

MUHAMMADIYAH'S POTENTIAL ROLE AS A NON-STATE ACTOR IN ADVANCING INDONESIA'S NET ZERO EMISSION 2060 AGENDA

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Abstract: Climate change has necessitated multi-stakeholder collaboration, where non-state actors play increasingly important roles. Indonesia is committed to achieving Net Zero Emission (NZE) by 2060, an ambitious target requiring participation from all stakeholders, including faith-based organisations. This research analyses Muhammadiyah's potential as a non-state actor in supporting Indonesia's NZE 2060 agenda through the lens of green diplomacy. The study employs a qualitative approach with library research methods, analysing policy documents, academic literature, and Muhammadiyah's official publications. This research argues that Indonesia's Net Zero Emission 2060 agenda cannot be optimally achieved without Muhammadiyah's involvement, as its strategic roles in social mobilisation, political advocacy, education and innovation, and ethical-theological leadership directly correspond to the four dimensions of green diplomacy analysed in this study. In the ASEAN regional context, Muhammadiyah potentially bridges state diplomacy with civil society, strengthening Indonesia's position in regional environmental cooperation. The study concludes that optimising Muhammadiyah's role requires systematic synergy with the government, institutional capacity building, and more structured integration into Indonesia's green diplomacy strategy. This research recommends establishing formal partnership mechanisms between the government and Muhammadiyah, along with enhanced participation of religious organisations in national and regional green policy formulation.

Keywords: Muhammadiyah, Net Zero Emission, Green Diplomacy, ASEAN.

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INTRODUCTION

Climate change has emerged as an existential challenge for many nations in the 21st century. Several profound impacts have been identified, including threats to ecological, economic, and social stability on a global scale. Rising global temperatures, increased frequency of hydrometeorological disasters, biodiversity crises, and sea-level rise constitute tangible manifestations of a systemic crisis demanding swift, comprehensive, and inclusive collective action. In addressing this crisis, international agreements such as the Paris Agreement have established ambitious targets to limit the average global temperature increase to well below 1.5°C to 2°C above pre-industrial levels. Achieving these targets is only feasible through robust

national commitments from each nation, subsequently translated into concrete actions across various sectors.

As a nation possessing one of the world's largest biodiversities, the fourth-largest population globally, and the largest economy in Southeast Asia, Indonesia holds a pivotal role in the global climate action landscape. Indonesia has formally declared its long-term strategic commitment to achieve Net Zero Emissions (NZE) by 2060. This commitment not only forms an integral component of national development policy but also serves as a cornerstone of Indonesia's Green Diplomacy. This green diplomacy functions as a foreign policy instrument aimed at attracting investment, facilitating technology transfer, and fostering international cooperation to support the transition to clean energy and sustainable development (Prasodjo, 2024, p. 2). The realisation of the 2060 NZE target would yield significant impacts, not only for Indonesia but also for the collective climate mitigation efforts within the Southeast Asian region.

Nevertheless, the pathway to NZE by 2060 is fraught with highly complex, multidimensional challenges. Data and reports from various sources reveal a gap between commitments and their implementation, while also outlining the scale of the issues at hand. The following Table 1 summarises critical data illustrating the principal challenges at national and regional levels, underscoring the urgency for engagement from all stakeholders.

Table 1: Critical Data on Climate Challenges and Transition Efforts in Indonesia and ASEAN

Aspect	Current Data & Conditions	Implications & Sources
Greenhouse Gas (GHG) Emissions in Indonesia	By 2030, Indonesia is committed to reducing emissions by 31.89% (unconditional) and 43.20% (conditional) against the business-as-usual scenario. The forestry and energy sectors are the largest contributors.	Achieving these targets requires a radical transformation in both sectors, including accelerated cessation of deforestation and transition from coal. (Various NDC Reports)
Dependence on Fossil Fuels	As of 2021, the national energy mix is still dominated by coal, oil, and gas. The contribution of New and Renewable Energy (NRE) remains far from the 23% target for 2025.	Transitioning to NRE requires substantial investment, estimated at up to USD 1,042 billion by 2060 (Prasodjo, 2024, p. 4).
Deforestation & Ecosystem Degradation	Indonesia is the fourth country with the greatest loss of primary tropical forest globally, after Brazil, Congo, and Bolivia (Cahyo & Dahliana, n.d., p. 3).	Deforestation not only releases carbon but also eliminates critical ecosystem buffer functions, exacerbating disaster vulnerability.
ASEAN Regional Vulnerability	Southeast Asia is among the regions most vulnerable to climate impacts, such as floods, sea-level rise, and crop failures, threatening the food and economic security of hundreds of millions of people (WRI Indonesia, n.d.).	Regional resilience heavily depends on the leadership and success of climate action by major countries such as Indonesia.

The data in Table 1 clearly demonstrates that achieving the 2060 NZE target is a crucial vision that cannot be entrusted to the government alone. A whole-of-society approach is essential, one that actively engages all components of the nation, including non-state actors such as the private sector, civil society organisations, local communities, and faith-based organisations (FBOs). FBOs, with their deep-rooted networks permeating to the grassroots level, moral authority, and ability to frame issues within spiritual values, possess a unique potential to serve as catalysts for social and behavioural change. They can function as policy communicators, drivers of public awareness, monitors of implementation, and even as partners in concrete conservation and energy transition actions.

Recent analyses of Indonesia's transition underline the same implementation gap from the supply and finance side. Studies of the power sector show that meeting the nationally determined contribution and the 2060 horizon requires long-term scenarios that combine renewable expansion with coal retirement (Kanugrahan & Hakam, 2023), while work on the forestry sector identifies the institutional and land-use obstacles to delivering the contribution in that sector (Wongkar, 2021). The Just Energy Transition Partnership has been examined as the principal international finance vehicle intended to close the investment gap on the road to 2060 (Hermawan & Prabhawati, 2024). These accounts support the reading of Table 1: the policy architecture exists, but delivery depends on actors beyond the central government.

Within the constellation of FBOs in Indonesia, Muhammadiyah emerges as an actor with highly relevant capacity and track record. As the largest modernist Islamic organisation, with an estimated membership exceeding 60 million and a network of charitable enterprises encompassing thousands of educational institutions, hundreds of hospitals, and various other social institutions, Muhammadiyah's influence is both structural and cultural. More importantly, Muhammadiyah has long internalised ecological insights into its identity and movements. This commitment is rooted in theological interpretation, as reflected in the *Pedoman Hidup Islami Warga Muhammadiyah* (PHIWM) formulated since 2000, which affirms humanity's responsibility as *khalifah* (stewards) to preserve environmental sustainability (Cahyo & Dahliana, n.d., p. 4).

This theological commitment has been translated into tangible institutional actions and social movements. The establishment of the *Majelis Lingkungan Hidup* (MLH - Environmental Council) in 2005 and the Muhammadiyah Disaster Management Center (MDMC) in 2007 serve as institutional evidence (Efendi & Swarga, 2024, p. 1). At the practical level, Muhammadiyah has launched various initiatives such as the *Kader Hijau Muhammadiyah* (KHM - Green Cadre) movement, the *Eco-Masjid* programme focusing on water, energy, and waste management in places of worship, and the *Sedekah Sampah* (Charity through Waste) campaign (Fiyani, 2025, p. 7; Hasna, 2025, p. 4). Muhammadiyah's environmental activism has also expanded into the digital realm, utilising social media for

massive campaigns such as during the commemoration of #Milad111Muhammadiyah with the theme "Ikhtiar Menyelamatkan Semesta" (Endeavour to Save the Universe) (Hasna, 2025, p. 6).

Muhammadiyah's role does not conclude with domestic mobilisation. The organisation has stepped into the arena of non-state diplomacy by convening the Global Forum for Climate Movement and actively building interfaith collaboration on climate issues (Muhammadiyah, 2023; Muhammadiyah, n.d.). Furthermore, Muhammadiyah is developing Fikih Energi Berkeadilan (Jurisprudence of Just Energy), an Islamic normative framework to promote a just and sustainable energy transition (Mosaic Indonesia, n.d.). These steps indicate that Muhammadiyah is not merely an object or executor of government policy but also possesses the potential to be a strategic partner and an active subject in shaping climate discourse, policy, and cooperation.

Therefore, there is an academic and practical urgency to systematically explore and analyse the strategic potential of Muhammadiyah as a non-state actor within the 2060 NZE agenda. This research stems from the question of how a religious organisation with a strong mass base, institutional infrastructure, and social capital like Muhammadiyah can have its role optimised to accelerate Indonesia's transition towards a net-zero emissions future. This potential encompasses two domains. First, as a reinforcement of domestic governance through education, advocacy, and community action. Second, as an element of soft power within Indonesia's green diplomacy, capable of enriching the narrative, expanding networks, and enhancing the credibility of Indonesia's commitments in the eyes of the world. Based on the aforementioned background, this research will address two primary questions:

"How can Muhammadiyah's role and potential strengthen the position and effectiveness of Indonesia's green diplomacy, particularly within the context of regional ASEAN environmental cooperation?"

Specifically, the objectives of this research are to analyse the capacity, track record, and strategic potential of Muhammadiyah as a non-state partner within the policy framework and implementation of NZE 2060. Furthermore, this research will examine the actual and potential contributions of Muhammadiyah to Indonesia's green diplomacy and identify opportunities for stronger synergy between state and non-state actors in achieving national and regional sustainable development targets.

LITERATURE REVIEW

Green Diplomacy As A Strategic Framework

In studies concerning international cooperation to address environmental challenges, the concept of green diplomacy has emerged as a strategic instrument. Iftime (2014) defines green diplomacy as a specialised form of classical diplomacy adapted to environmental issues, with the goal of harmonising the interests of the state, every individual, and the preservation

and sustainable development of the natural conditions of life (p. 117). This concept developed rapidly since the latter half of the 20th century, emphasising the role of expert discourse, more direct civic participation, and greater shared responsibility (Iftime, 2014, p. 118). Green diplomacy operates at various societal levels and serves as a primary instrument for international cooperation specifically in the ecological field (Iftime, 2014, p. 119).

The non-state dimension of that diplomacy has been theorised from two complementary directions. Work on the Paris Agreement framework argues that holding non-state actors accountable through normative links to the treaty system is what makes their pledges credible rather than merely declaratory (Streck, 2021), while studies of transnational non-state actors as public diplomacy agents show how such actors build understanding with foreign publics independently of state channels (Popkova, 2019). A multi-track account of a joint state and non-state nomination process further illustrates how state and non-state tracks can be combined in a single diplomatic outcome (Putro & Warsito, 2023). Together, these perspectives frame green diplomacy as a layered practice in which non-state credibility, public engagement, and formal negotiation interact.

The Capacity Of Non-State Actors In Diplomacy And Global Goals

Previous studies have increasingly recognised the crucial role of non-state actors, including faith-based organisations (FBOs), in global politics and diplomacy. The concept of public diplomacy expands diplomatic actors beyond governments to include non-governmental organisations, religious groups, and civil society engaged in building understanding and direct relationships with foreign publics (Melissen, 2005 in Adam & Surwandono, 2025, p. 473). Muhammadiyah, as the largest FBO in Indonesia, has demonstrated its capacity in this arena. Research by Husein et al. (2024) examines Muhammadiyah as a model FBO in global humanitarian engagement, which they term 'humanitarian diplomacy.' Using Minear and Smith's (2007) framework, this study identifies four dimensions of Muhammadiyah's activities: orchestration of presence, negotiation of access, mobilisation of advocacy, and oversight of programmatic assistance. Their findings indicate that Muhammadiyah's capacity in these four dimensions has shaped an effective cross-border humanitarian work model, affirming its position as an important non-traditional diplomatic actor.

Furthermore, Muhammadiyah's strategic contribution is not limited to crisis response but also extends to broader sustainable development agendas. In the Indonesian context, green diplomacy is practiced by the government to realise the 2060 Net Zero Emission (NZE) target, partly through building international partnerships for funding and clean technology transfer (Prasodjo, 2023 in Bijaksana et al., 2024, p. 5). A study by Nugroho et al. (2025) finds that Muhammadiyah plays a crucial role and has a strategic plan in various sectors supporting the SDGs, such as education, health, economy, and social services, and even plans to expand into new sectors. A VRIO analysis in that study concludes that Muhammadiyah possesses assets

and capabilities that provide sustainable competitive advantage, indicating it is an entity with solid managerial capacity and resources.

The wider literature on faith-based engagement supports reading that capacity as transferable beyond humanitarian work, while also warning against romanticising it. Partnerships between faith-based organisations and scientists have been presented as a practical route to advancing the Sustainable Development Goals where scientific expertise and community trust are combined (Boorse & Jablonski, 2024), and critical work on faith-based organisations distinguishes their humanitarian mission from a religious missionary agenda, a distinction that matters for their legitimacy as partners (Khafagy, 2020). In Indonesia specifically, a recent expert meeting on Green Islam documents deliberate efforts to ignite faith-led environmental action, placing Muhammadiyah's environmental turn within a broader national movement rather than treating it as an isolated initiative (Jannah, 2024).

The Role Of Indonesia And Muhammadiyah In Environmental Issues

Several studies have specifically mapped Indonesia's efforts and the potential of its domestic actors in environmental and climate issues. Research by Bijaksana, Ardian, and Wildan (2024) examines Indonesia's green diplomacy endeavours, analysing how domestic policies like the NZE target and Renewable Energy (EBT) development support Indonesia's position in international forums like the Paris Agreement (pp. 3-5). They highlight Indonesia's participation in partnerships such as the Just Energy Transition Partnership (JETP) and the Forest and Other Land Uses (FOLU) Net Sink 2030 programme as forms of tangible contribution (p. 6). At the regional level, Listianto's (2025) study delves into how Indonesia, during its ASEAN Chairmanship in 2023, leveraged its position to advance environmental diplomacy despite the meeting's main theme not explicitly targeting environmental issues. This research demonstrates that Indonesia successfully initiated and adopted various joint declarations and leaders' statements focusing on climate change, disaster resilience, electric vehicle ecosystem development, and regional environmental governance (pp. 41-43).

Meanwhile, research on Muhammadiyah's direct involvement in environmental and climate issues remains very limited. Existing studies focus more on humanitarian diplomacy in conflict contexts, such as Adam and Surwandono's (2025) work on Muhammadiyah's dilemma in assisting the Rohingya humanitarian crisis in Myanmar. This study reveals the organisation's strategies in facing social, political, and cultural barriers, as well as its dependence on government diplomatic channels to access conflict zones (pp. 477-479). The comparative analysis in this research also places Muhammadiyah's capacity in fundraising and accessing affected areas below that of international organisations like UNHCR and ICRC, which possess stronger global legitimacy and networks (pp. 480-481).

Gap In Previous Research

Based on the review above, the author identifies a clear research gap. The existing literature confirms Muhammadiyah's capacity as an effective non-state actor in humanitarian diplomacy and its contributions to various SDGs 2030 targets. Studies have also detailed Indonesia's strategies and roles, both nationally and as a regional leader, in advancing green diplomacy and climate agendas. However, no study has specifically investigated the potential, strategies, and actual role of Muhammadiyah as a FBO in advancing a highly technical and policy-based national agenda of Indonesia - namely the 2060 Net Zero Emission target - through a green diplomacy approach. Therefore, this research aims to fill this gap. The author will synthesise several key conceptual frameworks from previous studies:

1. The institutional capacity, operational networks, and humanitarian diplomacy model of Muhammadiyah as an FBO
2. The concepts of green diplomacy and environmental diplomacy as instruments for environmental policy advocacy and cooperation, as practiced by Indonesia
3. The strategic position of non-state actors in public diplomacy and regional governance.

This synthesis is necessary to analyse how Muhammadiyah's social capital, grassroots and international networks, and operational capacity can be transferred and optimised to support Indonesia's energy transition and climate action. This analysis will also explore how Muhammadiyah can serve as a strategic partner strengthening Indonesia's environmental diplomacy at regional and global levels, while simultaneously advocating for and implementing sustainable development principles at the community level.

The mosque-based strand of that transfer is already visible in the Indonesian literature. The Istiqlal Mosque's Green Mosque programme has been studied as a case of a religious institution acting as a global sustainability champion (Farabi & Fatharini, 2025), and a study of the Az-Zikra mosque traces a transformation from an eco-mosque into a wider eco-social institution (Suwendi & Abror, 2024). Critical reflection on Green Islam and public policy in Indonesia cautions that religious environmentalism gains policy traction only when it is institutionalised rather than left at the level of slogans (Wijsen, 2025). Those findings give the Eco-Masjid discussion in the analysis below a comparative Indonesian reference point.

THEORETICAL FRAMEWORK: GREEN DIPLOMACY AND THE ROLE OF NON-STATE ACTORS IN INDONESIA'S NZE 2060 AGENDA

Green Diplomacy Theory

Green diplomacy represents an approach in international relations and global cooperation that places environmental issues as an integral component of politics, economics, and society (Iftime, 2014). Unlike traditional state-centric diplomacy, green diplomacy acknowledges that environmental problems like climate change are cross-border in nature and require multi-sectoral collaboration. Its primary focus includes nature protection, biodiversity

conservation, sustainable energy transition, and the achievement of global commitments such as greenhouse gas emission reduction (Ioan, 2013).

In contemporary developments, the practice of green diplomacy is no longer the exclusive domain of states. Non-state actors, including civil society organisations, religious institutions, and educational bodies, have emerged as significant driving forces. They engage in policy advocacy, norm-building, and public mobilisation for climate action (Dela Cruz et al., 2023). This concept is relevant for analysing Indonesia's Net Zero Emission (NZE) 2060 agenda because the success of this agenda depends not only on the government's technocratic policies but also on the acceptance, participation, and constructive pressure from all societal elements. Green diplomacy provides a framework for understanding how non-state actors can bridge state policy with grassroots implementation.

The theological grounding for that bridging role is developed in the Islamic environmental ethics literature. A cultural framework for sustainable resource management treats Islamic environmental ethics as a basis for stewardship that links belief, behaviour, and resource use (Basri et al., 2024), and a contemporary restatement of Islamic environmental ethics examines how moral status and responsibility are assigned within that tradition (Mohamed, 2025). Those accounts support the framework's claim that a faith-based organisation can translate technical climate targets into a moral vocabulary that its members already inhabit, rather than importing an external rationale.

Green Diplomacy And The Strategic Position Of Non-State Actors

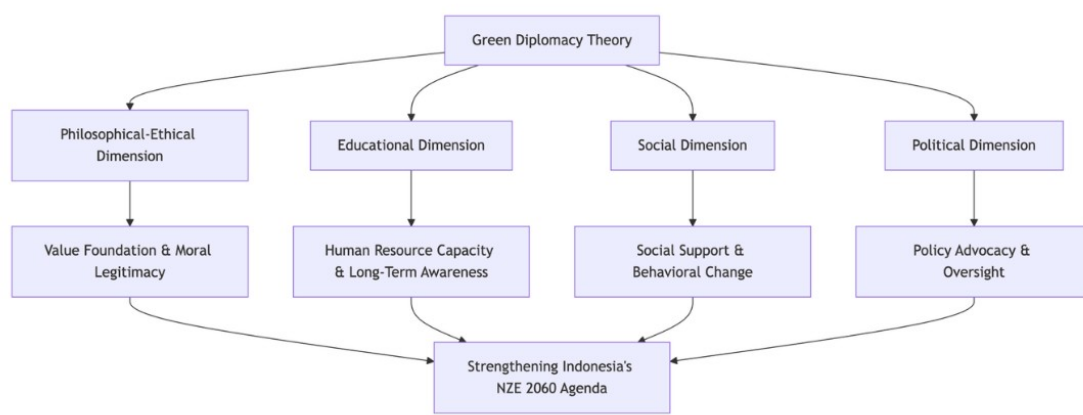
Green diplomacy theory underscores the central role of non-state actors in global environmental governance. They function as moral forces, agents of social change, and critical partners for governments. Religious organisations, in particular, hold a unique position due to their broad mass base, moral authority, established networks, and ability to frame environmental messages within ethical and religious value systems (Kim & Ali, 2016).

Muhammadiyah, as a progressive Islamic organisation with extensive networks in education, health, social, and economic fields, can be positioned as a strategic non-state actor within Indonesia's green diplomacy landscape. This organisation has the potential to translate the technical NZE 2060 agenda into a socio-religious movement that is comprehensible and actionable by the community. Through a green diplomacy approach, Muhammadiyah's role extends beyond being a project implementer to being a partner that builds social legitimacy, performs social control, and strengthens the value-based foundation for the government's green policies.

Four-Dimensional Analytical Framework: Mapping Muhammadiyah's Potential Contribution

According to the literature, the implementation of green diplomacy manifests across several levels. To analyse Muhammadiyah's potential, this study will focus on four interrelated dimensions (Ioan, 2013). These four dimensions are not isolated but form a mutually reinforcing ecosystem. The philosophical-ethical dimension provides a value foundation, the educational dimension builds capacity and awareness, the social dimension mobilises collective action, and the political dimension ensures policy sustainability. The dynamic relationship between these four dimensions can be visualised as an integrated system:

Diagram 1: Four Dimensions of Green Diplomacy and Their Implications for Muhammadiyah's Role



The diagram above illustrates how Muhammadiyah's contributions across each dimension will ultimately converge to strengthen the overall NZE 2060 agenda. To provide a more operational overview of the specific form of these contributions within each domain, the analysis proceeds by mapping the theoretical focus, practical applications, and their linkages to NZE targets in the following table:

Table 2: Analysis of Muhammadiyah's Potential Role in Each Dimension of Green Diplomacy

Dimension	Theoretical Focus of Green Diplomacy	Application and Potential Contribution of Muhammadiyah	Relevance to NZE 2060
Philosophical-Ethical	Building moral values, environmental ethics, and a worldview (weltanschauung) on human-nature relationships (Ioan, 2013).	Developing progressive ecological theology (eco-theology) and environmental jurisprudence (fiqh al-bi'ah). Framing environmental stewardship as an act of worship (khilafah) and intergenerational justice.	Provides a strong normative foundation and intrinsic motivation for NZE commitment, extending beyond mere regulatory compliance.
Educational	Transferring knowledge, building human resource capacity, and	Integrating climate science, renewable energy, and	Creates a pipeline of green talent and a climate-literate society,

	instilling sustainability values across generations (Ioan, 2013).	environmental ethics into curricula across thousands of schools and universities. Conducting climate literacy training for the broader public.	essential for the long-term sustainability of the energy transition.
Social	Mobilising communities, encouraging behavioural change, and fostering grassroots movements.	Mobilising members through councils, branches, and charitable enterprises for concrete actions: waste banks, energy gardens, plastic reduction campaigns, and energy efficiency in organisational facilities.	Builds critical mass and a supportive social ecosystem vital for translating national policies into community norms and practices.
Political	Conducting policy advocacy, engaging with decision-makers, and participating in governance forums (Dela Cruz et al., 2023).	Acting as a critical yet constructive government partner in climate policy formulation and evaluation. Utilising networks for social lobbying and amplifying public voices in national forums.	Enhances the accountability and quality of NZE policies. Support from a major mass organisation like Muhammadiyah can strengthen the political legitimacy of the agenda.

This four-dimensional framework demonstrates that Muhammadiyah's contributions can be holistic and multidisciplinary. From building a value-based foundation at the philosophical level to fostering collective action at the social level and influencing policy at the political level, Muhammadiyah possesses the tools and networks to engage across all fronts. Analysis through the lens of green diplomacy not only maps this potential but also highlights how these various levels of engagement are mutually reinforcing, creating a synergistic effect capable of accelerating Indonesia's journey towards NZE 2060.

The just-transition qualifier attached to that synergy deserves emphasis, because the energy transition is distributionally contested. A framework for assessing territorial just transition plans stresses that transition plans must be judged on how costs and benefits are shared across coal regions (Peretto et al., 2025), and legal analysis of coal phase-out shows that the sequencing of plant retirement, worker protection, and community investment is where just-transition commitments succeed or fail (Farah et al., 2023). Muhammadiyah's Fikih Energi Berkeadilan, examined in the analysis below, is the organisation's own attempt to supply a normative language for exactly that distributional question.

METHOD

This research is developed as a qualitative study focused on an in-depth exploration of the potential of a socio-religious organisation within the context of a national strategic issue. The

approach employed is library research with a descriptive-analytical character, which enables the researcher to delve into and comprehend the complexity of the social phenomenon under investigation. As explained in methodological literature, qualitative research is highly suitable for exploring the meaning and understanding of an issue from the perspective of participants or, in this case, from documents that represent the voice and position of the organisation in question (Creswell, 2009, pp. 22; 26). Consequently, this approach is selected to deconstruct the narratives, capacities, and opportunities held by Muhammadiyah within the constellation of green diplomacy and the national Net Zero Emission (NZE) agenda.

The data sources for this research are entirely derived from written materials, which are classified into two main categories. The first category encompasses secondary academic literature discussing key concepts such as Net Zero Emission, green diplomacy, and faith-based diplomacy. The review of this literature aims to establish a theoretical and contextual foundation, including understanding the dynamics of ASEAN regional cooperation in the environmental sector. The second category consists of official documents serving as primary and secondary sources. These documents include Muhammadiyah's policy archives, such as the outcomes of its National Congress (Muktamar), Leadership Council Meetings (Tanwir), and various official publications addressing environmental jurisprudence (fiqh), humanitarianism, and sustainable development. It also includes Indonesian government policy documents related to the NZE 2060 target and ASEAN strategic documents in the environmental sector.

The analysis process is conducted thematically on these texts. Data from various sources are collected, selected, and then categorised based on emerging themes. Through in-depth interpretation of these categories, the researcher seeks to identify patterns, substantive capacities, strategic opportunities, and to formulate arguments regarding Muhammadiyah's potential contributions. This method emphasises deep textual analysis to produce a rich and argumentative synthesis, without involving direct field data collection, thus ensuring all conclusions are built upon the analysis of documented discourse (Creswell, 2009, pp. 41-42; 56).

LIMITATIONS

This study is a documentary synthesis, and its conclusions must be read within that design. No fieldwork, interview, survey, or emissions measurement was undertaken, so nothing in this article demonstrates that any programme described here reduced emissions, changed behaviour at scale, or altered a diplomatic outcome; the findings are assessments of potential and of documented activity, not measured effects. No corpus size, search strategy, database list, date range, or inclusion and exclusion criteria are stated for the documentary sources, and no coding scheme is reported, so the selection of sources cannot be independently reproduced from the method as written. The four dimensions used as the analytical framework are qualitative themes rather than measured indicators: the article defines no

indicator set, no variable, and no measurement rubric for effective green diplomacy, so claims about correspondence between the organisation's roles and green diplomacy effectiveness remain interpretive.

Three further limits qualify the argument. First, although the introduction announces two primary questions, only one question is actually set out in the text; the conclusion therefore answers that single stated question, and no second question is supplied or assumed here. Second, the headline figures for the organisation's membership and for its number of higher education institutions are reproduced as reported in the source material, but no source is cited for them at the point of claim, so they should be treated as as-reported figures rather than independently verified counts. Third, one illustrative example in the analysis below attributes an environmental fatwa to a different national clerical body rather than to the organisation under study, so that example cannot be read as evidence of the organisation's own religious authority; it is retained as printed and flagged here so that readers do not mistake it for such evidence. The scenario labels in Table 3 are likewise reproduced as printed without definitions in the source text. These limits do not remove the value of the mapping exercise, but they bound what it can claim: a structured argument about strategic potential, not an evaluation of delivered impact.

RESULT AND DISCUSSION

National And Regional Policies On Net Zero Emission 2060

The achievement of Indonesia's Net Zero Emission (NZE) target by 2060 depends not only on domestic policy but also on a regional cooperation ecosystem. This section will outline the national policy map and the regional framework that constitute the strategic context for non-state actor engagement.

Table 3: Policy Map and Challenges of Indonesia's NZE 2060

Policy Aspect	Main Document/Pillar	Key Targets	Key Implementation Challenges
Global Commitment	Paris Agreement (Law No. 16/2016)	Limit global temperature rise to 1.5°C - 2°C.	Coherence and ambition of NDCs with long-term targets.
Long-Term Strategy	LTS-LCCR 2050, ENDC	NZE by 2060 or sooner; emission reduction of 31.89% (unconditional) and 43.20% (conditional) by 2030.	Gap between CPOS, TRNS, and LCCP scenarios; persistent investment need.
Energy Transition	PLN's Electricity Supply Business Plan (RUPTL) 2021-2030, National Energy Policy	>51.6% share of renewable energy in the electricity generation mix by 2030.	Continued reliance on coal-fired power plants (PLTU); technological and financing constraints for renewables.
Land-Based Emission Control	FoLU Net Sink 2030, Forest Moratorium	Forestry sector becomes a net carbon sink by	Ongoing deforestation; land-use conflicts; weak

Economic Instruments	Harmonized Tax Law (Carbon Tax), Presidential Regulation on Carbon Economic Value	2030. Introduce carbon price signals on emissions.	law enforcement. Sector readiness, economic burden risks, and carbon market effectiveness.
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Note: The scenario labels CPOS, TRNS, and LCCP in the Long-Term Strategy row are reproduced as printed; they are not defined in the source text.

The table above underscores that, although the policy framework for NZE 2060 is relatively comprehensive, a significant implementation gap persists. The primary challenges are structural, encompassing economic aspects (investment), governance (law enforcement), and social dimensions (public acceptance). This creates a critical space for non-state actors, such as community organisations, to serve as partners, mobilisers, and guardians of policy implementation.

ASEAN plays a crucial role as a facilitator for Indonesia's NZE agenda. Through the ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025, member states are committed to increasing the share of renewable energy to 23% by 2025. This cooperation materialises in initiatives like the ASEAN Power Grid for electricity grid connectivity and joint projects in solar, wind, and bioenergy. For Indonesia, participation in this regional forum is not solely about achieving domestic targets but also about positioning itself as a leader in the regional green energy transition, attracting investment, and accelerating technology transfer. The synergy between national policy and regional momentum will determine the pace of Indonesia's transition.

Regional energy cooperation in Southeast Asia reinforces that reading. ASEAN-EU energy cooperation has been studied as a channel for sharing best practice on renewable integration into regional grids (Indeo, 2019), and analysis of zero-carbon transition across ASEAN countries finds that carbon finance, carbon taxes, and sustainable energy technologies jointly condition the pace of transition (Chien et al., 2023). Work on whether energy transition matters for sustainable development in ASEAN reaches a similar conclusion from the development side (Mu'min et al., 2024), while comparative research on energy transition governance in ASEAN and the EU highlights data governance as an emerging constraint on regional coordination (Yu et al., 2025). The regional ecosystem is therefore best understood as an uneven but active set of cooperation channels, not as a single integrated market.

The Role Of Muhammadiyah As Non-State Actors In The Green Diplomacy Agenda For A Collaborative Ecosystem

Conventional policy approaches are deemed insufficient within the context of this research. Consequently, green diplomacy emerges as a diplomatic paradigm that integrates environmental issues into all layers of international relations and public policy. Modern green diplomacy does not view the state as the sole actor. This approach creates space for the

involvement of corporations, academics, NGOs, and especially faith-based organisations (FBOs). These non-state actors function as force multipliers: they expand the reach of policy socialisation, provide moral legitimacy, mobilise grassroots action, and serve as critical partners in policy evaluation. In the highly religious context of Indonesia, the role of FBOs becomes particularly central, as religion constitutes the most influential source of values and motivation for collective behaviour (Puglisi & Buitendag, 2022). Among various FBOs, Muhammadiyah offers unique strategic potential. This potential can be mapped through its substantial social capital and institutional capacity.

Table 4: Social Capital and Strategic Capacity of Muhammadiyah

Capacity Dimension	Description and Scope	Relevance to NZE 2060 Agenda
Mass Base & Network	Over 60 million members and sympathisers; thousands of mosques, schools, universities, hospitals, and orphanages across Indonesia.	Direct channels for communication and mobilisation that reach broad segments of society at the grassroots level.
Moral & Theological Authority	As a modernist Islamic organisation with recognised religious authority, capable of issuing fatwas and religious interpretations.	Can provide religious legitimacy to environmental policies, transforming technical issues into moral obligations (e.g., MUI's environmental fatwa).
Education & Research Capacity	Operates 172 higher education institutions and thousands of schools; hosts the Institute for Environment and Sustainable Development (LLHPB).	Centres for education, research, human resource development, and technological innovation to support the energy transition and the green economy.
International Network & Diplomacy	Member of various international Islamic forums; active in interfaith and cross-civilisational dialogue.	Can act as a track-two diplomacy actor, building global networks and solidarity for climate issues, and strengthening Indonesia's position in green diplomacy.

Note: The membership figure (over 60 million) and the higher education institution figure (172) in this table are reproduced as reported in the source text; no source is cited for them at the point of claim.

The mosque-based evidence gives concrete content to the social-capital mapping above. A study of the Az-Zikra mosque shows an eco-mosque evolving into a wider eco-social institution, with environmental management embedded in congregational life (Suwendu & Abror, 2024), and the Istiqlal Mosque's Green Mosque programme has been presented as a religious institution acting as a sustainability champion with transferable practices (Farabi & Fatharini, 2025). Those cases suggest that the Eco-Masjid model discussed below is not a hypothetical format: comparable Indonesian mosque programmes already combine water, energy, and waste management with religious education, even though their emissions effects have not been measured in the studies cited.

Opportunities And Potential Of Muhammadiyah In Supporting The Implementation Of Net Zero Emission 2060

Leveraging its substantial strategic capital encompassing a mass base of over 60 million, a nationwide network of institutions, and recognised moral authority Muhammadiyah is uniquely positioned to contribute to Indonesia's Net Zero Emission (NZE) 2060 agenda across multiple, interdependent domains. Its potential can be systematically examined through a framework of four reinforcing levels of intervention: social, political, educational, and philosophical. These levels are not isolated but form a synergistic system: philosophical foundations motivate action, education builds capacity, social mobilisation creates scale, and political advocacy ensures supportive governance. The table below synthesises Muhammadiyah's specific potential actions and their contributions to the NZE 2060 agenda within this framework.

Table 5. Multidimensional Opportunities for Muhammadiyah in Supporting NZE 2060

Level of Intervention	Muhammadiyah's Potential Actions	Direct Relevance & Contribution to NZE 2060 Agenda
Social	<ul style="list-style-type: none"> • Implementing and scaling the "EcoMasjid" programme for sustainable mosque management (Purwanto et al., 2024). • Launching coordinated digital awareness campaigns (e.g., #Milad111Muhammadiyah) to shape public discourse (Hasna, 2025). 	Fosters community-level behavioural change and creates a supportive social ecosystem essential for adopting low-carbon lifestyles and technologies. Builds public mandate for green policies.
Political	<ul style="list-style-type: none"> • Developing and deploying "Fiqh of Just Energy" as a normative framework for policy advocacy (Mosaic Indonesia, n.d.). • Facilitating multi-stakeholder policy dialogues between government, business, and communities. 	Enhances policy quality and equity, ensuring a just transition. Strengthens political legitimacy and accountability of NZE policies through critical yet constructive partnership.
Educational	<ul style="list-style-type: none"> • Integrating climate and sustainability into curricula across its educational network. • Developing university-based research hubs for green technology. • Providing vocational training in green skills (solar installation, waste management). 	Builds the essential long-term human resource pipeline (green talent). Drives innovation and technological diffusion. Ensures community capacity for implementation and adaptation.
Philosophical	<ul style="list-style-type: none"> • Theologically reaffirming khilafah as environmental stewardship. • Issuing religious edicts (fatwas) on specific environmental obligations. • Promoting the concept of nature as ayat kauniyah (divine signs) (Efendi & Swarga, 2024). 	Provides a deep, intrinsic motivational framework beyond regulation. Offers religious legitimacy, transforming environmental action into an ethical and spiritual imperative for millions.

By activating its strategic capital across this integrated framework, Muhammadiyah can transition from a peripheral supporter to a central pillar in Indonesia's collective journey toward a net-zero future. The organisation's multi-domain engagement ensures that the NZE agenda is not only a governmental policy but also a deeply rooted socio-religious movement.

That transition still depends on the energy-system choices mapped in Table 3. Long-term power-sector scenarios for Indonesia show that the 2060 horizon is reachable only with a decisive shift in the generation mix, including a role for low-carbon baseload options alongside renewables (Permana et al., 2022), and carbon trading has been examined as a decarbonisation instrument supporting the enhanced nationally determined contribution (Hadi & Shalmont, 2025). Those system-level findings do not change the social-capital argument, but they set its boundary: mobilisation and legitimacy can accelerate adoption, while the pace of plant retirement and grid investment remains governed by finance and technology decisions outside any single organisation's control.

Muhammadiyah's Contribution To Green Diplomacy And ASEAN Regional Cooperation

Muhammadiyah's role and influence are not confined to Indonesia's domestic sphere; its global vision and extensive networks position it as a significant non-state actor capable of bolstering Indonesia's regional standing through green diplomacy. As an organisation with active participation in international Islamic forums and a history of interfaith engagement, Muhammadiyah can effectively translate its domestic environmental initiatives into instruments of regional soft power and cooperative action (Muhammadiyah, 2023; Muhammadiyah, n.d.). This potential manifests primarily through two interconnected avenues: building people-to-people diplomacy networks and strengthening ASEAN cooperation through non-governmental channels.

A primary contribution lies in fostering People-to-People Diplomacy Networks. By leveraging its affiliations with global bodies such as the World Muslim League, Muhammadiyah can cultivate strategic alliances focused on climate issues across the Muslim world and beyond. This network facilitates the cross-border exchange of community-driven best practices. For instance, the successful "EcoMasjid" model in Indonesia - which integrates water and energy conservation, waste management, and ecological awareness into mosque activities - can be shared and adapted with similar faith-based environmental initiatives in Malaysia, Singapore, or Thailand (Purwanto et al., 2024). Furthermore, Muhammadiyah's established platforms for interfaith dialogue can be deliberately steered towards the ecological crisis, building a unique form of multi-religious solidarity within ASEAN. This collective moral voice from diverse faith communities can generate substantial social pressure and foster a shared regional commitment to climate action, operating in parallel to formal state-led processes.

Concurrently, Muhammadiyah can Strengthen ASEAN Cooperation through Non-Governmental Channels by actualising its potential in several concrete forms. The organisation's vast educational infrastructure, comprising 172 higher education institutions, provides a foundation for cross-border academic collaboration. This could include establishing twinning programmes, facilitating student and faculty exchanges, and launching joint research initiatives with universities across ASEAN, with a focused agenda on sustainability studies, renewable energy technologies, and climate adaptation strategies. Beyond academia, Muhammadiyah's representative capacity allows it to function as a credible voice for Indonesian civil society in regional policy dialogues. Through its networks, it can advocate for more ambitious, equitable, and culturally-attuned climate policies within ASEAN forums, ensuring that grassroots perspectives and ethical considerations inform regional governance (Listianto, 2025). Crucially, Muhammadiyah can champion an "Indonesian model" of environmental stewardship that synergises religious values with concrete action. Promoting proven programmes like EcoMasjid and religious edicts (fatwas) on environmental protection as best practices enhances Indonesia's soft power, presenting it as a leader in innovative, culturally-grounded approaches to sustainable development.

This analysis affirms that Indonesia's ambitious NZE 2060 target necessitates a collaborative ecosystem where state and non-state actors engage as equal partners, a core tenet of modern green diplomacy. Within this ecosystem, Muhammadiyah emerges as an entity with multidimensional strategic value. It operates simultaneously as an agent of social change, mobilising its mass base towards low-carbon lifestyles; a partner in political advocacy, offering ethical frameworks like the Fiqh of Just Energy for policy dialogue; an institution of education and innovation, building critical human capital and driving research; and a moral and philosophical authority, providing deep theological legitimacy for the environmental movement (Mosaic Indonesia, n.d.; Efendi & Swarga, 2024). These mutually reinforcing roles not only fortify the domestic pillars of the NZE agenda but also significantly enrich Indonesia's green diplomacy portfolio. By strategically engaging Muhammadiyah as a partner, Indonesia can accelerate its domestic energy transition while solidifying its leadership in climate diplomacy within ASEAN, leveraging a distinctive form of socio-religious capital that is both influential and authentically Indonesian.

The regional promise of that portfolio should not be overstated. Research on how external delegations engage civil society organisations in climate diplomacy finds that such engagement is selective and shaped by the delegations' own priorities (Petri & Colli, 2025), and comparative work on ASEAN and EU energy transition governance points to coordination constraints that people-to-people networks alone do not resolve (Yu et al., 2025). The realistic claim is therefore narrower: Muhammadiyah can add a credible civil-society and faith-based channel to Indonesia's regional climate presence, complementing rather than substituting for state-led negotiation.

CONCLUSION

The research question set out in the introduction asks: how can Muhammadiyah's role and potential strengthen the position and effectiveness of Indonesia's green diplomacy, particularly within the context of regional ASEAN environmental cooperation? The answer developed in this article is that Muhammadiyah strengthens that position not through a single programme, but through the combination of its four dimensions: a theological-ethical language that legitimates climate action for its members, an educational network that builds climate literacy and green talent, a social base that can normalise low-carbon practices at community level, and a political advocacy role that offers the government a critical yet constructive partner. Regionally, the same combination translates into people-to-people networks, cross-border academic collaboration, and the sharing of community models such as EcoMasjid, which together present Indonesia's climate commitment as socially rooted rather than merely declaratory.

The imperative to achieve Indonesia's Net Zero Emissions (NZE) 2060 target requires robust engagement from all societal actors, including faith-based organisations. This research demonstrates that Muhammadiyah, with its extensive grassroots network of over 60 million members and thousands of educational, health, and social institutions, possesses substantial potential to accelerate Indonesia's NZE agenda. As evidenced by its establishment of the Environmental Council (MLH) in 2005, the Eco-Masjid programme for sustainable mosque management, the digital #Milad111Muhammadiyah climate campaign, and ongoing development of a Fiqh of Just Energy framework, Muhammadiyah has moved beyond rhetoric to tangible, value-driven environmental action.

These concrete initiatives illustrate how Muhammadiyah's involvement can significantly enhance Indonesia's green diplomacy. Domestically, it acts as a force multiplier by translating technical climate policies into ethical and religious imperatives, mobilising community action, building climate literacy through its educational system, and advocating for just transition policies. Regionally, Muhammadiyah's international networks and participation in forums such as the Global Forum for Climate Movement position it as a soft power asset, capable of strengthening Indonesia's leadership in ASEAN environmental cooperation through faith-based diplomacy, cross-border educational partnerships, and the sharing of community-based models like EcoMasjid.

To fully harness this potential, structured and formalised collaboration is essential. It is recommended that the Indonesian government establish a dedicated partnership framework with Muhammadiyah, integrating the organisation systematically into national and regional green policy design and diplomacy strategies. Concurrently, capacity-building support should be provided to strengthen Muhammadiyah's environmental governance, while its educational and research institutions should be further leveraged as centres for green innovation and talent development. Through this synergistic approach, Muhammadiyah can

evolve from a supportive actor into a core strategic partner, significantly bolstering both the domestic realisation and the international credibility of Indonesia's NZE 2060 commitment.

REFERENCES

- Adam, M. F. M., & Surwandono, S. (2025). Muhammadiyah's dilemma in assisting the Rohingya humanitarian crisis in Myanmar. *Society*, 13(1), 469-486.
<https://doi.org/10.33019/society.v13i1.765>
- Basri, S., Adnan, Y., & Widiastuty, L. (2024). Islamic environmental ethics: A cultural framework for sustainable resource management and global ecological stewardship. *Diversity: Disease Preventive of Research Integrity*, 5(2). <https://doi.org/10.24252/diversity.v5i2.52342>
- Bijaksana, M. R. R., Ardian, A., & Wildan, A. (2024). Sepak terjang diplomasi hijau Indonesia. ResearchGate.
- Boorse, D., & Jablonski, L. (2024). Strengthening partnerships for the Sustainable Development Goals: Engaging faith-based organisations and scientists. *Sustainable Earth Reviews*.
<https://doi.org/10.1186/s42055-024-00077-8>
- Cahyo, E. D., & Dahliana, Y. (n.d.). Tafsir ekologis Muhammadiyah: Peran Muhammadiyah dalam pengelolaan lingkungan hidup. *Jurnal Ilmu Quran dan Tafsir*, Universitas Muhammadiyah Surakarta.
- Chien, F., Vu, T. M., & Hien Phan, T. (2023). Zero-carbon energy transition in ASEAN countries: The role of carbon finance, carbon taxes, and sustainable energy technologies. *Renewable Energy*.
<https://doi.org/10.1016/j.renene.2023.04.116>
- Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). SAGE Publications.
- Dela Cruz, R. A., Liu, L. Z., & Valencia, S. C. (2023). Institutionalizing inclusive sustainability: The role of green diplomacy in advancing environmental governance between ASEAN and the EU. *Proceedings of IROFONIC 2023*, 385-392.
- Efendi, D., & Swarga, A. B. (2024). Green faith in action: Eco-theological insights from Muhammadiyah in contemporary Indonesia. *SSRN Electronic Journal*.
<https://doi.org/10.2139/ssrn.5186205>
- Farabi, N., & Fatharini, A. T. (2025). Religious institutions as global sustainability champions: Istiqlal Mosque's Green Mosque programme and the Sustainable Development Goals. *Studia Islamika*, 32(3). <https://doi.org/10.36712/sdi.v32i3.46647>
- Farah, P., Nahtigal, M., & Svec, M. (2023). Just energy transition: Legal challenges associated with coal phase out. *Proceedings of the ASIL Annual Meeting*. <https://doi.org/10.1017/amp.2023.69>
- Fiyani, I. N. R. (2025). Eco masjid Muhammadiyah: Implementasi ayat-ayat ekologis dalam merespons isu lingkungan berbasis masjid. *Prosiding Kolokium Nasional Ke-1 Hukum Ekonomi Syariah*, Universitas Muhammadiyah Purwokerto, 125-133.
- Hadi, K., & Shalmont, J. (2025). Indonesia's carbon trading as a decarbonization effort in achieving the Enhanced Nationally Determined Contribution (ENDC). *Pandecta Research Law Journal*, 20(1). <https://doi.org/10.15294/pandecta.v20i1.16181>
- Hasna, S. (2025). Aktivisme digital warganet Muhammadiyah dalam menyuarakan isu krisis iklim dan lingkungan pada tagar #Milad111Muhammadiyah. *Jurnal Riset Komunikasi*, 8(1), 153-170.
<https://doi.org/10.38194/jurkom.v8i1.1160>
- Hermawan, L., & Prabhawati, A. (2024). Implementasi Just Energy Transition Partnership Indonesia menuju Net Zero Emissions tahun 2060. *Jurnal Energi Baru dan Terbarukan*.
<https://doi.org/10.14710/jebt.2024.24161>

- Husein, R., Kurniawan, B. D., & Kurniawati, N. (2024). Humanitarian diplomacy in action: Examining Muhammadiyah as a model for faith-based organisational engagement. *Jurnal Hubungan Internasional*, 13(1). <https://doi.org/10.18196/jhi.v13i1.19673>
- Iftime, E. (2014). Green diplomacy - A new type of international cooperation (II). *Ecoforum Journal*, 3(2), 117-122.
- Indeo, F. (2019). ASEAN-EU energy cooperation: Sharing best practices to implement renewable energy sources in regional energy grids. *Global Energy Interconnection*. <https://doi.org/10.1016/j.gloei.2019.11.014>
- Ioan, S. (2013). Green diplomacy - The chance to mitigate the effects of the economic crisis in the context of sustainable development. *Procedia - Social and Behavioral Sciences*, 81, 224-228. <https://doi.org/10.1016/j.sbspro.2013.06.417>
- Jannah, A. (2024). Expert meeting on Green Islam: Igniting faith-led environmentalism action in Indonesia. *Studia Islamika*, 31(2). <https://doi.org/10.36712/sdi.v31i2.41149>
- Kanugrahan, S., & Hakam, D. (2023). Long-term scenarios of Indonesia power sector to achieve Nationally Determined Contribution (NDC) 2060. *Energies*, 16(12). <https://doi.org/10.3390/en16124719>
- Khafagy, R. (2020). Faith-based organisations: Humanitarian mission or religious missionary. *Journal of International Humanitarian Action*. <https://doi.org/10.1186/s41018-020-00080-6>
- Kim, R. E., & Ali, S. H. (2016). Green diplomacy: An opportunity for peace-building? *Environmental Policy and Law*, 46(1), 86-96.
- Listianto, K. S. (2025). Indonesia's chairmanship of ASEAN 2023: Advancing regional collaboration on environmental diplomacy. *Jurnal Studi Diplomasi dan Keamanan*, 17(1), 31-47.
- Mohamed, N. (2025). Towards a contemporary Islamic environmental ethics: The nature and moral status of animals. *Journal of Islamic Ethics*. <https://doi.org/10.1163/24685542-20250009>
- Mosaic Indonesia. (n.d.). Muhammadiyah and fikih for just energy. Retrieved from <https://mosaic-indonesia.com/en/muhammadiyah-and-fikih-for-just-energy>
- Muhammadiyah. (2023, August). Risalah Islam berkemajuan untuk krisis ekologi. Retrieved from <https://muhammadiyah.or.id/2023/08/risalah-islam-berkemajuan-untuk-krisis-ekologi/>
- Muhammadiyah. (2023, November). Sukses selenggarakan global forum for climate movement, Muhammadiyah bergerak selamatkan semesta. Retrieved from <https://muhammadiyah.or.id/2023/11/sukses-selenggarakan-global-forum-for-climate-movement-muhammadiyah-bergerak-selamatkan-semesta/>
- Muhammadiyah. (n.d.). Interfaith collaboration for a greener future: Addressing climate change together. Retrieved from <https://en.muhammadiyah.or.id/interfaith-collaboration-for-a-greener-future-addressing-climate-change-together/>
- Mu'min, M., Yaqin, M., & Anam, M. (2024). Does energy transition matter to sustainable development in ASEAN? *International Journal of Renewable Energy Development*. <https://doi.org/10.61435/ijred.2024.59544>
- Nugroho, T. T., Hardiansyah, E., & Krisnaningsih, D. (2025). The role and strategy of Islamic organisation (Muhammadiyah) in realizing sustainable development goals in Indonesia. *Jurnal Manajemen Indonesia*, 25(1), 101-115. <https://doi.org/10.25124/jmi.v25i1.8970>
- Peretto, M., Eichhammer, W., & Süsner, D. (2025). Just energy transition in coal regions: Innovative framework for assessing territorial just transition plans. *Renewable and Sustainable Energy Transition*. <https://doi.org/10.1016/j.rset.2024.100101>
- Permana, S., Trianti, N., & Rahmansyah, A. (2022). Nuclear energy contribution for Net Zero Emission and national energy mix 2060 in Indonesia. *Journal of Physics: Conference Series*, 2243. <https://doi.org/10.1088/1742-6596/2243/1/012066>

- Petri, F., & Colli, F. (2025). Partners for the climate? How and why EU Delegations engage with civil society organisations in climate diplomacy. *Journal of European Integration*.
<https://doi.org/10.1080/07036337.2025.2532423>
- Popkova, A. (2019). Transnational non-state actors as "alt agents" of public diplomacy: Putin's Russia versus Open Russia. *Place Branding and Public Diplomacy*.
<https://doi.org/10.1057/s41254-019-00126-6>
- Prasodjo, H. (2024). Green diplomacy as an effort by the Indonesian government in realizing Net Zero Emission (NZE) in the year 2060. In Robbie et al. (Eds.), *Environmental issues and social inclusion in a sustainable era* (pp. 184-189). CRC Press.
- Puglisi, A., & Buitendag, J. (2022). A faith-based environmental approach for people and the planet: Some inter-religious perspectives on our Earth-embeddedness. *HTS Teologiese Studies/Theological Studies*, 78(2), a7582. <https://doi.org/10.4102/hts.v78i2.7582>
- Purwanto, H., Imawan, F. A., & Reynold, W. (2024). The role of the "EcoMasjid" programme in Jakarta in the development of awareness of eco-friendly living culture. *Cities and Urban Development Journal*, 2(1), 1-12. <https://doi.org/10.7454/cudj.v2i1.1023>
- Putro, D., & Warsito, T. (2023). Multi-track diplomacy of the joint state actor and non-state actor proposed the Maros Pangkep Geopark to become a UNESCO Global Geopark. *Journal of Islamic World and Politics*, 7(2). <https://doi.org/10.18196/jiwp.v7i2.74>
- Streck, C. (2021). Strengthening the Paris Agreement by holding non-state actors accountable: Establishing normative links between transnational climate action and the UNFCCC. *Transnational Environmental Law*. <https://doi.org/10.1017/s2047102521000091>
- Suwendi, & Abror, M. (2024). Masjid Az-Zikra Sentul: Transformasi dari Eco-Masjid ke Eco-Sosial. *Jurnal Bimas Islam*, 17(2). <https://doi.org/10.37302/jbi.v17i2.1385>
- Wijsen, F. (2025). How green is Green Islam? Religious environmentalism and public policy in Indonesia. *Studia Islamika*, 32(3). <https://doi.org/10.36712/sdi.v32i3.46654>
- Wongkar, E. (2021). Achieving the Nationally Determined Contribution (NDC) in forestry sectors: Challenges for Indonesia. *IKAT: The Indonesian Journal of Southeast Asian Studies*, 5(1). <https://doi.org/10.22146/ikat.v5i1.64974>
- WRI Indonesia. (n.d.). Meningkatkan aksi iklim di ASEAN (Enhancing climate action in ASEAN). Retrieved from <https://wri-indonesia.org/id/inisiatif/enhancing-climate-action-asean>
- Yu, K., Sung, J., & Zhou, Y. (2025). Data governance in the geopolitics of energy transition: Comparing regional energy cooperation in ASEAN and the EU. *Politics and Governance*.
<https://doi.org/10.17645/pag.10429>