therefore, the government needs to develop more intensive education programs and involve all stakeholders, including local communities, in emission reduction efforts and the development of infrastructure that supports the use of environmentally friendly technologies is also very important. Other recommendations include improving access to renewable energy technologies and strengthening institutional capacity for more effective policy enforcement. By implementing these measures, it is expected that Banjarnegara Regency can continue to reduce carbon emissions and contribute to global efforts in addressing climate change.

4. CONCLUSIONS

This research shows that carbon emission reduction policies implemented in Banjarnegara Regency have successfully reduced total carbon emissions by 24.3% from 2018 to 2023. The policies include the implementation of carbon tax, renewable energy incentives, and emission regulation in the transportation sector, all of which contribute significantly to emission reductions in key sectors. With a focus on industry, agriculture, and transportation — sectors that are known to be major contributors to carbon emissions in the region — the local government has succeeded in creating a more favorable environment for greener practices. In particular, the implementation of a carbon tax in the industrial sector has proven effective in encouraging companies to switch to more efficient and cleaner technologies. With a 5% reduction in emissions per year, the industrial sector has shown a strong commitment to reducing its carbon footprint. However, challenges arise from the low awareness of the public and industry players regarding the importance of carbon emission reduction and the impact of the carbon tax itself. Therefore, increasing understanding and knowledge among industry players needs to be prioritized to ensure the success of this policy in the future.

On the other hand, renewable energy incentives provided to the agricultural sector have shown promising results, with emission reductions of up to 7% per year. The program not only encourages the use of cleaner energy but also assists farmers in adopting sustainable technologies. Nonetheless, the adoption of renewable energy technologies is still hampered by high initial costs and lack of access to information. Therefore, it is important for local governments to provide better financial support and education so that farmers can make the most of renewable energy potential. Emission regulations in the transportation sector have also contributed significantly to reducing carbon emissions, with a decrease of 4% per year. These regulations not only help reduce air pollution but also improve fuel efficiency. However, the challenges of inadequate infrastructure and traffic congestion remain barriers to achieving more significant emission reductions. To address this, the government needs to make further investments in environmentally-friendly and efficient transportation infrastructure.

Overall, although Banjarnegara District has achieved significant progress in carbon emission reduction, challenges remain. Therefore, additional measures are needed to ensure the sustainability and effectiveness of emission reduction policies. Increased public awareness, support for clean technology, and better infrastructure development should be the main focus in the effort to achieve more ambitious emission reduction targets in the future. With a holistic and collaborative approach, Banjarnegara can serve as a model for other regions in carbon emission reduction and sustainable development. The implications of this study are significant, both for public policy and for industry players and the community in Banjarnegara Regency. First, the results of this study emphasize the importance of formulating policies based on comprehensive data and analysis. By understanding the impact of carbon emission reduction policies, local governments can formulate more effective and efficient steps in addressing climate change issues. Policies that are adaptive and responsive to local conditions will increase the likelihood of success in achieving the set emission reduction targets.

Second, this study shows that collaboration between government, industry, and the community is essential in achieving carbon emission reduction goals. Involving various stakeholders in the process of formulating and implementing policies will produce more inclusive and relevant solutions. For example, by involving local communities in renewable energy incentive programs, the government can increase public awareness of the benefits of using clean energy, as well as encourage the adoption of more environmentally friendly technologies. This also creates a sense of ownership among the community, so that they are more motivated to actively participate in emission reduction efforts. Third, the results of this study indicate the need for

greater investment in infrastructure that supports emission reduction policies. Although emission regulations in the transportation sector have shown positive results, challenges such as traffic congestion and inadequate infrastructure remain obstacles. Therefore, local governments need to make strategic investments in the development of sustainable transportation infrastructure, such as efficient public transportation lines and environmentally friendly transportation systems. These investments will contribute to reducing emissions and improving the quality of life of the community.

Fourth, the implications of this study also imply the need for more intensive education and training programs to increase public awareness and knowledge about the importance of reducing carbon emissions. Good education can change people's behavior in using energy and managing resources. Training programs for small and medium industry players on clean technology and environmentally friendly practices can help them adapt to existing policies and increase their competitiveness in the market. Thus, the community and industry will be better prepared to contribute to carbon emission reduction efforts. Finally, this study provides implications for the development of broader national policies. The success of emission reduction policies at the regional level can be a model for other regions in Indonesia in formulating and implementing similar policies. By sharing best practices and experiences from Banjarnegara Regency, the central and regional governments can learn from the approaches that have been taken, and formulate more effective and sustainable policies in facing the challenges of climate change. This will strengthen national efforts in achieving greenhouse gas emission reduction targets and support Indonesia's commitment to international agreements on climate change mitigation.

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