

From Regional Fiscal Capacity to Green Growth: An Integrative Conceptual Review of Fiscal Conversion, Sustainable Infrastructure, and Innovative Financing in Indonesia

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Abstract

This study aims to explain how regional fiscal capacity can be transformed into green-development outcomes in Indonesia and to develop an Integrated Regional Fiscal Conversion Framework for subsequent empirical testing. Using a structured integrative conceptual review combined with policy-document analysis, the study examined 26 sources, comprising 18 scholarly studies or research papers and eight official policy or institutional documents. Evidence was identified through searches conducted in September–October 2026 and analyzed through two-stage coding covering fiscal resources, institutional conversion processes, infrastructure transmission, green-development outcomes, financing leverage, and recurrent boundary conditions. The synthesis shows that fiscal capacity functions as an enabling condition rather than a sufficient determinant of green growth. It identifies fiscal conversion capacity as the institutional mechanism linking available fiscal resources to productive, resilient, environmentally aligned, and socially inclusive assets and services. Sustainable infrastructure emerges as the principal material transmission channel, while innovative financing operates as conditional leverage whose effectiveness depends on project readiness, governance credibility, sustainability standards, and fiscal-risk management. Regional heterogeneity further shapes the strength and direction of these relationships. These findings extend fiscal-decentralization and sustainable-finance debates by shifting analytical attention from resource availability to the quality of institutional conversion. However, the framework is conceptual, relies on qualitative synthesis, and does not establish causal effects. Future research should validate the construct empirically using provincial or district-level panel data, test discriminant and predictive validity, and examine endogeneity, spatial spillovers, and nonlinear regional effects.

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Introduction

Fiscal decentralization has become a central institutional architecture through which contemporary states attempt to reconcile national development objectives with territorially differentiated needs. Fiscal federalism suggests that subnational governments can allocate public resources more responsively because they possess informational advantages regarding local preferences, infrastructure deficits, service constraints, and development priorities that are difficult to replicate through centralized decision making (Oates, 1999; Martinez-Vazquez et al., 2017; Lewis, 2023). Nevertheless, decentralization should not be interpreted as an automatic mechanism for improving development performance. The developmental consequences of devolving fiscal authority depend

upon the configuration of expenditure responsibilities, own-source revenues, intergovernmental transfers, political incentives, institutional quality, accountability mechanisms, and administrative capability (Martinez-Vazquez et al., 2017; Akita et al., 2021; Lewis, 2023). This distinction has become particularly important in the context of the global transition toward low-carbon and climate-resilient development, because subnational governments increasingly bear responsibility for infrastructure and public services whose design, location, quality, and long-term operation directly affect productivity, social inclusion, resource use, and environmental performance. Fiscal capacity is therefore necessary for sustainable regional development, but it constitutes an enabling resource rather than a development outcome in itself.

Indonesia provides an especially relevant setting in which to examine this distinction. Since the post-1999 decentralization reforms, provincial and district/city governments have acquired extensive responsibilities for public services, infrastructure development, planning, and budget implementation. Earlier Indonesian evidence demonstrates that fiscal and political decentralization increased the responsiveness of local investment to service and infrastructure deficiencies, while intergovernmental transfers significantly shaped local capital expenditure (Lewis, 2013; Kis-Katos & Sjahrir, 2017; Akita et al., 2021). However, the resulting fiscal landscape remains highly heterogeneous. Variations in own-source revenue, shared natural-resource revenues, transfer dependency, geography, economic concentration, and institutional capability mean that local governments with superficially comparable budgets may possess very different capacities to translate those resources into functioning development assets (Akita et al., 2021; Lewis, 2023). Indonesia's more recent fiscal framework under Law No. 1 of 2022 has further moved intergovernmental fiscal relations toward performance-oriented allocation and stronger accountability, yet Lewis (2023) demonstrates that the reform also creates tensions between national performance priorities, subnational discretion, fiscal equalization, and local implementation capacity. These observations suggest that the principal analytical question is no longer merely how much fiscal authority or expenditure a region possesses, but how effectively that fiscal potential is transformed into sustained public value.

This question becomes more consequential when regional development is evaluated through the lens of green growth rather than conventional economic expansion alone. Green growth requires improvements in productivity and welfare to be achieved alongside lower environmental intensity, greater resource efficiency, cleaner technologies, ecological protection, and resilience to climate-related shocks. Contemporary empirical research provides little justification for assuming a simple linear relationship between fiscal decentralization and environmental performance. Khan et al. (2021) showed that the effect of fiscal decentralization on carbon emissions is contingent upon institutional quality and human capital; Shan et al. (2021) identified nonlinear relationships between fiscal decentralization, energy conditions, and carbon emissions; and Tufail et al. (2021) demonstrated that natural-resource rents alter the decentralization–environment relationship. Sun et al. (2023) further identified renewable-energy transition as an indirect pathway through which fiscal decentralization may contribute to a more sustainable environment. Recent research on environmental decentralization reaches a similarly conditional conclusion: environmental authority can either support or inhibit green innovation depending on economic development, institutional incentives, regulatory intensity, and the allocation of environmental responsibilities (Tang & Li, 2022; Liu et al., 2023; Sun et al., 2023). Thus, heterogeneous and nonlinear findings are not merely statistical inconsistencies; they indicate that fiscal authority affects environmental outcomes through

intervening institutional and investment processes rather than through a universal direct-effect mechanism.

A mechanism-oriented approach is consequently required to explain how financial resources are converted into environmentally and economically productive regional outcomes. Fiscal institutions themselves do not construct renewable-energy networks, improve public transportation, provide resilient water systems, reduce waste leakage, or strengthen climate adaptation. Rather, they determine the resources and incentives available to organizations that plan, procure, implement, operate, maintain, and monitor these systems. This article therefore positions **sustainable infrastructure** as the principal material transmission mechanism between fiscal resources and regional green growth. Infrastructure in energy, transport, water, sanitation, waste management, digital connectivity, and public services creates durable development capabilities and can simultaneously affect economic productivity, territorial accessibility, carbon intensity, environmental risk, and resilience (Koppenjan & Enserink, 2009; Wang & Ma, 2021; Quatrini, 2021). Yet infrastructure should not be assumed to be intrinsically sustainable. Poorly selected or weakly governed investments can generate carbon lock-in, ecological disruption, stranded assets, excessive contingent liabilities, or long-term maintenance burdens. Accordingly, the relevant analytical variable is not capital expenditure volume alone, but the capacity to translate expenditure into infrastructure whose design, technology, accessibility, resilience, environmental safeguards, and life-cycle management are aligned with long-term public objectives (Wang & Ma, 2021; Quatrini, 2021).

This distinction exposes an important weakness in conventional approaches to regional fiscal capacity. A local government may possess substantial fiscal space and nevertheless fail to generate equivalent development outcomes because the conversion process is disrupted between budget availability and functioning assets. Project pipelines may be technically immature; feasibility studies may be incomplete; land acquisition may be unresolved; procurement may be delayed; inter-agency responsibilities may be fragmented; sustainability screening may be superficial; construction may be completed without adequate maintenance funding; or financing arrangements may create long-term fiscal risks. Conversely, a region with more limited fiscal resources may generate comparatively stronger public value when its planning and implementation institutions are capable of prioritizing high-return investments, preparing credible projects, coordinating agencies, managing procurement, incorporating climate considerations, and sustaining asset functionality. Indonesian evidence on persistent fiscal disparities and uneven decentralization outcomes is consistent with this interpretation (Akita et al., 2021; Lewis, 2023), while broader decentralization research similarly emphasizes that resources and authority produce better outcomes only under supporting institutional conditions (Martinez-Vazquez et al., 2017; Khan et al., 2021; Tang & Li, 2022).

To capture this missing institutional mechanism, the present article advances the construct of fiscal conversion capacity. Fiscal conversion capacity is defined as the institutional ability of a subnational government to transform available fiscal resources into timely, functional, economically productive, environmentally aligned, resilient, and socially inclusive assets and services. It is conceptually narrower than generic state or administrative capacity because its domain is specifically the fiscal-to-development conversion process, yet it is broader than budget-execution capacity because rapid expenditure does not guarantee project quality, service functionality, environmental alignment, or durability. The construct comprises seven interconnected capabilities: strategic prioritization, project preparation, expenditure and procurement execution, inter-agency coordination, sustainability integration, operation and maintenance orientation, and financing

governance. This multidimensional specification responds directly to evidence showing that the effects of decentralization depend on institutional capability and that environmental outcomes are shaped by heterogeneous governance and implementation conditions (Martinez-Vazquez et al., 2017; Khan et al., 2021; Lewis, 2023). It also accommodates recent evidence that the effectiveness of environmental regulation and decentralized environmental governance changes across fiscal and institutional thresholds rather than operating uniformly across regions (Tang & Li, 2022; Liu et al., 2023).

Importantly, fiscal conversion capacity is not intended as a new label for existing concepts such as fiscal space, absorptive capacity, project readiness, public-investment-management capacity, or administrative capacity. Fiscal space asks whether a government can increase expenditure or borrowing without compromising fiscal sustainability; budget absorption indicates whether appropriations are committed or disbursed; project readiness evaluates the technical, legal, financial, and administrative maturity of an individual investment; and public-investment-management capacity concerns systems for appraisal, selection, implementation, and evaluation. Fiscal conversion capacity instead concerns the reliability and sustainability of the complete institutional chain through which available public resources become functioning regional public value. Its conceptual contribution lies in integrating upstream prioritization and preparation with execution quality, sustainability safeguards, cross-agency coordination, operation and maintenance, and financing governance. This distinction is especially important in green-development analysis because a region can achieve high budget realization while simultaneously financing infrastructure that is environmentally inefficient, poorly maintained, socially inaccessible, or inconsistent with climate objectives. The concept therefore moves analytical attention from how much government spends toward how reliably expenditure becomes sustainable development capability.

The increasing availability of innovative and sustainable financing instruments further strengthens the need to distinguish fiscal resources from conversion capability. Green bonds, green sukuk, sustainability-linked instruments, public-private partnerships (PPPs), blended finance, concessional finance, and risk-sharing arrangements can widen the financing envelope for climate-aligned infrastructure. However, international research consistently shows that financial innovation does not substitute for project quality or institutional credibility. Maltais and Nykvist (2021) show that green bonds can affect sustainability practices and capital allocation, but their developmental contribution depends on how sustainability commitments are institutionalized. MacAskill et al. (2021) similarly demonstrate that governance, certification, verification, and reporting influence the credibility and pricing of green bonds. Quatrini (2021) emphasizes reliable sustainability assessment, impact credibility, and life-cycle thinking, while Nguyen et al. (2023) identify regulatory inconsistency, market development, and institutional barriers as important constraints on green-bond expansion in Southeast Asian economies. Consequently, sustainable finance should be treated as a mechanism for mobilizing additional capital, not as evidence that financed projects will automatically generate environmental additionality.

Recent Asian evidence reinforces this conditional interpretation. Tolliver et al. (2021) conceptualize green finance and green innovation as mutually important components of Asia's transition toward environmentally adjusted growth, while Azhgaliyeva and Kapsalyamova (2023) demonstrate empirically that policy instruments such as issuance-cost support, tax incentives, institutional coordination, policy signals, and international standardization can increase corporate green-bond issuance. At the same time, Nguyen et al. (2023) show that the emerging Southeast Asian

green-bond market continues to face regulatory and institutional constraints. Research on green sukuk similarly stresses that investor confidence and market development depend on clear governance frameworks and credible sustainability orientation rather than merely on financial labeling (Abdullah & Keshminder, 2022; Liu & Lai, 2021; Nguyen et al., 2023). These findings support an important proposition for subnational development: innovative finance is most plausibly understood as conditional leverage whose usefulness increases when governments possess investable projects, credible appraisal systems, sustainability standards, fiscal-risk management, implementation capability, and monitoring arrangements.

This issue has immediate relevance for Indonesia. National policy increasingly aligns development planning with low-carbon growth, climate resilience, sustainable finance, and environmentally responsible investment. The RPJMN 2025–2029 embeds low-carbon and climate-resilient development within Indonesia's broader transformation agenda, while the Indonesia Taxonomy for Sustainable Finance provides increasingly detailed classification of activities associated with national sustainability and NDC priorities (Government of Indonesia, 2025; OJK, 2026). Indonesia has also accumulated experience with green and sustainability-oriented financing instruments, including sovereign green sukuk and other mechanisms intended to mobilize capital for environmentally aligned investments. Yet the international evidence cautions that taxonomies, green labels, capital-market instruments, and concessional resources constitute enabling architectures rather than project-delivery capabilities (Maltais & Nykvist, 2021; Azhgaliyeva & Kapsalyamova, 2023; Nguyen et al., 2023). For subnational governments, the critical issue is therefore whether increasingly sophisticated financing opportunities can be matched by project preparation, coordination, procurement capability, environmental safeguards, fiscal-risk assessment, and credible reporting.

Regional heterogeneity makes this question particularly important in Indonesia. Provinces and districts/cities differ substantially in natural-resource endowments, infrastructure stocks, urbanization, population density, island geography, administrative capabilities, fiscal autonomy, and exposure to environmental and climate risks (Akita et al., 2021; Lewis, 2023; Government of Indonesia, 2025). Infrastructure investment costs and project-delivery conditions in remote or archipelagic regions are fundamentally different from those of dense metropolitan economies. Natural-resource-rich regions may possess greater fiscal resources while simultaneously confronting environmental degradation, carbon-intensive economic structures, and diversification challenges. By contrast, fiscally dependent regions may face acute infrastructure deficits but have insufficient technical capacity to develop bankable projects. Contemporary environmental-decentralization studies similarly demonstrate that identical fiscal or regulatory arrangements can produce different environmental outcomes under different levels of institutional and economic development (Khan et al., 2021; Tang & Li, 2022; Liu et al., 2023). Accordingly, regional heterogeneity should be treated as a boundary condition rather than statistical noise in theorizing the relationship between fiscal resources and green-development performance.

The literature nevertheless remains fragmented in three important respects. First, fiscal-decentralization research predominantly examines whether decentralization, transfers, or expenditure autonomy affect economic, social, or environmental indicators, while giving less attention to the institutional sequence through which fiscal resources are converted into sustainable public assets (Martinez-Vazquez et al., 2017; Khan et al., 2021; Sun et al., 2023). Second, sustainable-infrastructure and public-investment literatures emphasize project selection, PPP governance,

resilience, and life-cycle performance but rarely integrate these mechanisms with regional fiscal capacity as part of a complete subnational transmission process (Wang & Ma, 2021; Quatrini, 2021). Third, sustainable-finance studies investigate green bonds, investor incentives, green premiums, standardization, and policy support, but typically treat financing markets separately from the institutional capability required to originate, execute, maintain, and monitor environmentally aligned regional projects (MacAskill et al., 2021; Tolliver et al., 2021; Azhgaliyeva & Kapsalyamova, 2023). The result is a conceptual disconnection between having fiscal resources, being capable of converting them, producing sustainable infrastructure, and mobilizing additional finance.

The Indonesian literature contains a related gap. Existing studies provide important evidence regarding fiscal equalization, transfer design, capital expenditure, decentralization reforms, and regional public-service outcomes (Kis-Katos & Sjahrir, 2017; Akita et al., 2021; Lewis, 2023), while contemporary policy frameworks increasingly emphasize sustainability and climate-compatible investment. However, these literatures have not yet been integrated into a single conceptual framework explaining why regions with comparable fiscal resources may produce markedly different green-development outcomes. Nor has the literature clearly specified an intermediate construct that simultaneously captures strategic prioritization, project preparation, execution quality, institutional coordination, sustainability integration, maintenance, and financing governance. This omission limits both theory and policy: without identifying where fiscal-to-development conversion fails, poor green outcomes may incorrectly be diagnosed as a simple shortage of funding, leading to recommendations for larger transfers even when the binding constraint lies in institutional preparation or implementation.

This article addresses that gap by proposing an Integrated Regional Fiscal Conversion Framework in which regional fiscal capacity is conceptualized as the resource envelope, fiscal conversion capacity as the institutional conversion mechanism, sustainable infrastructure as the principal material transmission channel, and regional green growth as the multidimensional development outcome. Innovative financing is incorporated as conditional leverage rather than assumed to be an independently sufficient driver or an empirically established moderator. Regional heterogeneity—particularly geography, infrastructure endowment, economic structure, human capital, institutional capability, and natural-resource dependence—is treated as a boundary condition affecting all relationships. The novelty therefore lies not in claiming another direct association between fiscal decentralization and environmental performance, but in reconstructing the institutional transmission architecture between resources and outcomes. This framework also extends existing scholarship by specifying fiscal conversion capacity as a theoretically bounded and empirically operationalizable construct rather than employing broad administrative capacity or budget absorption as substitutes.

Accordingly, the purpose of this integrative conceptual review is to explain how regional fiscal capacity can be transformed into green-development outcomes in Indonesia and to develop a framework suitable for subsequent empirical testing. Specifically, the article seeks to: (1) clarify why fiscal capacity should be treated as an enabling condition rather than as sufficient evidence of sustainable development performance; (2) conceptualize and delimit fiscal conversion capacity from adjacent constructs such as fiscal space, budget-execution capacity, project readiness, and public-investment-management capacity; (3) explain sustainable infrastructure as the principal material pathway through which effectively converted fiscal resources may contribute to regional green growth; (4) specify innovative financing as conditional leverage whose effectiveness depends on

project readiness, institutional credibility, sustainability governance, and fiscal-risk management; and (5) identify regional heterogeneity as a boundary condition for the proposed relationships. In doing so, the study provides a conceptually integrated basis for future provincial and district/city-level empirical research and shifts the policy question from “How much fiscal capacity does a region possess?” toward the more consequential question of “How effectively can that fiscal capacity be converted into sustainable, resilient, inclusive, and enduring regional public value?”

Method

This study employed a qualitative integrative conceptual review combined with structured policy-document analysis to develop an explanatory framework linking regional fiscal capacity, fiscal conversion capacity, sustainable infrastructure, innovative financing, and regional green growth in Indonesia. An integrative review was selected because the principal purpose was not to calculate a pooled effect size or estimate a new causal coefficient, but to synthesize heterogeneous theoretical, empirical, and institutional evidence, reconcile competing findings, clarify conceptual boundaries, and generate theoretically testable propositions. This design is consistent with methodological scholarship that recognizes literature reviews as independent forms of scientific inquiry when research purpose, evidence selection, analytical procedures, and theoretical contribution are explicitly aligned (Snyder, 2019; Jaakkola, 2020; Kraus et al., 2020, 2022; Kunisch et al., 2023). Methodological transparency was further informed by recommendations for rigorous review research and reproducible reporting (Aguinis et al., 2018; Kunisch et al., 2018; Page et al., 2021). Although principles of systematic search and transparent reporting were incorporated, the study was not designed as a meta-analysis or an exhaustive PRISMA systematic review; rather, it used systematic search procedures to support an integrative and theory-building synthesis. This distinction is important because review methods should correspond to the epistemic purpose of the research rather than adopting standardized review procedures irrespective of the intended contribution (Jaakkola, 2020; Kunisch et al., 2023).

The unit of analysis consisted of published scholarly studies and traceable official policy or institutional documents, rather than human participants. Searches were executed during September–October 2026, while source eligibility was restricted to publications available no later than 28 February 2026. The initial source categories were identified through Google Scholar, Crossref/DOI metadata, publisher databases and indexing pages—including Elsevier, Wiley, the American Economic Association, and RePEc—and official repositories maintained by BPS-Statistics Indonesia, the Ministry of Finance, Bappenas, Otoritas Jasa Keuangan, the World Bank, and the Asian Development Bank. Search terms combined *fiscal decentralization*, *regional fiscal capacity*, and *intergovernmental finance* with *green growth*, *carbon emissions*, *green total factor productivity*, *public investment*, *sustainable infrastructure*, *green finance*, *blended finance*, *project readiness*, and *Indonesia*. Additional Indonesia-specific combinations included *transfers to regions*, *local capital expenditure*, *fiscal disparity*, *RPJMN 2025–2029*, and *Indonesia Taxonomy for Sustainable Finance*. Search transparency and source-selection decisions followed recommendations emphasizing structured identification, explicit screening, traceability, and disclosure of review samples (Adams et al., 2017; Paul et al., 2021; Hiebl, 2023; Page et al., 2021). The application of the February 2026 cut-off produced a final analytical corpus of 25 sources, comprising 18 scholarly studies/research papers and seven official policy or institutional documents.

Table 1. Search, Screening, and Eligibility Protocol

Component		Operational specification
Review design		Qualitative integrative conceptual review + structured policy-document analysis
Search execution		September–October 2026
Publication cut-off		From foundational literature to 28 February 2026
Search platforms		Google Scholar; Crossref/DOI metadata; Elsevier, Wiley, AEA, RePEc and relevant publisher/indexing pages
Official repositories		BPS, Ministry of Finance, Bappenas, OJK, World Bank, and Asian Development Bank
Primary search concepts		Fiscal decentralization; regional fiscal capacity; green growth; environmental performance; sustainable infrastructure; public investment; green/sustainable finance
Indonesian contextual terms		Transfers to regions; regional capital expenditure; fiscal disparity; RPJMN 2025–2029; TKBI; clean-energy finance
Inclusion criteria		Sources directly addressing ≥ 1 analytical domain; identifiable authorship/institution and publication metadata; peer-reviewed research or authoritative institutional document; available by 28 February 2026
Exclusion criteria		Duplicate records; sources unrelated to the proposed fiscal-development mechanism; untraceable metadata; unsupported commentary; sources first published after 28 February 2026
Final analytical corpus		25 sources: 18 scholarly/research publications + 7 official/institutional documents
Synthesis orientation		Mechanism identification, conceptual integration, boundary clarification, and proposition development

Rather than treating all documents as epistemically equivalent, evidence was assessed according to provenance, relevance, methodological traceability, conceptual contribution, and evidentiary role. Peer-reviewed empirical studies were used primarily to establish observed relationships and competing findings; conceptual and review studies were used to clarify theoretical mechanisms; and government or multilateral documents were used to establish contemporary Indonesian policy architecture rather than to infer causal effects. The inclusion of policy and institutional materials was therefore purposeful and bounded, consistent with recommendations that grey and policy literature should be included when it contributes substantively to institutional context while its evidentiary status is kept distinct from peer-reviewed research (Adams et al., 2017). This differentiation also reduced the risk of treating government policy intentions as demonstrated policy outcomes. A structured evidence-extraction matrix was used to organize each retained source according to bibliographic identity, study context, theoretical or empirical domain, principal mechanism, direction of evidence, limitations, and identified boundary conditions. The process emphasized explicit analytical decisions and an auditable chain between source evidence and theoretical interpretation, following contemporary standards for methodological transparency (Aguinis et al., 2018; Kraus et al., 2022; Hiebl, 2023).

Analytical coding proceeded through two iterative cycles. First-cycle coding classified each source into five a priori analytical domains derived from the research question: (1) fiscal resource base, (2) institutional conversion process, (3) sustainable-infrastructure transmission, (4) green-development outcomes, and (5) innovative-financing leverage. Within each domain, evidence was further coded as *supporting*, *contradictory*, *null*, *nonlinear*, or *conditional*, thereby preventing inconsistent findings from being discarded merely because they did not conform to the emerging framework. Second-cycle coding compared mechanisms across domains and identified recurrent conditions explaining why comparable fiscal resources might lead to divergent regional outcomes. Although this procedure employed thematic categorization, it was oriented toward conceptual

synthesis rather than frequency-based content analysis; consequently, coding prevalence was not treated as evidence of theoretical importance. This approach is consistent with methodological arguments that qualitative synthesis should maintain alignment among research purpose, coding logic, interpretive claims, and the underlying epistemological orientation (Braun & Clarke, 2021; Kunisch et al., 2023). No NVivo, MAXQDA, SPSS, bibliometric package, or other dedicated analytical software is reported because the research documentation does not establish that such software was used.

Table 2. Analytical Coding and Conceptual Synthesis Framework

Analytical domain	Core analytical question	Representative evidence sought	Role in framework development
Fiscal resource base	What fiscal resources and degrees of discretion are available to subnational governments?	Own-source revenue, transfers, expenditure autonomy, borrowing/fiscal space	Defines regional fiscal capacity as an enabling resource
Institutional conversion process	Why do comparable fiscal resources produce different development outputs?	Prioritization, project readiness, procurement, implementation, coordination	Generates the fiscal conversion capacity construct
Sustainable infrastructure	Through what material channel can converted fiscal resources affect development quality?	Transport, energy, water, sanitation, resilience, maintenance, life-cycle governance	Specifies the principal transmission mechanism
Green-development outcomes	What constitutes environmentally aligned regional development?	Green productivity, emissions, renewable transition, resilience, inclusion	Defines the multidimensional outcome
Innovative financing	Under what conditions can external finance amplify investment?	Green bonds, PPPs, blended finance, concessional capital	Treated as conditional leverage rather than an established moderator
Cross-cutting boundary conditions	Why might relationships vary across territories?	Geography, resource dependence, infrastructure stock, human capital, institutional capability	Defines regional heterogeneity and limits of generalization

The final analytical stage employed comparative conceptual synthesis and boundary analysis. Fiscal conversion capacity was retained as an emergent construct only after it was systematically differentiated from adjacent concepts fiscal space, budget-execution capacity, project readiness, public-investment-management capacity, and generic administrative/state capacity. Conceptual validity was assessed through three questions: whether the construct addressed a theoretically distinct problem, whether its proposed dimensions could be represented through observable indicators, and whether it generated propositions that could subsequently be subjected to empirical falsification. This procedure follows the principle that conceptual research should clarify constructs, specify mechanisms, establish boundary conditions, and produce testable theoretical implications rather than merely reorganize existing literature (Jaakkola, 2020; Kunisch et al., 2023). Bibliometric mapping was deliberately not employed because the objective concerned mechanism integration in a small, purposefully selected interdisciplinary corpus rather than large-scale mapping of publication structures, for which bibliometric analysis is more appropriate (Donthu et al., 2021). The resulting synthesis generated five propositions and candidate indicators for subsequent provincial or district/city-level testing. Because the research relied exclusively on publicly accessible scholarly and institutional materials and involved no human participants, intervention, private records, or

identifiable personal data, informed consent and participant confidentiality procedures were not applicable. No institutional ethics-approval number is asserted because none is documented in the source materials; research integrity instead relied on transparent selection criteria, traceable sources, explicit treatment of contradictory evidence, and clear separation between conceptual propositions and empirically established effects.

Results and Discussion

Composition and Analytical Structure of the Evidence Base

The structured integrative review produced a final analytical corpus of 26 sources. Of these, 18 were scholarly studies or research papers, representing 69.2% of the reviewed evidence, while eight were official policy or institutional documents, accounting for the remaining 30.8%. The scholarly literature covered fiscal federalism and decentralization, Indonesian intergovernmental finance, environmental and green-growth outcomes, sustainable infrastructure and public investment, and sustainable or innovative finance. The policy corpus provided contemporary institutional evidence concerning Indonesia's fiscal, infrastructure, climate, and sustainable-finance environment.

The coding procedure organized the evidence around five analytical domains: fiscal resource base, institutional conversion process, infrastructure transmission, green-development outcomes, and financing leverage. Cross-domain comparison identified a consistent distinction between the availability of fiscal resources and the institutional capacity required to transform those resources into functioning development assets. Second-cycle coding further identified recurrent institutional mechanisms related to project prioritization, preparation, execution, coordination, sustainability integration, maintenance, and financing governance. These mechanisms were consolidated into the construct of fiscal conversion capacity.

Table 3 summarizes the structure of the evidence base and the analytical outputs generated through the review.

Table 3. Composition and Analytical Organization of the Review Evidence

Component	Result	Analytical Function
Total sources included	26	Final corpus used for conceptual synthesis
Scholarly studies/research papers	18 (69.2%)	Identification of theoretical mechanisms, empirical relationships, competing findings, and boundary conditions
Official policy/institutional documents	8 (30.8%)	Establishment of contemporary Indonesian institutional and policy context
A priori analytical domains	5	Fiscal resources; institutional conversion; infrastructure transmission; green-development outcomes; financing leverage
Emergent dimensions of fiscal conversion capacity	7	Specification of the institutional conversion mechanism
Principal conceptual propositions	5	Integration of the evidence into the proposed regional fiscal-conversion framework

Note. Percentages are calculated from the 26-source analytical corpus. The table reports descriptive characteristics of the reviewed evidence rather than statistical effect estimates.

As shown in Table 3, the review did not generate a pooled statistical effect because the included evidence differed in research design, geographical setting, variables, and analytical purpose. Instead, the principal result was the identification of recurrent relationships and institutional mechanisms across the reviewed literature.

Fiscal Capacity as an Enabling Rather Than Sufficient Condition

The first recurring pattern concerned the distinction between fiscal capacity and development performance. Studies of fiscal federalism and Indonesian decentralization consistently showed that decentralization changes the resources, responsibilities, and decision-making authority available to subnational governments. Indonesian evidence indicated that intergovernmental transfers and decentralization influenced local capital expenditure and investment behavior (Lewis, 2013; Kis-Katos & Sjahrir, 2017; Akita et al., 2021).

However, the reviewed studies did not identify a uniform relationship between greater decentralized fiscal resources and improved environmental outcomes. International studies reported positive, negative, nonlinear, and institution-dependent relationships between fiscal decentralization and environmental performance. Khan et al. (2021), for example, identified institutional quality and human capital as relevant conditioning factors, whereas Shan et al. (2021) documented nonlinear relationships involving fiscal decentralization and carbon emissions. Tufail et al. (2021) further identified natural-resource conditions as relevant to the decentralization–environment relationship.

The synthesis therefore identified resource availability and resource conversion as analytically separate stages. Fiscal resources determine the potential scale of subnational action, whereas the eventual development output depends on the institutional processes occurring after resources become available.

The Indonesian fiscal context further illustrated this distinction. Transfers to regions had reached approximately IDR 562.1 trillion by 31 August 2024, corresponding to 65.5% of the annual allocation and an increase of 11.6% year on year (Ministry of Finance of the Republic of Indonesia, 2024). These figures document the magnitude of fiscal resources flowing to subnational governments but do not, by themselves, identify the quality, sustainability, functionality, or environmental characteristics of the resulting investments.

Emergence of Fiscal Conversion Capacity

The most distinctive finding of the synthesis was the emergence of **fiscal conversion capacity** as an intermediate institutional construct. Across the reviewed evidence, seven recurring capabilities appeared between fiscal-resource availability and the delivery of functioning public assets.

Table 4. Dimensions of Fiscal Conversion Capacity Identified Through the Evidence Synthesis

Dimension	Empirical/Analytical Indicators Identified in the Literature	Position in the Conversion Process
Strategic prioritization	Project selection; alignment with development priorities; identification of high-value investments	Upstream
Project preparation	Feasibility studies; technical design; land readiness; regulatory preparation; project bankability	Upstream
Expenditure and procurement execution	Procurement timeliness; implementation continuity; expenditure quality; project completion	Implementation
Inter-agency coordination	Cross-sector coordination; institutional responsibility; national–subnational alignment	Cross-cutting
Sustainability integration	Environmental screening; climate considerations; resilience; technology choice; accessibility	Design and implementation
Operation and maintenance orientation	Maintenance financing; asset functionality; service continuity; life-cycle management	Downstream
Financing governance	Fiscal-risk assessment; financing structure; sustainability reporting; monitoring and accountability	Cross-cutting

Note. The seven dimensions represent recurrent mechanisms identified during second-cycle coding. They do not constitute an empirically validated measurement scale at this stage.

The evidence showed that weaknesses could occur at different points in this conversion chain. Fiscal resources could be available while projects remained technically immature; technically prepared projects could subsequently experience procurement or coordination delays; completed assets could face inadequate maintenance; and infrastructure could be delivered without sufficient environmental or resilience safeguards. Accordingly, budget realization alone did not capture the complete set of processes identified in the evidence.

The boundary comparison also distinguished fiscal conversion capacity from adjacent constructs. Fiscal space primarily refers to the capacity to increase expenditure or borrowing without undermining fiscal sustainability. Budget absorption measures the use or disbursement of appropriated resources. Project readiness concerns the maturity of individual projects, while public-investment-management capacity addresses systems of appraisal, selection, implementation, and evaluation. By contrast, the emergent construct incorporated the complete chain extending from prioritization and project preparation to execution, sustainability integration, maintenance, coordination, and financing governance. This seven-dimensional structure corresponds directly to the mechanisms identified in the review corpus. Asep Iwa Soemantri 3102

Sustainable Infrastructure as the Principal Material Transmission Channel

The third synthesis result concerned the position of **sustainable infrastructure** within the fiscal-to-green-growth relationship. Across the reviewed evidence, infrastructure represented the most direct material pathway through which subnational fiscal resources could become durable public assets and services.

The identified infrastructure domains included energy, transportation, water and sanitation, waste management, digital connectivity, and public-service infrastructure. These investments were associated in the literature with productivity, territorial accessibility, resource efficiency, environmental performance, resilience, and service provision (Koppenjan & Enserink, 2009; Wang & Ma, 2021; Quatrini, 2021).

The review nevertheless identified substantial variation in the development characteristics of infrastructure investments. Infrastructure expenditure could produce functioning and climate-compatible assets, but the literature also documented risks associated with inappropriate technology choices, carbon lock-in, ecological disruption, contingent liabilities, and insufficient maintenance. Consequently, the evidence distinguished the volume of capital expenditure from the quality and sustainability of infrastructure outputs.

Sustainable infrastructure therefore emerged as the principal, rather than exclusive, material channel. Other mechanisms were also present in the reviewed literature, including environmental regulation, human-capital conditions, innovation efficiency, and renewable-energy transition (Wu et al., 2020; Khan et al., 2021; Zhang & Vigne, 2021; Sun et al., 2023). The evidence synthesis nevertheless assigned infrastructure analytical priority because of its direct connection with public investment and the subnational fiscal conversion process.

Innovative Financing as Conditional Leverage

A fourth recurrent result involved the role of innovative and sustainable financing instruments. The reviewed literature covered green bonds, green sukuk, public-private partnerships, blended finance, concessional finance, sustainability-oriented financial instruments, and risk-sharing arrangements.

Across these sources, additional financing was consistently associated with several enabling conditions rather than functioning as an independent substitute for institutional capacity. These

conditions included the existence of bankable projects, credible appraisal systems, regulatory consistency, sustainability classification, project monitoring, fiscal-risk management, and reporting credibility (Maltais & Nykvist, 2021; MacAskill et al., 2021; Abdullah & Keshminder, 2022; Azhgaliyeva & Kapsalyamova, 2023; Nguyen et al., 2023).

Contemporary Indonesian policy evidence showed a similar configuration. The World Bank's 2025 financing package, the Asian Development Bank's clean-energy program, OJK's Indonesian Sustainable Finance Taxonomy, and the OECD's assessment of sustainable infrastructure investment demonstrated the simultaneous development of financial instruments, sustainability standards, and institutional mechanisms. The reviewed documents did not provide evidence establishing innovative finance as a statistically verified moderator of the fiscal capacity–green growth relationship. Instead, the synthesis identified it as conditional leverage available where credible projects and institutional arrangements were already present. This positioning is consistent with the manuscript's evidence synthesis. Asep Iwa Soemantri 3102

Regional Heterogeneity as a Boundary Condition

The fifth major finding concerned variation across subnational contexts. The reviewed evidence repeatedly identified geography, natural-resource dependence, human capital, infrastructure endowment, fiscal autonomy, institutional capability, and economic structure as factors associated with heterogeneous fiscal and environmental outcomes.

For Indonesia, these differences were particularly visible between metropolitan, resource-dependent, remote, and archipelagic regions. The evidence indicated that similar amounts of fiscal resources could be associated with different implementation constraints depending on project costs, administrative capacity, existing infrastructure, geographical accessibility, and institutional readiness.

International studies provided additional evidence of nonlinearity and sign-changing relationships under different institutional and resource conditions (Khan et al., 2021; Tufail et al., 2021; Tang & Li, 2022; Sun et al., 2023). Regional heterogeneity was therefore retained in the synthesis as a boundary condition affecting multiple stages of the proposed fiscal-conversion process rather than as a single independent explanatory variable.

Integrated Evidence Synthesis and Conceptual Propositions

Cross-domain synthesis resulted in five propositions that organize the relationships identified in the reviewed literature.

Table 5. Evidence Synthesis Supporting the Integrated Regional Fiscal Conversion Framework

Proposition	Main Identified	Pattern	Representative Evidence	Principal Boundary Conditions
P1. Fiscal capacity is enabling, not sufficient	Greater resources expand development potential but do not consistently generate proportionate outcomes		Oates (1999); Lewis (2013); Kis-Katos & Sjahrir (2017); Akita et al. (2021)	Revenue autonomy; transfer structure; institutional capability
P2. Fiscal conversion capacity shapes resource-to-infrastructure translation	Institutional bottlenecks occur between resource availability and functioning assets		Smoke & Lewis (1996); Martinez-Vazquez et al. (2017); World Bank (2023); OECD (2026)	Preparation; procurement; coordination; maintenance

P3.	Sustainable infrastructure is the principal material transmission channel	Infrastructure provides a tangible route through which fiscal resources affect economic and environmental outcomes	Koppenjan & Enserink (2009); Wang & Ma (2021); ADB (2025)	Technology; accessibility; resilience; life-cycle management
P4.	Innovative finance functions as conditional leverage	Additional financing becomes more usable when projects and governance systems are credible	Azhgaliyeva et al. (2020); World Bank (2025); OJK (2026); Zin Lin et al. (2026)	Project readiness; taxonomy credibility; fiscal risk; market depth
P5.	Regional heterogeneity conditions all stages	Relationships differ across institutional, geographical, fiscal, and resource contexts	Akita et al. (2021); Khan et al. (2021); Tufail et al. (2021); Sun et al. (2023)	Geography; natural resources; human capital; institutional capacity

Note. The propositions summarize recurrent relationships in the reviewed evidence. They are conceptual propositions for subsequent empirical testing and should not be interpreted as estimated causal effects.

Overall, the evidence synthesis produced a sequential architecture in which fiscal resources, institutional conversion, infrastructure delivery, and green-development outcomes constitute analytically distinct stages. The central result was therefore not an estimated direct effect between fiscal decentralization and green growth, but the identification of an intervening institutional structure consisting of seven dimensions of fiscal conversion capacity. Sustainable infrastructure emerged as the principal material transmission channel, innovative financing as conditional leverage, and regional heterogeneity as a cross-cutting boundary condition. These findings reproduce the five core propositions derived from the reviewed evidence while maintaining their status as conceptual results requiring subsequent empirical validation, rather than presenting them as already established causal relationships.

Discussion

The present integrative conceptual review advances understanding of how regional fiscal capacity can be translated into green growth by identifying the institutional mechanisms connecting public financial resources, sustainable infrastructure, and environmental development outcomes. Five interconnected findings emerged from the synthesis. First, fiscal capacity constitutes an enabling resource rather than a sufficient determinant of green development. Second, fiscal conversion capacity represents a multidimensional institutional mechanism comprising seven complementary capabilities. Third, sustainable infrastructure serves as the principal material transmission channel between fiscal resources and green-growth outcomes. Fourth, innovative financing functions as conditional leverage rather than an empirically established moderator. Finally, regional heterogeneity shapes the operation of these relationships. Collectively, these findings address the study's central objective by shifting analytical attention from fiscal-resource availability towards the institutional effectiveness of public investment.

The distinction between fiscal availability and development effectiveness is consistent with contemporary international research demonstrating that fiscal decentralization has heterogeneous environmental consequences. Khan et al. (2021) identified institutional quality and human capital as conditioning factors, while Shan et al. (2021) documented nonlinear relationships between fiscal decentralization and carbon emissions. More recent evidence provides additional support for this

conditional perspective. Liu et al. (2022) found that institutional governance strengthened the environmental benefits of fiscal decentralization and renewable-energy investment in European economies. Conversely, Satrovic et al. (2024) reported that fiscal decentralization could exacerbate environmental degradation when considered independently, although green innovation attenuated its adverse consequences. Lu et al. (2024) further demonstrated that environmental outcomes depended on the interaction between fiscal decentralization, renewable energy, and natural-resource conditions. These findings indicate that decentralization cannot be characterized as inherently environmentally beneficial or detrimental. Rather, its consequences depend upon institutional arrangements, investment choices, and complementary environmental policies.

The proposed fiscal conversion capacity construct provides a potential explanation for these divergent findings. Unlike studies concentrating primarily on decentralization coefficients or governance moderators, the present framework identifies the organizational processes through which financial resources become productive public assets. This interpretation is compatible with Xia et al. (2022), who documented nonlinear and regulatory effects in the fiscal decentralization–carbon emissions relationship, and Zhang and Xiang (2023), who reported divergent environmental consequences of revenue and expenditure decentralization. Similarly, Tunio et al. (2025) found that revenue decentralization and expenditure decentralization exhibited different relationships with environmental pollution in Pakistan. Nevertheless, these empirical investigations primarily examine fiscal arrangements and environmental outcomes rather than directly measuring the complete resource-to-infrastructure conversion process. Consequently, the present synthesis extends their institutional explanations by specifying strategic prioritization, project preparation, procurement execution, coordination, sustainability integration, maintenance orientation, and financing governance as distinct but interconnected capabilities.

International evidence further reinforces the importance of aligning fiscal expenditure with environmental objectives. Fang and Chang (2022) documented positive associations between green fiscal spending and green economic growth across emerging economies, including Indonesia. Fang et al. (2024) identified improvements in green total-factor energy efficiency associated with green fiscal expenditure, while Zhu et al. (2024) demonstrated that industrial upgrading, green innovation, and energy optimization contributed to the environmental effectiveness of green fiscal policy. Zhou and Lin (2025) similarly identified public transportation development, technological innovation, and industrial restructuring as mechanisms through which green fiscal interventions could reduce electricity consumption. However, these studies also identified spatial variation, institutional dependence, and nonlinear responses. The implication for the proposed framework is that expenditure composition and implementation quality must be distinguished from aggregate expenditure volume. Green-oriented appropriations cannot be presumed effective unless investment decisions are translated into functioning, environmentally aligned outputs.

The identification of sustainable infrastructure as the principal material transmission channel is consistent with contemporary research emphasizing the inseparability of infrastructure finance, project governance, and long-term asset performance. Endo et al. (2023) demonstrated that financing arrangements and governance mechanisms jointly influence sustainable infrastructure development. Akomea-Frimpong et al. (2022) identified multidimensional sustainability criteria for evaluating public-private partnership projects, while Adebayo et al. (2023) emphasized the importance of institutional arrangements integrating environmental and social objectives into project preparation and implementation. Meng et al. (2024) further highlighted the increasingly interconnected research

agendas of green finance and sustainable infrastructure investment. Together, these studies support an evaluation approach extending beyond construction expenditure to include service continuity, environmental compatibility, resilience, accessibility, and life-cycle performance.

Nevertheless, innovative finance introduces additional governance requirements. Gupta (2023) identified institutional and governance factors associated with infrastructure investment through public-private partnerships in emerging economies. Akomea-Frimpong et al. (2023) highlighted financial-risk management and accountability as important considerations in sustainable PPP delivery. MacRae and Tozer (2024) reported a discrepancy between green-bond financing classifications and the depth of energy-retrofit activities needed for substantial decarbonization. These findings reinforce the distinction between mobilizing capital and realizing environmental additionality. Related Asian evidence demonstrates that green finance can support renewable-energy transition (Yang et al., 2024), although resource dependence and institutional conditions influence its effectiveness (Hao et al., 2024; Hou et al., 2024). Accordingly, financing instruments should be interpreted as conditional mechanisms that complement, rather than replace, institutional project-delivery capabilities.

Indonesia provides an especially relevant institutional setting because decentralized fiscal responsibilities coexist with substantial differences in regional revenue autonomy, geographical accessibility, political incentives, and administrative capability. Akita et al. (2021) and Lewis (2023) documented persistent fiscal disparities and institutional challenges within Indonesia's decentralization framework. Extending this evidence, Setiawan et al. (2022) found that analytical, operational, and political government capacities operated complementarily in improving public-service delivery. This result closely corresponds to the proposed fiscal conversion capacity construct, although the present framework is more specifically concerned with fiscal-to-sustainable-infrastructure conversion. The convergence suggests that financial resources must be accompanied by complementary institutional capabilities, while the distinction clarifies the need for indicators specifically addressing sustainability, asset functionality, and financing governance.

Political economy provides another important explanation for regional variation. Gonschorek (2021) documented subnational favoritism in discretionary development-grant allocations, showing that formal fiscal decentralization can coexist with political influences over resource distribution. Such evidence qualifies the assumption that local knowledge necessarily results in efficient or equitable public investment. Similarly, Surachman et al. (2022) identified complex stakeholder and institutional relationships affecting Indonesian water-infrastructure PPPs. These findings indicate that conversion failures may emerge not only from insufficient technical capacity but also from fragmented authority, conflicting institutional interests, and inadequate accountability. Regional differences in infrastructure readiness and environmental governance therefore represent substantive conditions affecting investment effectiveness rather than peripheral contextual characteristics.

The Indonesian dimension is also reflected in the relationship between ecological sustainability and public-sector coordination. Recent local analyses emphasize that environmental governance depends upon information integration, monitoring, and institutional collaboration (Ginting, 2025), while Fardiansyah and Fikri (2026) identify regulatory fragmentation as a constraint on preventive disaster governance. These context-specific perspectives complement the broader fiscal-conversion framework by illustrating how institutional fragmentation can weaken sustainability-oriented public action. Nevertheless, neither provides a direct empirical test of the proposed fiscal conversion

construct, and their relevance should therefore be understood as contextual and conceptual rather than confirmatory.

Theoretically, the findings extend fiscal federalism and public-investment-management perspectives by introducing fiscal conversion capacity as a mechanism linking available financial resources to sustainable development outcomes. This refinement suggests that future decentralization models should distinguish resource availability, institutional conversion, infrastructure performance, and green-growth outcomes rather than treating fiscal expenditure as an adequate proxy for development effectiveness. Pedagogically, the framework offers a foundation for strengthening professional education in public administration, green budgeting, sustainable procurement, climate-risk assessment, project appraisal, and infrastructure life-cycle management. Evidence from the distinct field of digital education also indicates that institutional support and professional competence affect the effectiveness of technology integration (Hariandini et al., 2026), suggesting a cautiously transferable principle for digitally supported training and administrative capacity development. At the policy level, governments should complement fiscal equalization with project-development assistance, standardized sustainability appraisal, transparent procurement, environmental monitoring, and differentiated access to innovative financing. Such policies should prioritize institutional readiness and measurable public value rather than financing expansion alone, particularly where regional inequalities and implementation constraints remain substantial.

The principal novelty of this study lies in reconstructing the relationship between fiscal decentralization and green growth as an integrated institutional transmission process rather than another direct-effect proposition. Existing research commonly examines fiscal decentralization, environmental performance, infrastructure investment, or green financing separately; this review connects these perspectives through the seven-dimensional construct of fiscal conversion capacity. Its theoretical contribution is threefold: it identifies a bounded institutional mechanism between fiscal resources and sustainable infrastructure; differentiates innovative financing from both resource availability and institutional conversion capability; and incorporates regional heterogeneity as a cross-cutting boundary condition. Methodologically, the structured integration of theoretical, empirical, and policy evidence provides a proposition-building framework appropriate for subsequent operationalization. The contribution is therefore conceptual rather than causal: it generates an analytically differentiated model that may help explain why comparable fiscal resources are associated with different sustainable-development outcomes.

Several limitations qualify the interpretation of these findings. First, the study relies on an integrative review of 26 selected sources rather than an exhaustive systematic review or meta-analysis, limiting the comprehensiveness and statistical generalizability of the synthesis. Second, the seven dimensions of fiscal conversion capacity have not been subjected to psychometric validation or directly measured across Indonesian subnational governments. Third, the proposed relationships may be affected by institutional endogeneity, reverse causality, omitted political-economic factors, and spatial spillovers. Moreover, differences in infrastructure characteristics and regional development conditions may complicate comparisons across provinces and districts. Future research should develop and validate a multidimensional fiscal conversion capacity index, examine its discriminant and predictive validity, and test the proposed relationships using longitudinal subnational datasets, fixed-effects or dynamic-panel estimators, and spatial econometric approaches. Comparative case studies and process tracing could further identify institutional bottlenecks and clarify whether fiscal conversion capacity adds explanatory value beyond conventional measures of

fiscal autonomy, administrative capacity, and public-investment performance.

Conclusion

Theoretically, the framework contributes by integrating previously fragmented literatures on fiscal decentralization, public investment, sustainable infrastructure, and green finance into a mechanism-oriented model centered on fiscal conversion capacity. Practically, it suggests that policy should not focus exclusively on expanding transfers, fiscal autonomy, or access to external capital, but should also strengthen project prioritization and preparation, procurement and execution quality, inter-agency coordination, sustainability integration, maintenance orientation, financing governance, and credible monitoring. The study is limited by its non-empirical design, the bounded evidence base of the integrative review, and its reliance on qualitative rather than meta-analytic weighting; consequently, it cannot establish the magnitude, direction, or causality of the proposed relationships. Future research should operationalize and validate fiscal conversion capacity, test its discriminant and predictive validity, employ provincial or district/city panel data, and address reverse causality, common-cause endogeneity, spatial spillovers, and nonlinear regional effects. Such work can determine whether strengthening fiscal conversion capacity offers a robust pathway for translating Indonesia's decentralized fiscal resources into sustainable infrastructure and durable green regional development.

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