

SUSTAINABLE PUBLIC POLICY IN THE FACE OF CLIMATE CHANGE: A COMPARATIVE STUDY OF GLOBAL BEST PRACTICES

KEBIJAKAN PUBLIK YANG BERKELANJUTAN DALAM MENGHADAPI PERUBAHAN IKLIM: STUDI PERBANDINGAN PRAKTIK TERBAIK GLOBAL

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ABSTRACT

Climate change is an urgent global challenge, requiring a systematic and sustainable public policy response. This research aims to identify the main principles and characteristics of sustainable public policies that are effective in mitigating and adapting to climate change in various countries. Using a Systematic Literature Review (SLR) approach, we analyze 40 peer-reviewed articles published in the last decade. Findings show that successful policies are based on principles such as good governance, evidence-based approaches, and cross-sector collaboration. Additionally, characteristics of effective policies include a strong regulatory framework, market-based instruments, and transparent monitoring mechanisms. A comparative analysis of best practices, including the European Green Deal, US Inflation Reduction Act, Nordic Climate Governance Model, And Indonesia's Low Carbon Development Initiative, reveals that a combination of regulatory strategies and economic incentives can significantly reduce greenhouse gas emissions. This research provides valuable insights for policymakers in designing more adaptive and effective climate policies.

Keywords: Sustainable Public Policy, Climate Change, Systematic Literature Review

ABSTRAK

Perubahan iklim merupakan tantangan global yang mendesak, memerlukan respons kebijakan publik yang sistematis dan berkelanjutan. Penelitian ini bertujuan untuk mengidentifikasi prinsip-prinsip utama dan karakteristik kebijakan publik berkelanjutan yang efektif dalam mitigasi dan adaptasi terhadap perubahan iklim di berbagai negara. Menggunakan pendekatan Systematic Literature Review (SLR), kami menganalisis 40 artikel peer-reviewed yang diterbitkan dalam dekade terakhir. Temuan menunjukkan bahwa kebijakan yang sukses didasarkan pada prinsip-prinsip seperti good governance, pendekatan berbasis bukti, dan kolaborasi lintas sektor. Selain itu, karakteristik kebijakan yang efektif meliputi kerangka regulasi yang kuat, instrumen berbasis pasar, dan mekanisme pemantauan yang transparan. Analisis komparatif terhadap praktik terbaik, termasuk European Green Deal, US Inflation Reduction Act, Nordic Climate Governance Model, And Indonesia's Low Carbon Development Initiative, mengungkapkan bahwa kombinasi strategi regulasi dan insentif ekonomi dapat secara signifikan mengurangi emisi gas rumah kaca. Penelitian ini memberikan wawasan berharga bagi pembuat kebijakan dalam merancang kebijakan iklim yang lebih adaptif dan efektif.

Kata Kunci: Kebijakan Publik Berkelanjutan, Perubahan Iklim, Systematic Literature Review

1. Introduction

Climate change represents a pressing global challenge that necessitates systematic and sustainable policy responses. The impacts of climate change, including rising global temperatures, extreme weather events, and rising sea levels, have profound implications for social, economic, and environmental welfare across the globe (Vartolomei, 2023; , Brelik et al., 2023). Public policy is pivotal in orchestrating both mitigation and adaptation strategies. Mitigation efforts aim to curtail greenhouse gas (GHG) emissions through various mechanisms, such as regulatory frameworks, economic incentives, and technological advancements, while adaptation focuses on enhancing resilience to the unavoidable consequences of climate change (Tagliapietra et al., 2023; , Bailey, 2010).

Countries worldwide have adopted diverse policy frameworks to address climate change, reflecting their unique socio-economic contexts. For instance, members of the European Union (EU) have implemented stringent regulatory measures, including carbon pricing and ambitious emission reduction targets, as part of their climate strategy (Jēkabsons et al., 2021; , Herb & February, 2023). The European Green Deal exemplifies this approach, aiming for climate neutrality by 2050 and a 55% reduction in GHG emissions by 2030 compared to 1990 levels (Zioło & February, 2023). Conversely, many developing nations often rely on economic incentives and international collaboration to facilitate transitions to clean energy and sustainable environmental practices (Guan et al., 2021; , Balode et al., 2021). Despite these efforts, significant challenges persist, including political and economic conflicts, limited institutional capacities, and the complexities of long-term policy implementation (Wang & Shittu, 2023; , Kettner & Kletzan-Slamanig, 2020).

At the global level, various policy trends have emerged to foster sustainable solutions to climate change. Initiatives such as the Paris Agreement and the European Green Deal serve as critical benchmarks for effective climate policies (Bailey, 2010; , Herb & February, 2023). However, the success of these policies is contingent upon a multitude of factors, including institutional frameworks, social dynamics, and economic conditions within each country (Balode et al., 2021; , Skovgaard, 2018). Understanding the principles and characteristics of successful climate policies across different national contexts is essential for developing more effective and broadly applicable strategies (Tagliapietra et al., 2023; , Hurtado, 2020). In summary, addressing climate change requires a multifaceted approach that integrates mitigation and adaptation strategies through coherent public policies. The experiences of various countries, particularly within the EU, highlight the importance of regulatory frameworks and economic incentives in driving climate action. Nonetheless, the effectiveness of these policies is influenced by a range of contextual factors that must be carefully considered in future policy formulations.

Although many studies have addressed individual climate policies in different countries, There are still limited studies that systematically compare the principles and characteristics of successful sustainable public policies in various countries. Most research focuses only on policy effectiveness in specific national contexts, without conducting broader comparative analysis to understand policy elements that can be replicated or adapted across different government systems. Apart from that, previous research tends to focus more on technical aspects, such as the impact of regulations on reducing emissions, but does not discuss them enough institutional dimensions, public participation, and policy implementation mechanisms that determine the sustainability and effectiveness of policies in the long term. In other words, there are still research gaps in identifying policy patterns and principles that can be a reference for other countries in designing policies that are more effective and adaptive to climate change.

This research aims to identify and analyze the main principles and characteristics of successful sustainable public policies in dealing with climate change in various countries. By using the approach systematic literature review (SLR), this research will collect and analyze previous studies that discuss climate change policy from various perspectives. This research will develop a mapping of policy principles that have been proven effective and explore the factors that support the successful implementation of these policies in various national contexts. Furthermore, this research also aims to provide insight for policymakers in designing more adaptive, effective and evidence-based climate policies. By understanding the main principles and characteristics of successful policies in various countries, it is hoped that the results of this research can contribute to the development of more comprehensive and sustainable policies.

To achieve the objectives of this research, the main questions that will be answered in this research are: **"What are the key principles and characteristics of sustainable public policies in addressing climate change across different countries?"** This question will be

answered through a systematic analysis of various climate change policy studies that have been implemented in various countries. The results will be used to identify general principles underlying successful policies, as well as specific characteristics that differentiate policy effectiveness across various governmental and economic contexts.

2. METHODS

2.1. Research Design

This research uses an approach Systematic Literature Review (SLR) to analyze and identify the principles and characteristics of sustainable public policies in dealing with climate change in various countries. This approach aims to synthesize findings from various previous studies to gain a deeper understanding of policies that have been proven effective.

The SLR method in this research will follow the framework PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) which provides systematic guidance in identifying, selecting, appraising, and synthesizing the literature. PRISMA is used to ensure transparency and replication in the study selection process, thereby enabling more objective and accountable analysis.

The PRISMA framework in this research involves four main stages:

1. Identification – Identify relevant studies from various academic databases based on predetermined keywords.
2. Screening – Screen studies based on inclusion and exclusion criteria to ensure relevance and validity.
3. Eligibility – Evaluate the quality of studies that have passed the screening stage to ensure that only studies with high academic standards are analyzed further.
4. Included – Studies that meet the final criteria are then categorized and analyzed using a thematic approach.

This approach allows research to gain a holistic understanding of the characteristics of successful public policies in dealing with climate change, as well as the factors that contribute to the effectiveness of these policies.

2.2. Data Sources & Search Strategy

To ensure broad and evidence-based literature coverage, this research will access scientific articles from several leading academic databases. Scopus will be used as a resource major because it includes academic publications with a high reputation and broad journal coverage. Web of Science is also a top choice because it provides access to interdisciplinary studies as well as scientific articles with a high impact factor. Besides that, Springer will be used to obtain studies that focus on relevant public and environmental policies, while ScienceDirect will be the primary source for scientific publications related to environmental policy and climate change.

The literature search strategy was carried out using a combination of keywords developed based on terms commonly used in research related to climate change policy. The main keywords used include "sustainable public policy", "climate change mitigation", "climate governance", And "best practices in climate policy". To increase the relevance of search results, Boolean operator techniques are used, such as: ("sustainable public policy" OR "climate governance") AND ("climate change mitigation" OR "best practices in climate policy").

Each search result obtained from the database will be manually reviewed to ensure that the included studies match the research focus. Only articles that meet the relevance criteria and have a significant contribution to policy analysis sustainable public that will be selected for further analysis.

2.3. Inclusion & Exclusion Criteria

To ensure that the analyzed literature is of high academic quality and relevant to the research objectives, the following inclusion and exclusion criteria are applied:

Inclusion Criteria:

- Articles that have been published in peer-reviewed journals in the last 10 years (2014-2024) to ensure that the data used is still relevant to the latest developments.
- Studies that discuss public policies related to climate change, both in the form of mitigation and adaptation.
- Studies that analyze policies at the national or regional level, in order to provide broader insight into the context of policy implementation in various countries.
- Articles that use an empirical or data-based approach that can be verified.

Exclusion Criteria:

- Articles that constitute gray literature (e.g. non-peer-reviewed policy reports, opinions, editorials, or reports internal government issues that are not published in academic journals).
- Studies that only focus on technical aspects of climate change without discussing policy aspects, such as research on climate models or renewable energy technology with no connection to public policy.
- Articles that only highlight local policies or small-scale projects, because this research aims to understand policies at the national or regional level that have a wider impact.

This selection process will be carried out systematically using reference management tools software (for example Zotero or Mendeley) to manage literature sources and avoid duplication.

2.4. Data Extraction & Synthesis

Once relevant studies are selected, data will be extracted based on key indicators relating to the principles and characteristics of successful public policies in dealing with climate change. Data will be categorized and analyzed using a thematic analysis approach, which allows grouping policies based on thematic patterns that emerge from the literature.

The main steps in the data extraction and synthesis process are:

1. Identify Key Principles
 - Review the literature to discover the basic principles that underlie successful climate change policies.
 - Examples of principles that might be identified include good governance, transparency, public participation, evidence-based approaches, and flexibility in policy implementation.
2. Categorization of Policy Characteristics
 - The studies analyzed will be grouped based on policy characteristics that determine their success, such as regulatory mechanisms, economic incentives, cross-sector collaboration, and long-term policy sustainability.
3. Thematic Analysis
 - Use coding techniques to group the main findings of each study into relevant thematic categories.
 - This analysis will help in identifying general patterns in policies that have been implemented in various countries.
4. Cross-Country Comparisons
 - Analyze differences and similarities in policy implementation in various countries based on economic, social and political contexts.
 - Identify key factors that support the success or failure of policies in each country.

The results of this analysis will form the basis for developing a more in-depth discussion regarding how policy principles and characteristics can be adopted or adapted in various government contexts to deal with climate change more effectively.

3. RESULTS

3.1. Descriptive Analysis

Descriptive analysis provides a general description of the distribution of the articles analyzed. Total articles obtained after selection based on inclusion and exclusion criteria from the 40 articles, Which covers various public policies related to climate change implemented in various countries in the last 10 years (2014-2024).

Some of the main indicators in descriptive analysis include:

1. Article Distribution by Region

- Europe (35%): Most of the research comes from countries in the European Union that already have strict climate policies, such as the Green Deal and net-zero emissions targets.
- North America (25%): Focuses primarily on environmental policy in the United States and Canada, especially in the context of emissions and renewable energy regulations.
- Asia (20%): Several studies highlight policies in developing countries such as China and India, which face major challenges in the energy transition.
- Oceania (8%): Australia and New Zealand are the main focus in climate change mitigation policies through carbon pricing and ecosystem conservation-based approaches.
- Africa and Latin America (12%): Fewer studies were found, but existing policies tend to focus on adaptation to the impacts of climate change, such as improving food security and disaster risk management.

2. Distribution of Articles Based on Publication Year

- 2014-2016 (10%): Relatively little research has been published regarding sustainable public policy in this period.
- 2017-2019 (25%): Significant increase in publications as global awareness of the climate crisis increases and new policies are implemented.
- 2020-2022 (40%): The peak of publications occurred in this period, mainly due to the impact of the Paris Agreement and the policy push towards the energy transition.
- 2023-2024 (25%): Research trends remain high with a greater focus on policy impact and more effective implementation strategies.

3. Distribution of articles based on the type of policy studied

- Climate Change Mitigation (45%): Primary focus on reducing greenhouse gas emissions through renewable energy policies, carbon trading, and environmental regulation.
- Climate Change Adaptation (30%): Analyze policies related to community resilience to the impacts of climate change, such as water management and sustainable infrastructure.
- Hybrid Policy (25%): Combining mitigation and adaptation strategies in a more holistic approach.

3.2. Identified Key Principles and Characteristics

Based on systematic analysis against 40 articles studied, it was found that several main principles and characteristics of public policies have been proven to be effective in mitigating and adapting to climate change.

1. Main Principles of Sustainable Public Policy in Climate Change

- Principles of Good Governance: Effective policies require transparency, accountability and public participation in the formulation and implementation process.
- Science Based Approach: Policy decisions must be supported by strong scientific research and verifiable data.
- Cross-Sector Collaboration: Partnerships between government, private sector, NGOs and civil society play an important role in accelerating policy implementation.
- Flexibility and Adaptability: Policies must be able to adapt to changing environmental, social and economic conditions.
- Financial Sustainability: Policy success depends on stable funding mechanisms, such as carbon taxes and clean energy investments.

2. Categories of Policy Characteristics Commonly Implemented in Various Countries

- Environmental Regulation and Standardization (35%)
 - Example: European Green Deal which sets strict targets for reducing carbon emissions.
- Economic Instruments and Market Incentives (25%)
 - Example: Emissions Trading System (ETS) in the European Union.
- Public Participation and Community Empowerment (15%)
 - Example: Forest Governance Policy in Brazil.
- Investment in Eco-Friendly Infrastructure and Technology (15%)
 - Example: China's investment in electric vehicles and solar energy.
- Multilevel Governance Approach (10%)
 - Example: Climate Policy in Germany which integrates pay attention to central, regional and local policies.

This analysis shows that successful policies adopt a combination of regulation-based strategies, economic incentives, as well as participatory and multilevel governance approaches.

4. DISCUSSIONS

4.1. Key Principles of Sustainable Public Policies

Sustainable public policies aimed at climate change mitigation are grounded in several key principles that guide their formulation and implementation. These principles ensure that policies are effective, inclusive, and adaptable to the evolving challenges posed by climate change.

4.1.1. Principle of Scientific-Based Policy Making

The foundation of effective climate policies is robust scientific data and research. This principle emphasizes the necessity of utilizing empirical evidence, such as climate models and emission scenarios, to inform policy targets. For instance, Roser-Renouf et al. highlight the importance of scientific consensus in shaping public health policies related to climate change, indicating that public health professionals are particularly adept at implementing evidence-based policies (Roser-Renouf et al., 2016). This reliance on scientific data is crucial for establishing credible and effective climate policies that can withstand scrutiny and adapt to new findings.

4.1.2. Principle of Long-Term Sustainability

Sustainable public policies must prioritize long-term impacts over temporary fixes. The European Union's commitment to achieving net-zero emissions by 2050 exemplifies this principle, as it reflects a strategic vision aimed at long-term environmental sustainability

(Kettner & Kletzan-Slamanig, 2020). This approach necessitates a shift from short-term gains to enduring solutions that address the root causes of climate change, ensuring that future generations inherit a healthier planet.

4.1.3. Principle of Policy Integration

The integration of climate policies across various sectors—such as environment, economy, and social welfare—is essential for holistic climate action. Kettner and Kletzan-Slamanig discuss the concept of Climate Policy Integration (CPI), which involves embedding climate change considerations into all stages of policy-making across different sectors (Kettner & Kletzan-Slamanig, 2020). This principle is vital for creating synergies between climate adaptation and mitigation efforts, as highlighted by Huang-Lachmann and Guenther, who advocate for integrated climate strategies that consider both adaptation and mitigation (Huang-Lachmann & Guenther, 2020). Such integration helps to minimize contradictions between policies and enhances overall effectiveness.

4.1.4. Principle of Stakeholder Engagement

Engaging a diverse array of stakeholders—including government entities, the private sector, civil society, and local communities—is critical for the success of climate policies. The public consultation processes in Germany for renewable energy policies serve as a prime example of how stakeholder involvement can lead to more comprehensive and accepted policy outcomes (Locatelli et al., 2020). This principle ensures that policies are not only scientifically sound but also socially equitable and widely supported.

4.1.5. Principle of Adaptive Governance

Finally, the principle of adaptive governance underscores the need for policies to be flexible and responsive to advancements in science and technology. This is particularly relevant in the context of carbon tax policies, which have been revised in various countries based on their implementation effectiveness (Kucharski & Unesaki, 2016). Adaptive governance allows for the continuous improvement of policies, ensuring they remain relevant and effective in the face of changing circumstances and emerging knowledge.

In conclusion, the formulation of sustainable public policies for climate change mitigation is guided by principles that emphasize scientific integrity, long-term vision, cross-sectoral integration, stakeholder involvement, and adaptive governance. These principles collectively contribute to the development of effective and resilient climate policies that can address the multifaceted challenges posed by climate change.

4.2. Characteristics of Effective Sustainable Public Policies

To ensure the success of sustainable public policies, several characteristics have been identified as essential for effective policy implementation. These characteristics include a robust regulatory and legal framework, market-based instruments, public-private partnerships (PPP), decentralization and localized solutions, and a comprehensive monitoring, reporting, and verification (MRV) mechanism.

4.2.1. Regulatory and Legal Framework

A strong legal basis is critical for the enforcement of sustainable public policies. For instance, the European Climate Law establishes binding emission reduction targets for EU member states, thereby providing a clear regulatory framework that enhances accountability and compliance (Ordóñez-Ponce, 2022). This legal structure is essential for ensuring that policies are not only formulated but also effectively implemented and enforced, as highlighted by Ranabhat et al., who emphasize the necessity of coherent institutional mechanisms for climate policy enforcement (Ranabhat et al., 2018).

4.2.2. Market-Based Instruments

Market-based instruments, such as carbon taxes and renewable energy subsidies, play a pivotal role in incentivizing sustainable practices. The implementation of carbon pricing mechanisms in Canada and the EU exemplifies how economic incentives can drive reductions in greenhouse gas emissions while promoting renewable energy adoption (Schoenefeld et al., 2016). Furthermore, studies indicate that such instruments can significantly influence corporate behavior towards sustainability, as firms respond to economic signals by investing in cleaner technologies (Greco et al., 2022). The effectiveness of these instruments is underscored by the evidence of their impact on eco-innovation within firms, demonstrating their potential to foster sustainable technological advancements (Shooshtarian et al., 2022).

4.2.3. Public-Private Partnerships (PPP)

Collaboration between government entities and the private sector is vital for the successful implementation of climate policies. For example, the Danish government's partnership with energy technology companies in financing green energy initiatives illustrates how PPPs can leverage resources and expertise to achieve sustainability goals (Green & Kuch, 2022). This collaborative approach not only enhances the effectiveness of policy implementation but also fosters innovation and investment in sustainable technologies.

4.2.4. Decentralization and Localized Solutions

Empowering local governments to implement localized solutions is another critical characteristic of effective sustainable public policies. Initiatives such as off-grid solar projects in African villages demonstrate the benefits of localized approaches that cater to specific community needs (Rumpel & Chabbi, 2021). This decentralization allows for tailored solutions that can be more responsive and effective in addressing local environmental challenges, as supported by the findings of Ciambra et al., which highlight the importance of local contributions to achieving sustainable development goals (Ciambra et al., 2023).

4.2.5. Monitoring, Reporting, and Verification (MRV) Mechanism

A transparent MRV system is essential for assessing the effectiveness of sustainable public policies. The European Union's MRV framework for carbon trading exemplifies how systematic monitoring can enhance accountability and facilitate the evaluation of policy impacts (Masse et al., 2020). Effective MRV systems not only provide critical data for assessing progress but also reinforce trust among stakeholders, as emphasized by Scott, who discusses the role of transparency in climate finance and policy commitment (Scott, 2023). Additionally, the establishment of robust MRV systems is crucial for ensuring the integrity of emissions trading markets, as highlighted by various studies focusing on the challenges and requirements of MRV in different contexts (Tang et al., 2018; Huitema et al., 2011).

In conclusion, the effectiveness of sustainable public policies hinges on a combination of a strong regulatory framework, the use of market-based instruments, collaborative public-private partnerships, localized solutions, and robust monitoring mechanisms. These characteristics work synergistically to create an environment conducive to sustainable development and climate action.

4.3. Comparative Analysis of Best Practices

The comparative analysis of best practices in climate change mitigation reveals significant insights from various case studies, notably the European Union Green Deal, the US

Inflation Reduction Act (IRA), the Nordic Model of Climate Governance, and Indonesia's Low Carbon Development Initiative.

4.3.1. Case Study 1: The European Union Green Deal

The European Union Green Deal (EGD) represents a comprehensive strategy aimed at achieving climate neutrality by 2050. It encompasses strict regulations and ambitious targets, including a commitment to reduce greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels (Tutak et al., 2021; Tagliapietra et al., 2023; Dupont & Torney, 2021). The EGD has been pivotal in steering EU member states towards sustainable practices, emphasizing technological innovation and renewable energy policies (Tomala & Urbaniec, 2024; Vukušić et al., 2023). Since its inception, the EU has successfully reduced its greenhouse gas emissions by approximately 30% since 1990, showcasing the effectiveness of its regulatory framework (Soemanto & Koestoer, 2023; Aznar et al., 2021). This initiative aligns with the Sustainable Development Goals (SDGs), particularly Goal 13 on climate action, reinforcing the EU's commitment to global climate governance (Kandemir & KAYIKÇIOĞLU, 2022).

4.3.2. Case Study 2: The US Inflation Reduction Act (IRA)

In contrast, the US Inflation Reduction Act (IRA) adopts an economic incentive-based approach to accelerate the clean energy transition. This act provides substantial subsidies for investments in electric vehicles and renewable energy, significantly boosting the renewable energy sector (Biresselioğlu et al., 2021; DOBRE et al., 2024). The IRA exemplifies a shift towards market-driven solutions in climate policy, contrasting with the regulatory focus of the EGD. By incentivizing private sector investment, the IRA aims to foster innovation and reduce reliance on fossil fuels, thereby contributing to the broader goal of mitigating climate change (Bloomfield & Steward, 2020; Sikora, 2020).

4.3.3. Case Study 3: The Nordic Model of Climate Governance

The Nordic Model of Climate Governance, particularly in countries like Sweden and Norway, combines stringent regulations with high carbon taxes and active civil society involvement. Sweden has implemented carbon taxes since the early 1990s, resulting in a significant reduction in greenhouse gas emissions while simultaneously experiencing economic growth ("Policy brief: A review of the Nordic implementation of the UNFCCC Gender Action Plan", 2024). This model illustrates the potential for integrating economic and environmental objectives, demonstrating that robust climate policies can coexist with economic development. The Nordic approach emphasizes the importance of public engagement and transparency in climate governance, which has been crucial for its success (Szczubełek, 2022).

4.3.4. Case Study 4: Indonesia's Low Carbon Development Initiative

Indonesia's Low Carbon Development Initiative presents a contrasting scenario, highlighting the challenges faced by developing countries in implementing climate policies. This initiative focuses on renewable energy and community-based policies but struggles with limited funding and underdeveloped green infrastructure (Soemanto & Koestoer, 2023; DOBRE et al., 2024). The Indonesian case underscores the necessity of tailored approaches that consider local economic contexts and capacities. While the initiative aims to transition towards a greener economy, it faces significant hurdles that require international support and investment to overcome (Sikora, 2020).

In summary, the comparative analysis of these case studies reveals diverse strategies and outcomes in climate change mitigation. The European Union's regulatory framework, the US's incentive-based approach, the Nordic governance model, and Indonesia's developmental challenges illustrate the complexity of implementing effective climate policies. Each case

provides valuable lessons on the importance of context-specific strategies, stakeholder engagement, and the integration of economic and environmental goals.

5. CONCLUSIONS

5.1. Summary of Findings

This research identifies the main principles of sustainable public policy in mitigating climate change as well as the characteristics of the most effective policies based on global comparative studies. The main principles found include scientific-based policy making, which emphasizes the use of data and research as a basis for decision making, as well as long-term sustainability, which ensures policies are not only oriented towards short-term results but also consider long-term impacts. In addition, cross-sector integration (policy integration) is an important aspect in aligning environmental, economic and social policies, while stakeholder engagement ensures active participation from the government, private sector, civil society and local communities. The principle of adaptive governance is also key, allowing policies to be flexible and able to adapt to the latest scientific and technological developments.

Apart from these principles, this research also identifies several characteristics of policies that are most effective in mitigating climate change. A strong regulatory and legal framework is the basis for successful policy implementation, while market-based instruments, such as carbon taxes and renewable energy subsidies, provide incentives for economic actors to shift to more environmentally friendly practices. Public-private partnerships (PPP) play an important role in driving innovation as well as policy implementation, especially in the development of green technology. Decentralization and solutions based on local conditions enable policies to be more relevant to the specific needs of each region, while monitoring, reporting and verification (MRV) mechanisms ensure transparency and effectiveness of the policies implemented.

Comparative analysis of various global policies, such as **European Green Deal**, **US Inflation Reduction Act**, **Nordic Climate Governance Model**, And **Indonesia's Low Carbon Development Initiative**, shows that approaches based on strict regulations and economic incentives have the most significant impact on climate change mitigation. This policy model has succeeded in reducing carbon emissions, encouraging green technology innovation, and strengthening sustainable environmental governance.

5.2. Theoretical & Practical Implications

This research has a significant contribution in both theoretical and practical aspects. In terms of theoretical implications, this study enriches the literature on sustainable public policy by presenting a framework based on the main principles and characteristics found in policies in different countries. By establishing a systematic approach to the principles of effective policy, this research helps build a stronger conceptual foundation for future policy research. Additionally, this study offers a new perspective on the effectiveness of different policy approaches in addressing climate change, by analyzing how a combination of regulation, economic incentives and adaptive governance can produce optimal outcomes.

In terms of practical implications, the findings of this research provide insights for policy makers in designing more effective and evidence-based climate change mitigation strategies. By understanding the key principles and characteristics of successful policies, governments can adopt policies that are not only scientifically relevant, but also have long-term durability. International organizations, such as the UN and other global environmental agencies, can also use these findings to develop policy recommendations that can be widely implemented in various countries. In addition, the private sector has the opportunity to further participate in climate change mitigation through economic incentive mechanisms, such as carbon taxes and renewable energy subsidies, as well as through public-private partnerships (PPPs) that support innovation and investment in green

technologies. Thus, this research not only makes an academic contribution, but also has a direct impact on public policy and business practices in facing the challenge of global climate change.

5.3. Limitations and Future Research Directions

This study has several limitations that need to be noted. First, this study only focuses on policies at the national and regional levels, so it has not discussed in depth the dynamics of policies at the local or specific community level. This leads to a lack of understanding of how policies are implemented in more micro contexts and how local social and cultural factors influence their success. Second, the data used in this research comes from peer-reviewed articles within the last 10 years. While this approach ensures the quality and relevance of the data, it is possible that some recent developments in climate change policy have not been fully accommodated in the analysis. Third, some of the policies identified in this study are still in the early stages of implementation and do not yet have long-term data on their impact on carbon emission reductions and economic growth. As a result, the effectiveness of these policies in the long term still needs to be studied further.

Based on these limitations, there are several research directions that can be carried out in the future. First, a more in-depth analysis of policy implementation in developing countries is needed, including challenges and opportunities in implementing sustainability-based policies. This study can provide more contextual insight into the structural, political and economic obstacles facing developing countries in implementing climate change mitigation policies. Second, empirical research regarding the effectiveness of various economic incentives in encouraging the clean energy transition needs to be carried out. This study can explore how policies such as carbon taxes, renewable energy subsidies and emissions trading schemes can encourage changes in the behavior of industry and society in adopting green technologies. Third, future research could also explore how digital technologies and artificial intelligence (AI) can be used to improve the effectiveness of climate change policy monitoring and evaluation. With advances in technology, AI-based analytical tools can help measure the impact of policies in more real-time and increase accuracy in data-based decision making. By exploring these areas, future research can make a greater contribution to strengthening the effectiveness of public policy in addressing the global challenge of climate change.

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