The Role of Climate Diplomacy in Supporting City Carbon Trading Schemes in Indonesia: A Case Study of East Kalimantan and Jakarta

Masito Ilmia[1], Anggi Koenjaini Putri[2]

[1] Undergraduate Student, Development Economics Program, Faculty of Economics and Business, UPN Veteran Jawa Timur

[2] Bachelor of International Relation UPN Veteran Jawa Timur, Center Urban Identity and Urban Studies

Email: 23011010097@student.upnjatim.ac.id[1], anggikoenjani@gmail.com[2]

ABSTRACT

Climate change is a global challenge that demands cross-border cooperation through an inclusive approach. Indonesia's commitment to the Paris Agreement and its Nationally Determined Contributions (NDC) targets is realised through Presidential Regulation No. 98 of 2021 concerning the Economic Value of Carbon, which regulates the implementation of carbon trading schemes as a market-based emission reduction instrument. This study aims to examine the role of Indonesian climate diplomacy in supporting the implementation of carbon trading at the local level, using case studies in Jakarta and East Kalimantan, two regions with distinct characteristics and policy approaches. The research employed a qualitative approach with a comparative case study method, and data was collected through analysis of national and international policy documents. The results show that Jakarta focuses on the energy and transportation sectors, while East Kalimantan emphasizes the forestry and energy transition sectors. Conversely, Indonesia's climate diplomacy affirms its strategic position on the global stage by promoting market-based approaches, climate justice, and equitable global partnerships. These findings demonstrate a close relationship between local policies and Indonesia's foreign diplomacy strategy, with regions playing a crucial role in supporting international narratives and commitments. This study concludes that the success of carbon trading schemes as an inclusive environmental protection instrument depends on the synergy between climate diplomacy, national regulations, and local capacity.

Keyword: *Carbon trading, climate diplomacy, decarbonization, East Kalimantan, Jakarta*

INTRODUCTION

Subnational entities have entered the international climate governance stage and are expected to strategically network and collaborate directly with peers and other subnational entities in other sovereign states, such as through inter-city cooperation (for example, between Bangkok and Yokohama). As cities have increasingly begun to organize themselves in transnational climate networks in the last decade, it has become much easier for nanation-stateso address cities as a coherent group (Fischer et al., 2015) and allow cities to have a voice at international climate meetings, such as COP21 in Paris. City networks, such as ICLEI, C40, and UCLG, represent aggregate city interests, as well

as officially as members of the UNFCCC Local Governments and Regional Authorities, at international meetings and have pressed for the adoption of measures at the international level that would recognize cities as key actors in the global fight against climate change and facilitate the adoption of urban climate change mitigation measures. These efforts resulted in the explicit involvement of cities as key implementing partners in the INDCs submitted by October 2015 (Fischer et al., 2015). In addition to INDCs, cities are increasingly being directly addressed in national climate change policy frameworks (Clapp et al., 2010). According to Fischer et al. (2015), thousands of local government organizations, and hundreds of large cities, have joined various COP meetings, exerting pressure, and making their own climate policy promises for change.

One of the most pressing issues in the world today is climate change. Various factors, including ecological systems, human health, and the stability of the global economy influence this phenomenon. The impacts of climate change include rising average global temperatures, melting polar ice caps, and an increase in extreme weather events. These developments highlight the critical importance of global cooperation in addressing this challenge (Manasa & Subodh, 2025). The Paris Agreement of 2015, a landmark in climate change mitigation efforts, was established by the international community to address this problem. Its main goal is to limit global temperature rise to well below 2°C, while pursuing efforts to restrict the increase to 1.5°C above pre-industrial levels (Schleussner et al., 2016). The central pillar of the Paris Agreement is the Nationally Determined Contributions (NDCs), which are voluntary commitments by each country to set their own climate mitigation and adaptation targets. Unlike the "top-down" approach of the Kyoto Protocol, the NDC mechanism is "bottom-up," emphasizing the role of domestic politics and the integration of climate policies into national economic development strategies. This model fosters stronger global pressure to decarbonize economies, with direct implications for national development pathways across different countries (Falkner, 2016).

Indonesia is the fifth-largest greenhouse gas (GHG) emitter globally, with emissions from deforestation and forest degradation constituting the majority share of national GHG emissions. Expanding agriculture, logging, mineral extraction, urbanization and housing development have resulted in not only increased land conversio, but also forest degradation, reducing environmentalbenefitsi which further exacerbatespoverty. Indonesia, as a developing country that ratified the Paris Agreement, has set an unconditional emissions reduction target of 29% and a conditional target of 41% by 2030 (Hastuti, 2024). Although these commitments reflect Indonesia's political willingness to participate in global climate efforts, several studies argue that the targets remain "insufficient," particularly due to the dominance of coal in the national energy mix and challenges in implementing cross-sectoral policies (Suroso et al., 2022). Nevertheless, amid these challenges, the government has begun to demonstrate progressive steps through Presidential Regulation No. 98 of 2021 on the Economic Value of Carbon (NEK). This regulation paves the way for the implementation of domestic carbon market mechanisms, both in the form of carbon trading and emission offsets, while also serving as a foundation for a more environmentally friendly economic transformation (Government of Indonesia, 2021).

When these commitments are translated into regional levels, their relevance becomes more complex. Alongside the net-zero emissions target and Presidential Regulation 98/2021, several regions have begun implementing market-based carbon trading schemes. Jakarta and Kalimantan are two prime examples. In Jakarta, the application of carbon trading in the industrial and transportation sectors has the potential to address common urban challenges such as air pollution and traffic congestion (Firdaus & Arkananta, 2024). Meanwhile, Kalimantan faces issues of deforestation and peatland degradation, which are two major sources of national greenhouse gas (GHG) emissions. Implementing carbon trading in this region offers an innovative solution for forest conservation while also providing economic incentives for local communities. This decentralized approach underscores the importance of local governments in tailoring climate policies to the environmental and socio-economic characteristics of their respective regions (Nikonovas et al., 2020).

Furthermore, carbon trading serves not only as a technical tool for reducing emissions but also as a means of fostering economic partnerships. Through such schemes, Indonesia can attract green investment, enhance the transfer of environmentally friendly technologies, and strengthen its involvement in the global carbon market. Consequently, implementing carbon trading at the sub-national level will contribute to achieving NDC targets and bolster Indonesia's position in international climate diplomacy (Government of Indonesia, 2021). Against this backdrop, this research aims to examine in depth the role of carbon trading as an instrument of Indonesia's climate diplomacy at the sub-national level, with a focus on Jakarta and East Kalimantan. The study will explore the mechanisms, incentives, and challenges faced by local actors in implementing carbon trading, while also analyzing how these local policies are interconnected with Indonesia's broader climate diplomacy strategy at the global stage. Accordingly, the findings of this research are expected to provide a comprehensive roadmap for local governments, the national government, and other stakeholders in balancing economic development agendas with effective climate change mitigation commitments.

METHODS

This study uses a qualitative comparative case study design to examine the role of climate diplomacy in supporting the implementation of carbon trading schemes at the subnational level in Indonesia. A comparative case study approach was chosen to capture the differences and similarities in policy orientations and institutional arrangements between Jakarta and East Kalimantan, two regions representing distinct contexts. Jakarta was selected due to its urban characteristics and policy emphasis on the energy and transportation sectors, while East Kalimantan was included due to its significant forestry resources and ongoing energy transition initiatives. Data collection relied primarily on the analysis of policy documents, covering regulatory frameworks at the national, regional, and international levels. To complement these data, secondary data were collected from academic articles and international organization reports. Data analysis followed a thematic analysis procedure, identifying recurring patterns related to the intersection between climate diplomacy and local carbon trading initiatives.

Codes were developed based on key themes such as governance structures, sectoral focus, international cooperation, and policy implementation challenges. Cross-case comparisons were then conducted to highlight variations and convergences between Jakarta and East Kalimantan, allowing for an analytical discussion of how local experiences reflect and reinforce Indonesia's international climate commitments.

RESULT AND DISCUSSION

Climate diplomacy in local government actions

Local governments diplomacy with regard to climate governance in four different mechanisms on two different levels (vertical and horizontal) and on two layers of interaction (exogenous and endogenous). The four mechanisms are thus (i) through networks (horizontal, exogenous), (ii) bilateral relations (horizontal, endogenous), (iii) local-national (vertical, endogenous) and, (iv) city-global multilateral mechanism (vertical, exogenous). The last mechanism (vertical, exogenous) is not a mechanism for most cities and only applies to city-states who have a direct representative and diplomatic role in terms of participating in the global climate governance regime. This includes the UNFCCC and the UNCSD.

Table 1. Illustrates the matrithatch captures these mechanisms anaimses tprovide a comprehensivell picture of climate diplomacy conducted by cities across multiple levels and layers.

	Endogenous	Exogenous
Horizontal diplomacy	Bilateral relations • Sister cities • twin towns • friendship cities • Examples: Sister Cities International; Council of Local Authorities for International Relations	City networks • ICLEI – Local Governments for Sustainability • C40 Climate Leadership Group • United Cities and Local Governments • Council of Local Authorities for International Relations.
Vertical diplomacy	Local-national climate governance mechanisms • Nationally Appropriate Mitigation Actions • National Adaptation Programme of Action • Intended Nationally Determined Contributions	City-state - global climate governance mechanism • Singapore, Brunei, Bahrain, Kuwait, Malta, San Marino, Qatar at the UNFCCC and UNCSD Conference of Parties

Source: Amul et al., 2015

Local governments can bolster dialogue that can leverages the influence of cities globally not only in environmental governance but also in promoting best practices and norms

in local environmental governance – a global policy culture shared among networked cities (Toly in Amen et al. 2011). local governments, such as the International Council for Local Environmental Initiatives (ICLEI) – Local Governments for Sustainability and the C40 Climate Leadership Group, have been spurred on by, what seems to them as, an inactive and unproductive international platform on climate change (See Table 2. for a more extensive list of city networks contributing to climate diplomacy for and by cities operating in the Asia Pacific). For example, while deadlock continuously afflicts international climate negotiations, members (city mayors) of the C40 Climate Leadership Group decided in 2012 to reduce a combined 1.3 gigatons of carbon emissions in their cities collectively by 2030. Bolstered by the Clinton Climate Initiative, C40 cities made the strong case for city leadership on climate change action based on three tenets: (1) cities are the main consumers of energy and emitter of greenhouse gases; (2) cities house more than half of the world's population and; (3) cities are vulnerable to climate change (C40 2013) (Amul et al., 2015).

Table 2. Selected City Networks contributing to Climate Diplomacy

City Networks	Year Established	No. of members	Nature of Climate action and initiatives
ICLEI	1990	1,000 + cities, municipalities and local governments • Southeast Asia (47) • South Asia (59) • East Asia (88)	• Advocacy and lobbying • technical support • knowledge sharing
C40	2005	75 megacities • East Asia (9) • South and West Asia (6) • Southeast Asia and Oceania (7)	• Technical assistance • peer-to-peer exchange • research • knowledge management and communications • advocacy to national governments
CITYNET (Asia Pacific)	1987	87 full members (cities)	• Cooperative links and partnerships • Program clusters on climate change, disaster, infrastructure and MDGs
UCLG	2004	1000 cities 155 national associations	• International cooperation between cities and their associations • International advocacy on climate change and sustainable urban development
METROPOLIS	1985	141 metropolises (25 in Asia Pacific)	• cooperation • knowledge exchange • interaction and negotiations with international and non-state actors
Council of Local Authorities for International Relations	1988	67 domestic branches in 47 prefectures in Japan and 20 designated cities	• Promote and provide support for local internationalization

Asian Network of Major Cities 21	2001	13 cities	• Networking and joint projects on environment (global warming, urban greening, water services, waste management, air pollution, health and sanitation)
ASEAN Environmentally Sustainable Cities (ESC)	2011	Japan-ASEAN Integration Fund: 14 cities in 8 ASEAN countries (Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Thailand and Viet Nam)	• National and local capacity building for environmentally sustainable cities (solid waste management, water and sanitation, urban greenery and low-carbon city development)
Asia-Europe Meeting Mayors and Governors (ASEM-MGM)	2010	45 ASEM partners	• Provide a forum for city and local government leaders from Asia and Europe

Source: Amul et al., 2015

ICLEI is a global network of about 1,000 cities and local governments committed to sustainable development. ICLEI also describes itself as a 'movement working with national, regional and international networks', and 'a sustainable and environmental agency' strengthening and enabling local governments in implementing local and global climate action (ICLEI, n.d). ICLEI's activities are organised around 10 agendas: (1) sustainable city; (2) resilient city; (3) biodiversity; (4) low carbon city; (5) resource-efficient and productive city; (6) smart city; (7) sustainable local economy and procurement; (8) happy, healthy and inclusive communities; (9) ecomobile city and; (10) sustainable regions. These agendas form part of the recent Seoul Declaration and form the core of ICLEI's programmes for its member cities. Among these, the most robust is its low carbon city and resilient city agenda (See Figure 2) (Amul et al., 2015).

Through this low carbon agenda, ICLEI provides a gamut of mitigation tools and platforms for local/city governments including the self-reporting carbonn Cities Climate Registry (with C40 and UCLG), the GreenClimateCities network, and the Urban-LEDS (low emission development strategies) project. ICLEI's global programmes on mitigation include the Local Agenda 21 Initiative after the UN Conference on Environment and Development (Earth Summit) in Rio de Janeiro (1992) and the Cities for Climate Protection (CCP) Campaign at the first Municipal Leaders' Summit on Climate Change in 1993. By 2009, more than 1000 local governments have passed resolutions pledging greenhouse gas emission reductions from local government operations and throughout their communities (Amul et al., 2015).

At the global level, climate diplomacy is evident in active participation in forums such as the UNFCCC COP, the G20, and ASEAN. Through these forums, Indonesia promotes issues of energy transition, climate finance, and climate justice, while demonstrating its leadership in the Southeast Asian region. For example, the Norway-supported REDD+ initiative and the Just Energy Transition Partnership (JETP) mechanism demonstrate that international diplomacy can unlock funding and technology opportunities that are then channeled to strengthen national policies (Maulidina & Hapsari, 2025).

Conversely, the implementation of climate diplomacy at the provincial level, seen through the ER Program, will address deforestation by addressing underlying governance issues through policy reform, engaging palm oil and forestry companies, and engaging local communities. The ER program is estimated to generate a gross emission reduction of 34.9 million tCO2e over the five-year ERPA period (2020-2024). Approximately half of this is expected to come from reduced deforestation in areas allocated for plantations. The ER program was developed through a participatory process involving all stakeholders in East Kalimantan (FCPF, 2019).

Meanwhile, the Jakarta Provincial Government, through the Jakarta Climate Action Plan 2021–2050, affirmed its commitment. In terms of mitigation, Jakarta targets a gradual reduction in greenhouse gas emissions to achieve carbon neutrality by 2050. This effort includes transforming the energy sector by increasing the renewable energy mix, energy efficiency in buildings, and implementing low-emission transportation. Integrated mass transportation programs, electrification of public vehicles, and the development of pedestrian- and bicycle-friendly paths are priorities in reducing emissions from the transportation sector, which currently contributes a large portion of air pollution in Jakarta. Adaptation strategies focus on strengthening the city's capacity to deal with climate risks, particularly flooding, sea level rise, and heat waves. The government is encouraging the development of green infrastructure, revitalizing blue-green open spaces, and integrated water management to increase environmental absorption ((DKI Jakarta, 2021).

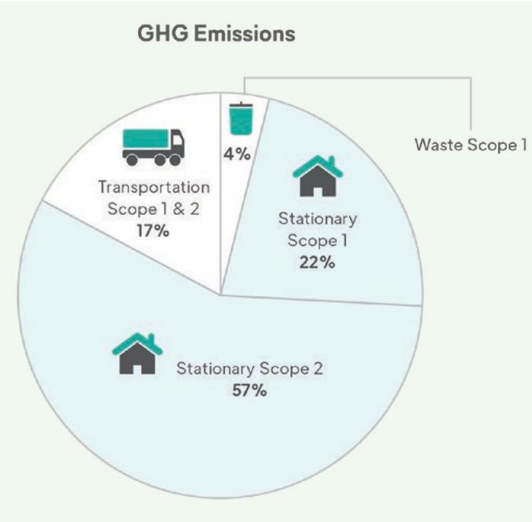
Thus, the relationship between international diplomacy and local action in Indonesia is reciprocal. Indonesia's position on the global stage—for example, its role in the ASEAN Joint Statement on Climate Change or its leadership in the G20—provides legitimacy and resources to strengthen domestic policies. Conversely, successful local implementations such as increasing the renewable energy mix, developing electric vehicles, and conserving forests strengthen the credibility of Indonesian diplomacy at the international level. This demonstrates that Indonesia's climate diplomacy is not merely global rhetoric, but rather a strategic instrument for balancing the needs of economic development with the responsibility to maintain environmental sustainability.

Implementation of the Carbon Trading Scheme

Jakarta Case

Jakarta, as the political and economic center of Indonesia, occupies a strategic position in advancing the country's emission reduction agenda. The city is a major contributor to national carbon emissions, particularly from the transport and building energy sectors, which also exemplify the challenges of implementing climate policy at the sub-national level. Based on the city's 2016 GPC inventory in the Jakarta Climate Action Plan (CAP) 2021–2050, stationary energy (grid electricity, Scope 2) accounts for 57% of citywide GHG emissions, stationary energy Scope 1 for 22%, transport for 17%, and waste for 4% (total 53.6 $MtCO_2e$). (DKI Jakarta, 2021). This indicates that effective mitigation in Jakarta is critical for achieving Indonesia's Nationally Determined Contribution (NDC).

Figure 1. Jakarta's GPC compliant GHG emissions inventory by sector in 2016



Source: DKI Jakarta, 2021

Indonesia's climate diplomacy, as reflected in the CAP and Jakarta's membership in the global C40 network, does not end at the national level but is projected through subnational policies that reinforce the credibility of the NDC. Jakarta has set ambitious goals to achieve carbon neutrality by 2050, in line with the global agenda toward net zero emission (NZE). The CAP outlines emission reduction targets of 50% from the business-as-usual (BAU) scenario by 2030 (106.5 $MtCO_2e$ -> 53 $MtCO_2e$) and 62% by 2050 (189.5 $MtCO_2e$ -> 72 $MtCO_2e$), surpassing the targets of the earlier RAD-GRK 2021. (DKI Jakarta, 2021). Thus, Jakarta is not merely a recipient of national policies but also a transnational actor strengthening Indonesia's climate diplomacy narrative.

The urgency of mitigation is reinforced by empirical data. The Carbon Report of Jakarta (2014-2022) estimates that total electricity-related emissions reached 14.1 million tons of CO_2 in 2022, while vegetation absorption capacity was only 829 thousand tons of CO_2, leaving a net emission of 13.3 million tons of CO_2. (R. P. Putra et al., 2023). Spatial analysis using geospatial indicators such as Night-time Light (NTL), Land Surface Temperature (LST), and carbon monoxide pollution maps highlights the need for spatially informed mitigation strategies. The CAP emphasizes that land use, energy emissions, and transport systems must be integrated into low-carbon urban planning. (DKI Jakarta, 2021).

Figure 2. Calculation of CO2 Difference Not Absorbed by Vegetation,

Klasifikasi	Luas Daerah (ha)	Laju Serap (Ton/ha/Tahun)	Laju Serapan Total	Emisi CO2 (Ton)	Selisih
			2022	2022	2022
Padang Rumput	5653.213415	12	67838.56098	14107212.01	13277996.44
Pohon	1212.881981	569.07	690214.7489		
Sawah	1860.236111	12	22322.83333		
Semak Belukar	887.989483	55	48839.42157		
JUMLAH	9614.32099		829215.5648		

Source: Welas Asih, 2023

Jakarta's carbon trading framework is rooted in national regulation, particularly Presidential Regulation No. 98/2021 on Carbon Economic Value (Nilai Ekonomi Karbon-NEK). (Gubernur DKI Jakarta, 2021). At the subnational level, this framework is operationalized through Governor Regulation No. 90/2021 on Low-Carbon Development and Climate Resilience. Furthermore, the establishment of a Task Force through Governor Decree No. 28/2025 ensures cross-agency coordination, the design of Measurement, Reporting, and Verification (MRV) mechanisms, and alignment with the Indonesia Carbon Exchange (IDX Carbon). (Gubernur DKI Jakarta, n.d.) As Andrian et al argue, local derivative regulations are essential for ensuring the effectiveness of carbon trading and its compatibility with the national system. (Andrian et al., 2025)

Jakarta's carbon trading priorities focus on the transport and energy sectors. In transport, the electrification of TransJakarta buses and the expansion of MRT and LRT networks are central to decarbonization, with the provincial government targeting 60% electric bus operations by 2050 (DKI Jakarta, 2021). In energy, policies promote rooftop solar PV installations in government and commercial buildings, alongside the enforcement of energy efficiency standards in new buildings. Nugroho, 2021 emphasize that transport and energy are the most feasible urban sectors for carbon trading, as their emission reductions can be measured and verified relatively quickly. (Nugroho et al., 2021)

The successful implementation of Jakarta's CAP, and by extension its carbon trading scheme, hinges on financing, governance, and MRV systems. First, financing strategies combine provincial and national budgets, public–private partnerships (PPPs), and access to multilateral green funds to support low-carbon infrastructure (DKI Jakarta, 2021). Second, from an institutional perspective, Governor Decree No. 96/2020 established a cross-departmental Climate Change Mitigation and Adaptation Working Group, while Governor Decree No. 28/2025 further strengthens coordination specific to carbon trading. Third, in terms of data governance, the CAP emphasizes Monitoring, Evaluation, and Reporting (MER) as the basis for MRV integration. This system is essential to ensure transparency, enhance investor confidence, and minimize the risk of greenwashing in

the carbon market. In other words, CAP Chapter 5 provides the technocratic foundation for linking local climate actions with national carbon trading instruments. (Gubernur DKI Jakarta, n.d.)

Despite this progressive framework, significant challenges remain. Technically, MRV weaknesses are evident, as transport emission data are often inconsistent across agencies.(DKI Jakarta, 2021)(Nugroho et al., 2021). Legally, Law No. 32/2009 on Environmental Protection and Management does not explicitly regulate carbon trading, leading to legal uncertainty (Soeharso & Chaniago, 2025). From a governance perspective, the risk of greenwashing persists, as large corporations may engage in carbon trading primarily for reputational legitimacy rather than genuine emission reductions. Jakarta's role in climate diplomacy is strategic. According to Andrian et al. (2025), Indonesia's climate diplomacy in international forums requires concrete evidence at the local level to sustain its narrative as a "Global South leader." As a C40 member, Jakarta serves as a policy laboratory showcased at global platforms such as COP, thereby strengthening Indonesia's bargaining power in climate negotiations. (Andrian et al., 2025)

The success of carbon trading in Jakarta will depend on three key factors: (i) regulatory clarity and legal certainty, (ii) robust and transparent MRV systems supported by spatial data, and (iii) consistent political commitment and multi-stakeholder coordination. (J. J. H. Putra et al., 2021) Jakarta illustrates how climate diplomacy and carbon trading are interlinked: local implementation not only strengthens national climate policy but also underpins Indonesia's international diplomatic stance. This case demonstrates that effective climate diplomacy can only be realized through sustained synergy between national regulation, local capacity, and global participation.

East Kalimantan Case

Indonesia became the first country in the East Asia and Pacific region to receive a payment through the World Bank's Forest Carbon Partnership Facility (FCPF), representing 13.5 percent of the emission reductions reported in the Indonesian Government's Monitoring Report for the 2019-2020 crediting period. Indonesia received an upfront payment of US$20.9 million (Rp320 billion) under the Emission Reduction Payment Agreement between the Government of Indonesia and the World Bank's Forest Carbon Partnership Facility (FCPF) for reduced emissions from deforestation and forest degradation (REDD+) in East Kalimantan Province. Under the Agreement, Indonesia will receive up to US$110 million (Rp1.6 trillion) for verified emissions from reduced deforestation and forest degradation. The full payment will be disbursed upon completion of independent third-party verification of the reported emission reductions, which is currently underway (World Bank, 2022).

This upfront payment will facilitate the start of the East Kalimantan program's Benefit Sharing Plan, developed by the Government of Indonesia and published in October 2021. This Benefit Sharing Plan document was developed through a consultative, transparent, and participatory process to ensure that all relevant program stakeholders

can access the benefits of emission reduction payments. This document outlines the agreed-upon arrangements for how ERPA payments will be shared with beneficiaries, from the central government and local governments to local communities (World Bank, 2022).

The ERPA is a legally binding contract to provide payments for environmental services, in other words, compensation for Indonesia's efforts to conserve tropical forests and thereby reduce greenhouse gas emissions into the atmosphere. These payments are designed to help Indonesia and its stakeholders achieve long-term sustainability in financing forest conservation. These payments aim to help mitigate the impacts of climate change from forest loss and degradation by making forests more valuable than logged forests, by offering results-based incentives to countries to reduce emissions across the forestry sector and broader land use (World Bank, 2022).

The national decision to implement the ER Program in East Kalimantan recognizes the province's level of readiness and political commitment. East Kalimantan has been closely involved in supporting national commitments to reduce carbon emissions since 2009. East Kalimantan was one of the first provinces to join the GCF association and signed the Rio Branco Declaration, a document that unequivocally commits to reducing tropical deforestation, protecting the global climate system, improving rural livelihoods, and reducing poverty. East Kalimantan was one of the first provinces in Indonesia to appoint a REDD+ Task Force to implement REDD+ pilot projects and to embrace the Governor's priority policies for transitioning to a low-carbon economy. In 2014, the Governor of East Kalimantan strengthened the national moratorium on peatland conversion and primary forest clearance by issuing a provincial-level moratorium. East Kalimantan Province has integrated REDD+ into its Medium-Term Development Plan, has allocated a portion of its budget (APBD, APBN) for REDD+-related activities, and has prepared various regional regulations to support REDD+. The province has established a REDD+ Working Group and a Regional Council on Climate Change (DDPI). The multi-stakeholder DDPI represents the interests of local governments, universities, and civil society organizations. DDPI has been closely involved in the development of the East Kalimantan Environmentally Sustainable Development Strategy (2011); the East Kalimantan Province REDD+ Strategy and Action Plan (SRAP), and the East Kalimantan Climate Change Master Plan (2015-2035).

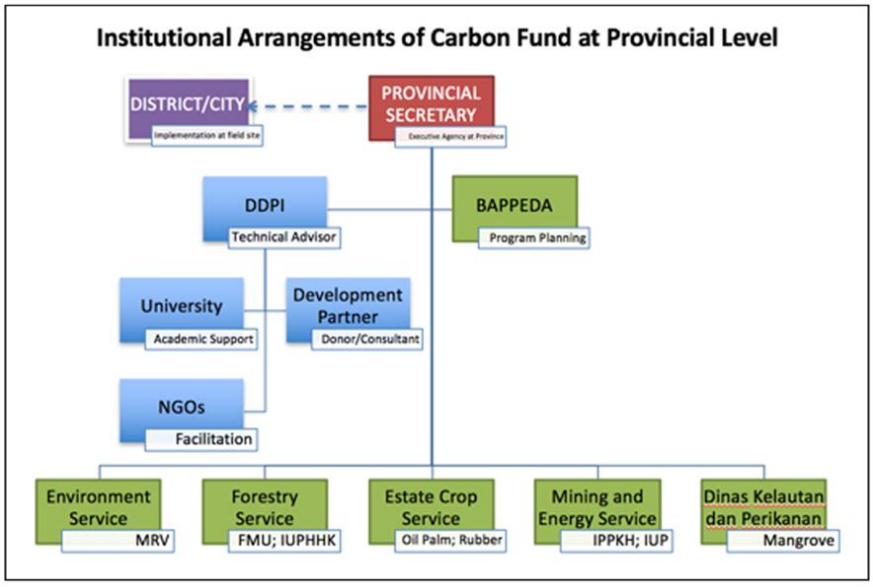
At the provincial level, the Provincial Secretary (Sekda Provinsi Kaltim) is responsible for implementing the ER Program, with the Provincial Environmental Agency acting as coordinator and carrying out the day-to-day management of the ER Program. During the ER Program implementation, the Sekda will be advised by the Regional Climate Change Council (DDPI). The Regional Climate Change Council (DDPI) of East Kalimantan Province is a key partner in the implementation of the ER Program. DDPI is a multi-stakeholder organization that has coordinated the planning and implementation of low-emission development in East Kalimantan Province. DDPI has significant experience (as well as operational infrastructure) in managing donor development funding.

Table 3. Regional Institutions and Organizations Involved in the Implementation of the East Kalimantan ER Program

Agency	Status	Role
Provincial Secretary (SEKDA)	Executing Agency at Province Level	• Responsible for Implementation and achievement of ER Program in the Province • A member of Steering Committee
The Regional Council on Climate Change (DDPI)	Advisory	• Providing advice and inputs to local government in relation to ER Program • A Member of Steering Committee
East Kalimantan Environment Service (Dinas Lingkungan Hidup)	Implementing agency	• Local responsibility for FREL and MMR • ER Program implementation
Other Provincial Government Services (OPD)	Implementing Agencies	• ER Program implementation • Leading consultation processes within their respective jurisdictions
Provincial Planning Board (BAPPEDA) East Kalimantan Province	Coordinative implementation at provincial level	• Coordinate all activities done by OPD in relation to ER program
Development Partners (Prov. & Kab/Kota)	Partner	• Provide supporting funds and technical advice to DDPI or District/City Government
University/NGOs (Prov. & Kab/Kota)	Partner	• Provide scientific supports and facilitation to DDPI and District/City Government • A Member of Steering Committee (observer)
District/City Secretary	Executing Agency at District/City Level and Feld Site	• Responsible for Implementation and achievement of ER Program in the District and Field Site
BAPPEDA District/City	Coordinative implementation at district/city level and field site	• Coordinate all activities done by OPD in relation to ER program at District/City level
OPD District/City	Implementing Agencies	• Implementing ER Program at District/City and Field Site
Village Government	Implementing Agencies	• Implementing ER Program at District/City and Field Site

Source: FCPF, 2019

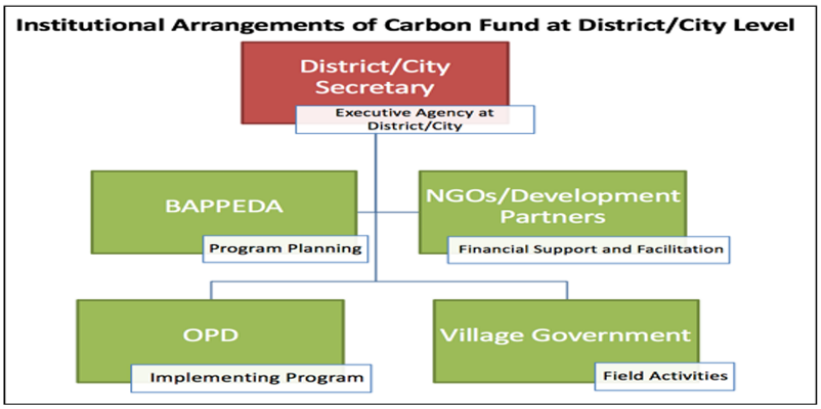
Figure 3. Institutional arrangements of ER Program at Provincial Level



Source: FCPF, 2019

At the district/city level, the ER Program will be carried out by the District Environmental Service (Dinas Lingkungan Hidup). Each respective district/city government will be responsible for implementing the ER Program in its region. The detailed institutional arrangements for the ER Program at the district/city level. At the village level, the village government, along with the local community, is responsible for reducing emissions within their village region.

Figure 4. Institutional arrangements of ER Program at District/City Level



Source: FCPF, 2019

To ensure effective coordination among the various implementing agencies, a Steering Committee will be established to represent the interests of the relevant Ministries of the National Government and the Governor of East Kalimantan. Other members of the Steering Committee will represent development partners and civil society. This high-level committee (Directorates-General) will be chaired by the MoEF. The World Bank and selected partner agencies will be given observer status. Steering Committee meetings will be held every 6 months to evaluate activities and progress. Technical coordination meetings, will be held as required. As noted above, accountability for program implementation, at least for the public agencies, is facilitated through the

national governance system, where district institutions are accountable to the province, and the province is accountable to the Center. It is important to note, however, that the ERP is not a top-down program. Program activities are largely based on policies and commitments that have come from the province and district levels. This includes East Kalimantan's GHG reduction commitments, the Governor's moratorium on issuing licenses in primary forests, district-level commitments to sustainable estate crop development, and ongoing sustainability efforts by the private sector. The ERP, places these efforts into the national REDD+ framework (which is based on national accounting and sub-national implementation) and provides performance-based incentives for successful implementation.

Comparative Cross-Case Analysis of Jakarta and East Kalimantan

SWOT Analysis of Jakarta's Carbon Trading Potential

The potential for carbon trading in Jakarta can be analyzed through a SWOT framework that highlights the city's strengths, weaknesses, opportunities, and threats, based on the Jakarta Climate Action Plan (CAP) 2021-2050 and relevant regulatory instruments. From the perspective of strengths, Jakarta possesses significant mitigation leverage in its key emitting sectors. The greenhouse gas inventory of 2016 reported a total of 53.6 $MtCO_2e$, with the largest contributions coming from stationary energy (79%) and transport (17%) (DKI Jakarta, 2021). Focusing on these two sectors provides the greatest potential for measurable reductions. Another major strength lies in the robust regulatory framework. The issuance of Governor Regulation No. 90/2021 on Low-Carbon Development and Climate Resilience as a derivative of Presidential Regulation No. 98/2021 on Carbon Economic Value ensures strong alignment between national and subnational climate policies. This framework is further reinforced by the establishment of a Climate Change Task Force, mandated to coordinate measurement, reporting, and verification (MRV) processes as well as multi-stakeholder participation (DKI Jakarta, 2021). At the institutional level, Jakarta has demonstrated consistent political commitment since 2017, when climate change was prioritized within regional development agendas and supported by cross-departmental working groups. Such stability provides a solid foundation for integrating carbon markets into the city's governance structure.

Jakarta also enjoys strong global recognition and partnerships. As a member of the C40 Cities network and a signatory to the Global Green New Deal, Jakarta has pledged to achieve carbon neutrality by 2050. These commitments enhance the city's international credibility, attract cooperation opportunities, and strengthen Indonesia's broader climate diplomacy. Furthermore, Jakarta's data-driven planning approach, which incorporates geospatial monitoring such as Night-time Light (NTL), Land Surface Temperature (LST), and CO pollution mapping, demonstrates a scientific basis for transparent and evidence-based implementation of carbon trading mechanisms (DKI Jakarta, 2021).

Despite these advantages, several weaknesses remain. One critical issue is the MRV system, which still faces challenges in integrating data and ensuring consistent reporting across agencies, particularly in the transport and building sectors (DKI Jakarta, 2021). Another weakness is the limited natural carbon sink capacity. The CAP explicitly acknowledges that vegetation absorption is far from sufficient to offset emissions, thereby requiring stronger reliance on renewable energy expansion and efficiency measures (DKI Jakarta, 2021). A further concern is legal ambiguity, as Law No. 32/2009 on Environmental Protection and Management does not explicitly regulate carbon market mechanisms, creating uncertainty for subnational implementation (Soeharso & Chaniago, 2025).

Opportunities for Jakarta's carbon market development are equally significant. The CAP sets out a clear agenda for decarbonization through transport electrification, including the target of 100% electrification of the TransJakarta fleet by 2030 and the continued expansion of MRT and LRT systems. In the energy sector, opportunities arise from the promotion of rooftop solar PV deployment in government and commercial buildings, coupled with the implementation of energy efficiency standards for new buildings (DKI Jakarta, 2021). Additionally, climate finance presents an enabling opportunity, as the CAP emphasizes the role of public private partnerships and access to multilateral funds in accelerating climate action and supporting low-carbon initiatives (DKI Jakarta, 2021).

Nevertheless, threats may undermine the effectiveness of carbon trading in Jakarta. A major concern is the risk of greenwashing, where corporate participation in carbon markets may be motivated more by reputational legitimacy than by genuine mitigation outcomes (Samasta, 2023). Moreover, Jakarta remains heavily dependent on the Java-Madura-Bali power grid, which continues to be dominated by coal-fired power plants, thereby limiting the effectiveness of local renewable energy initiatives (DKI Jakarta, 2021). Finally, the CAP highlights the challenge of institutional fragmentation, with overlapping mandates and weak inter-agency coordination posing real obstacles to effective governance of carbon market implementation (DKI Jakarta, 2021; Andrian et al., 2025).

In sum, the SWOT analysis demonstrates that Jakarta holds substantial structural strengths in terms of regulatory frameworks, political commitment, and global legitimacy. However, its effectiveness in carbon trading will depend on addressing weaknesses in MRV systems, overcoming limited carbon sink capacity, and ensuring greater legal clarity. At the same time, opportunities in transport, renewable energy, and climate finance must be maximized while carefully managing threats such as greenwashing, fossil fuel dependence, and institutional fragmentation. Only through consistent synergy between national regulations, local capacity, and international cooperation can Jakarta position itself as a pioneer of urban carbon trading in Indonesia.

SWOT Analysis of East Kalimantan's Carbon Trading Potential

The potential for the ER-PD program in East Kalimantan has a strong institutional foundation, as it falls within the jurisdictional approach framework recognised by the

FCPF. The provincial government has demonstrated strong commitment through sustainable land use policies, a moratorium on new permits in primary forests, and strengthening social forestry programs. Technical support from international partners, including facilitation of measurement, reporting, and verification (MRV) methodologies, strengthens the program's credibility in the eyes of donors and the carbon market.

Despite these advantages, the policy framework is in place, but implementation capacity at the local level remains limited. Challenges include inter-agency coordination, limited human resources for REDD+ technical matters, and limited consistent data on deforestation and forest degradation. Potential conflicts of interest, particularly between extractive-based economic targets (such as mining and plantations) and emission reduction targets, are also weaknesses that could hamper effectiveness.

The Opportunities of this program offers significant opportunities to access international climate finance through voluntary carbon markets and compliance mechanisms. Furthermore, the program's success could enhance Indonesia's reputation as a regional leader in climate diplomacy, while strengthening its position in international negotiations on REDD+ and climate finance. Domestically, the program also creates space for empowering local communities through equitable benefit-sharing schemes.

Nevertheless, external factors that could hinder implementation include the volatility of carbon prices in the global market and uncertainty about international policies related to REDD+ mechanisms. Locally, pressure from the expansion of oil palm plantations and coal mining in East Kalimantan has the potential to undermine emissions reduction success. Another threat is the potential for weak political sustainability if regional or central government priorities change.

CONCLUSION

Differences in approach, Jakarta, as a high-density urban center, prioritizes the energy and transportation sectors in its carbon trading scheme. Decarbonization targets in Jakarta focus on electrification of public transportation (TransJakarta, MRT, LRT), building energy efficiency, and the use of renewable energy such as rooftop solar panels. This approach reflects the typical challenges of urban areas: air pollution, congestion, and high energy consumption. In contrast, East Kalimantan prioritizes forestry and the energy transition. This region, home to extensive tropical forests, is a key location for REDD+ implementation. Through the Emission Reduction Payment Agreement (ERPA) with the World Bank, East Kalimantan receives results-based incentives for successfully reducing deforestation and forest degradation. Furthermore, the province has begun preparing a transition pathway to low-carbon energy by strengthening the role of the Regional Climate Change Council (DDPI) and enforcing a moratorium on primary forests and peatlands. Thus, the fundamental difference lies in sectoral orientation: Jakarta is driven by urban needs to manage energy-transportation emissions, while East Kalimantan relies on its ecological strengths in the forestry sector as a pillar of carbon trading.

Despite their different sectors, both regions rely on national regulations and the framework established by Presidential Regulation No. 98/2021 concerning the Economic Value of Carbon (NEK). Jakarta operationalizes this regulation through Gubernatorial Regulation No. 90/2021 and the establishment of a carbon task force, while East Kalimantan aligns regional policies with national REDD+ commitments and the ERPA instrument. Furthermore, both require international support, whether in the form of funding, technology transfer, or political legitimacy. Jakarta strengthens its position through global city networks such as the C40, while East Kalimantan accesses multilateral funding mechanisms from the World Bank and other development partners. These similarities emphasize that local carbon trading schemes cannot stand alone without a national legal framework and a connection to the global climate architecture.

Interlinkages with Indonesia's Climate Diplomacy, local actions in Jakarta and East Kalimantan strengthen the credibility of Indonesia's climate diplomacy in international forums. Jakarta, through its ambitious net-zero 2050 target, demonstrates that large cities in developing countries can serve as climate policy laboratories aligned with the global agenda. This enhances Indonesia's bargaining power as a representative of the Global South in climate negotiations. Meanwhile, East Kalimantan's success in reducing deforestation and securing international incentives (REDD+, ERPA) underscores Indonesia's commitment to balancing economic development with environmental conservation. This concrete evidence legitimizes Indonesia's climate diplomacy, which often emphasizes the principles of climate justice and common but differentiated responsibilities (CBDR). Thus, despite their differing sectoral contexts, the two complement each other in supporting the national climate diplomacy narrative: Jakarta represents urban innovation and energy modernization, while East Kalimantan emphasizes Indonesia's role as a strategic tropical forest nation in the global carbon market.

REFERENCES

Agustinus Prajaka Wahyu Baskara. (2023). Kerangka Hukum Bursa Karbon Di Indonesia: Perkembangan Terkini Dan Tantangan Ke Depan. *Mimbar Hukum*, *35*, 40–79. https://doi.org/10.22146/mh.v35i0.11396

Amul, G. G. H., & Shrestha, M. (2015). Cities and Climate Diplomacy in The Asia Pacific. *Nts) Studies, S. Rajaratnam School of International Studies (Rsis)*, *Clc*, 2–42.

Andrian, M., Harahap, R. N., Purnomo, M., & Brawijaya, U. (2025). Peran Perseroan sebagai Pelaku Usaha Perdagangan Karbon untuk Mitigasi Perubahan Iklim Mazhar. *Jurnal Locus*, *4*(8), 7627–7639.

Askandar, A., & Putro, U. S. (2025). Strategy to Achieve Indonesia's Nationally Determined Contribution Target by Developing a Sustainable Carbon Market. *European Journal of Business and Management Research*, *10*(1), 92–107. https://doi.org/10.24018/ejbmr.2025.10.1.2494

Blume, L. (2017). *City Climate Mitigation \&Diplomacy*. https://edepot.wur.nl/453343

Celios. (2023). *Kawasan Industri Hijau Kalimantan Utara Tercemar PLTU Batubara*.

C40 Knowledge Community. (2021). *How to advance your city's climate action through city diplomacy*. Retrieved September 1, 2025, from https://www.c40knowledgehub.org/s/article/How-to-advance-your-citys-climate-action-through-city-diplomacy?language=en_US

Chan, D. (2016). City Diplomacy and "Glocal" Governance: The Missing Link in Sustainable Development. Conference Paper for the International Conference on Sustainable Development, 2016, accessed on December 2, 2016, http://ic-sd.org/wp-content/uploads/sites/4/2016/06/ICSD_submission_Dan_Koon-hong_Chan_City_diplomacy.pdf

Dinas Lingkungan Hidup Provinsi DKI Jakarta. (2025). *Jakarta Pionir Penyelenggaraan Nilai Ekonomi Karbon di Indonesia*. Dinas Lingkungan Hidup Provinsi DKI Jakarta.

DKI Jakarta. (2021). *Jakarta Climate Action Plan 2021-2050: Towards Climate Resilience and Carbon Neutrality*. https://rendahemisi.jakarta.go.id/en/reports

Falkner, R. (2016). *The Paris Agreement and the new logic of international climate politics*. *5*(December 2015), 1107–1125.

Fischer, K., Dellas, E., Schreiber, F., Acuto, M., London, D., Taenzler, D., Carius, A. (2015). Urbanization and Climate Diplomacy: The Stake of Cities in Global Climate Governance. Climate Diplomacy Series. Berlin: Adelphi.

Firdaus, S. U., & Arkananta, F. N. S. (2024). Carbon Trading and Its Role in Shaping Indonesia's Environmental Resilience to Climate Change. *IOP Conference Series: Earth and Environmental Science, 1362*(1), 012005.

Forest Carbon Partnership Facility (FCPF). (2019, May). *Emission Reductions Program Document (ERPD): Indonesia* [PDF]. Retrieved September 1, 2025, from Forest Carbon Partnership Facility website: https://www.forestcarbonpartnership.org/system/files/documents/ERPD_Indonesia%20FINAL%20VERSION_MAY_2019.pdf

Goverment of Indonesia. (2021). Indonesia Long-Term Strategy for Low Carbon and Climate Resilience 2050. *Minister of Environment and Forestry*, 156.

Gubernur DKI Jakarta. (n.d.). *Keputusan Gubernur Daerah Khusus Ibukota Jakarta Nomor 28 Tahun 2025*.

Gubernur DKI Jakarta. (2021). *Peraturan Gubernur DKI Jakarta No 90 Tahun 2021 Tentang Rencana Pembangunan Rendah Karbon Daerah yang Berketahanan Iklim*. *2019*(93), 9–11.

Guides, I., & Diplomacy, C. (2024). *How to advance your climate action through city diplomacy*. *November*.

Haptari, V. D. (2022). Potensi Ekonomi di IKN Melalui Potensi Investasi di IKN. In *Bunga Rampai: Ibu Kota Negara (IKN)*. https://penerbitan.pknstan.ac.id/wp-content/uploads/2023/01/IKN-NUSANTARA.pdf

Hastuti, I. S. (2024). *Assessing Indonesia's Enhanced Nationally Determined Contributions (NDC) to The Paris Agreement: Identifying The Obstacles Indonesia has in Addressing Climate Change*. Atlantis Press SARL. https://doi.org/10.2991/978-2-38476-269-9_14

Husein, Z. A., Harahap, A. R., & Surya, R. Z. (2023). Analisa Potensi Carbon Trade Sebagai Sumber Pendapatan Daerah (Kasus: Kabupaten Indragiri Hilir). *Selodang Mayang: Jurnal Ilmiah Badan Perencanaan Pembangunan Daerah Kabupaten Indragiri Hilir*, *9*(3), 182–192. https://doi.org/10.47521/selodangmayang.v9i3.321

Karpowicz, D. A., Mohan, M., Al, S., & Meshal, R. (2024). *Proyek Pasar Karbon Berbasis Mangrove : 15 Pertimbangan untuk Melibatkan dan Mendukung Komunitas Lokal*. 1–17.

Karpowicz, D. A., Mohan, M., Watt, M. S., Montenegro, J. F., King, S. A. L., Selvam, P. P., Nithyanandan, M., Robyn, B., Ali, T., Abdullah, M. M., Doaemo, W., & Ewane, E. B. (2024). *Engaging and Supporting Local Communities*. 1–17.

Kebijakan, R., & Kompetisi, H. (2022). *Perdagangan dan Asuransi Karbon Biru Nusantara Pembangunan dan Sumber Daya Alam Pesisir Perlindungan Skema Perdagangan dan Asuransi Karbon Biru Nusantara*.

Kedeputian Bidang Transformasi Hijau dan Digital Otorita Ibu Kota Nusantara. (2023). *Cetak Biru Kota Cerdas Nusantara | CETAK BIRU KOTA CERDAS NUSANTARA*. 102.

Kern, K. & Alber, G. (2008). Governing climate change in cities: modes of urban climate governance in multi-level systems. Competitive Cities and Climate Change, 171.

Lee, T. (2014). Global cities and climate change: the translocal relations of environmental governance. Routledge.

Laković, D. (2025). *Climate change and city waterworks*. *December*, 163–170. https://doi.org/10.5937/pim25163l

Li, K., Luo, Z., Hong, L., Wen, J., & Fang, L. (2024). The role of China's carbon emission trading system in economic decarbonization: Evidence from Chinese prefecture-level cities. *Heliyon*, *10*(1), e23799. https://doi.org/10.1016/j.heliyon.2023.e23799

Lim, S. Il, Park, D. H., Lee, S. J., Han, S. S., & Choi, M. S. (2007). Reliability Enhancement Scheme for IEC61850 Based Substation Automation System. *Power Plants and Power Systems Control 2006*, 207–211. https://doi.org/10.1016/B978-008046620-0/50035-9

Lueng-langsa, S., Siregar, M., Cita, V., Tarigan, E., Mulyadi, M., Meliany, Y., & Iqbal, L. M. (2024). *Mahadi : Jurnal Hukum Indonesia Literasi Perdagangan Karbon di Masyarakat Pesisir Gampong*. *03*(02), 137–145.

Manasa, P., & Subodh, S. (2025). *Future Forward: Universalizing Climate Action to Bend the Curve of Climate Change for Global Sustainability*. United Nations Development Programme (UNDP). https://www.un.org/en/un-chronicle/future-forward-universalizing-climate-action-bend-curve-climate-change-global

Maulidina, S. Z., & Hapsari, R. D. (2025). *The Indonesian Journal of Social Studies INDONESIA ' S CLIMATE DIPLOMACY IN ADDRESSING*. *8*(1), 116–131.

Mawardi, M. I., Winanti, W. S., Sudinda, T. W., Amru, K., Saraswati, A. A., Sachoemar, S. I., Arifin, Z., & Alimin, A. (2023). Analysis of net-zero emission index for several areas in Indonesia using individual carbon footprint and land use covered. *IOP Conference Series: Earth and Environmental Science*, *1201*(1). https://doi.org/10.1088/1755-1315/1201/1/012058

Nikonovas, T., Spessa, A., Doerr, S. H., Clay, G. D., & Mezbahuddin, S. (2020). Near-complete loss of fire-resistant primary tropical forest cover in Sumatra and Kalimantan. *Communications Earth and Environment*, *1*(1), 1–8. https://doi.org/10.1038/s43247-020-00069-4

Nuntavorakarn, S. et al. (2014). The Survey and Assessment of the Appropriate Share of Climate Change Actions in Developing Country: the Case of Thailand. Healthy Public Policy Foundation. Nonthaburi, Thailand.

Nugroho, S. B., Dewi, R. G., Siagiaan, U. R., Fujino, J., Ishikawa, T., Hendrawan, I., Sevie, G. N., Sari, V. R., Warih, A., Fitratunisa, E. P., & Andraiani, S. (2021). Analysis the Long-term Impact of Low Carbon Transport Policy in Jakarta City. *Asian Research Policy*, *24*, 1–8.

Putra, J. J. H., Nabilla, & Jabanto, F. Y. (2021). Comparing "carbon tax" and "cap and trade" as mechanism to reduce emission in indonesia. *International Journal of Energy Economics and Policy*, *11*(5), 106–111. https://doi.org/10.32479/ijeep.11375

Putra, R. P., Saputri, C. H., Hadid, A. M., & Ghozali, W. (2023). *Rapor Karbon DKI Jakarta Menilik Milestone dan Evaluasi Penurunan Emisi Karbon dengan Integrasi Big Data Geospasial*. http://storymaps.arcgis.com/stories/75b1aff3c9f24fdbbeb8466617e56358

Rohmattullah, P. (2025). *KEBERLANJUTAN INDUSTRI Perubahan Iklim : Triple Planetary Crisis : Indonesia salah satu yang paling rentan terhadap dampak iklim*.

Rum, I. A., Tukker, A., Hoekstra, R., Koning, A. de, & Yusuf, A. A. (2024). Exploring carbon footprints and carbon intensities of Indonesian provinces in a domestic

and global context. *Frontiers in Environmental Science*, *12*(October), 1–15. https://doi.org/10.3389/fenvs.2024.1325089

Samasta, N. A. (2023). Pengaruh Perdagangan Karbon Terhadap Kondisi Ekologi di Indonesia. *Jurnal Biologi*, *1*(1), 8. https://doi.org/10.47134/biology.v1i1.1899

Santosa, M. A., Juwana, S. P. R., Lasrindy, K., Laidha, G. M., Makarim, H., Parahita, A. N., Binowo, G. G., Prasetya, J. H., & Harimuddin, J. D. P. (2023). Blue Carbon Ecosystem as Critical Natural Capital: Strengthening Blue Carbon Ecosyste Governance in Indonesia. *Indonesia Ocean Justice Initiative. Blue Carbon Ecosystem as Critical Natural Capital: Strengthening Blue Carbon Ecosystem Governance*, 1–194.

Schleussner, C. F., Rogelj, J., Schaeffer, M., Lissner, T., Licker, R., Fischer, E. M., Knutti, R., Levermann, A., Frieler, K., & Hare, W. (2016). Science and policy characteristics of the Paris Agreement temperature goal. *Nature Climate Change*, *6*(9), 827–835. https://doi.org/10.1038/nclimate3096

Siagian, A. W., & Arifin, A. H. (2022). Perlindungan Hutan Mangrove Melalui Valuasi Ekonomi Jasa Karbon Sebagai Upaya Pertambahan Pendapatan Negara. *Kajian*, *27*(2), 111–125.

Soeharso, S. Y., & Chaniago, J. (2025). *Recommendations For Carbon Economic Value Governance Regulation : A Normative Analysis Of Carbon Trading In Indonesia*. *14*(2), 205–212.

Suroso, D. S. A., Setiawan, B., Pradono, P., Iskandar, Z. S., & Hastari, M. A. (2022). Revisiting the role of international climate finance (ICF) towards achieving the nationally determined contribution (NDC) target: A case study of the Indonesian energy sector. *Environmental Science and Policy*, *131*, 188–195. https://doi.org/10.1016/j.envsci.2022.01.022

Surya, B., Suriani, S., Menne, F., Abubakar, H., Idris, M., Rasyidi, E. S., & Remmang, H. (2021). Community empowerment and utilization of renewable energy: Entrepreneurial perspective for community resilience based on sustainable management of slum settlements in Makassar city, Indonesia. *Sustainability (Switzerland)*, *13*(6), 1–37. https://doi.org/10.3390/su13063178

Tracker, C. A. (2024). *Indonesia Overall Rating Critically Insufficient*. https://climateactiontracker.org/countries/indonesia/

Toly, Noah. 2011. 'Cities, the environment and global governance: A political ecological perspective' in Mark Amen, Noah J. Toly, Patricia L. McCarney and Klaus Segbers (eds.) Cities and Global Governance: New Sites for International Relations. London: Ashgate

Ummul Firdaus, S., & Nanda Sava Arkananta, F. (2024). Carbon Trading and Its Role in Shaping Indonesia's Environmental Resilience to Climate Change. *IOP Conference Series: Earth and Environmental Science*, *1362*(1). https://doi.org/10.1088/1755-1315/1362/1/012005

Van der Pluijm, R., & Melissen, J. (2007). City diplomacy: the expanding role of cities in international politics. Netherlands Institute of International Relations' Clingendael'.

World Bank. (2022, November 8). Indonesia Receives First Payment for Reducing Emissions in East Kalimantan. https://www.worldbank.org/en/news/press-release/2022/11/08/indonesia-receives-first-payment-for-reducing-emissions-in-east-kalimantan?utm_source=chatgpt.com