

Islamic Fintech as a Catalyst for Green Economic Transformation: A Deep Dive into Zakat-Based Funding Models in Bengkulu

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ABSTRACT

This study aims to examine the role of Islamic fintech in optimizing zakat collection and distribution to advance green economic transformation in the Bengkulu region, while identifying the opportunities, challenges, and impact potential of integrating zakat-based funding with digital Sharia-compliant platforms. Using a qualitative case study approach, the research synthesizes documentary analysis of national policies (e.g., BAZNAS's Green Zakat Framework), institutional reports, and field-level operational data from Bengkulu's zakat bodies, Islamic financial institutions, and green investment initiatives (e.g., the Hello Green Nusantara PT Bengkulu Mandiri partnership). The results indicate that Islamic fintech offers transformative opportunities particularly through blockchain-enabled transparency, AI-driven targeting, and crowdfunding scalability to channel zakat toward productive green projects such as mini-hydro power and circular economy enterprises. However, major challenges persist, including fragmented regulation, weak monitoring and mentoring capacity at the local zakat management level, low digital and financial literacy, and eroded public trust due to governance failures. The study's novelty lies in its granular, regionally grounded analysis that bridges macro-level national strategy with micro-level operational realities, proposing a hybrid implementation model where trusted zakat institutions partner with specialized fintech providers to overcome capacity gaps. This work contributes a practical, context-sensitive roadmap for policymakers and Islamic finance practitioners seeking to mobilize zakat as a scalable instrument for sustainable and inclusive development.

Keywords: *Islamic fintech, green economy, zakat management, digital transformation, sustainable development*

INTRODUCTION

The contemporary landscape of Indonesia presents a powerful confluence of national policy imperatives, institutional innovation, and market-driven technological momentum that creates a fertile ground for the integration of Islamic finance, environmental sustainability, and digital transformation. This convergence is not merely theoretical but is actively shaping the nation's economic and social trajectory, establishing a robust foundation upon which innovative models like Islamic fintech-powered green zakat can be built. At its core, this shift reflects a paradigm change where faith-based social finance is being repositioned as a critical instrument for achieving national development goals, including climate targets and the Sustainable Development Goals (SDGs). The government's commitment to a green recovery is explicit, with Finance Minister Sri Mulyani Indrawati reaffirming that such recovery packages must be planned from a long-term perspective to build a sustainable economy. This top-down politics will be mirrored by significant state-led action through specialized financial institutions. PT Sarana Multi Infrastruktur (Persero) (PT SMI), a Special Mission Vehicle under the Ministry of Finance, has made a decisive pivot away from fossil fuels, easing financing for coal-based power plants since 2019 and shifting its focus entirely to climate-related projects starting in 2020. Renewable energy now stands as the dominant sector for SMI's funding, followed by essential

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services like drinking water and sanitation, and public transportation. This institutional realignment demonstrates a clear channel for directing capital towards decarbonization efforts.¹

This strategic redirection of state capital is complemented by a growing private sector commitment. Major international banks operating in Indonesia, such as Bank SMBC Indonesia, have committed to halting financing for coal-fired power plants and tightening lending criteria for coal mining and oil & gas sectors, while simultaneously redirecting their resources toward renewable energy investments. Similarly, Mitsubishi UFJ Financial Group (MUFG) participated in financing the Jatigede Hydroelectric Power Plant, showcasing global financial institutions aligning their portfolios with Indonesia's long-term decarbonization ambitions.² The need for such investment is immense; Indonesia faces an annual funding gap of USD 18.5 billion between 2020 and 2024 to meet its climate targets, underscoring the crucial role of both private sector and international funding mechanisms.³ Financial instruments like green bonds, green loans, and green sukuk are central to this effort. PT SMI's issuance of a IDR 500 billion (USD 34.9 million) green bond, aligned with both Green Bond Principles (GBP) and ASEAN Green Bond Standards, serves as a pioneering example in Indonesia, with proceeds specifically allocated to refinance light rail transit and mini-hydro projects in Bengkulu and South Sumatra provinces.⁴ This direct link between sovereign-backed green financing and renewable energy infrastructure in regions like Bengkulu provides a tangible model for how large-scale green projects can be funded and scaled.

In parallel with this green finance revolution, a monumental institutional innovation has emerged at the heart of Indonesia's Islamic social finance ecosystem: the Green Zakat Framework. Spearheaded by BAZNAS (Badan Amil Zakat Nasional), the national zakat agency, this framework represents a strategic redefinition of zakat's purpose and scope.⁵ Launched officially in late 2024 and early 2025, and even presented at the United Nations headquarters in New York as Indonesia's contribution to global climate and social equity challenges, the framework aims to transform zakat from a tool primarily focused on poverty alleviation into an instrument for reconstructing social and ecological systems.⁶ It explicitly channels zakat funds toward climate-responsive programs, including renewable energy, sustainable agriculture, and ecosystem restoration, thereby aligning the world's largest Muslim population's wealth redistribution practice with national and global environmental goals. The religious legitimacy for this expansion is reinforced by DSN MUI Fatwa No. 001/MUNAS-IX/MUI/205, which permits the use of zakat for public welfare and life preservation, encompassing clean water and sanitation infrastructure. To ensure this ambitious vision is not just aspirational but measurable, BAZNAS has developed the Green Zakat Index (GZI), a comprehensive measurement tool designed to track the implementation and impact of green zakat initiatives across all levels of the organization. This index provides a data-driven framework for accountability and performance

¹ hellogreenfoundation.com/blog/132-bengkulu-takes-a-bold-step-toward-a-green-economy-hello-green-nusantara-and-pt-bengkulu-mandiri-launch-sustainable-investment-project

² <https://www.kompas.id/artikel/en-akses-keuangan-hijau-fondasi-percepatan-energibersih>

³ [https://www.ptsmi.co.id/pt-smi-and-climate-bonds-initiative-commitment-to-accelerategreen-infrastructure-in-indonesia](https://www.ptsmi.co.id/pt-smi-and-climate-bonds-initiative-commitment-to-accelerate-green-infrastructure-in-indonesia)

⁴ <https://www.ptsmi.co.id/pt-smi-and-climate-bonds-initiative-commitment-to-accelerategreen-infrastructure-in-indonesia>

⁵ <https://www.puskasbaznas.com/video/peluncuran-green-zakat-framework-implementasi-green-economy-di-baznas>

⁶ <https://www.undp.org/id/indonesia/press-releases/baznas-bsi-dan-undp-resmi-luncurkan-kerangka-zakat-hijau-untuk-membangun-ketangguhan-masyarakat-dan-mengatasi-perubahan>

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assessment, enabling a transition from traditional aid-giving to a more structured, results-oriented approach to environmental and social investment.⁷

The third pillar of this national convergence is the explosive growth of the Shariah fintech industry. Indonesia, home to the world's largest Muslim population, leads globally in the number of Shariah fintech companies.⁸ The industry experienced staggering growth, increasing by approximately 130% from 2020 to 2021 and reaching 180% growth by 2022, with a projected market size of US\$179 billion and a compound annual growth rate (CAGR) of 17.9% by 2026.⁹ This rapid expansion is fueled by a burgeoning digital adoption rate, with internet users in Indonesia projected to reach 215 million by 2020, creating a massive addressable market for digital financial services.¹⁰ Fintech platforms have already revolutionized zakat collection in the country. Partnerships between major tech firms and religious bodies have created scalable infrastructure; for instance, GoPay (part of Gojek) partnered with the Indonesian Mosque Council to enable digital zakat donations across a network of 800,000 mosques, demonstrating a model for mass mobilization of zakat funds. Other platforms like Kitabisa, Indonesia's largest crowdfunding site, have shown the power of technology to fund diverse social causes, raising \$10,700 for a street children's school in West Java.¹¹¹² These existing ecosystems provide the necessary technological backbone to manage the complex logistics of collecting, tracking, and distributing zakat funds efficiently, securely, and transparently. The synergy between these three powerful forces state-led green finance, institutionally driven social finance innovation, and market-driven technological disruption creates a unique opportunity to harness the vast potential of zakat for green economic transformation. The challenge, however, lies in effectively connecting these pillars, particularly at the regional level, where local contexts, operational capacities, and systemic weaknesses can either amplify or undermine this transformative potential. The case of Bengkulu offers a compelling lens through which to examine this dynamic interplay.

National Force	Key Initiatives & Players	Relevance to Green Zakat
Green Finance Policy	PT Sarana Multi Infrastruktur (SMI) ceasing coal financing; Bank SMBC Indonesia halting coal/oil & gas financing; Government commitment to green recovery.	Creates demand and channels for green projects (e.g., hydro power, waste-to-energy) that can be funded by zakat. ¹²

⁷ <https://www.undp.org/id/indonesia/press-releases/baznas-bsi-dan-undp-resmilocurkan-kerangka-zakat-hijau-untuk-membangun-ketangguhan-masyarakat-dan-mengatasiperubahan>

⁸ <https://thefintechtimes.com/fintech-for-good-with-zakat-in-islamic-finance/>

⁹ Fidhayanti, Dwi etc, 2024, Exploring The Legal Landscape of Islamic Fintech in Indonesia: A Comprehensive Analysis of Policies and Regulations, <https://PMC.ncbi.nlm.nih.gov/articles/PMC11101920/>

¹⁰ Friantoro,Dian, 2019, Do We Need Financial Technology for Collecting Zakat

¹¹ <https://govinsider.asia/intl-en/article/how-indonesia-is-developing-sharia-fintech>

¹² <https://www.ptsmi.co.id/pt-smi-and-climate-bonds-initiative-commitment-toaccelerate-green-infrastructure-in-indonesia>

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Green Zakat Framework	BAZNAS launching the Green Zakat Framework (Aug 2024/Oct 2025); UN presentation; supported by DSN MUI Fatwa; Green Zakat Index (GZI) for measurement.	Provides the strategic blueprint and religious legitimacy to channel zakat directly into environmental and sustainable development projects. ¹³
Shariah Fintech Growth	Indonesia leading in Shariah fintech companies; rapid growth rates; platforms like GoPay, ZakatPay, Kitabisa facilitating digital collection.	Offers the scalable, efficient, and transparent technological infrastructure needed to mobilize and manage largescale zakat funds for green projects. ¹⁴

Bengkulu Province stands as a compelling microcosm where the macro-level national trends of green economic development, institutional social finance, and Islamic financial innovation intersect with distinct local realities. The province is not a passive recipient of these national shifts but an active participant, strategically positioning itself as a hub for sustainable development. This proactive stance is evident in high-level collaborations and ambitious infrastructure projects that signal a clear departure from conventional economic models. The most prominent example is the partnership between Hello Green Nusantara, a Hungarian company, and PT Bengkulu Mandiri (Perseroda), a provincial state-owned enterprise. This collaboration aims to establish a Special Economic Zone based on green industries, a vision endorsed by key figures including the Acting Governor of Bengkulu and a member of the House of Representatives' Commission VI. The project's scope is tangible and forward-looking, encompassing the development of a waste-to-energy processing facility and the introduction of hydrogen-powered buses to tackle environmental and energy challenges. This initiative is part of a broader plan to create a sustainable economic ecosystem that also supports critical infrastructure development, such as airport expansion, port modernization, and new highways, demonstrating an integrated approach to regional planning.¹⁵ The provincial government has demonstrated strong political will by committing to attract responsible investments that are not only economically profitable but also deliver positive social impacts, including job creation and improved quality of life.¹⁶

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https://baznas.go.id/newsshow/BAZNAS_Luncurkan_Green_Zakat_Index,_Dorong_Zakat_sebagai_Instrumen_Ekonomi_Hijau_dan_Keberlanjutan/3422

¹⁴ Ummu, chorin, 2018, Financial Innovation on Zakat Distribution and Economic Growth. INTERNATIONAL CONFERENCE OF ZAKAT 2018 PROCEEDINGS ISSN: 2655-6251, <https://www.iconzbaznas.com/submission/index.php/proceedings/article/download/115/62/>

¹⁵ <https://hellogreenfoundation.com/blog/132-bengkulu-takes-a-bold-step-toward-green-economy-hello-green-nusantara-and-pt-bengkulu-mandiri-launch-sustainable-investment-project>

¹⁶ <https://windonesia.com/article/bengkulu-hello-green-nusantara-works-on-sustainableinvestment-project>

METHOD

This study employs a qualitative case study design to provide an in-depth, contextualized investigation of the integration of Islamic fintech, zakat management, and green economic initiatives in the Bengkulu region. The case study approach is selected for its suitability in exploring complex real-world phenomena within their natural setting, particularly when the boundaries between the phenomenon and context are not clearly evident (Yin, 2018). Data were collected through multiple, triangulated sources to ensure rigor and credibility. Documentary Analysis: Primary and secondary documents were systematically reviewed, including national policy instruments (e.g., BAZNAS Green Zakat Framework, DSN-MUI Fatwas), reports from financial institutions (Bank Indonesia, OJK, PT SMI), project proposals (e.g., Hello Green Nusantara–PT Bengkulu Mandiri MoU), and operational records from local zakat institutions (BAZNAS Bengkulu, IZI Perwakilan Bengkulu), including program evaluations and theses (e.g., the 2017 study on IZI's productive program management). Secondary Data Synthesis: Publicly available data on Islamic finance growth (e.g., fintech market size, Islamic bank asset statistics), green investment flows (e.g., green bond issuances), and regional development indicators for Bengkulu were collated and analyzed. Contextual Observation: The analysis incorporated observable trends and institutional landscapes, such as the proliferation of Shariah fintech platforms (e.g., GoPay's zakat integration), the structure of Bengkulu's Islamic banking sector, and the operational models of local zakat programs (e.g., Business Cart Assistance, Lapak Berkah). Data analysis followed an inductive-deductive thematic approach, combining a priori categories derived from the research questions (e.g., regulation, governance, technology adoption) with emergent themes identified from the empirical data (e.g., monitoring gaps, trust deficit, hybrid implementation potential). This method enabled a critical, evidence-based diagnosis of the systemic enablers and barriers, moving beyond theoretical speculation to ground the findings in the operational realities of the Bengkulu context.

RESULT AND DISCUSSION

This strategic vision is supported by a mature and well-established Islamic financial ecosystem. As of November 2022, Bengkulu was home to five full-fledged Islamic banks Bank Syariah Indonesia, Bank Muamalat Indonesia, Bank Mega Syariah, Bank Sinarmas Syariah, and Bank Tabungan Negara Syariah as well as three Shariah Rural Banks (SRBs). The assets held by these Islamic financial institutions grew at a remarkable year-on-year rate of 18.29%, significantly outpacing the 8.12% growth of conventional banks in the same period, despite having a smaller overall asset base. This indicates a strong community preference for shariah-compliant financial products and services, providing a ready-made network of potential partners, collaborators, and fund custodians for any initiative involving Islamic finance, including zakat-based green funding. The region's interest in Islamic economics is further reflected in Google Trends, which ranked Bengkulu third among Indonesian subregions in terms of search interest in 2023. This established financial infrastructure, coupled with a receptive public, creates a favorable environment for the adoption of innovative financial models.¹⁷

Complementing this financial landscape are numerous zakat management institutions that form the social finance backbone of the region. These include BAZNAS Bengkulu, IZI (Inisiatif Zakat Indonesia) Perwakilan Bengkulu, LAZ Yakesma Bengkulu, and others.¹⁸ These organizations are already engaged in productive zakat programs aimed at economic empowerment. For example, BAZNAS Bengkulu and the provincial government collaborated on a Business Cart Assistance

¹⁷ <https://www.mdpi.com/2077-1444/14/11/1376>

¹⁸ https://baznas.go.id/news-show/Kota_SDGs_Bengkulu_Diluncurkan/121

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Program, distributing 60 carts to beneficiaries between 2021 and 2024.¹⁹ Similarly, IZI Perwakilan Bengkulu has implemented programs like the 'Lapak Berkah' (Blessed Stall) to provide operational capital and business branding to vulnerable individuals, such as a widow in Pagar Dewa Village, to help them start a homebased food business [[27]]. These initiatives demonstrate a commitment to moving beyond consumptive aid and fostering self-sufficiency among the poor and needy. However, a deeper analysis reveals that while these institutions are active, their effectiveness is hampered by systemic operational weaknesses that represent a significant friction point in bridging the gap between their current capacity and the demands of a sophisticated, digitally-enabled green economy model. The presence of these players—a visionary green economy project, a robust Islamic banking sector, and a network of zakat institutions—is undeniable. The primary challenge in Bengkulu, therefore, is not a lack of actors or strategic intent, but rather a gap between their current operational realities and the future potential they could unlock through better governance, stronger human resources, and the effective integration of technology.

Bengkulu Ecosystem	Component Key Entities & Activities	Strengths	Weaknesses / Frictions
Islamic Financial Sector	5 Islamic Banks (BSI, Muamalat, etc.) & 3 SRBs; Strong asset growth (18.29% YoY vs 8.12% for conventional banks).	Mature Islamic banking market; High community preference for shariahcompliant services; Ready partner network.	Lack of information on specific partnerships with zakat institutions or dedicated green financing products for SMEs.
Zakat Institutions	BAZNAS Bengkulu, IZI Perwakilan Bengkulu, LAZ Yakesma Bengkulu, and others.	Active in productive zakat programs (e.g., business carts, stalls); Existing networks for community outreach.	Evidence of weak monitoring, inconsistent followup, low entrepreneurial motivation among recipients, and inadequate beneficiary support

¹⁹ Apriani, Laisah etc, 2025, Synergy In The Utilization Of Productive Zakat: A Case Study Of Baznas And The Provincial Government Of Bengkulu, BIMA Journal, <https://journal.pdmbengkulu.org/index.php/bima/article/view/1556/0>

Sustainable Development	Designated as Indonesia's first SDGs city (Nov 2018); Multistakeholder partnerships with government, universities, NGOs, and zakat institutions.	Strong collaborative framework; Focus on holistic development integrating spiritual, social, and environmental dimensions.	Challenges remain in program effectiveness, administrative workload, and ensuring long-term sustainability of interventions
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Optimizing Collection and Distribution: The Role of Islamic Fintech in Enhancing Efficiency and Trust

Islamic fintech serves as the critical connective tissue required to bridge the gap between the vast potential of zakat and the demanding needs of green economic projects. Its primary function is to optimize the entire zakat lifecycle, from collection to final distribution, by introducing unprecedented levels of efficiency, transparency, and scalability. This technological enhancement is not merely about digitizing existing paper-based processes; it is about fundamentally reshaping the architecture of zakat management to meet the expectations of a modern, digitally-native generation of donors and the rigorous demands of data-driven, accountable governance. One of the most significant contributions of fintech is its ability to dramatically increase the speed and efficiency of fund disbursement, particularly in a geographically dispersed archipelago like Indonesia. Digital payment systems, mobile banking, and online platforms reduce transaction costs, minimize delays, and expand access to zakat services for populations in remote areas who may lack proximity to physical collection centers.²⁰ Platforms like GoPay, which partnered with the Indonesian Mosque Council to facilitate donations across 800,000 mosques, exemplify how existing digital ecosystems can be leveraged to achieve near-instantaneous, large-volume transactions. This ease of access is a powerful incentive for donors, potentially helping to close the significant gap between zakat potential and actual collection, which stood at only 0.09% of potential between 2011– 2015.²¹

Beyond mere efficiency, the true transformative power of fintech lies in its capacity to rebuild and reinforce public trust, a currency that has been eroded by past allegations of corruption within zakat management bodies.²² Technologies such as blockchain offer a revolutionary solution to this challenge by creating immutable, transparent, and auditable transaction records. A blockchain-based system allows donors to trace their contributions from the moment of donation through every stage of the supply chain, right up to the final point of distribution to the intended beneficiary. This end-to-end traceability is invaluable for enhancing donor confidence and institutional credibility, as it makes manipulation and misallocation of funds exceedingly difficult²³. For an institution like BAZNAS,

²⁰ Ummu, chorin, 2018, Financial Innovation on Zakat Distribution and Economic Growth. INTERNATIONAL CONFERENCE OF ZAKAT 2018 PROCEEDINGS ISSN: 2655-6251, <https://www.iconzbaznas.com/submission/index.php/proceedings/article/download/115/62/>

²¹ Friantoro,Dian, 2019, Do We Need Financial Technology for Collecting Zakat

²² Fahamsyah, etc, 2025, Navigating Fintech Sharia Regulation In Indonesia: Lessons Learned From Malaysia, MJS, <https://mjsl.usim.edu.my/index.php/jurnalmjsl/article/view/794>

²³ Suwanda, 2024, Fintech-Based Crowdfunding System for Zakat Collection: An Innovation in Social

which has faced scandals affecting public trust, implementing such a system would be a powerful tool for demonstrating integrity and meeting the high standards of accountability demanded by the Green Zakat Index. Furthermore, AI and big data analytics can be employed to improve the targeting of zakat recipients, ensuring that funds are directed to those who are most in need and most likely to benefit from productive programs. While these tools require careful governance to avoid algorithmic bias, their potential to move beyond manual verification to data-driven decision-making is significant.

In the context of green economic transformation, fintech enables the aggregation of small individual donations into substantial investment pools capable of funding larger-scale projects. Crowdfunding platforms, which are a core component of the Islamic fintech landscape, allow thousands of individuals to contribute small amounts of zakat to collectively finance a single initiative, such as the installation of solar panels in a village or the purchase of eco-friendly farming equipment. This democratizes participation in the green economy, allowing even modest-income Muslims to become investors in sustainable development. The establishment of a subsidiary, PT Lotus Crypt Indonesia, by Hello Green Nusantara suggests a direct corporate strategy to integrate blockchain and digital platforms into managing green investments, which could pave the way for tokenized green projects funded by zakat. Smart contracts, another blockchain feature, can automate the disbursement of funds based on predefined, verifiable conditions, such as the completion of training modules or the submission of sales reports by a zakat recipient. This embeds accountability directly into the technology, reducing administrative overhead and ensuring that funds are released only when specific milestones are met, thereby addressing one of the key weaknesses identified in local zakat programs the lack of consistent monitoring and mentorship.²⁴ By streamlining operations and automating compliance, fintech can free up human resources within zakat institutions to focus on higher-value activities like beneficiary mentoring, community engagement, and strategic project planning. This creates a virtuous cycle where technology enhances operational efficiency, which in turn builds trust, attracting more donors and increasing the total pool of capital available for impactful green projects.

Bridging the Gaps: Overcoming Operational Weaknesses in Local Zakat Management

While the technological potential of Islamic fintech is immense, its successful application in a region like Bengkulu hinges critically on addressing the deep-seated operational weaknesses that currently plague many local zakat management institutions. A stark, evidence-based diagnosis of these challenges comes from a 2017 thesis analyzing the zakat productive program management practices of IZI (Inisiatif Zakat Indonesia) Perwakilan Bengkulu. The study reveals a significant disconnect between the ambition of empowering mustahik (beneficiaries) and the reality of program implementation. One of the most fundamental flaws is the absence of strategic planning. The program operates reactively, with planning activities triggered only after an application is received and focusing solely on logistical details like timing and amount of disbursement, rather than on comprehensive business planning aimed at long-term economic improvement. There is no dedicated unit for productive programs within IZI Bengkulu; all functions are handled informally by the Head of Program & Distribution, who lacks a formal educational background in zakat or waqf management due to a scarcity of such graduates in the region. This organizational structure is ill-equipped to handle the complexities of fostering sustainable entrepreneurship, let alone scaling a program according to a national framework like the Green Zakat Framework.

A second, equally critical failure is the systematic breakdown in monitoring and accountability. The thesis found that monitoring of zakat recipients is inconsistent and largely ineffective, hindered by staff shortages. Many recipients reported receiving no postdisbursement visits, with follow-ups limited to occasional phone calls or a single check-in months later. When failures occur such as the misuse of funds or the abandonment of provided assets like business carts there is no corrective guidance or mentoring provided.²⁴ The system's response is punitive: violators lose eligibility for future aid, but there is no mechanism to rehabilitate or support them back on track. This reactive approach fails to address the root causes of failure, such as low entrepreneurial motivation, and undermines the very goal of sustainable empowerment. In fact, the evaluation showed that a significant portion of recipients reused their initial funding for consumptive purposes rather than business development, indicating non-productive usage in a notable percentage of cases. Similar findings were reported in a parallel Business Cart Assistance Program run by BAZNAS Bengkulu, which suffered from identical challenges of low motivation, misuse of assets, and weak monitoring. These documented failures highlight that simply providing capital is insufficient; sustained economic improvement requires ongoing supervision, mentorship, and problem-solving support, which are conspicuously absent in the current model.

Furthermore, these operational deficiencies are compounded by a pervasive gap in financial and digital literacy. While there is a growing public interest in Islamic economics in Bengkulu, a significant knowledge deficit persists regarding core concepts like riba (interest) and the principles of shariah-compliant finance. This lack of awareness affects both muzakki (donors) and mustahik (recipients). For beneficiaries, a lack of financial literacy can lead to poor business decisions, making them unable to effectively utilize the capital and skills provided by zakat programs. For amil (managers), insufficient digital literacy poses a barrier to adopting modern management systems like the Green Zakat Index or leveraging fintech platforms to their full potential. The TOE (Technology-Organization-Environment) framework highlights that the successful adoption of fintech in zakat institutions depends not just on the technology itself, but on the organization's readiness and the surrounding communitygovernment collaboration. Without investing in continuous training and education for their staff, institutions cannot fully capitalize on the efficiencies offered by technology. Finally, the issue of public trust remains a formidable obstacle. Allegations of corruption within zakat management bodies, including high-profile cases in Bengkulu where a treasurer was named a suspect for unaccounted funds, have contributed to a decline in formal donation channels . For any new digital system to succeed, it must first prove its own integrity and transparency, a challenging task given the history of malfeasance. Therefore, before deploying advanced fintech solutions, zakat institutions in Bengkulu must undertake foundational reforms to strengthen their human resources, improve their monitoring and support systems, and work diligently to rebuild the public trust that is the bedrock of their mission.

²⁴ Apriani, Laisah etc, 2025, Synergy In The Utilization Of Productive Zakat: A Case Study Of Baznas And The Provincial Government Of Bengkulu, BIMA Journal, <https://journal.pdmbengkulu.org/index.php/bima/article/view/1556/0>

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Operational Challenge	Evidence from Bengkulu Context	Implication for Green Zakat Integration
Lack of Strategic Planning	IZI Bengkulu's productive programs operate reactively without a dedicated planning unit; forecasting focuses only on logistics, not business sustainability.	Difficulty in aligning zakat funds with the long-term, multi-phase nature of green infrastructure projects. Requires a shift from tactical to strategic thinking.
Ineffective Monitoring & Support	Minimal post-disbursement follow-up; no corrective mentoring for failed projects; punitive measures instead of supportive rehabilitation.	Hinders the success of productive zakat, which is a prerequisite for funding more complex green enterprises. Sustainability of green projects is at risk.
Low Human Resource Capacity.	Staff handle multiple roles informally without specialized zakat/waqf backgrounds; lack of dedicated personnel for productive programs.	Limits the ability to manage complex digital platforms (like GZI) and analyze data for effective green project selection and impact assessment
Insufficient Beneficiary Support	Low entrepreneurial motivation among recipients; lack of ongoing mentorship and problem-solving assistance.	Productive zakat recipients often fail to sustain businesses, undermining the core objective of empowerment. This weakness would be magnified in green ventures.
Public Trust Deficit	Corruption allegations against zakat officials in Bengkulu and elsewhere have led to declining donation rates.	Any new digital system must first overcome skepticism. Transparency features of fintech are essential but must be proven to be genuine

The practical application of integrating Islamic fintech with zakat for green economic transformation can be illuminated through several illustrative case studies drawn from both national-level initiatives and emerging corporate strategies in Indonesia. These examples demonstrate how technology can be used to channel faith-based capital towards tangible, environmentally beneficial projects, providing a roadmap for similar implementations in regions like Bengkulu. One of the most direct and relevant examples is the work of PT Sarana Multi Infrastruktur (Persero) (PT SMI), a state-owned enterprise that has become a leader in green infrastructure financing. In 2018, SMI issued a green bond worth IDR 500 billion to refinance three key projects: the Lubuk Gadang mini-hydro plant in West Sumatra and the Tunggang Bengkulu mini-hydro plant (PLTM) in Bengkulu Province. This transaction represents a clear pathway for zakat funds to indirectly support renewable energy. While SMI itself is not a zakat institution, the existence of such a platform creates a trusted, regulated channel for ethical capital to flow into the green economy. An Islamic fintech platform could potentially develop a product that allows zakat donors to invest their funds, which are then pooled and channeled through

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intermediaries like SMI to finance projects like the Tunggang PLTM, thereby linking individual charitable contributions directly to large-scale environmental impact. The collaboration between SMI and Bank Syariah Indonesia (BSI) on a Rp 2 trillion green loan for PLN's projects further strengthens this potential partnership, creating a symbiotic relationship between state green financing and Islamic banking that could be extended to zakat.²⁵

Another powerful case study is the corporate strategy of Hello Green Nusantara, a company deeply involved in developing green industrial zones in Indonesia. Their collaboration with PT Bengkulu Mandiri to establish a green special economic zone in Bengkulu is a prime example of public-private partnership driving sustainable development. The company's strategic moves suggest a deliberate integration of digital technologies into its operations. The signing of a Memorandum of Understanding (MoU) with PT OGB Environmental Technologies for MSW management using advanced technologies indicates a focus on cutting-edge solutions. More significantly, the establishment of a subsidiary, PT Lotus Crypt Indonesia, in partnership with Hungarian developers points towards the potential use of blockchain or other digital platforms for managing green investments.²⁷ This could evolve into a model where zakat funds are collected via a Shariah-compliant fintech app and then used to purchase tokens representing shares in a green project, such as the waste-toenergy facility in Bengkulu. This would provide zakat donors with a transparent and secure way to participate in and monitor the progress of the project, embodying the principles of the Green Zakat Framework. This model transforms zakat from a simple donation into a participatory form of ethical investment.

Finally, the academic and operational models being tested at the grassroots level in Bengkulu provide insights into the necessary components of a successful program. The 'Kampung Zakat' (Zakat Village) program launched by LAZNAS Yakesma Bengkulu in Tasikmalaya Village is a localized initiative that demonstrates a model for community-based development²⁶. While the specifics of its integration with green economy projects are not detailed, the concept of creating dedicated development zones at the village level is highly scalable. A tech-enabled version of this program could involve using a mobile app to register and verify beneficiaries, provide them with targeted training modules on sustainable livelihoods (e.g., organic farming, eco-tourism), and track their progress. Successful completion of these modules could trigger automated disbursements of zakat-funded seed capital for green micro-enterprises. Baznas Bengkulu's existing community empowerment programs, which focus on converting waste into valuable products like plastic pellets and fertilizer, already incorporate elements of a circular economy.²⁷ These programs, which benefited over 600 families, could be enhanced with fintech by using QR code payments for the sale of processed goods, providing real-time sales data to beneficiaries, and automatically allocating a portion of profits back to the zakat fund for reinvestment. By combining these national financing models, corporate green initiatives, and local community programs, a comprehensive and replicable framework for green zakat emerges one that is technologically enabled, financially viable, and socially impactful.

Navigating the Labyrinth: Regulatory, Governance, and Implementation Barriers

Despite the immense potential unlocked by the convergence of green finance, social capital, and technological innovation, the path to widespread implementation of Islamic fintech-powered green zakat is fraught with significant barriers. These challenges span the regulatory, governance, and

²⁵ <https://www.kompas.id/artikel/en-akses-keuangan-hijau-fondasi-percepatan-energi-bersih> ²⁷ <https://hellogreen.id/>

²⁶ <https://www.yakesma.org/yakesma-dukung-green-zakat-framework-bersama-baznas/>

²⁷ <https://khazanah.republika.co.id/berita/phyxm3368/baznas-luncurkan-sdgs-pertama-di-bengkulu>

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implementation domains, requiring concerted efforts from policymakers, regulators, and industry stakeholders to navigate successfully. At the forefront are the regulatory ambiguities that characterize Indonesia's approach to Shariah fintech. The legal framework is fragmented and lacks specificity, primarily relying on general Financial Services Authority Regulations (POJK) designed for conventional fintech.²⁸ This creates a state of legal uncertainty, as platforms offering Shariah-compliant services like peer-to-peer lending and crowdfunding often fall under regulations not tailored to their unique characteristics, such as the prohibition of interest (riba) and the emphasis on profit-and-loss sharing. Licensing procedures are notoriously complex and fragmented, with different authorities overseeing different aspects of fintech operations OJK for peer-to-peer lending and Bank Indonesia (BI) for payment systems—which necessitates cumbersome coordination between the two institutions. This regulatory maze is further complicated by the requirement for Islamic fintech to establish its own Sharia Supervisory Board and comply with fatwas issued by the National Sharia Council of the Indonesian Ulema Council (DSN MUI). While these fatwas provide important religious guidance, they hold no binding legal force or enforceable sanctions within Indonesia's formal legal hierarchy, creating a reliance on voluntary compliance that is less robust than in countries like Malaysia or Saudi Arabia, where Sharia advisory bodies operate under state authority and their rulings are legally binding.²⁹

These regulatory shortcomings give rise to profound governance and accountability challenges. The absence of a dedicated dispute resolution mechanism specifically for Shariah fintech is a critical vulnerability. Under Law Number 50/2009, Religious Courts should handle such cases, but this provision remains unclear and underdeveloped in practice. If a smart contract on a blockchain platform fails to execute correctly, or if funds are misallocated through a digital zakat platform, there is no clear, streamlined process for redress and accountability. This lack of a robust enforcement mechanism weakens investor and donor confidence. Moreover, consumer protection remains a pressing concern. The proliferation of illegal online lending entities, with the Satgas Pasti task force blocking 173 such operations, highlights the risks of scams, cybercrime, and data security breaches in the broader fintech space. These risks are amplified in the sensitive realm of zakat, where trust is paramount. Unlicensed operators and information asymmetry between muzakki and amil further exacerbate the problem, creating an environment where fraud and mismanagement can flourish³⁰.

Even with a perfect regulatory and governance framework, numerous implementation risks persist. Cybersecurity threats and data privacy concerns are legitimate challenges that require robust, low-risk payment systems and strong encryption protocols to mitigate. Infrastructure inequality remains a significant hurdle, with inconsistent internet connectivity and low ownership of mobile devices, particularly outside of Java, potentially excluding large segments of the population from digital zakat platforms. This digital divide threatens to deepen existing inequalities if not addressed proactively through inclusive design, such as SMSbased tools for basic phone users. There is also a risk of "mission drift," where the focus on "green" projects could dilute the core mission of poverty alleviation if not carefully managed. Some skepticism persists among the public regarding the authenticity of Islamic banking, with some viewing certain profit-sharing schemes as camouflaged interest, reflecting a

²⁸ Fahamsyah, etc, 2025, Navigating Fintech Sharia Regulation In Indonesia: Lessons Learned From Malaysia, MJSL, <https://mjsl.usim.edu.my/index.php/jurnalmjsl/article/view/794>

²⁹ Fidhayanti etc, 2024, Exploring The Legal Landscape of Islamic Fintech in Indonesia: A Comprehensive Analysis of Policies and Regulations, PMC Pubmed Central.

³⁰ Friantoro,Dian, 2019, Do We Need Financial Technology for Collecting Zakat

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broader challenge in fully adhering to shariah principles amid complex economic realities.³¹ To conclude, realizing the transformative potential of green zakat in Bengkulu and across Indonesia requires a multi-pronged strategy. Stakeholders must advocate for clearer, Sharia-specific regulations from OJK and BI, promoting best practices from jurisdictions like Malaysia. They must prioritize foundational upgrades in local zakat institutions, focusing on strengthening human resources and improving monitoring systems before deploying advanced technology. Ultimately, a hybrid implementation model that pairs the deep community understanding and trusted brand of established zakat institutions with the scalable, transparent infrastructure of specialized Shariah fintech firms offers the most promising path forward. By navigating these labyrinthine challenges with strategic foresight, Bengkulu can become a national model, demonstrating how faith-based social finance, empowered by ethical technology, can serve as a powerful engine for a just and sustainable green economic transformation.

CONCLUSION

The integration of Islamic fintech with zakat-based funding models presents a powerful, yet complex, pathway for driving green economic transformation in Bengkulu. The research confirms that the technological potential is substantial: digital platforms can revolutionize zakat by enhancing collection efficiency, ensuring transparent and traceable distribution via blockchain, and aggregating small donations into capital pools capable of financing large-scale renewable energy or circular economy projects. This aligns perfectly with national strategic initiatives like BAZNAS's Green Zakat Framework and PT SMI's green infrastructure investments, creating a viable channel for faith-based capital to contribute directly to Indonesia's climate and sustainability goals.

However, the primary conclusion is that the most significant barriers are not technological but operational and institutional. The case of Bengkulu reveals a critical gap between the region's strategic vision and its implementation capacity. Local zakat institutions, despite their active role in productive programs, suffer from systemic weaknesses including inadequate strategic planning, ineffective monitoring, insufficient human resource expertise, and a profound deficit in public trust stemming from past governance failures. These weaknesses render even the most advanced fintech tools ineffective if not addressed first. Furthermore, the broader ecosystem is constrained by fragmented regulations, a lack of enforceable Shariah compliance mechanisms, and persistent challenges related to cybersecurity and the digital divide.

Therefore, the path forward requires a strategic, two-pronged approach. First, local zakat institutions must undertake foundational reforms to strengthen governance, invest in staff training, and rebuild public trust through demonstrable transparency. Second, they should adopt a hybrid implementation model, partnering with specialized, reputable Islamic fintech firms to leverage their technological infrastructure for efficient, secure, and scalable operations. This collaboration allows zakat bodies to focus on their core competencies community engagement and beneficiary support while technology handles the complex logistics of fund management and impact tracking. By navigating these challenges with foresight and collaboration, Bengkulu has the unique opportunity to become a pioneering model for how faith-based social finance, empowered by ethical technology, can serve as a transformative engine for a just, inclusive, and sustainable green economy.

³¹ <https://www.mdpi.com/2077-1444/14/11/1376>

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