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FROM UNFCCC RULES TO DOMESTIC DELIVERY: AN INSTITUTIONAL ECONOMICS EXPLANATION OF INDONESIA'S COMMITMENT AND IMPLEMENTATION GAP IN EMISSION REDUCTION

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Abstract
This study examines how United Nations Framework Convention on Climate Change (UNFCCC) based climate governance shapes Indonesia's mitigation commitments and why the gap between commitment and implementation persists. Building on New Institutional Economics, Transaction Cost Economics, and polycentric governance, this paper applies a theoretically informed documentary analysis of UNFCCC rules, Indonesia's legal and regulatory instruments, energy transition documents, and climate finance reports. The findings show that the Paris Agreement influences domestic climate policy less through direct enforcement than through credibility producing mechanisms: transparency routines, Measurement, Reporting and Verification (MRV) and registry systems, coordination mandates, and finance governance. In Indonesia, the delivery gap is concentrated in three institutional domains: cross sector regulatory coherence, the implementability of clean energy transition within a fossil dominant energy structure, and the governance of climate finance. Evidence from energy and finance documents indicates that mitigation credibility is constrained not only by ambition, but by the capacity to translate targets into bankable projects, traceable investment flows, and enforceable implementation routines. Its policy implication is direct: Indonesia's mitigation credibility depends on regulatory harmonization, implementable renewable energy deployment, stronger climate finance governance, and subnational MRV that links transparency with delivery discipline.
Keywords: Climate finance; Climate governance; Implementation gap; Institutional economics; Paris Agreement

Abstrak
Studi ini meneliti bagaimana tata kelola iklim berbasis *United Nations Framework Convention on Climate Change* (UNFCCC) membentuk komitmen mitigasi Indonesia dan mengapa kesenjangan antara komitmen dan implementasi tetap ada. Dengan berlandaskan *New Institutional Economics, Transaction Cost Economics,* dan tata kelola polisentris, makalah ini menerapkan analisis dokumenter yang berlandaskan teori terhadap aturan UNFCCC, instrumen hukum dan regulasi Indonesia, dokumen transisi energi, dan laporan keuangan iklim. Temuan menunjukkan bahwa Perjanjian Paris memengaruhi kebijakan iklim domestik lebih sedikit melalui penegakan langsung dibandingkan melalui mekanisme yang menghasilkan kredibilitas: rutinitas transparansi, *Measurement, Reporting and Verification* (MRV) dan sistem registrasi, mandat koordinasi, dan tata kelola keuangan. Di Indonesia, kesenjangan implementasi terkonsentrasi pada tiga domain kelembagaan: koherensi regulasi lintas sektor, kemampuan implementasi transisi energi bersih dalam struktur energi yang didominasi fosil, dan tata kelola keuangan iklim. Bukti dari dokumen energi dan keuangan menunjukkan bahwa kredibilitas mitigasi dibatasi tidak hanya oleh ambisi, tetapi juga oleh kapasitas untuk menerjemahkan target menjadi proyek yang layak dibiayai, aliran investasi yang dapat dilacak, dan rutinitas implementasi yang dapat ditegakkan. Implikasi kebijakannya langsung: kredibilitas mitigasi Indonesia bergantung pada harmonisasi regulasi, penerapan energi terbarukan yang dapat diimplementasikan, tata kelola keuangan iklim yang lebih kuat, dan MRV subnasional yang menghubungkan transparansi dengan disiplin pelaksanaan.
Kata kunci: Ekonomi kelembagaan; Kesenjangan implementasi; Pembiayaan iklim; Perjanjian Paris; Tata kelola iklim

INTRODUCTION

Climate change has moved beyond the register of environmental externalities and should be treated as a systemic macro risk that reshapes development trajectories, fiscal

resilience, and national competitiveness. The persistence of structurally high global fossil CO_2 emissions continues to erode the remaining carbon budget consistent with Paris temperature goals, sharpening the premium on credible mitigation commitments and delivery capacity rather than rhetorical ambition (Friedlingstein et al., 2025). In this setting, international climate governance is not merely a diplomatic arena; it is a rule setting architecture that seeks to translate collective objectives into nationally implemented policies with measurable outcomes, an architecture whose effectiveness is conditional on domestic institutions.

The United Nations Framework Convention on Climate Change (UNFCCC) established the foundational logic of collective action through common objectives, differentiation principles, and reporting expectations (United Nations Framework Convention on Climate Change, 1992), later strengthened through the Kyoto Protocol and the Paris Agreement (United Nations Framework Convention on Climate Change, 2015). Paris institutionalized a "pledge and review" regime centered on Nationally Determined Contributions (NDCs), placing domestic politics and institutions at the core of climate action (Falkner, 2016). Rather than mandating uniform top-down targets, the regime relies on iterative cycles of national commitment setting underpinned by transparency, periodic review, and escalating ambition. The implication is both analytical and practical: the binding constraint is frequently not the absence of formal commitment, but the credibility of implementation, built through regulatory coherence, enforcement capability, and finance governance that can convert targets into bankable action.

Indonesia is a strategically revealing case for examining this global domestic transmission problem. As a large emerging economy with persistent development imperatives and energy security concerns, Indonesia faces a structural tension between growth-oriented policy coalitions and decarbonization requirements. The transition challenge is therefore not reducible to technology availability; it is institutional and political economic. Recent evidence from the energy transition literature underscores how investment incentives, policy design, and coal system lock ins can slow decarbonization even under pro transition scenarios, particularly in electricity planning and coal dependent development pathways (Shah et al., 2024). At the same time, scholarship on climate finance and transition governance emphasizes that delivery is not distribution neutral: procedural design, legitimacy, and the governance of finance shape who benefits, who bears costs, and whether policy instruments gain durable compliance (Anantharajah and Setyowati, 2022; Setyowati, 2021).

This paper uses Figure 1 as a motivating diagnostic to frame the credibility stakes of Indonesia's delivery problem under a globally monitored regime. Figure 1 compares long run annual CO_2 emissions from fossil fuels and industrial processes (excluding land use change) among major emitters using Our World in Data (2024). The figure reveals pronounced divergence in national pathways: some economies show peaking and partial declines while others continue to rise, illustrating that emissions trajectories respond to different combinations of development structure, energy systems, and policy capacity. Indonesia's upward trend positions it as an increasingly material actor in the global mitigation landscape, where credibility is assessed comparatively rather than in isolation. Crucially, the figure does not serve as descriptive ornamentation; it motivates the paper's institutional proposition that, under UNFCCC rules, the relevance of Indonesia's targets depends on whether domestic institutions can generate an eventual inflection in the emissions pathway through coordinated execution and finance enabled implementation, not commitment statements alone.

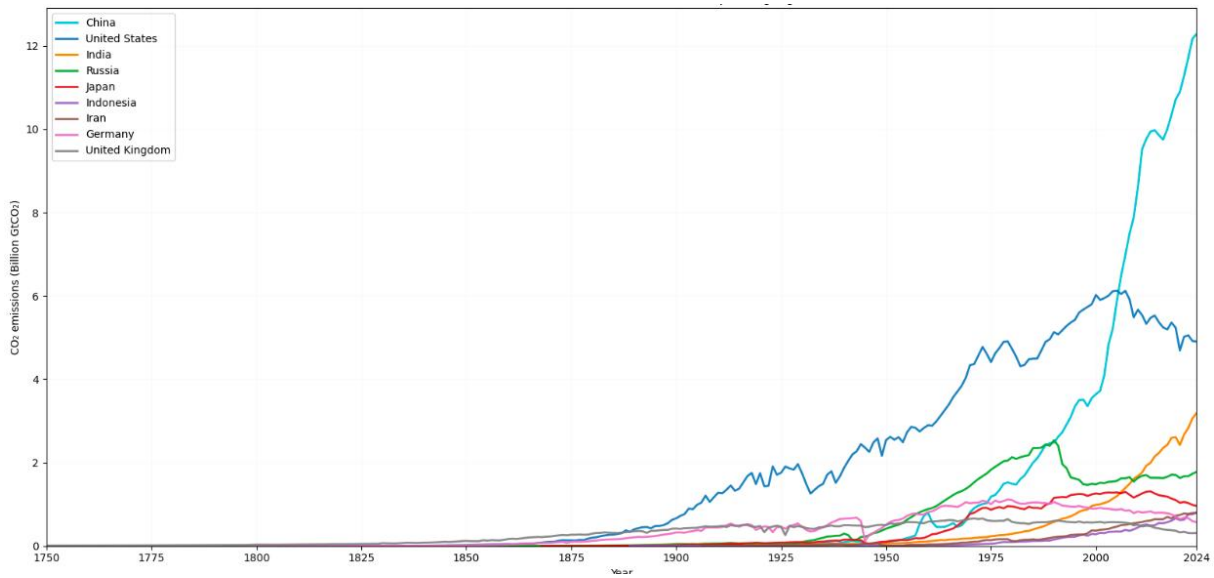

Figure 1. Annual CO2 Emissions Graph (Source: Our World in Data, 2024)

Note: CO_2 emissions refer to annual territorial emissions from fossil fuels and industrial processes, excluding land use change and trade embedded emissions. The figure is used as descriptive context, not for causal inference.

Despite a growing research base on Indonesia's climate and energy transition, an important gap remains. Existing studies often evaluate sector specific instruments (e.g., renewables deployment, grid constraints, coal retirement scenarios) or benchmark Indonesia's stated commitments against Paris aligned pathways. Fewer studies explicitly theorize and trace how the UNFCCC regime functions as an institutional driver that shapes domestic commitment formation and delivery (through coordination incentives, enforcement credibility, and the governance of mitigation finance) using an institutional economics lens. Institutional research suggests that implementation gaps often emerge not from policy absence but from uneven institutional strength and gradual modes of change that layer new objectives onto existing bureaucratic architectures, sometimes enhancing durability while limiting transformative capacity (Gerschewski, 2021; Levitsky and Murillo, 2009). This perspective is particularly relevant in climate governance settings where transparency routines can improve information quality, yet policy outcomes still hinge on authority, incentives, and credible enforcement.

This article addresses that gap by explaining Indonesia's commitment implementation gap as an institutional governance problem at the intersection of international rules and domestic delivery. It links (i) the Paris regime's pledge and review logic and transparency expectations, (ii) the domestic delivery architecture visible in Indonesia's energy transition instruments, and (iii) climate finance governance as a binding constraint. The analysis is anchored in verifiable delivery evidence drawn from authoritative documents: Indonesia's energy supply structure remains fossil dominant, with coal accounting for approximately 44.7% of the 2022 energy supply mix while renewables constitute about 9.58% (Institute for Essential Services Reform, 2023). In addition, climate finance tracking indicates a large-scale mismatch between needs and realized flows: meeting Indonesia's enhanced 2030 target requires climate aligned investment of roughly USD 285 billion, while tracked climate aligned investment totals USD 41.7 billion over 2015 2021 and government budget coverage is around USD 96.9 billion (~34%) (Climate Policy Initiative, 2023). These anchors allow the paper to specify where credibility breaks: in rule coherence, investment readiness, and finance governance, rather than relying on non verifiable secondary statistics.

The novelty of this study lies in integrating the global climate regime's "pledge and review" logic with a mechanism based institutional explanation of why domestic delivery can

lag behind commitment signaling in Indonesia. First, it identifies concrete institutional channels through which international expectations are domesticated, not as a linear compliance story, but as a coordination and credibility problem shaped by enforcement capacity and finance governance. Second, it couples regime logic with comparative emissions context (Figure 1) and delivery evidence (energy structure and finance mobilization gaps) to strengthen inferential credibility and reduce reliance on unverifiable claims. Third, it produces implementation relevant implications that are testable and policy actionable: aligning Measurement, Reporting and Verification (MRV) routines with budgeting and regulatory enforcement; strengthening cross sector coordination mandates; and designing finance governance instruments that reduce bankability bottlenecks and improve legitimacy in distributional terms, an area repeatedly emphasized in the climate finance justice literature (Anantharajah and Setyowati, 2022; Setyowati, 2021).

The remainder of the paper is structured as follows. Section 2 reviews the relevant literature and theoretical foundations. Section 3 describes the research method and data used in the analysis. Section 4 presents results and discussion on Indonesia's emissions trends and institutional commitment dynamics under UNFCCC related frameworks. Section 5 concludes with policy implications and recommendations.

LITERATURE REVIEW

UNFCCC and the Paris Agreement as a Global Institutional Architecture

The UNFCCC constitutes the core multilateral arena through which climate norms, reporting expectations, and cooperative mechanisms are negotiated and diffused across states. The Paris Agreement reconfigured this governance landscape by institutionalizing a predominantly bottom-up architecture in which Parties submit Nationally Determined Contributions (NDCs) and operate within a rules-based cycle of transparency, review, and periodic updating intended to strengthen ambition over time (Bodansky, 2016; Falkner, 2016). A large body of scholarship interprets this design as a pragmatic response to the political constraints of deep cooperation: rather than relying on centralized enforcement, coordination is sustained through iterative pledging, information disclosure, and reputational incentives that discipline credibility and enable incremental tightening of commitments (Hale, 2020; Keohane and Victor, 2016).

Within this architecture, the Paris Agreement's Enhanced Transparency Framework (ETF) should be treated not as a technical reporting annex but as an institutional technology of "governance by information" (United Nations Framework Convention on Climate Change, 2022) By specifying what information must be produced, how it will be reviewed, and how support is tracked, the ETF shapes what becomes legible to international audiences and domestic stakeholders and therefore conditions the credibility of commitments (Winkler et al., 2017). Recent transparency scholarship further suggests that capacity building for transparency is not politically neutral: it can steer the scope, granularity, and evaluative focus of national reporting systems, with implications for what forms of action become prioritized and governable (Konrad et al., 2022). Indonesia focused evidence reinforces this point by showing that climate transparency processes can strengthen the reflexive capacity of state actors (improving the ability to reorganize information routines and administrative practices) while mitigation outcomes remain constrained by broader political economy trade offs (Kamil et al., 2021). Collectively, these studies indicate that the Paris regime's effectiveness depends less on formal commitment language and more on whether transparency linked routines become embedded in domestic delivery systems.

In a pledge and review regime, international rules influence outcomes primarily through domestic credibility production: data routines, institutional coordination, and the governance of implementation support, rather than through direct supranational enforcement.

New Institutional Economics: How Global Rules Translate into Domestic Commitment

New Institutional Economics (NIE) emphasizes that institutions (formal rules, enforcement arrangements, and informal norms) structure incentives, reduce uncertainty, and shape the feasibility of collective goals over time (Ménard, 2018; North, 1990). From this vantage point, the UNFCCC regime functions as an external institutional environment that can reconfigure domestic policy trajectories through at least three channels. First, norm diffusion shapes what counts as "appropriate" climate policy and acceptable evidence, thereby influencing how policy legitimacy is produced. Second, incentive reconfiguration operates through access to finance, technology cooperation, and reputational standing, which can shift domestic coalitions and bureaucratic priorities. Third, coordination constraints arise when shared transparency expectations and NDC cycles require harmonization of targets, reporting, and sectoral planning. Under NIE, Paris era commitments become meaningful only when they are internalized through implementable rules that reduce ambiguity for agencies and investors, thereby transforming "pledges" into predictable expectations.

However, NIE also stresses that institutional change is path dependent and mediated by domestic capacity. Similar global rule sets can therefore generate heterogeneous outcomes across countries depending on administrative capability, cross sector coordination, and enforcement credibility. For Indonesia, the NIE lens motivates an explicit focus on the institutional arrangements that translate international expectations into delivery conditions, especially those governing energy transition instruments, climate budgeting, and the credibility of inter ministerial coordination.

UNFCCC influence on mitigation performance operates through domestic institutional credibility (i.e., whether rules and incentives reduce uncertainty and align actor expectations) rather than through the mere existence of formal commitment statements.

Transaction Cost Economics: Coordination, Credibility, and Climate Finance Governance

Transaction Cost Economics (TCE) explains why coordination problems persist even when actors share broad objectives. Information asymmetries, fragmented authority, contracting complexity, and enforcement uncertainty raise the costs of collective action and make credible commitments difficult to sustain (Williamson, 1979, 1998). Climate governance is intrinsically transaction cost intensive because mitigation policies require coordination across multiple actors (ministries, SOEs, private investors, local governments) and credible monitoring of outcomes across long time horizons.

The UNFCCC regime can reduce transaction costs by standardizing information requirements (MRV/ETF), clarifying policy direction through NDC cycles, and providing reputational commitment devices that increase predictability for investors and implementing agencies (Keohane and Victor, 2016; Winkler et al., 2017). Yet TCE also predicts a common failure mode: reporting improvements do not automatically lower coordination and contracting friction when domestic governance remains fragmented. This is particularly visible in climate finance, where procedural compliance can coexist with weak substantive transformation. Evidence from Indonesia's sustainable finance governance shows high formal compliance by financial institutions (e.g., action plans and reporting), while interpretive variation over what constitutes "green" investment enables tokenism and uneven portfolio shifts (Setyowati, 2021). This pattern underscores a core TCE claim: credibility becomes procedural when oversight, definitions, and incentives are insufficiently binding.

The commitment implementation gap widens when domestic institutions fail to lower coordination and contracting frictions (especially in climate finance) because credibility becomes procedural rather than outcome producing.

Collective Action and Polycentric Governance: Why Multi Actor Alignment Matters

Climate mitigation is a collective action problem: benefits are diffuse and long term, while costs are often concentrated and immediate. Classic collective action theory implies that cooperative outcomes require mechanisms that align incentives, reduce free riding, and build trust (Olson, 1965). In climate governance, these mechanisms frequently emerge through polycentric arrangements (multiple centers of decision making operating at different scales) enabling experimentation, learning, and coalition building (Ostrom, 2010).

This is consistent with regime complex perspectives arguing that climate governance is not a single unified regime but a loosely coupled set of institutions and initiatives. Such a structure can support flexibility and incremental progress, but it also risks fragmentation without strong domestic coordination (Keohane and Victor, 2011). For Indonesia, this literature implies that UNFCCC influence should be evaluated not merely by the existence of formal commitments, but by the institutional capacity to coordinate polycentric actors across energy transition policy, climate budgeting, and climate finance governance, where misalignment can rapidly convert ambitious targets into implementation drift.

UNFCCC influence is most likely to translate into measurable delivery when domestic coordination mechanisms enable multi actor alignment, especially between central agencies, sector regulators, subnational governments, and finance institutions.

Analytical Framework and Research Questions

Building on NIE, TCE, and polycentric governance, this study develops an analytical framework to explain how UNFCCC governance is transmitted into domestic commitment signals and implementation conditions in Indonesia. Because the paper is designed as documentary analysis supported by descriptive emissions trends, it is guided by research questions and mechanism-based propositions rather than statistical hypothesis testing. Accordingly, the study addresses three research questions (RQ):

1. RQ1: How do UNFCCC rules and transparency expectations shape Indonesia's commitment signals and policy direction?
2. RQ2: Through which domestic governance channels (regulatory coherence, clean energy implementability, and climate finance governance) do the commitment implementation gap emerge?
3. RQ3: What institutional reforms and policy actions can strengthen credibility and delivery toward the 2030 NDC target and the long run net zero pathway?

To operationalize the framework, documentary evidence is synthesized across five analytical dimensions that structure coding and interpretation in the Results and Discussion section: (i) legal and regulatory foundations and inter agency coordination; (ii) clean energy transition targets, constraints, and implementation instruments; (iii) climate finance needs, realized flows, and governance arrangements; (iv) multi actor participation and subnational engagement; and (v) the national institutional architecture for cross sector coordination.

METHODS

Research Design and Analytical Logic

This study employs a qualitative, documentary analysis to examine how the UNFCCC regime shapes Indonesia's mitigation commitment signals and the domestic delivery conditions required to translate those commitments into implementation. Documentary analysis is appropriate for policy institutional research because it enables systematic interrogation of authoritative texts (treaties, rulebook provisions, NDC submissions, laws and regulations, and

institutional reports) through which commitments are articulated, operationalized, and monitored (Bowen, 2009). Rather than treating documents as passive records, the approach reads them as institutional artifacts that encode mandates, accountability structures, transparency routines, and financing logics that affect implementation credibility.

The analytical logic follows a mechanism-based interpretation aligned with the paper's theoretical framing. Specifically, the study uses New Institutional Economics (institutional credibility and rule internalization), Transaction Cost Economics (coordination and contracting frictions), and collective action/polycentric governance (multi actor alignment) as interpretive lenses to structure evidence and derive institutionally grounded explanations (Ménard, 2018; Ostrom, 2010; Williamson, 1979, 1998). This design is consistent with the Paris "pledge and review" architecture: international rules influence outcomes primarily through domestic credibility production (data routines, coordination arrangements, and governance of implementation support) rather than through direct supranational enforcement (Falkner, 2016; Keohane and Victor, 2016; Winkler et al., 2017).

Unit of Analysis, Scope, and Period Coverage

The unit of analysis is Indonesia's mitigation commitment under UNFCCC related governance, operationalized through two linked components: (a) formal commitment instruments (NDC targets and updates, transparency related commitments), and (b) domestic delivery signals and constraints emphasized in this paper: regulatory coherence, clean energy implementability, and climate finance governance. The temporal scope is anchored in the period for which the study's descriptive emissions trend is presented (up to 2023) and the post Paris governance era in which ETF/MRV routines and domestic implementation instruments became increasingly salient (Kamil et al., 2021; Winkler et al., 2017).

Data Sources

This study relies exclusively on secondary sources, consistent with the paper's dataset and narrative analysis, consisting of two complementary streams:

1. Quantitative secondary dataset (descriptive support):
   Annual CO_2 emissions from fossil fuels and industry (excluding land use change) are used descriptively to contextualize Indonesia's trajectory relative to other major emitters. The emissions series is derived from widely used global datasets that draw on the Global Carbon Budget ecosystem (Friedlingstein et al., 2025) and is presented to motivate credibility stakes rather than to estimate causal effects.
2. Qualitative documentary sources (core evidence):
   The primary evidence base consists of authoritative and credible institutional documents relevant to UNFCCC governance and Indonesia's domestic delivery architecture: (i) UNFCCC texts and transparency guidance; (ii) Indonesia's commitment instruments and domestic legal foundations (e.g., Paris ratification law and sector regulations); and (iii) national and reputable institutional reports used to trace delivery constraints in energy transition and climate finance. These sources are analyzed to identify how international obligations and expectations are translated into domestic commitments, mandates, coordination routines, and financing arrangements.

Because finance indicators are frequently contested in scope and definition, each quantitative figure reported in this study is treated as a traceable documentary claim rather than an independently estimated statistic. Accordingly, all finance related numbers are sourced from identifiable institutional publications and are reported with their stated coverage period and measurement basis (e.g., whether they represent budget allocations, tracked climate aligned investment, or investment needs projections). This protocol reduces the risk of "floating numbers" and strengthens auditability, an important requirement for documentary analysis that aims to support policy relevant inference (Bowen, 2009; Hsieh and Shannon, 2005).

Document Corpus Construction and Inclusion Criteria

Documents were selected through purposive sampling guided by explicit inclusion criteria to preserve evidentiary quality and traceability (Bowen, 2009). Included documents had to meet three conditions: (1) authority (issued by official institutions or recognized international scientific bodies); (2) direct relevance to the research objective (UNFCCC rules and expectations, Indonesia's commitment instruments, and the three delivery domains); and (3) temporal consistency with the post Paris period and the emissions trend window discussed in the manuscript.

The corpus was structured to maximize traceability from global rules to domestic delivery mechanisms. Accordingly, the document set was organized into five analytical dimensions that parallel the paper's Results and Discussion: (i) legal and regulatory foundations and inter agency coordination; (ii) clean energy targets, constraints, and implementation instruments; (iii) climate finance needs, realized flows, and governance arrangements; (iv) multi actor participation and subnational engagement; and (v) national institutional architecture for cross sector coordination.

Coding Strategy and Analytical Procedure

The study applies directed qualitative content analysis, in which coding and interpretation are guided by prespecified theoretical constructs while allowing evidence based refinement of mechanism narratives (Elo and Kyngäs, 2008; Hsieh and Shannon, 2005). The procedure follows five steps:

1. Document familiarization and mapping.
   Key sections of UNFCCC governance texts and Indonesia related policy documents are read and mapped to identify commitment instruments, policy objectives, implementation mandates, and transparency/finance routines.
2. Deductive codebook development.
   A theory informed codebook is specified ex ante from NIE, TCE, and collective action/polycentric governance, organized into four code families:
   a. Commitment signals: targets, scope, update cycles, stated ambition;
   b. Institutional mechanisms: mandates, coordination arrangements, accountability, reporting routines;
   c. Transaction cost frictions: information asymmetries, fragmented authority, enforcement uncertainty, administrative burdens;
   d. Collective action dynamics: stakeholder incentives, burden sharing, participation structures, and coordination across levels.
3. Category based coding and synthesis.
   Document segments are coded into the above families and synthesized into the paper's three delivery domains: regulation, clean energy implementability, and climate finance governance. Mechanism memos are produced to capture how specific rule expectations (e.g., transparency requirements) are interpreted and institutionalized domestically.
4. Triangulation with descriptive emissions trends.
   Annual CO_2 emissions trends are used strictly as descriptive context to frame the credibility stakes of Indonesia's trajectory. They are not used for causal inference or econometric estimation.
5. Theory guided interpretation and inference.
   Findings are interpreted through the NIE TCE collective action lenses to explain how UNFCCC governance reshapes domestic commitments and why implementation constraints persist in specific domains.

Limitations

This research is designed to provide an institutional and documentary-based explanation rather than a causal econometric estimate. Accordingly, findings should be interpreted as mechanism-based inferences grounded in documentary evidence and descriptive emissions trends, not as quantified causal effects. The approach prioritizes traceability, coherence of interpretation, and plausibility of institutional mechanisms, appropriate for the study's objective to explain how UNFCCC governance influences domestic commitment structures and delivery constraints in Indonesia. A further limitation is that documentary evidence may reflect formal design more clearly than informal practices; however, this is addressed by triangulating across legal texts, regulatory instruments, and institutional reports that capture implementation conditions.

RESULTS AND DISCUSSIONS

UNFCCC as a Global Institutional Driver of Domestic Policy Direction

UNFCCC operates not only as a diplomatic arena but as a rule setting institutional architecture that reorganizes domestic expectations about credible climate action. Under the Paris Agreement's pledge and review logic, national performance becomes the binding locus of climate governance: targets are domestically determined, yet their credibility is continuously tested through transparency, periodic review, and expectations of progression (Bodansky, 2016; Falkner, 2016; Keohane and Victor, 2016). This architecture effectively positions the UNFCCC regime as a "meta institution" that standardizes what must be made legible (targets, inventories, policies, and support) and thereby creates structured pressure for domestic reforms in data systems, coordination routines, and financing arrangements *(Konrad* et al*., 2022; Winkler* et al*., 2017)*.

A central mechanism of this influence is the Enhanced Transparency Framework (ETF), which functions as governance by information: it shapes what states must report, how progress is assessed, and how implementation support is tracked, with downstream effects on domestic administrative routines and policy coherence *(Winkler* et al*., 2017)*. In practice, countries experience dual pressures. The first is normative, demonstrating ambition consistent with global expectations. The second is operational, building domestic systems capable of converting commitments into measurable outcomes. This duality is precisely where institutional capacity becomes decisive and where commitment implementation gaps tend to emerge, particularly in emerging economies confronting growth energy security trade offs (Hale, 2020; Keohane and Victor, 2016).

Indonesia's Domestic Legal Basis

Indonesia's domestic legal anchoring of the Paris Agreement is clear: Law No. 16/2016 formally ratifies the Paris Agreement and incorporates it as an integral part of national law. This legal basis is necessary but not sufficient (Republic of Indonesia, 2016). The credibility test under Paris is not whether ratification exists, but whether domestic rule coherence and coordination structures can translate obligations into delivery, particularly through interoperable data systems and enforceable MRV routines that reduce cross sector contradictions and implementation drift.

Consistent with this logic, domestic regulatory instruments increasingly encode "delivery infrastructure" rather than mere intent. For example, Indonesia's power sector carbon governance regulation defines SRN PPI as the national web-based system for mitigation, adaptation, and carbon economic value (NEK), an institutional signal that implementation credibility depends on registry integrity and data governance, not solely on declaratory targets. From an institutional perspective, this is an important transmission channel: the UNFCCC

emphasis on transparency and accountability is internalized through domestic systems that structure what can be monitored, compared, and audited.

Clean Energy Implementability: Evidence of Structural Constraints

The transition challenge in Indonesia is not only technical; it is institutional, because policy credibility is constrained by structural energy system realities and the governance capacity to alter them. The Indonesia Energy Transition Outlook (IETO) evidence indicates that Indonesia's total energy supply remains fossil dominant, with coal accounting for about 44.7% and renewables constituting only around 9.58% of the 2022 supply mix. This profile suggests that commitment credibility hinges on implementability: the ability to scale bankable renewable pipelines, align incentives, and reduce regulatory friction in procurement and grid readiness *(Shah* et al*., 2024)*.

Regulatory adjustments in renewables also illustrate how institutional design matters. Rooftop solar governance under Permen ESDM No. 2/2024 shifts toward managed scaling through policy adjustments (including quota provisions) indicating that implementation will depend on grid operator readiness, monitoring, and enforceability rather than on formal permission alone (Ministry of Energy and Resources, 2024). Similarly, Permen ESDM No. 12/2023 frames biomass co firing in CFPPs as a transitional instrument to support renewables targets and reduce emissions, while also emphasizing a local economic role in biomass supply (Ministry of Energy and Resources, 2023). Institutionally, these instruments can reduce transition frictions, but they also introduce credibility risks if bridging measures become substitutes for structural renewable capacity additions, making MRV safeguards, sustainability criteria, and time bound sequencing essential.

Taken together, the evidence aligns with the literature's core proposition: Paris style governance can discipline credibility through transparency, but delivery ultimately depends on domestic institutional arrangements that can reduce coordination costs and align incentives across regulators, state owned enterprises, private investors, and subnational actors (Keohane and Victor, 2011; Ostrom, 2010).

Climate Finance Governance as a Binding Constraint

Climate finance emerges as the binding constraint not because commitments are absent, but because mobilization and governance remain misaligned with the scale of transition needs. The CPI evidence states that meeting Indonesia's Enhanced NDC requires around USD 285 billion in climate aligned investment; government budget coverage is approximately USD 96.9 billion (about 34%); and climate aligned investment by public and private finance institutions totals USD 41.7 billion over 2015 2021, around 15% of the estimated need. These figures shift the interpretation of the implementation gap: the constraint is not merely fiscal space, but the institutional capacity to govern finance, through clear definitions, credible tagging and tracking, and incentive structures that convert policy intent into investable portfolios.

To avoid interpretive ambiguity, this study treats climate finance "delivery" not as nominal pledges but as the governance conditions that convert commitments into bankable pipelines and traceable flows, namely (i) allocative clarity (what counts as climate aligned investment), (ii) measurement integrity (MRV/registry interoperability), and (iii) accountability architecture (who authorizes, monitors, and verifies outcomes). Within this framing, the reported investment needs for 2018-2030 and the realized climate aligned investment figures should be read as governance diagnostics: they indicate a structural gap between required capital mobilization and the institutional capacity to originate, classify, and monitor climate aligned projects at scale. Where definitions and reporting incentives remain weakly binding, financial mobilization risks becoming procedural compliance rather than outcome producing portfolio shifts, thereby widening the commitment implementation gap even under a transparency centered regime *(Setyowati, 2021, 2023; Winkler* et al*., 2017)*.

This reading is consistent with the broader climate finance governance literature: when green definitions are contested and oversight is weak, compliance can become procedural (reports and plans) rather than transformational (portfolio reallocation and real economy decarbonization) (Setyowati, 2021, 2023). The institutional implication is direct: finance governance must be treated as a credibility infrastructure (integrated with MRV systems and aligned with energy transition pipelines) rather than as an administrative appendage to mitigation narratives.

Synthesis: From UNFCCC to Domestic Delivery Mechanisms and Implementation Gaps

To consolidate the findings and their actionable implications, Table 1 maps how UNFCCC governance is transmitted into Indonesia's domestic delivery conditions across regulation/MRV, clean energy implementability, and climate finance governance.

Table 1. From UNFCCC to Domestic Delivery: Evidence, Governance Mechanisms, and Policy Implications in Indonesia

Domain	Institutional aspect	Policy benchmark / target	Institutional gap (why it persists)	Policy implications / recommendations	Data & sources
Regulation & Law	Paris Agreement domestication	Legal basis for NDC cycles + transparency obligations	Legal ratification does not automatically create downstream regulatory coherence across energy land industry finance instruments	Build a cross sector legal harmonization track; clarify coordination mandate and assign enforceable MRV responsibilities	(Republic of Indonesia, 2016). Law No. 16/2016 on the ratification of the Paris Agreement.
National institutions	Registry, MRV, and governance architecture	Operational coordination for NDC 2030 / long run net zero: clear authority + MRV chain + registry linkage	Fragmentation risk persists when registry/MRV operates separately from sector planning and budgeting/finance governance	Establish a formal coordination architecture linking registry MRV budgeting and inter ministerial mandates	(Ministry of Energy and Mineral Resources, 2022). Regulation No. 16/2022 on the Implementation of Carbon Economic Value (NEK) in the Power Generation Subsector.
Clean energy transition	Energy system structure and transition credibility	Transition credibility depends on implementable pathways and policy consistency (deployment + grid + investment pipeline)	Policy ambition can outpace delivery when procurement certainty, risk allocation, and enabling regulations are not aligned	Recalibrate instruments: procurement certainty, tariff/risk allocation, grid readiness, and a "bankable" pipeline	(Institute for Essential Services Reform (IESR), 2024). Indonesia Energy Transition Outlook (IETO) 2024.
Clean energy transition	Rooftop solar governance	Reduce administrative barriers; improve governance of rooftop PV scaling	Implementation hinges on grid operator readiness, quota governance, and monitoring/enforcement consistency	Strengthen quota governance + transparency; link with MRV and public building programs	(Ministry of Energy and Mineral Resources, 2024). Regulation No. 2/2024 on Rooftop Solar PV (PLTS Atap)
Clean energy transition	Transitional measures	Transitional instrument to	Risk of "transition lock in" if co firing	Treat co firing as time bound bridging;	(Ministry of Energy and Mineral

Domain	Institutional aspect	Policy benchmark / target	Institutional gap (why it persists)	Policy implications / recommendations	Data & sources
	(biomass co firing)	support emissions reduction while leveraging existing CFPP assets	substitutes for structural RE additions; sustainability + MRV integrity are decisive	require MRV + sustainability safeguards; ensure parallel RE capacity acceleration	Resources, 2023). Regulation No. 12/2023 on biomass co firing in CFPPs.
Carbon/economic instruments	Carbon economic value (NEK) and market readiness	Operationalize carbon pricing/market mechanisms; integrity depends on MRV + registry	Market maturity depends on MRV integrity, compliance incentives, and coherent market design	Prioritize MRV + registry integrity; align NEK design with sectoral decarbonization roadmap	(Ministry of Energy and Mineral Resources, 2022). Regulation No. 16/2022 on the Implementation of Carbon Economic Value (NEK) in the Power Generation Subsector.
Climate finance (macro)	Mitigation financing needs (cost to achieve target)	Financing needs to achieve NDC; auditability requires each number anchored to a primary institutional publication	"Floating numbers" problem: different scopes (mitigation cost vs climate aligned investment) can be mixed without clear basis/period	Treat each figure as a traceable documentary claim; report scope, period, and measurement basis (budget vs tracked investment vs modeled need)	(Investor Relations Unit Republic of Indonesia of Bank Indonesia, 2024). Presentation Book Synergy and Policy Coordination to Maintain Stability and Revive Economic Growth Amidst Heightened Global Uncertainty.
Climate finance (financial sector)	Climate aligned investment needs and tracked flows	Climate aligned investment needed to meet Enhanced NDC; government budget coverage share; tracked FI flows	Misalignment between definitions/taxonomy and pipeline readiness; transition finance clarity remains a barrier	Strengthen taxonomy for "transition"; expand project preparation facility; improve disclosure comparability and tracking	(Climate Policy Initiative, 2023). Landscape of Climate Aligned Investment in Indonesia's Financial Sector.
Collective & multi actor action	LCDI mainstreaming and subnational delivery	Mainstream low carbon development into planning with multi actor delivery logic	Inclusion uneven because incentives, fiscal transfers, and local capacity differ	Introduce incentive compatible local delivery: fiscal incentives, capacity support, measurable subnational MRV	(Ministry of National Development Planning / Bappenas, 2019b). Low Carbon Development: A Paradigm Shift Towards a Green Economy in Indonesia
Green economy transformation	Sequencing, coherence, and implementation discipline	Coherence across energy industry land fiscal instruments; delivery requires sequencing and	Implementation gap is institutional: coordination + incentives + credible sequencing	Make sequencing explicit: quick wins + structural reforms + finance pipeline; integrate MRV into planning/budget cycles	(Ministry of National Development Planning / Bappenas, 2019a). 7 Project Profiles of Indonesia's Low Carbon

Domain	Institutional aspect	Policy benchmark / target	Institutional gap (why it persists)	Policy implications / recommendations	Data & sources
		institutional coordination			Development (Buku 7 Profil Project LCDI).
Circular economy (co benefits)	Circular economy as emissions growth co benefit strategy	Integrate CE into planning and MRV/budgeting to avoid "side agenda" status	CE can be siloed if not embedded into MRV, financing, and sectoral plans	Integrate CE indicators into MRV + budgeting; align CE interventions with energy and industrial transition instruments	(Ministry of National Development Planning / Bappenas, 2024). National Roadmap and Action Plan Circular Economy Indonesia 2025 2045.

Sources: Authors's compilation from several sources.
Note: The table synthesizes documentary evidence on how UNFCCC governance is translated into Indonesia's domestic delivery mechanisms. Finance figures follow the scope, period, and definitions of their original sources.

Policy Implications: Institutional Reform as the Binding Constraint

Overall, the results indicate that UNFCCC governance has contributed to structural shifts in Indonesia's climate policy direction by strengthening the credibility requirements attached to commitment signaling. Yet the feasibility of Indonesia's 2030 pathway is primarily determined by domestic institutional reforms that lower transaction costs and strengthen collective action capacity. Four implications follow.

First, regulatory harmonization across energy, environment, and fiscal instruments is required to reduce contradictory incentives and overlapping mandates. A Paris aligned credibility strategy requires enforceable coordination and a coherent MRV chain, not merely parallel to sector plans. Second, clean energy implementability must be treated as an institutional problem: scaling renewables requires predictable procurement and risk allocation, grid readiness governance, and time bound management of transitional instruments so that bridging does not become locked in. Third, climate finance governance must be strengthened as credibility infrastructure: clarity of taxonomy and tracking, results oriented governance, and pipeline preparation are necessary to convert investment needs into realized flows at scale. Fourth, polycentric coordination should be operationalized through incentive compatible subnational delivery (combining fiscal incentives, capacity building, and measurable subnational MRV) to reduce fragmentation and improve legitimacy.

Consistent with the institutional lens adopted in this paper, these implications emphasize that the central challenge is not the absence of policy intent, but the weakness of institutional effectiveness. The study's contribution is therefore to position UNFCCC influence as a credibility producing institutional driver whose impact is realized or constrained through domestic delivery capacity in regulation/MRV, energy implementability, and climate finance governance rather than through formal commitment statements alone.

CONCLUSIONS

This study examined how UNFCCC based climate governance, particularly the Paris Agreement's pledge and review logic and the Enhanced Transparency Framework (ETF), shapes Indonesia's mitigation commitment signals and domestic delivery agenda. The results indicate that UNFCCC influence is visible in how commitments are framed, updated, and rendered auditable through transparency expectations. Yet, consistent with Paris era governance theory, effectiveness depends less on international enforcement and more on

whether domestic institutions can produce credibility through coherent mandates, enforceable MRV routines, and implementation capable policy design.

Indonesia's commitments are increasingly explicit, but a persistent commitment implementation gap remains. The evidence suggests that the gap is structurally institutional: coordination frictions, fragmented authority, and policy sequencing problems raise transaction costs and weaken implementability, particularly in the energy transition. This matters because Paris style transparency can improve information routines and reflexive capacity but does not automatically resolve the political economy and institutional constraints that determine whether targets translate into bankable pipelines and sustained emissions reductions. In this sense, Indonesia's credibility challenge is not a deficit of stated intent, but a deficit of delivery architecture.

Climate finance emerges as the binding constraint and the most credibility sensitive bottleneck. CPI evidence indicates that meeting Indonesia's Enhanced NDC requires around USD 285 billion in climate aligned investment; government budget coverage is approximately USD 96.9 billion (~34%); and climate aligned investment by public and private finance institutions totals USD 41.7 billion (2015-2021), around 15% of the estimated need. These figures imply that transition feasibility hinges on finance governance as credibility infrastructure: taxonomy clarity, comparable tracking, and incentive compatible risk allocation that can mobilize private capital while preserving legitimacy and distributional fairness.

The policy implications are therefore institutional and implementation focused. First, Indonesia should strengthen cross sector regulatory coherence by harmonizing mandates and instruments across energy, environment, and fiscal authorities, thereby reducing transaction costs and policy inconsistency. Second, the renewable deployment architecture should be reinforced through predictable procurement and permitting rules, grid readiness governance, and time bound sequencing of transitional instruments so that bridging does not become lock in. Third, transparency should be operationalized as delivery discipline: MRV and registry integrity need to be linked to budgeting, enforcement routines, and results-based monitoring, consistent with the ETF's credibility logic. Fourth, polycentric delivery should be made incentive compatible by strengthening subnational roles through measurable subnational MRV, capacity support, and accountability partnerships with academia and civil society.

Methodologically and theoretically, this paper contributes by treating UNFCCC influence as an institutional driver transmitted through domestic governance channels (regulation/MRV, clean energy implementability, and climate finance governance) rather than inferring effectiveness from commitment statements alone. This framing responds to core debates in Paris governance scholarship: iterative ambition and transparency can discipline credibility, but they function as intended only when aligned with domestic political economy incentives and implementation capacity.

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