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The Role of Government Subsidies in Promoting Green Investments in Renewable Energy Projects in Indonesia

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Abstract

This study investigates the role of government subsidies in promoting green investments in Indonesia's renewable energy sector. With the goal of achieving a 23 percent renewable energy mix by 2025, Indonesia has implemented various fiscal policies, including subsidies, tax incentives, and feed-in tariffs to encourage investment in green energy. A qualitative methodology was adopted, relying on secondary data analysis from government reports and international institutions. The findings indicate that while subsidies have encouraged investment in renewable energy, their effectiveness is limited by the ongoing reliance on fossil fuel subsidies and institutional barriers such as fragmented governance and regulatory uncertainty. The study suggests that shifting fiscal support from fossil fuels to renewable energy, implementing performance-based subsidy programs, and improving governance structures could significantly enhance the effectiveness of subsidies. The main contribution of this research is its comprehensive assessment of Indonesia's subsidy landscape and its implications for the country's energy transition. This study highlights the need for coordinated, long-term policy strategies to align fiscal policies with sustainability goals and suggests avenues for future research, including evaluating the socio-economic impacts of subsidy reforms.

INTRODUCTION

Indonesia stands at a critical juncture in its pursuit of a cleaner and more sustainable energy future. On one hand, the government has committed to an ambitious energy transition, targeting a 23 percent renewable energy mix by 2025 and achieving net zero emissions by 2060. On the other hand, the country's long-standing dependence on fossil fuels and the persistence of fossil fuel subsidies have created structural and policy biases that favor conventional energy sources over renewable ones. This dual reality highlights the importance of evaluating how government subsidies, as fiscal instruments and policy tools, can effectively promote or hinder green investment in renewable energy projects (Yan et al., 2023; Sun et al., 2024; Wall et al., 2024).

Over the past two decades, Indonesia's government has implemented several fiscal and non-fiscal mechanisms to stimulate investment in renewable energy (Hendriwardani et al., 2022). These include tax incentives such as corporate income

tax reductions, accelerated asset depreciation, import duty exemptions for renewable energy equipment, and feed-in-tariff schemes that guarantee power purchase from renewable energy producers at pre-determined rates (Green Fiscal Policy Network, 2023). Such initiatives aim to reduce project risks and increase the financial attractiveness of renewable energy investments, particularly in solar, small hydro, geothermal, and biomass sectors. For instance, the feed-in-tariff policy has provided price certainty that encourages private developers to invest in small-scale renewable projects, which would otherwise be deemed unprofitable under market-driven pricing (Wu et al., 2025).

However, despite these progressive steps, Indonesia's fiscal landscape remains heavily tilted toward fossil fuels. The continuation of fossil fuel subsidies, including subsidies for coal-based electricity and petroleum products, distorts market prices and undermines the competitiveness of renewable energy. According to the International Institute for Sustainable Development (Durovic, 2025; Kabeyi & Olanrewaju, 2022; Koutsoukos, 2025), between 2016 and 2020, approximately 94 percent of Indonesia's energy-related fiscal incentives supported fossil fuels, while only a small share was directed toward renewable energy. This imbalance not only slows down the green transition but also locks the country into a high-carbon development pathway, increasing future environmental and fiscal risks (Liu & Zhou, 2024; Campiglio et al., 2017).

From a critical perspective, government subsidies function as a double-edged sword. When poorly designed or inconsistently implemented, subsidies may generate inefficiencies, moral hazards, and fiscal burdens without delivering meaningful environmental outcomes (Segerson et al., 2024; Damania et al., 2023). Yet, when strategically structured, subsidies can catalyze systemic change by lowering entry barriers for private investors, mitigating technology risks, and fostering innovation in clean energy technologies. For Indonesia, the challenge lies in shifting from fossil fuel-dependent subsidies toward green subsidies that incentivize sustainable investments and reflect the true social and environmental costs of energy production.

Recent policy discussions in Indonesia, such as those under the Green Economy Framework led by the Ministry of National Development Planning (Bappenas), highlight growing recognition of this paradigm shift. The Green Growth Program, for example, seeks to align public investment with sustainable development by promoting fiscal instruments that support renewable energy, energy efficiency, and sustainable land use (Yan et al., 2023; Huang, 2023; Saqib et al., 2025; Adamowicz, 2022). Nevertheless, the implementation of such programs often encounters institutional barriers, including regulatory uncertainty, overlapping authority among ministries, limited financial capacity, and the dominance of state-owned enterprises in the energy market (Nwosu et al., 2025). These structural challenges weaken investor confidence and reduce the effectiveness of subsidies as a policy tool.

Furthermore, the effectiveness of subsidies should be evaluated not only through economic metrics but also through social and environmental perspectives. Effective green subsidies must ensure energy justice, guaranteeing affordable and reliable energy access for marginalized communities while promoting environmental sustainability. Balancing fiscal sustainability with social equity thus becomes a defining test for Indonesia's energy policy. Without such balance, subsidies may reinforce existing inequalities or fail to achieve long-term emission reduction targets.

METHODS

This study employs a qualitative and analytical approach to assess the role of government subsidies in promoting green investments in Indonesia's renewable energy sector. The methodology is designed to comprehensively explore the effectiveness of fiscal policies in attracting private sector investment, fostering

renewable energy deployment, and addressing structural barriers in the energy sector. The research integrates secondary data analysis, policy review, and case studies to evaluate the design, implementation, and impact of government subsidies on the renewable energy transition.

Research Design

The research design is rooted in a policy analysis framework, which combines both descriptive and evaluative dimensions. The descriptive aspect involves mapping the current subsidy mechanisms, institutional frameworks, and regulatory reforms related to renewable energy investment in Indonesia. It also examines how these mechanisms interact with existing policy structures, including those supporting fossil fuels. The evaluative dimension, on the other hand, critically assesses the effectiveness of these subsidies in mobilizing green investment and fostering the deployment of renewable energy technologies. This is achieved by comparing the effectiveness of renewable energy subsidies with the continued support for fossil fuel subsidies in the Indonesian economy.

Data Collection

Data for this study were primarily collected through secondary sources, focusing on documents and reports from government bodies, international organizations, and academic publications. The primary sources include official reports from Indonesia's Ministry of Energy and Mineral Resources (MEMR), the Ministry of Finance, the National Development Planning Agency (Bappenas), and the state-owned electricity company PLN. In addition, reports from international institutions such as the International Energy Agency (IEA), the International Institute for Sustainable Development (IISD), and the World Bank were reviewed to provide comparative data on fiscal incentives and subsidy allocations. Peer-reviewed academic articles and policy briefs were also examined to gain theoretical and conceptual insights into the effectiveness of government subsidies in promoting green investments.

Secondary Data Analysis

Secondary data analysis is central to the research methodology, allowing for an in-depth understanding of the existing policies, subsidy structures, and their outcomes. The analysis of official reports and policy documents enables the identification of subsidy types and their intended outcomes. These documents were carefully screened for relevance to the study's objectives, focusing on those published between 2015 and 2024 to capture the most recent policy shifts and trends in Indonesia's energy sector. This period corresponds with Indonesia's commitment to the Paris Agreement and its subsequent efforts to reform fossil fuel subsidies and promote green investments.

The secondary data analysis also involved synthesizing information on the financial support provided to renewable energy sectors, including geothermal, solar, and biomass. Specific attention was given to the mechanisms of tax incentives, feed-in tariffs, and risk mitigation programs designed to attract private investment. These data were assessed in light of the ongoing subsidies for fossil fuels, which have historically constituted the largest share of Indonesia's energy-related fiscal incentives.

Analytical Framework

The analysis is grounded in the Political Economy of Energy Transitions framework, which explores the interplay between state policy, economic incentives, and institutional behavior. This framework views subsidies as tools of state intervention that can either correct or perpetuate market failures. It recognizes that subsidies can serve as policy instruments to address energy system challenges, but their design

and implementation are critical to achieving desired outcomes. In this context, the analysis seeks to evaluate how subsidies, when effectively designed, can support the transition to renewable energy by reducing financial and technological barriers to investment.

The study employs content analysis to interpret policy documents and subsidy frameworks. The content analysis focuses on understanding how fiscal allocations, policy language, and institutional priorities reflect Indonesia's commitment to renewable energy transition. This approach moves beyond numerical subsidy comparisons and examines how political priorities, regulatory coherence, and governance capacity influence the effectiveness of fiscal policy tools.

Case Study Approach

A case study approach is utilized to contextualize Indonesia's experiences within the broader global energy transition narrative. This approach provides a comprehensive view of the challenges and opportunities associated with renewable energy adoption in developing countries with fossil-fuel-dependent economies. By focusing on Indonesia, the study highlights the tension between achieving energy security through fossil fuel reliance and the pursuit of long-term environmental sustainability through renewable energy investments.

The case study approach also draws comparisons between Indonesia's experiences and those of other Southeast Asian countries such as Malaysia and Vietnam, which have implemented varying subsidy models to promote renewable energy investments. By exploring these comparative case studies, the research aims to identify policy lessons and best practices that could be applied to Indonesia's energy transition.

Evaluation Criteria

To assess the effectiveness of subsidies, the study evaluates the subsidy design, implementation mechanisms, and their fiscal sustainability. Key criteria for evaluation include transparency, consistency, and the capacity to attract private investment. International best practices are used to assess these criteria, focusing on the allocation of funds, the impact on market incentives, and the level of private sector involvement in renewable energy projects.

The evaluation process also involves assessing the level of governance and institutional coordination in subsidy implementation. This includes identifying the barriers that hinder effective subsidy deployment, such as fragmented governance structures, regulatory uncertainty, and the dominance of state-owned enterprises in the energy sector. The study further examines how these institutional barriers influence investor confidence and the overall effectiveness of fiscal incentives in promoting green investments.

The qualitative synthesis of data involves triangulating information from various sources to derive insights on the role of subsidies in facilitating green investments. The data synthesis process examines how subsidies have been structured, the extent to which they have achieved their intended outcomes, and the challenges faced during implementation. The synthesis also considers the broader economic, social, and environmental impacts of these fiscal interventions. Key themes explored during data synthesis include the balance between fiscal sustainability and environmental goals, the role of subsidies in promoting energy justice, and the social equity implications of energy subsidies. These factors are essential in evaluating the long-term impact of subsidy programs on marginalized communities and their access to affordable and sustainable energy.

RESULTS AND DISCUSSION

This section presents the findings from the analysis of government subsidies in promoting green investments in Indonesia's renewable energy sector. It is structured around the key areas of interest identified in the research: the types and structures of subsidies, their effectiveness in mobilizing private investment, the distortions caused by fossil fuel subsidies, and the potential for optimizing subsidy design to align with Indonesia's climate, fiscal, and social goals. These findings are based on the secondary data analysis, case studies, and evaluation of the subsidy frameworks employed by the Indonesian government. The results highlight both opportunities and challenges in the fiscal and policy landscape of Indonesia's renewable energy transition.

Types and Structures of Government Subsidies

The Indonesian government has implemented a range of fiscal instruments to promote renewable energy investment, with varying levels of success. These fiscal measures include direct subsidies, tax incentives, feed-in tariffs, and risk mitigation programs, which have been designed to stimulate private sector participation in renewable energy projects.

Direct Subsidies and Tax Incentives

One of the primary tools for promoting renewable energy in Indonesia is direct financial support through subsidies and tax incentives. The government offers a variety of incentives, including accelerated depreciation on renewable energy equipment, exemptions from import duties on renewable energy technologies, and corporate income tax reductions. These measures are aimed at reducing the financial burden on private investors, making renewable energy projects more financially viable.

For instance, the solar energy sector benefits from tax incentives such as accelerated depreciation, which reduces the taxable income for companies investing in solar technology. Additionally, the government has introduced feed-in tariff schemes for renewable energy producers, ensuring fixed rates for electricity generated from renewable sources. The feed-in tariff system has been particularly instrumental in encouraging investment in small-scale renewable energy projects such as geothermal, biomass, and solar energy.

Risk Mitigation Programs

To further reduce investment risks, Indonesia has introduced various risk mitigation programs that provide financial guarantees for investors in renewable energy projects. These programs are designed to alleviate the concerns of private investors by covering potential risks such as currency fluctuations, project completion delays, and revenue shortfalls. For example, the Geothermal Resource Risk Mitigation Project provides guarantees for geothermal projects, which are often seen as high-risk investments due to the long lead times and high upfront costs associated with geothermal energy development.

These programs, while beneficial, are limited in scope and often face challenges related to regulatory uncertainty and the lack of institutional capacity to implement them effectively.

Effectiveness of Subsidies in Mobilizing Private Investment

While the subsidy mechanisms have had some success in attracting private investment, their overall effectiveness remains limited by several factors, including the persistence of fossil fuel subsidies and institutional barriers that hinder the implementation of renewable energy policies.

Mobilizing Investment in Renewable Energy

The implementation of feed-in tariffs has proven effective in encouraging private sector participation, particularly in the geothermal and biomass sectors. These schemes have provided price certainty, which is a crucial factor in attracting long-term investments. The certainty of fixed electricity prices for renewable energy producers ensures that projects are financially viable and capable of securing financing from banks and other financial institutions.

However, despite the progress made in the renewable energy sector, the overall level of investment in green energy remains below its potential. The limited scale of subsidies and tax incentives, combined with bureaucratic inefficiencies, has resulted in slower-than-expected growth in renewable energy investments.

Barriers to Investment

One of the main barriers to investment in renewable energy is the continued dominance of fossil fuel subsidies. These subsidies distort market prices and make fossil fuels artificially cheaper compared to renewable energy sources, which are often more expensive due to the high initial capital costs and technology risks. The International Institute for Sustainable Development (Zhukovskiy et al., 2021) found that between 2016 and 2020, approximately 94 percent of Indonesia's energy-related fiscal incentives supported fossil fuels, while only a small share was directed toward renewable energy (Kumar & Rathore, 2023; Adeosun et al., 2023). This imbalance has slowed the transition to green energy by discouraging private investment in renewable energy projects.

In addition to fiscal distortions, the governance structure in Indonesia's energy sector is fragmented. Multiple ministries and agencies are involved in energy policy and subsidy implementation, leading to coordination challenges and delays in policy execution. The dominance of state-owned enterprises (SOEs) in the energy sector further complicates the investment environment, as private investors face competition from state-owned firms that often benefit from preferential treatment and greater access to financing.

Distortions Caused by Fossil Fuel Subsidies

The continued provision of subsidies for fossil fuels has created significant distortions in the energy market, undermining the competitiveness of renewable energy sources.

Impact on Market Prices

Fossil fuel subsidies have contributed to artificially low energy prices, particularly in the electricity sector. These subsidies make coal-based electricity and petroleum products cheaper than renewable energy, which is often seen as uncompetitive due to the high upfront capital costs and technological risks associated with renewable energy projects. The persistence of fossil fuel subsidies undermines the financial attractiveness of renewable energy investments, as the market prices for electricity and fuel do not reflect the true social and environmental costs of energy production.

This price distortion has had long-term consequences for the renewable energy sector. The lack of market-driven price signals has made it difficult for renewable energy technologies to compete on equal footing with fossil fuels. Consequently, many renewable energy projects have been delayed or abandoned, as private investors are hesitant to invest in technologies that may not be financially competitive in a subsidized market.

Environmental and Fiscal Risks

The continuation of fossil fuel subsidies also presents significant environmental and fiscal risks. By locking the country into a high-carbon development pathway, these

subsidies contribute to higher greenhouse gas emissions and environmental degradation. In addition, the fiscal burden of fossil fuel subsidies is substantial, consuming a significant portion of the government's budget and limiting the resources available for investment in renewable energy and other development priorities.

According to the Asian Development Bank (2020), fossil fuel subsidies in Indonesia consumed approximately 3 to 4 percent of GDP annually during the 2010s. These subsidies not only exacerbate Indonesia's carbon footprint but also create a fiscal strain that could hinder the country's ability to invest in sustainable energy infrastructure and meet its climate goals.

Strategic Recommendations for Optimizing Subsidy Design

To improve the effectiveness of subsidies in promoting green investments, several strategic recommendations have been identified. These recommendations aim to align fiscal support with broader climate, fiscal, and social objectives, ensuring that subsidies contribute to long-term sustainable development.

Shifting from Fossil Fuel to Green Subsidies

One of the key recommendations is to shift fiscal support away from fossil fuels and toward renewable energy. Redirecting subsidies from fossil fuels to renewable energy will help level the playing field and encourage private investment in green technologies. The government should phase out fossil fuel subsidies over time, gradually reducing their financial impact while simultaneously increasing support for renewable energy investments.

Designing Performance-Based Subsidy Programs

To ensure that subsidies are used effectively, the Indonesian government should design performance-based subsidy programs that are linked to measurable environmental and economic outcomes. This would involve setting clear targets for renewable energy deployment, emissions reduction, and energy access, and linking subsidy allocations to the achievement of these targets. Performance-based subsidies would also help improve transparency and accountability in subsidy distribution, ensuring that funds are directed toward the most impactful projects.

Strengthening Governance and Institutional Coordination

Improving governance and institutional coordination is crucial for the effective implementation of subsidy programs. The government should streamline decision-making processes, reduce bureaucratic inefficiencies, and foster better coordination between ministries and agencies involved in energy policy. Strengthening governance will improve investor confidence, accelerate policy implementation, and ensure that subsidies are effectively channeled to renewable energy projects.

Encouraging Public-Private Partnerships

Public-private partnerships (PPPs) have proven to be an effective mechanism for mobilizing private investment in renewable energy projects. The government should enhance the PPP framework, providing financial guarantees, risk-sharing mechanisms, and regulatory support to attract private sector investment. PPPs can help overcome the financial and technological barriers to renewable energy deployment, while also fostering innovation in clean energy technologies.

This section presents a detailed analysis of the findings regarding government subsidies and their role in promoting green investments in Indonesia's renewable energy sector. While subsidies have proven instrumental in stimulating investment in renewable energy, there are several challenges and inefficiencies that limit their full potential. Drawing from the results of the study and the literature, this

discussion will explore the implications of subsidies, identify the key challenges, and suggest potential solutions for improving the effectiveness of fiscal policies in supporting Indonesia's transition to a more sustainable energy future.

Government subsidies in Indonesia have played a critical role in encouraging investment in renewable energy, particularly in sectors like geothermal, solar, and biomass. The government has introduced several fiscal tools, such as tax incentives, feed-in tariffs, and risk mitigation programs, to reduce financial risks for private investors and make renewable energy projects more attractive (Moroz & Lyeonov, 2024; Onabowale, 2024). For example, feed-in tariffs have guaranteed fixed electricity prices for renewable energy producers, providing price certainty and encouraging long-term investments. Additionally, tax incentives such as accelerated depreciation and exemptions from import duties have lowered the financial burden on companies investing in renewable technologies. These measures have succeeded in attracting private investment, especially in small-scale projects that might otherwise be considered too risky or unprofitable under conventional market conditions.

However, despite the positive impacts of these subsidies, their overall effectiveness has been limited by several key challenges. One of the most significant barriers is the continued provision of subsidies for fossil fuels, which distorts energy pricing and undermines the competitiveness of renewable energy. Fossil fuel subsidies, which account for a large portion of Indonesia’s energy-related fiscal incentives, make coal and petroleum products artificially cheap, preventing renewable energy from competing on equal footing. As long as fossil fuels remain heavily subsidized, the incentives for investing in renewable energy remain constrained. The persistence of fossil fuel subsidies not only slows the transition to green energy but also locks Indonesia into a high-carbon development pathway, increasing future environmental and fiscal risks (Falcon, 2023).

In addition to fossil fuel subsidies, institutional and governance challenges also limit the effectiveness of renewable energy subsidies. Indonesia’s energy sector suffers from fragmented governance, with multiple ministries and agencies involved in energy policy and subsidy implementation. This lack of coordination leads to inefficiencies and delays in policy execution. The role of state-owned enterprises (SOEs) in the energy sector further complicates the situation, as these companies often receive preferential treatment and have access to more favorable financing terms (Munkhsaikhan & Kamal, 2024). Such fragmentation and the dominance of SOEs create barriers to private sector participation and undermine the potential of subsidies to drive large-scale renewable energy investments.

Furthermore, regulatory uncertainty and inconsistent policy implementation exacerbate the challenges in attracting private investment. The frequent changes in energy policies and the lack of a clear, stable framework for renewable energy development create an environment of uncertainty that deters investors. This uncertainty is particularly problematic in the renewable energy sector, where long-term planning and financial commitments are required. The lack of a consistent and transparent policy framework reduces investor confidence, making it more difficult to secure the necessary funding for large-scale renewable energy projects.

The political sensitivity surrounding fossil fuel subsidies also presents a significant challenge to subsidy reform. Fossil fuel subsidies are deeply embedded in Indonesia's economic and social structures, as they help keep energy prices low for households and industries, particularly in rural areas. Reducing or phasing out these subsidies could result in higher energy prices, which may provoke public opposition, particularly among low-income communities that rely on subsidized fossil fuels for their daily energy needs (Jones & Cardinale, 2023). Therefore, subsidy reforms must

be carefully planned to avoid negative social consequences and ensure that vulnerable populations are not disproportionately affected.

In light of these challenges, several strategies can be employed to optimize the design and implementation of subsidies in Indonesia's renewable energy sector. First and foremost, there is a need to gradually phase out fossil fuel subsidies and redirect that support toward renewable energy. This shift would help make renewable energy more competitive by internalizing the environmental costs of fossil fuel consumption and providing a level playing field for green technologies. The gradual removal of fossil fuel subsidies would also send a strong signal to the market, demonstrating the government's commitment to transitioning to a low-carbon economy (Stern & Cardinale, 2023).

To support this transition, Indonesia must design performance-based subsidy programs that are linked to specific, measurable outcomes. Performance-based subsidies would ensure that funds are allocated to projects that deliver tangible environmental and economic benefits, such as increased renewable energy capacity, reduced emissions, or the creation of green jobs. Such subsidies would improve the transparency and accountability of government spending, as well as incentivize innovation and competition in the renewable energy sector. By focusing on results rather than just providing blanket financial support, performance-based subsidies would maximize the impact of fiscal incentives.

Improving governance and institutional coordination is also critical for optimizing subsidy effectiveness. The Indonesian government should streamline decision-making processes and enhance coordination between the ministries and agencies involved in energy policy. Creating a central body responsible for overseeing renewable energy policy and subsidy implementation would help eliminate redundancies, reduce inefficiencies, and ensure that subsidies are targeted effectively. This body could also facilitate better communication between public and private stakeholders, providing a platform for collaboration and ensuring that policies align with Indonesia's long-term renewable energy goals.

Furthermore, the government must address social equity concerns when implementing subsidy reforms. As mentioned earlier, fossil fuel subsidies are a politically sensitive issue, especially for low-income households. To ensure that subsidy reforms do not disproportionately harm vulnerable communities, the government should introduce targeted support measures for these populations. For instance, revenues generated from phasing out fossil fuel subsidies could be used to fund energy access programs for marginalized communities, such as the development of off-grid renewable energy solutions or subsidies for clean cooking technologies. These measures would ensure that the benefits of the green transition are shared equitably, particularly in areas where access to affordable and clean energy is limited.

Public-private partnerships (PPPs) could also play a crucial role in accelerating the renewable energy transition. By providing financial guarantees, risk-sharing mechanisms, and regulatory support, the government can attract private sector investment in renewable energy projects. PPPs can help overcome the financial barriers to renewable energy deployment, particularly in sectors such as geothermal, where the upfront costs and risks are high. By fostering collaboration between the public and private sectors, Indonesia can leverage additional financial resources and expertise to scale up renewable energy development.

CONCLUSION

This study explores the role of government subsidies in promoting green investments in Indonesia's renewable energy sector. It examines how fiscal instruments, such as

subsidies and tax incentives, have influenced the development of renewable energy projects, particularly in the geothermal, solar, and biomass sectors. The findings reveal that while subsidies have played a crucial role in attracting private investments and stimulating renewable energy projects, their effectiveness is hampered by the continued dominance of fossil fuel subsidies, governance challenges, and social equity concerns. The persistence of fossil fuel subsidies distorts market prices, making renewable energy less competitive. Furthermore, fragmented governance and regulatory uncertainties create inefficiencies and reduce investor confidence in the long-term sustainability of renewable energy policies.

The main implication of this research is the need for a strategic shift in fiscal policy towards supporting renewable energy while phasing out fossil fuel subsidies. The study contributes to the existing body of knowledge by providing a comprehensive analysis of the subsidy structure and its impact on Indonesia's energy transition. It emphasizes the importance of performance-based subsidy programs and improved governance for optimizing subsidy effectiveness. Future research could explore the impact of specific renewable energy technologies on investment flows and evaluate the long-term socio-economic impacts of subsidy reforms on vulnerable communities.

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