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USAID's Role in Indonesia-United States Renewable Energy Transition Cooperation 2019-2024

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ABSTRACT: The challenges of the global energy crisis and the commitment to reduce carbon emissions support Indonesia and the United States in collaborating in the renewable energy sector. Implementing this bilateral cooperation requires the support of international development agencies with adequate technical and funding capacity. This study aims to analyze the strategic role of the United States Agency for International Development (USAID) in facilitating Indonesia-United States renewable energy transition cooperation for the 2019-20224 period, as well as to identify several factors that influence the effectiveness of foreign aid programs in supporting energy diplomacy. This article uses a qualitative descriptive method to analyze reference data from Scopus database journals and Harzing's Publish or Perish. Data analysis used Nvivo14 and VOSviewer to design findings across the collected references. This study found that USAID has contributed through two leading roles, namely as a facilitator of the development of a regulatory framework that produces supporting policies for the energy transition in five major industrial fields and as a coordinator of capacity-building programmes that can help the technical and managerial capabilities of stakeholders in the development of renewable energy projects, especially in Indonesia. Related to the various forms of programmes designed, it can be run significantly from several small and medium-scale renewable energy pilot programmes of 35% during the research period. There are 12 groups formed in cross-field technical working groups that are active in developing standards and guidelines for implementing the renewable energy transition.

KEYWORDS: Renewable Energy Transition, Regulatory Framework & Capacity Building, USAID

I. INTRODUCTION

Today's Earth is experiencing potential energy-related threats, including the global energy crisis and the urgency of limiting carbon emissions to mitigate climate change. The ongoing global energy shortage has illustrated the associated weaknesses of an energy system heavily reliant on fossil fuels. Energy price uncertainty, supply instability and geopolitical volatility have pressured various countries' global economies and national energy balances(Shcherbyna et al., 2024). Relatedly, global sensitivity to climate change has prompted more substantial international commitments to reduce carbon emissions, as reflected in the Paris Agreement and other multilateral agreements. Indonesia, one of the largest economies in Southeast Asia and a country with considerable energy consumption, has a significant role in the global energy transition(Fitzgerald, 2020). The country faces potentially complex threats in reconciling its economic development needs with its carbon emission reduction responsibilitie(Işeri & Uygurtürk, 2022)s. Indonesia has set ambitious targets to achieve 23% renewable energy in its national energy mix by 2024 and an obligation to achieve net zero emissions by 2060(Hussein et al., 2024). However, achieving this target requires political responsibility and considerable technical and monetary support.

Meanwhile, the United States is one of the global leaders in terms of advanced renewable energy technologies and continuous innovation, seeing Indonesia as a crucial partner in the worldwide energy transition agenda(Czermański & Cirella, 2022). Bilateral cooperation between the two countries in the field of renewable energy is becoming increasingly fundamental, not only to achieve sustainability goals but also to strengthen diplomatic and economic relations(Seelke et al., 2021). This bilateral relationship gained a modern initiative by signing the Just Energy Transition Partnership (JETP), which guarantees substantial assistance in Indonesia's energy transition(Stern, 2020). In light of this, the role of international development agencies is fundamental as a link between high-level political responsibility and implementation on the ground. USAID, as the official development agency of the United States, is uniquely positioned with sufficient technical and financial capabilities to coordinate this bilateral cooperation. USAID's long-standing professionalism in implementing Indonesia's development agenda, combined with its technical skills in energy,

make it a key factor in assisting Indonesia's energy transition. 2019-2024, USAID played a vital role in managing various renewable energy cooperation concepts between Indonesia and the United States. This role involves the technical and monetary aspects and the institutional and human capacity building needed to support a sustainable energy transition(Yavan, 2024). However, the ability of the foreign aid agenda in energy diplomacy relations requires interpretation of the factors it controls, consisting of political dynamics, institutional capacity and the socioeconomic situation at the domestic level(Buccieri & Loomis, 2023).

USAID has advanced a comprehensive approach to assisting Indonesia's energy transition through various mutually structured agendas(Anwar et al., 2023). As a facilitator of regulatory framework development, USAID provides technical assistance to the Indonesian government in formulating policies that help build the policy tools, technical standards, and incentive mechanisms needed to create a favourable environment for renewable energy investments. USAID's role as the capacity-building programme coordinator is crucial in building a strong foundation for a sustainable energy transition(Sim, 2024). The capacity-building agenda coordinated by USAID not only focuses on tennis but also includes strengthening the managerial capacity of stakeholders(Fowle et al., 2021). Through various workshops, training and monitoring programmes, USAID has supported the advancement of the competencies of more than 1,000 renewable energy professionals across a wide range of stakeholder groups, from government officials and industry practitioners to academics and researchers(Šekarić Stojanović & Zakić, 2024). This analysis can fill the interpretation gap of how international development agencies such as USAID can be influential in facilitating bilateral cooperation through energy transition(Bryan, 2022). Using a descriptive qualitative approach and in-depth data analysis from several trusted sources, this research aims to share a global understanding of USAID's strategic role and the factors that influence the efficiency of its programmes in Indonesia-United States energy cooperation(Serfilippi et al., 2022).

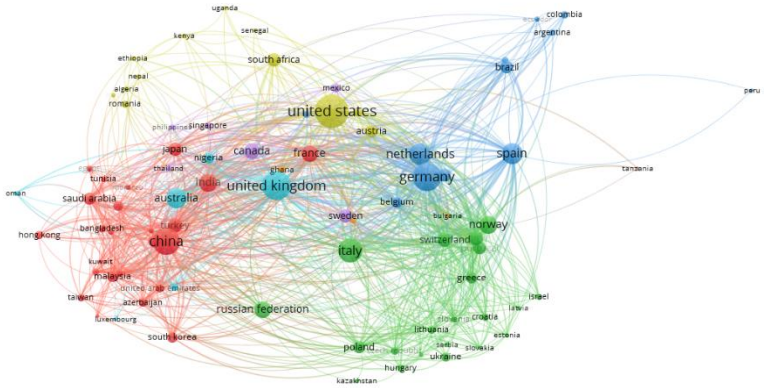

Fig 1. The Mapping USAID's Strategic Role in Inodenia-United States Renewable Energy Transition

Source: Scopus; data is Processed using VOSviewer

II. METHODS

The method used is qualitative to identify USAID's strategic role in the Indonesia-United States renewable energy transition cooperation for 2019-2024. Information accumulation was implemented by exploring the corresponding literature in the Scopus database with unique keywords such as (USAID AND "renewable energy") AND ("Indonesia" OR "Southeast Asia") AND ("energy transition" OR "energy cooperation"). Inclusion criteria included peer-reviewed articles in English and Indonesian published in 2019-2024 and a focus on USAID programmes in the energy sector and Indonesia-United States sustainable cooperation. Harzing's Publish or Perish extended the scope and identified additional literature, including documents related to draft government policies and think-tank publications. Data analysis used a deductive approach with the help of software, specifically Nvivo14. Stages included data preparation, starting with converting all data sources to RIS format using Mendelay and organizing them in a hierarchical folder based on source type and relevance.

The open coding process identified some initial themes, focusing mainly on the types of USAID programmes, implementation mechanisms, programme achievements and factors affecting effectiveness. Then, axial coding will be used to group the themes using an analytical framework of the role of development assistance agencies, particularly in regulatory facilitation and investment catalysis. Then, selective coding will integrate multiple themes into a coherent narrative related to USAID's strategic contribution. Research validation was strengthened through strategies. Data triangulation was conducted by comparing findings from various sources (academic articles and programme documents). Member checking was applied by verifying the interpretation of findings with key informants. Peer debriefing was undertaken by discussing the findings with other researchers with expertise in the international energy transition cooperation sector. For visualization and in-depth analysis, this research used VOSviewer to map relationships between themes and identify patterns in the data. The analysis matrix was extended to organize programme outcomes and factors affecting effectiveness. This approach informs a systematic understanding of USAID's role in promoting

renewable energy transition in developing countries, especially Indonesia. This research has some methodological limitations that need to be recognized. The temporal focus on the 2019-2024 period limits understanding of the long-term impact of USAID programmes. Furthermore, limited access to some internal USAID documents may affect the completeness of the analysis.

III. RESULT AND DISCUSION

1. USAID'S STRATEGIC ROLE IN BILATERAL COOPERATION FACILITIES

A. REGULATORY FRAMEWORK IMPROVEMENT FACILITATOR

USAID has played a crucial role in facilitating cooperation between the two countries to strengthen the regulatory framework for renewable energy in developing countries, especially Indonesia, through several significant strategies and initiatives(Echave et al., 2019). The agency has helped to provide exceptional technical support and assistance to the Indonesian government in improving and refining regulations to encourage an increase in clean energy. The role of this facilitator is all the more significant in collaboration because of the complexity of the regulatory barriers that Indonesia will face in its transition to renewable energy(Cordova et al., 2023). A critical piece of evidence from USAID's design is the support from the Indonesian government in analyzing and addressing the regulatory challenges that inhibit the growth of clean energy. Through several technically significant designs, USAID agencies have facilitated the in-depth identification of several stages of the existing regulatory framework, analysis of gaps and overlaps in regulations, and provision of recommendations for improving policies. This can assist the Indonesian government in formulating rules that are more effective and conducive to investment in clean energy(Lawler et al., 2023).

In 2019-2024, this USAID agency actively supported the Indonesian government in improving regulations to support private sector contributions to clean energy development(Sauhats et al., 2024). The agency is helping to formulate a regulatory framework for incentives and legal certainty for investors, including tariff-setting mechanisms, financing models and licensing regulations. There is support for conducting activities to participate in the creation of a unique investment climate for the promotion of clean energy projects(Clementi et al., 2021). USAID is essential in facilitating regulatory alignment between central and local governments. Through several designs produced by USAID, one of which is assistance in harmonizing various national and regional policies, it was partly obtained to create a more consistent regulatory framework that can function optimally(Marinakis et al., 2020). The resulting efforts include assistance to local governments in improving policies at the regional level to encourage the implementation of regulations in the field of renewable energy nationally. In the technical standardization model, the USAID agency provided substantial impetus in improving operational standards and regulations for installing and operating facilities in the renewable energy sector. The agency supports the Indonesian government in adopting international standards adapted to local circumstances, ensuring the safe quality of renewable energy installations while conducting activities to consider the domestic industry's capacity(Obeng-Odoom, 2021).

USAID's strategic role as a facilitator is reflected in efforts to support transparency and accountability by implementing clean energy regulations. The agency encourages developing monitoring systems and evaluations that are important enough to monitor how the implementation of rules is going well and facilitate performance as feedback that will be refined in regulations based on implementation experience in the field(Skoglund & García-Terán, 2020). USAID has produced significant designs to strengthen the capacity of government institutions to improve and implement renewable energy regulations. Several plans in the form of training and mentoring that have expertise in their fields to be facilitated by USAID institutions encourage increased understanding and technical knowledge of government officials in managing the renewable energy sector productively(Zigah, 2023). In the regulatory development model for grid integration, the USIAD agency provides technical support in formulating rules and standards that will be useful for effectively integrating renewable energy sources into the national electricity grid. This procedure includes assistance in developing regulations related to grid codes through dispatch mechanisms and in interconnection procedures that accommodate the unique characteristics of renewable energy generation(Sen, 2022). This USAID agency has a vital role in facilitating the development of regulations that support technological innovation and new business patterns in clean energy(Pata et al., 2023). The agency assists the Indonesian government in enhancing a flexible and adaptive regulatory framework related to technological developments, with a reference to adopting several innovative solutions in renewable energy development.

USAID's assistance through the design of national regulations for renewable energy in Indonesia illuminates a structured and comprehensive approach, realized in several key stages. Under the Indonesia Clean Energy Development (ICED) plan, USAID shared in-depth technical support through the process of revising Presidential Regulation No.79 of 2014 related to the National Energy Policy(Liu & Sun, 2023). The support mechanism began by conducting a gap analysis of the existing regulations, which USAID supported to identify regulatory barriers that hinder the scaling up of renewable energy in Indonesia. This research critically evaluated the existing energy policy's technical, economic, and institutional systems. Through the regulatory design process, USAID shared the Regulatory Impact Assessment (RIA) methodology that the Indonesian government will use to conduct systematic research through the potential impacts of various policy options(Yang et al., 2024). This methodology was implemented

in workshops and consultations involving technical teams from the Ministry of Energy and Mineral Resources, BAPPENAS and other relevant ministries. USAID facilitated more than 20 technical consultation sessions that obtained critical databases related to the effects of regulations through various areas of renewable energy development, consisting of socioeconomic and environmental implications(Zou & Wang, 2024). USAID also has a comprehensive obligation through the facilitation of an integrated public consultation process throughout the regulatory design. USAID coordinated 15 public discussion organizations using a multi-stakeholder approach, including over 500 stakeholders from various fields(Pavlakovič et al., 2022). These institutions include government and industry representatives, academics, civil society organizations and renewable energy groups. The integrated consultation process will obtain concrete inputs to improve the draft regulation, mainly through intensive procedures, licensing mechanisms and technical standards.

USAID's meaningful participation is also evident in improving databases and research to support evidence-based policy development. In collaboration with leading research institutes and universities, USAID facilitated 12 in-depth studies researching various areas of renewable energy regulation, including comparative analyses with international best practices(Roth et al., 2020). These studies yielded essential recommendations for improving the regulatory framework for simplifying licensing procedures, enhancing more varied feed-in tariff schemes, and strengthening implementation monitoring systems. The results of USAID's assistance in preparing national regulations can be seen from several significant achievements(Anwar et al., 2023). The revised regulation successfully integrates more accurate incentive procedures in renewable energy development, including tax relief, monetary facilities and technical support(Nikas et al., 2020). Furthermore, the new regulation shows a one-stop service system for licensing the renewable energy agenda, which can substantially cut time and costs in the project development process. Furthermore, the regulation also strengthens the institutional framework for inter-sectoral harmonization by implementing renewable energy policies(Deane, 2023).

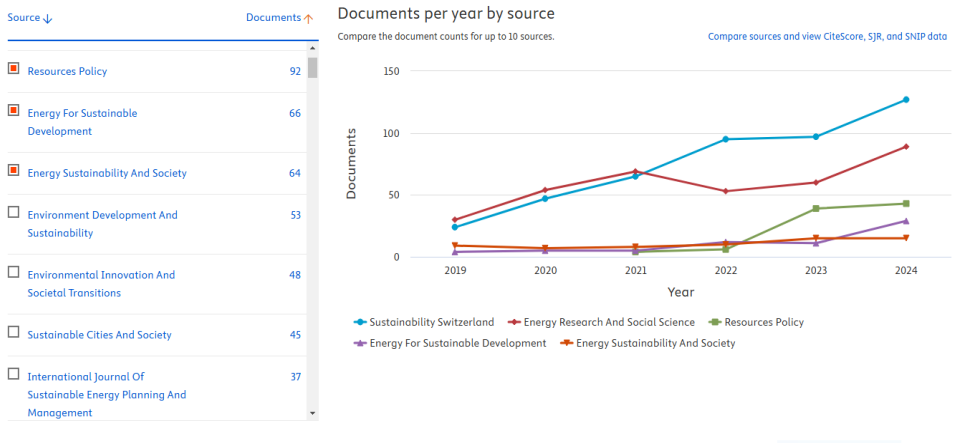

Fig 2. Sustainability and regulatory trends in Indonesia-United States Renewable Energy Transition
Source: Scopus

B. CAPACITY BUILDING COORDINATOR

The United States Agency for International Development (USAID) is important in assisting Indonesia's energy transition through a comprehensive range of capacity-building programmes over 2019-2024. The main focus of these programmes has been to strengthen stakeholders' technical and managerial skills in scaling up renewable energy projects in Indonesia. This analysis will take an intensive look at how USAID has participated in enhancing a strong foundation for Indonesia's energy transition through capacity building, pilot programme implementation and technical working groups(Jenkins et al., 2023). Through 2019-2024, USAID successfully scaled up and implemented an overarching strategy to contribute to Indonesia's energy transition in an organized and systematic group of programs(Yan et al., 2023). These programmes were developed with Indonesia's specific needs and domestic circumstances in mind while adhering to international standards and global best practices through renewable energy scaling up. Enhancing the training agenda is one of the main focuses of USAID's strategy(Iesue, 2022). The programme is designed with a competency-based approach in technical and managerial areas. Training is focused on preparing and designing renewable energy systems through the technical field, including load calculation, technology selection, and system integration. At the same time, the managerial perspective consists of feasibility studies, financial analyses, and project management(Silaen et al., 2020).

The coaching methodology adopted a blended learning approach, combining face-to-face, online and field practice learning to determine effective understanding transfer. Implementing the pilot agenda is tangible proof of USAID's responsibility through Indonesia's energy transition assistance(Listiningrum et al., 2023). Through 1MW small-scale plans, USAID has successfully

implemented 15 rooftop solar installations in various public facilities, including schools, health centres, government offices and traditional markets(Baniya & Giurco, 2021). These plans have achieved clean electricity generation and become a pattern of understanding for improving similar agendas in other areas. Methods in the form of micro-hydro were also deployed in eight remote areas, achieving the provision of electricity access to more than 2,400 households with a 90% accuracy rate. On a larger scale, USAID scaled up its grid-connected solar agenda in five strategic locations with an overall capacity of 25 MW(Nwokolo et al., 2023). These designs achieved excellent grid integration (98%) and significant energy generation (1,500-1,800 kWp/kWp/year). Meanwhile, there are three wind power plants with a capacity of 850 kW to 2 MW and 30-35% capacity. Creating technical working groups was a crucial element in USAID's plan(Nyasapoh et al., 2023). The twelve working groups established focus on technology and renewable energy improvement. The Solar Tennis Group, for example, achieved through the improvement of eight technical standards, five certification procedures, and three implementation guides. Furthermore, the Wind Energy Group participated in improving domestic wind atlases, technical standards and safety mechanisms(Bertheau & Lindner, 2022). Harmonization among stakeholders is done by constructing an appropriate scale through a Steering Committee composed of ministerial representatives, USAID executives, international experts, and industry stakeholders(Baniya & Giurco, 2021).

Technical Working Groups worked under the direction of the Steering Committee, concentrating on technical and design areas. A successful communication system was established through regular monthly meetings, quarterly evaluations, and annual reviews, aided by a knowledge management platform(Kilinc-Ata et al., 2023). Institutional capacity support was provided in partnership with 45 educational institutions, including universities, polytechnics, vocational training centres and industrial training centres(Resniova & Ponomarenko, 2021). The certification design was formulated through 12 technical frameworks, eight managerial frameworks, five supervisory frameworks, and three audit frameworks, obtaining an appropriate scheme for raising professionals in the field of renewable energy(Fikru et al., 2024). The design is monitored and evaluated in a structured manner by implementing a comprehensive framework. Technical specifications consisting of system performance, operating efficiency and reliability are regularly observed, while non-technical specifications consisting of stakeholder satisfaction and socioeconomic impact are also considered. Evaluation procedures are also implemented through monthly performance reporting and quarterly, annual, and effects assessments(Wang & Zhang, 2023). USAID's design was incorporated into the national design through synchronization with the National General Energy Strategy, Renewable Energy Roadmap, National Electrification Programme and Emission Reduction Targets. Multi-stakeholder partnerships were established through active participation by the Ministry of Energy and Mineral Resources, PLN, local governments, and the private sector, confirming that the designs were compatible with the national development programme(Feng et al., 2023).

The successful implementation of these plans is inseparable from USAID's comprehensive approach through capacity-building design, pilot agenda implementation, and institutional support. Notable achievements have been made, consisting of a 35% increase in implementing the pilot agenda and establishing 12 active technical working groups, revealing the capabilities of the strategy in developing Indonesia's energy transition to a sustainable energy system(Sotnyk et al., 2023). In addition to the strategy and implementation described above, USAID also leveraged a variety of supporting perspectives that have been critical to the success of Indonesia's energy transition design(Akbarova et al., 2024). One significant perspective is the improvement of the renewable energy technology innovation ecosystem. Community empowerment is also a significant focus in USAID's design. In the participatory approach, USAID enhances the type of community empowerment that involves domestic communities in the setting up, implementation and management of renewable energy programmes. The plan successfully established 85 of the largest renewable energy management community groups in different parts of Indonesia(Leonhardt et al., 2023). These communities are committed not only to implementing and maintaining renewable energy systems but also to Still; they are also agents of change in supporting the adoption of clean energy at the community level. USAID also built a digital platform to help implement its design. The platform consists of an online knowledge management system, a database of renewable energy designs and tools for programme implementation and monitoring. This platform has facilitated knowledge sharing among stakeholders and accelerated the process of understanding renewable energy development in Indonesia(Castro & Stephenson, 2022). Perspective through research and development is a crucial component of USAID's design through collaboration with research institutes and universities. The plan has produced 45 applied research studies from various renewable energy perspectives, including system optimization, socioeconomic impact analysis, and business development(Pannacciulli & Giandolfi, 2024). The results of these analyses not only enrich Indonesia's renewable energy knowledge base but also provide valuable input for policy and programme refinement.

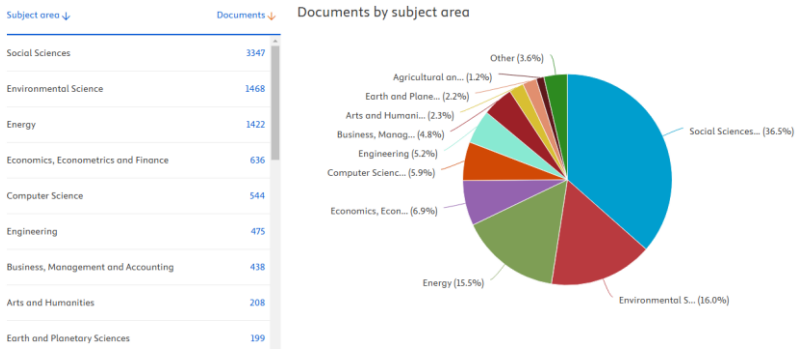

Fig 3. The integrations of social siences and environmental studies

Source: Scopus

2. STRATEGIC IMPACT

A. REVELATION WITH NATIONAL TARGET

USAID's strategic support for Indonesia's energy transition indicates significant linkages through various national targets set by the government. Based on an analysis conducted by the Ministry of Energy and Mineral Resources, USAID's programme contributions have responded to accelerate the achievement of renewable energy targets in the national energy mix of 23% by 2024 and 31% by 2060(Han et al., 2024). This equality is reflected in the various dimensions of the programme that are designed to encourage national energy development priorities. USAID's programme indicates intense harmonization with the National Energy Policy (KEN) established through Government Regulation No.79/2014(Fattoruso et al., 2024). According to an Institute for Essential Services Reform study, USAID's support contributes to KEN's four main targets: energy security, independence, sustainability and improved energy access. Various designs have been implemented to help overcome multiple obstacles and achieve the main targets through a comprehensive approach (Unuigbe et al., 2023).

USAID accommodates developing national capacity using domestic renewable energy sources through the energy security framework. This design is supported and differentiated by energy use, which will reduce dependence on imported fossil fuels. According to a World Bank study (Gianvincenzi et al., 2024), USAID initiatives have responded to the dependency to increase participation in the national primary energy transition from 11.2% in 2020 to 14.8% in 2023(Asmelash, 2023). USAID's programme indicates significant relevance by meeting a wide range of targets in the National General Energy Plan (RUEN). Based on the Asian Development Bank's evaluation, USAID's technical and financial assistance has supported the accelerated implementation of several key programmes in the RUEN(Poggi et al., 2020). Particularly in increasing renewable energy power generation, developing energy efficiency in industry and electrifying transport(Clemente et al., 2023).

By increasing renewable energy power generation, USAID's design achieves the target of 45.2 GW of installed capacity by 2026(Akbarova et al., 2024). In terms of encouragement to improve the regulatory framework and investment mobilization, the cooperation has resulted in a programme to assist in expanding renewable energy power plant installed capacity from 10.4 GW in 2019 to 16.8 GW in 2023(Mayer et al., 2023). Direct participation by USAID is needed to apply more significant relevance to Indonesia's commitment to reduce carbon emissions, as stated in the Nationally Determined Contribution (NDC)(Bazelaire et al., 2024). Drawing on the Climate Policy Initiative analysis, USAID-supported designs participate in the target of minimizing carbon emissions by 29% through independent efforts and by 41% through international support by 2030(Chai et al., 2021). USAID-supported energy efficiency strategies in industry and development have resulted in significant carbon emission reductions. Studies indicate that these initiatives could reduce carbon emissions by 12.5 million tonnes of CO2 equivalent in 2020-2023, representing 15% of the primary target for reducing energy emissions(Rasheed et al., 2024).

Assisted by international agencies, especially USAID, it is clear that harmonization with the national electrification target is needed, including in conditions of developing access to electricity in remote areas through solutions from the renewable energy transition that have been implemented. This established strategy advances the target of a 100% electrification ratio by 2024 by improving micro grids and off-grid solutions based on renewable energy(A. Shankar & Bukya, 2023). According to the International Agency's evaluation, various projects have been assisted by development agencies, especially USAID, in improving electricity access for more than 500,000 households in remote areas through renewable energy solutions. This impacts participation in advancing the national electrification ratio from 98.89% in 2020 to 99.45% in 2023(Chlela & Selosse, 2024). The design of the agency, especially USAID, proves the activity of the national target through the transformation of the field, especially transportation towards low-carbon mobility. This was based on Presidential Decree No. 55 of 2019 concerning the acceleration of battery-based electric motorized vehicles, with direct support from USAID, which helps accelerate the penetration of electric

vehicles in developing countries, especially Indonesia(Silva Herran & Fujimori, 2021). Through support for regulatory development and charging infrastructure, this strategy participates in the target of 2 million electric cars by 2025(Suroso et al., 2022). Based on data from the Ministry of Transportation, the USAID agency's initiative has helped increase the number of electric vehicles from 30,000 units in 2020 to 150,000 units in 2023(Nyasapoh et al., 2023).

USAID's strategy explains that there is harmonization with the national industrial development programme, particularly in the transformation towards green industry(Dash & Singh, 2020). This assistance is relevant to Making Indonesia 4.0 and the related strategy of increasing low-carbon sectors(Hoeltl et al., 2020). Based on the analysis of the United Nations Industrial Development Organization, energy efficiency and clean technology programmes assisted by USAID agencies have supported the improvement of national industrial competitiveness. From the domestic industrial capacity-building perspective, USAID strategies participate in developing domestic content in renewable energy development(Bhattacharya et al., 2023). The Ministry of Industry study indicated that this initiative has supported increasing the high domestic component (TKDN) for the solar power generation programme from 40% in 2020 to 60% in 2023(Gilbert, 2024). USAID indicated the relationship of the target of increasing human resources through the renewable energy field. Sourced from the Renewable Energy Human Resources Improvement Roadmap for 2020-2035, USAID's drive to help fulfil the need for skilled labour to implement the renewable energy transition strategy. In training and certification programmes, USAID has participated in developing more than 5000 professionals in various renewable energy-related sectors, especially solar PV technicians, energy auditors and green energy financing specialists(Mayer et al., 2023). This can support the target of providing 100,000 labour experts in renewable energy transition by 2024(Dritsaki et al., 2024).

The relationship of this USAID-implemented strategy supports local government programmes in improving Regional General Plans (RUEDs) that are on par with domestic targets. Based on sources evaluated by the Ministry of Home Affairs, USAID agency assistance has supported more than 25 provinces to improve RUEDs that are more universal(Batruch, 2020). The strategy also participated in improving local regulations that assist in implementing the renewable energy transition. These include rules on green energy development, energy efficiency standards, and incentives to adopt clean technologies at the city and district levels. Furthermore, the primary strategy planned by USAID has long-term national targets for energy transformation in developing countries, including Indonesia(Garcia & Borghi, 2024). The approach is underpinned by building significant institutional and regulatory foundations through the continued implementation of renewable energy policies. The participation of capacity building and technology transfer encourages long-term independence through the management of the renewable energy sector(Wannalak, 2023). USAID's strategy to achieve national targets demonstrates the effectiveness of an approach that indicates various aspects of sustainable energy transition development. This harmonization not only supports the achievement of short-term targets but also participates in the long-term transformation of Indonesia's energy sector(Djalilova, 2021).

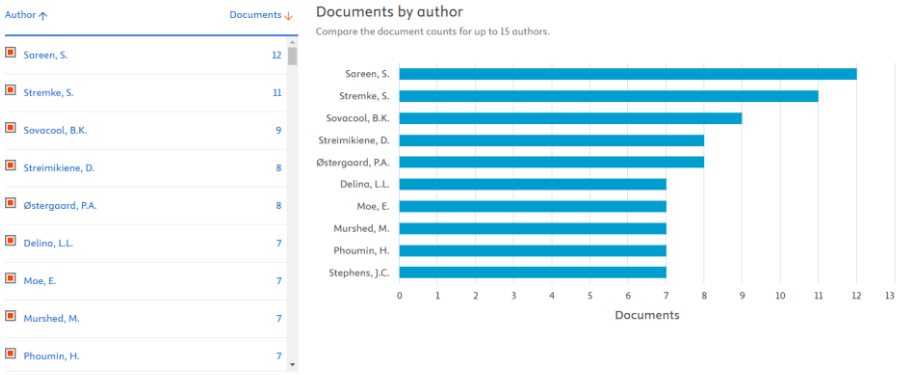

Fig 4. USAID's research role in the Indonesia-Unitd States energy partnership
Source: Scopus

B. REVELATION REGIONAL AND GLOBAL IMPACTS

Renewable energy cooperation between Indonesia and the United States through USAID has had a substantial impact on both countries, as well as on the Southeast Asian region and the global order as a whole. This cooperation is an effective collaboration between developed and developing countries in the transition to low carbon emissions(Tumilar et al., 2021). USAID's strategies have created positive ripple effects in key areas, from strengthening regional energy security to contributing to global climate change mitigation efforts. At the Southeast Asian regional level, this collaboration has supported the creation of a new standard in the renewable energy upgrade landscape. Indonesia, as one of the largest economies in the ASEAN region, plays a key role in influencing the direction of energy policy in the region(Hensher & Wei, 2024). The success of Indonesia's renewable energy programme can serve as a reference for neighbouring countries to improve their performance in the same field. This creates a

positive domino effect, where several countries in the ASEAN region are encouraged to adopt various best practices that have proven effective in developing countries, especially Indonesia(Amin et al., 2024). The regional impact is also evident from the strengthening of integration by the ASEAN energy market; through technology transfers and experience gained from collaboration with USAID, Indonesia can participate more actively in establishing the ASEAN Power Grid and other regional energy initiatives(Gupta et al., 2019). The success achieved by USAID can strengthen ASEAN's position as a region that is highly committed to sustainable energy transition and can advance the region's collective bargaining power in various global energy forums.

Regarding regional energy security, Indonesia-US collaboration has helped reduce dependence on imported fossil fuels. Increasing domestic renewable energy sources provides an innovative and sustainable option that minimizes the vulnerability of regional economies to global energy price fluctuations(Zhang et al., 2020). This aligns with ASEAN's efforts to support more significant regional energy security and self-reliance. Internationally, this collaboration provides proven participation in efforts to reduce high carbon emissions. Developing countries, especially in the region where Indonesia is one of the world's most significant contributors to greenhouse gas emissions, are taking responsibility for transitioning to clean energy in partnership with USAID(Musa et al., 2023). Evidence of success is associated with the various strategies implemented to support acceleration in achieving the ambitious targets set out in the Paris Agreement and other international climate opportunities. This collaboration has created a new way of bilateral relations aimed solely at sustainable development(U. Shankar & Basu, 2023). The schemes implemented by USAID to promote renewable energy development in developing countries, especially Indonesia, are innovative examples for neighbouring countries as foreign aid can be distributed to support the energy transition in developing countries, especially Indonesia(Pinczynski et al., 2024). The reflection related to this collaboration is increasingly significant in advancing the global urgency to switch from using fossil energy to renewable energy.

Collaboration between the two countries has supported accelerating innovations in the technology innovation sector, including adopting renewable energy technologies in the Asia Pacific region(Anantharajah, 2021). The transfer of knowledge and technology that occurs through various designs produced by USAID can help create a more dynamic innovation ecosystem. This condition can not only benefit Indonesia but can also have a positive impact related to spill overs in improving clean energy technology in several neighbouring countries. In terms of multilateral diplomacy, the success of this collaboration strengthens Indonesia's position as a leader in environmental and sustainable energy issues in various international forums(Mathews & Huang, 2021). Indonesia is increasingly portrayed as a successful example of how developing countries can take progressive steps in energy transition with full support through appropriate international collaboration. This situation can increase Indonesia's influence in global climate change and sustainable development negotiations. This renewable energy collaboration also actively strengthens regional and Asia Pacific security architecture(Nepal et al., 2021). By reducing dependence on some conventional energy delivery routes where there are conflict-prone situations, increasing renewable energy can help create a more stable political landscape. This situation occurs because it is in line with the interests of the US and its allies in maintaining the stability of the Indo-Pacific region(Zhang, 2023).

Furthermore, in terms of the global economy, this collaboration helps create new markets as centres for renewable energy technologies and products. Investments began to flow through several designs produced by USAID that benefited Indonesia and opened opportunities for several international companies to participate in the improvement of renewable energy in the region(Cappellaro et al., 2022). This creates a positive economic multiplier effect in the regional and global arena. Several methods produced by USAID have helped strengthen Indonesia's capacity to deal with climate change constraints. The professionalism in science gained in this collaboration supports Indonesia's ability to participate in climate change adaptation and mitigation efforts at the regional level. Indonesia is increasingly actively sharing experiences and best practices with other developing countries to create a more significant collaboration network(Ulrich, 2023). The strengthening of regional environmental governance is related to the strategic impact of this collaboration. This situation is gaining standards and practices developed through several strategies produced by USAID to help build the quality of regulations and implement renewable energy policies in the region. This can support alignment in energy policy at the ASEAN level and create a more conducive environment for investment in clean energy(Birge & Berger, 2019). Indonesia-US collaboration has supported forming a more sophisticated and significant international research network in research and development models. The cooperation between the two countries' research institutions helps accelerate innovation in renewable energy technologies. Some of the gains from the analyses obtained can benefit both countries and can contribute research to the global scientific expert group working in the sustainable energy transition sector(Nagarajah, 2023). Overall, the strategic impact of Indoensia-United States renewable energy cooperation through the role of USAID has gone beyond the bilateral relationship between the two countries. Some of the implemented strategic outcomes produced by USAID provide strong participation in strengthening regional and international energy security, accelerating the transition to a low-carbon economy and achieving key targets in global sustainable development(Saman, 2021). The evidence of success associated

with this collaboration is a testament to how efficient international partnerships can support positive change at the regional and global levels through sustainable energy transition(Polat et al., 2024).

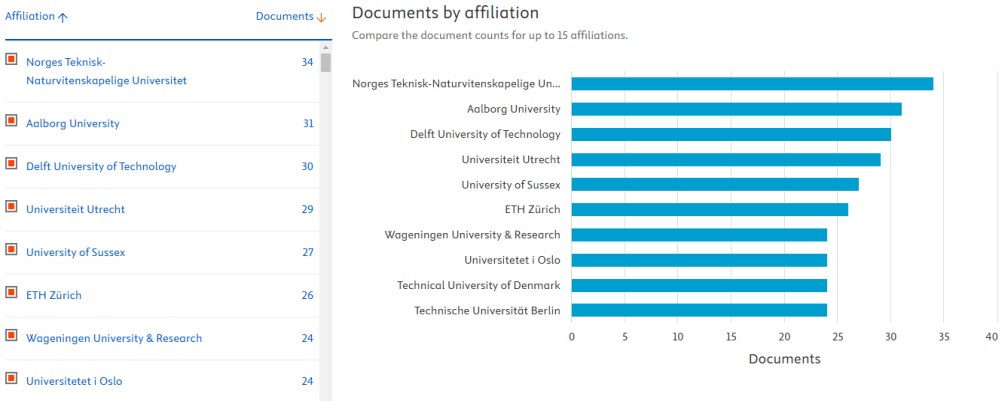

Fig 5. The role of research: USAID's STRATEGIC Partnerships Indonesia-United States renewable Energy Transitions 2019-2024

Source: Scopus

IV. CONCLUTIONS

The renewable energy transition cooperation between Indonesia and the United States for the 2019-2024 period illuminates USAID's comprehensive strategic role through two main functions. First, as a regulatory framework facilitator, USAID supports Indonesia by developing and refining renewable energy regulations, assisting in developing technical standards and integration procedures, facilitating regulatory balance between central and local governments, and supporting transparency and accountability through regulatory implementation. Secondly, as a capacity-building coordinator, USAID built a renewable energy pilot project with a 35% success rate and established 12 cross-sector technical working communities and partnerships with 45 educational institutions. The impact of this cooperation is reflected in its assistance related to achieving the national renewable energy target of 23% by 2024, increasing renewable energy power generation capacity from 10.4 GW in the 2019 period to 16.8 GW in 2023, shrinking carbon emissions by 12.5 million tonnes of CO2 during the 2020-2023 period, there is also an increase in the national electrification ratio from 98.89% in the 2020 period to 99.45% in the 2023 period. More generally, this cooperation positively impacts regional and global arrangements. It serves as an example of efficient collaboration between developed and developing countries in energy transition, strengthens ASEAN regional energy security, provides necessary assistance through global climate change mitigation efforts, and can support renewable energy technology innovation in the Asia Pacific region. USAID's role has proven to be a comprehensive catalyst through its assistance in Indonesia's renewable energy transition and the success of international partnerships through support for sustainable energy development.

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