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Echoes of the Coral Triangle: Investigating Institutional Barriers to Blue Energy Development in the Philippines and Indonesia

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ABSTRACT: This study examines the transition toward the use of osmotic or salinity gradient power in the Philippines and Indonesia. Despite being part of the coastal triangle, it argues that institutional barriers are the main drivers of ineffective and slow adoption of Blue Energy initiatives. The analysis finds coal and natural gas–centric frameworks adopted by the two (2) coastal frontier countries inadvertently marginalizes decentralized blue energy projects in coastal areas. Withstanding the maritime abundance, the study contends that reformulation of energy policies is essential for achieving maritime-led sustainable development in Southeast Asia

KEYWORDS: Philippines, Indonesia, Blue Energy, Southeast Asia, Maritime, Coral Triangle

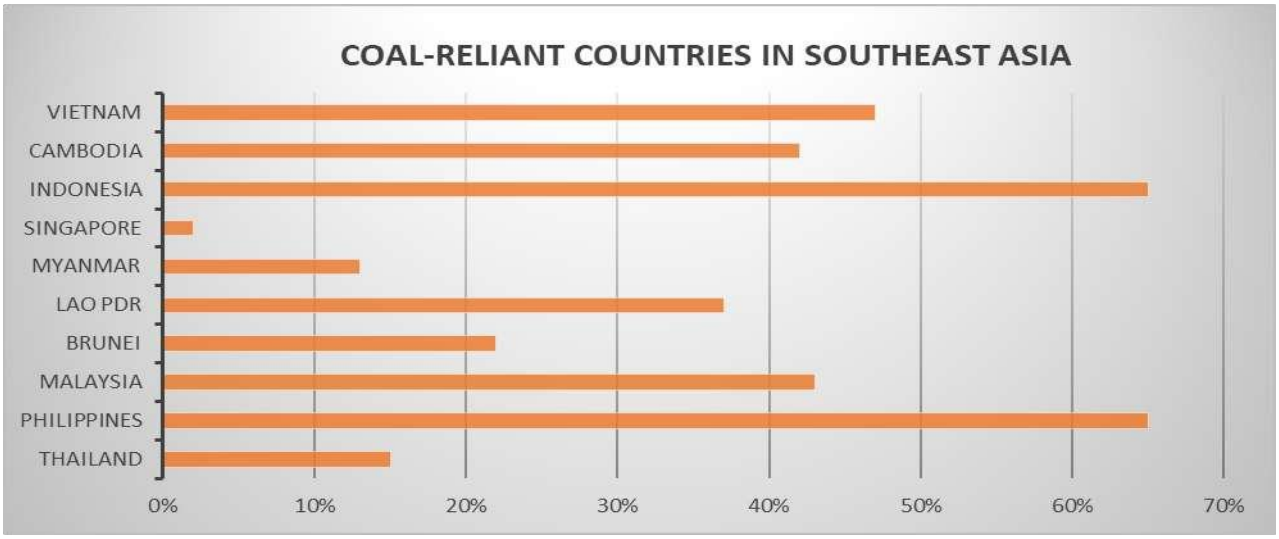
I. INTRODUCTION

The Coral Triangle is a region of the ocean which holds a rich marine biodiversity and has great potential to become a source of renewable energy in the future. The Philippines and Indonesia are both Southeast Asian archipelagic nations with vast maritime richness and are widely known as “the heart of the Coral Triangle” (Coral Triangle Center [CTC], n.d.). This coastal abundance offers not only biodiversity but also a solution to energy insecurity.

Salinity gradient energy is generated by making use of the different concentrations of salt between fresh water and seawater through technology called pressure-retarded osmosis (PRO) or reverse electrodialysis (RED). Unlike wind or solar energy, salinity gradient technologies have a baseline production capacity, as river flow rates and the difference in salinity between rivers and the oceans can be predicted with high levels of accuracy and reliability. The continued evolution of membrane technologies has significantly enhanced the efficiency of PRO technologies, thereby moving blue energy to within proximity to commercial viability (ABOUT IRENA, 2014). It is likely that the lack of blue energy projects is not attributable entirely to the technological limitations which have made these technologies non-mainstream to date.

Through the advance of technology, neither Indonesia nor the Philippines has incorporated blue energy into their national energy plans. Given the fact that both countries have thousands of kilometers of coastlines, are surrounded by oceans, and are situated within the Coral Triangle where there are a great deal of river outlets offering opportunities to produce energy from the salinity gradients of rivers. This divergence suggests that non-technical constraints may play a decisive role to why Philippines and Indonesia continue to rely heavily on fossil fuels for energy, particularly as renewables continue to gain traction in these countries' energy plans. The electricity sector in the Philippines is dependent on coal-generated electricity, despite significant increases in their renewable energy generation targets (ACE Accept, 2021). Just like many Southeast Asian countries also generate their electricity primarily from burning fossil fuels, Indonesia is no exception; its electric power system is almost entirely powered by fossil fuels (Rangelova & Setyawati, 2024).

Table 1: Coal and Natural Gas Dependence in Southeast Asia 2023



In the 2023 Rankings it shows that the Philippines and Indonesia are the top coal-reliant countries in Southeast Asia
Source: EMBER. (2023). Indonesia and the Philippines are the Most Coal-Reliant Countries in Southeast Asia. https://www.voronoiapp.com/energy/Indonesia-and-the-Philippines-are-the-Most-Coal-Reliant-Countries-in-SE-Asia-1686

The table shows that Indonesia and the Philippines are the top coal-reliant countries in the region despite their natural bounties and their geographical potential for blue energy, both states remained stubbornly tethered to natural gas and coal for energy production. Southeast Asia has a lot of energy resources and has a lot of potential for renewable energy. This study wants to find out why renewable energy is not being used more. The problems include things, like it not being economically viable, lack of policies, not enough financial and technical help and still using coal. The goal is to find the 443 GW of potential that is not being used (Apramadha & Prasetyo, 2025). This study aims to bridge the gap between maritime abundance and policy implementation in the Philippines and Indonesia by identifying leakages that inadvertently marginalize the potential of Blue Energy adoption to address energy insecurity and global environmental challenges.

Central Question: To what extent do institutional vulnerabilities serve as the primary drivers of blue energy stagnation in the Philippines and Indonesia, despite their archipelagic geographical advantages?

The Philippines' Renewable Energy Act has been in effect since 2008 and it provided energy policy mechanisms such as feed-in tariffs, renewable portfolio standards and fiscal incentives. Unfortunately, the mechanisms are usually implemented slower and in a fragmented way and may take a long time for permits to be issued. In addition to the slow pace and fragmented implementation, there are overlaps in the responsibilities of different government agencies and the occurrence of inefficient bureaucratic processes that discourage private sector investments (Renewable Energy Transition in the Philippines: Trends, Opportunities, Challenges, 2026).

Ongoing research on the energy transition in The Philippines have identified that major barriers exist to the expansion of renewable energy resources due to continued bureaucratic inefficiency; a lack of coordination between national and local level government agencies; and inconsistently applied regulation (Renewable Energy Transition in the Philippines: Trends, Opportunities, Challenges, 2026). Such an environment creates difficulty in institutionalizing new and decentralized technologies such as potential blue energy systems at coastal communities.

This justifies that blue energy's slow rate of implementation can be understood as not only a technological but also a policy and institutional phenomenon. While membrane performance and capital expenditure, as well as their energy density, are all still critical technical variables, the current research strongly illustrates that the expansion of renewable energy technology is predominantly affected by the quality of the governance framework, the clarity of the regulatory environment, and the level of institutional capacity (View of the Effect of Institutional Quality on Renewable Energy: Evidence from Developing Countries, n.d.).

The presence of path-dependent structures can also be seen in Indonesia and the Philippines. Investments in the coal power sector, vertically integrated utilities and fossil fuel subsidies create competitive advantages to existing energy sources which complicate the introduction of alternative production technologies that need support during the initial stages of their commercialization. Blue energy represents an innovative approach to energy production that is both decentralized and primarily located in coastal areas, which is why it does not easily align with the large scale, baseload coal or gas generation models that drive the current design of energy distribution systems in Southeast Asia. Therefore, institutional structures are likely to create conditions where analytical assessments indicate that a project is technically feasible, but, through the governance and institutional framework, create conditions where projects become marginalized (Kemplay, 2024).

As electricity demand increases in the future, both governments may use previously established technologies due to familiarity over financial investments in new, potentially disruptive technologies. Energy regulators in Southeast Asia are in a similar conundrum between balancing their long-term climate change commitments with their current economic competitiveness; therefore, any modernization of energy systems achieved by regulators has been gradual, not transformational, creating no opportunities to find new renewable marine energy sources.

Regional comparisons between Indonesia and the Philippines can be made based on the large number of structural similarities such as geography, climate vulnerability, increasing electric demand and continued reliance on carbon-intensive fuel sources. However, there are several differences between the two nations as far as each country's political and administrative structure, which could impact how renewable energy policies are developed and implemented by the two nations. In addition, this type of analysis of renewables governance allows for a comparison of governance practices, including whether the country has had stable regulatory environments; developers can reasonably expect transparency from / between their incentive programs (Kemplay, 2024), and whether agencies coordinate effectively.

In this context, our research contends that institutional barriers and the limitations of an appropriate policy environment are chiefly responsible for the sluggish and restricted rollout of blue energy initiatives in the Philippines and Indonesia. The reliance on fossil fuels in planning models, fragmented governance structures, inconsistent regulation and uncertainty of investment collectively impair experimentation with decentralized marine renewable energy technologies.

This study conducts a comparative analysis of the institutional structures in the two nations to define the underlying structural mechanisms that inhibit blue energy integration and to propose possible reforms that could facilitate maritime-based sustainable development for the Southeast Asian region. More than an unparalleled ecological resource, the Coral Triangle is an important energy resource for the region. The Coral Triangle's salinity gradients present an opportunity for sustainable energy generation and offer a means for providing environmentally responsible energy while promoting innovative economic development; however, transforming this opportunity into reality requires more than just technological development; transformational technologies, infrastructure and institutions are needed to develop and foster sustainable energy generation from the ocean. Thus, blue energy will not become a reality for both countries without the need for institutional reforms in terms of policy scaffolding.

Henceforth, this study is a grounded around the Path Dependence Theory as the primary lens to analyze the systematic barriers to blue energy development both in the Philippines and Indonesia. Path dependence is derived from the idea that historical development of a system or process strongly influences the current state and future outcomes, suggesting that past choices and events can create a “path” or trajectory that may hinders present and future possibilities. It also noted that a system or a particularly process becomes path-dependent, the accumulation of historical policy choices, institutional investments, regulatory frameworks and developments reinforcing a momentum that favors the existing path, making it difficult to deviate or switch to alternative paths, as such blue energy – resulting in a lock-ins: the system or process becomes resistant to change and perpetuates the current state or trajectory (Liebowitz and Margolis 1995; Cecere, et al., 2014; Eitan and Hekkert, 2023). By employing a Most Similar Systems Design (MSSD), this study controls for geographical and archipelagic similarities to specifically isolate how divergent institutional arrangements and governance structure contributes to energy outcomes.

The research aims to address how distinct institutional mechanisms namely, the Philippines' fragmented, devolved governance and Indonesia's centralized resource nationalism functions as path-dependent constraints, respectively. Considering that while both nations occupy the same environmental space, their unique historical energy governance structures have institutionalized dependencies on traditional fossil fuels, which systematically marginalize blue energy initiatives. This study argues that the observed differences in blue energy development are not accidental; rather, they are the result of institutional "stickiness" where established permitting mechanisms, energy subsidies, and regulatory silos create an inertia that resists transition. Consequently, by mapping these mechanisms, this research identifies how the interplay between historical policy paths and contemporary governance structures dictates the varying degrees of success in capturing blue energy potential in Southeast Asia. By applying this theory, the study illuminates how historical institutional "stickiness" creates a divergence between the technological possibility of a blue economy and the practical reality of policy implementation.

II. METHODS

The analysis in this article is grounded in the process of tracing and thematic analysis, drawing on secondary data sources such as official governmental policy documents, energy agency reports, and peer-reviewed academic literature. It employs a qualitative comparative case approach to examine institutional barriers and policy frameworks hindering blue energy adoption, investigating their role in perpetuating fossil fuel dependence despite maritime abundance in the Philippines and Indonesia. The research design applies the Most Similar Systems Design (MSSD), which leverages the countries' divergent institutional structures, policy trajectories, and historical energy governance while controlling for shared attributes like archipelagic geography, coral triangle location, and vulnerability to energy insecurity. This design was purposefully selected because the Philippines and Indonesia share critical systemic similarities—vast coastal resources and post-colonial democratic frameworks—yet exhibit stark differences

in energy policy implementation, regulatory agility, and institutional incentives (e.g., the Philippines' fragmented devolved governance versus Indonesia's centralized resource nationalism). These contrasts illuminate how policy leakages marginalize blue energy potential, addressing the archipelagic paradox central to this study. The Philippines and Indonesia were selected for these deliberate reasons: (1) Both are Southeast Asian archipelagic democracies in the Coral Triangle heartland, facing parallel climate-driven energy transition pressures amid institutional weaknesses; (2) Recent policy milestones (Philippines' 2023 Blue Economy Framework and Indonesia's 2024 Renewable Energy Roadmap) offer timely data on blue energy trajectories; (3) Despite geographic and developmental parallels, they diverge sharply—Indonesia displaying policy inertia from coal subsidies and elite capture, the Philippines hampered by regulatory fragmentation and offshore permitting delays—ideal for MDSD to isolate institutional drivers (IEA, 2023; IPCC, 2022).

This study is conducted exclusively through systematic literature assessment, accessing secondary sources including scholarly journals, books, official reports from energy ministries and commissions, and related policy documents. Key sources encompass reports from the Philippines' Department of Energy (DOE) and National Renewable Energy Program (NREP), alongside Indonesia's Ministry of Energy and Mineral Resources (ESDM) and Badan Pengatur Hilir Minyak dan Gas Bumi (Oil and Gas Downstream Regulatory Agency). Academic literature provides comparative depth, particularly works by Cruz et al. (2024) on Philippine blue economy barriers, Santoso (2023) on Indonesian energy nationalism, and regional analyses like those from the Coral Triangle Initiative (CTC, n.d.). Comparison proceeds via descriptive-narrative analysis, supported by a comparative matrix correlating finding from energy transition indices, policy trust surveys, and evaluations of regulatory reforms. The matrix systematically maps variables to reveal similarities and differences, including fixed factors such as policy framework types (e.g., centralized vs. devolved), regulatory stages for blue energy projects, permitting mechanisms, tenure of energy officials, structure of oversight bodies, dispute resolution protocols, campaign finance transparency in energy lobbying, and enforcement of blue energy mandates. Data triangulation enhances validity by cross-referencing diverse document types, with rigorous cross-checking across sources to ensure consistency

III. RESULTS AND DISCUSSION

The limited advancement of blue energy in the Philippines and Indonesia can be explained by these countries' institutional issues, despite their superabundant coastline area on the Coral Triangle. The slow development of salinity gradient energy programs has a clear relationship with governance, policy coherence, institutional capacity and the historical configuration of the existing energy infrastructure in each nation. Salinity gradient energy is generated using freshwater and saltwater; for example, it can be produced through pressure-retarded osmosis (PRO) or reverse electrodialysis (RED) (IRENA, 2014). As both of these nations are comprised of a series of islands with long coastlines, river mouths and coastal communities, they are both ideal candidates for the development of ocean-based renewable energy. The geographic advantages of the countries have not yet been fully realized through projects or national policy priorities; therefore, the issue is not only the lack of available natural ocean resources, but also the insufficient institutional framework that prevents blue energy from becoming an important aspect of each nation’s overall energy strategy.

Though institutional barriers have been seen to play an important role in understanding why the development of blue energy in the Philippines and Indonesia has not taken off, technological barriers as well as financial constraints also greatly hinder the utilization of blue energy from a salinity gradient. Though pressure retarded osmosis (PRO) and reverse electrodialysis (RED) processes are able to generate blue energy, these processes are less mature than other conventional forms of renewable energy generation such as solar energy and wind energy (IRENA, 2014). Renewable marine energy projects tend to reduce investor confidence due to the expensive nature of infrastructure, lack of efficient membranes, and low profitability in piloting operations currently being experienced by this sector (IRENA, 2014). These limitations in technological innovation pose more difficulties for developing countries such as the Philippines and Indonesia, who already struggle with regulatory and funding uncertainties. However, due to the absence of reliable funding, risk management, and specific support for the ocean innovations, domestic and international investments are discouraged in projects of blue energy generation (OECD, 2021). This leads to the omission of the opportunity of using salinity gradient energy despite a number of opportunities available in these two countries. Hence, this paper is aimed at contributing to discussions related to energy transition in Southeast Asia by proving that development of renewable energy will depend on factors other than availability of natural resources or innovative technologies; rather, development of renewable energy will depend on how effectively countries will be able to ensure proper governance (Eitan & Hekkert, 2023).

The lack of regulations that acknowledge ocean-based renewable energy as a distinct part of a nation's energy transition plan is a significant flaw in the development of blue energy. In the Philippines, the Renewable Energy Act of 2008 mentions ocean energy as part of the larger renewable energy framework and contains provisions for incorporating new renewable resources (like ocean energy) into current mechanisms (like feed-in tariffs and renewable portfolio standards). However, this does not necessarily mean that salinity gradient energy has received the level of support required to be fully implemented. Although the Department of Energy's Power Development Plan has set goals to increase the share of renewable resources in power generation (renewables should account for 35% of the Philippines' generating capacity by 2030 and 50% by 2040), policy discussions have focused more on commercially

viable renewable resources, such as geothermal, solar, wind, and hydroelectric energy (Department of Energy, 2025). Therefore, it can be concluded that although blue energy is currently included in the Philippines' renewable energy framework, it lacks a true policy framework for promoting it as such through targeted tools, pilot programs, permitting procedures, and funding support for salinity gradient energy.

Although the study primarily identifies institutional obstacles, technical and financial aspects of blue energy must also be taken into consideration, particularly in light of the fact that salinity gradient energy technologies, such as reverse electrodialysis and pressure-retarded osmosis, are less developed commercially than solar and wind technologies (IRENA 2014). Prior to significant commercial deployment, salinity gradient energy technologies are mainly characterized by their dependence on membrane performance, system efficiency, and the capacity to lower prices (IRENA 2014). Therefore, for blue energy to be practically included into their energy mix, both the Philippines and Indonesia would need pilot projects, research collaborations, and demonstration facilities.

However, when the institutional structure in which they operate is unclear, pilot programs can be challenging to develop. When there are unclear permitting procedures, a range of procurement strategies that were not designed to accommodate new technology, and few long-term revenue opportunities, investors are less inclined to invest in developing maritime renewable technologies. Innovative renewable energy projects in the Philippines may be delayed in their development due to overlapping public sector tasks and fragmented governance. Non-conventional technologies are less able to compete with existing traditional energy systems in Indonesia due to centralized energy planning, a significant reliance on coal, and uncertainty about investment levels. As a result, the issues are exacerbated by the institutions' general inadequacy and the immaturity of the technology. The current laws and regulations governing investment in these kinds of projects do not support adequate testing of the technologies and sharing in the risk/return associated with developing or commercializing them at an early stage, which is another reason why blue energy is still not developed enough.

Comparative analysis reveals that improved institutional measures are required for the development of blue/green electricity in Indonesia and the Philippines. In order to resolve conflicting laws and regulations, define agency duties and responsibilities, streamline the permitting procedure, and offer an implementation strategy tailored to ocean renewable energy sources, the Philippines should modify its policy. Since the Philippines' National Electric Power Industry Act already defines ocean energy, efforts must now concentrate on turning this into actual programs, such as mapping and feasibility studies, identifying pilot project sites, coordinating with local governments, and forming public-private partnerships for research on renewable energy from ocean sources (Republic Act No. 9513, 2008).

Policies that reduce fossil fuel lock-in, improve clean energy procurement, increase financing for renewables, and shift away from land-based renewables for energy transition planning are all necessary for Indonesia. Through their Just Energy Transition partnership, Indonesia has the chance to accelerate the reduction of coal and boost investment in renewable energy; however, long-term innovation planning should take into account emerging technologies, such as ocean energy, to provide a more inclusive energy transition (International Energy Agency, 2023). Without institutional frameworks that enable it, blue energy will continue to be on the periphery of the broader energy transformation.

The alignment of technology, government, and finance is necessary for the growth of blue energy in either nation. Although salinity gradient energy naturally arises from marine topography, this is insufficient to ensure development. The governments of the Philippines and Indonesia must establish legal frameworks that allow for the testing, financing, regulation, and ultimate integration of novel marine renewable technologies into their more comprehensive national energy plans (International Renewable Energy Agency, 2014). Therefore, the development of institutional readiness, investment confidence, and policies that will close the gap between the theoretical and the practical for ocean-based renewable energy are all necessary for the success of blue energy (International Renewable Energy Agency, 2014; Eitan and Hekkert, 2023).

To understand the institutional challenges holding back blue energy development, This table analyzes the institutional frameworks that limit the growth of blue energy in the Philippines and Indonesia in order to shed light on some of the difficulties confronting both countries' energy governance and electricity businesses. It was discovered that, despite having different types of governance structures in place to facilitate the decentralized nature of electricity in the Philippines and the centralized nature in Indonesia, the continued lack of adoption of blue energy technologies suggests that there are greater institutional barriers to blue energy development than can be attributed to each country's specific governance regime.

Dimension	**Philippines**	**Indonesia**	**Implication for Blue Energy**
Governance Structure		Centralised energy governance, with strong state ownership	Various governance frameworks pose of obstacles to innovation and the

	Fragmented and decentralized governance involves overlapping responsibilities among various agencies.	energy resources	implementation of renewable energy.
Primary Institutional Barrier	Bureaucratic inefficiency, permitting delays, regulatory fragmentation	Resource nationalism, subsidies for fossil fuels, and policy stagnation	Projects related to blue energy face challenges in securing institutional backing.
Historical Energy Path	Reliance on coal-based power and traditional energy	Chronic dependence on coal and natural gas as essential national assets.	Current energy systems establish lockins that are dependent on specific paths.
Regulatory Environment	Various agencies with conflicting responsibilities and uneven execution	Centralized decision-making focusing on traditional energy sectors	Restricted policy environment for developing marine renewable technologies
Investment Climate	Regulatory ambiguity deters private investment.	Preference for traditional energy diminishes motivation for alternative technologies	Decreased funding for blue energy advancement
Outcome	Gradual implementation of blue energy technologies	Gradual uptake of blue energy technologies	Comparable results irrespective of varying institutional frameworks.

Source: *Authors' comparative analysis based on reviewed literature*.

There are substantial differences in both how Indonesia and the Philippines govern and what they have available environmentally that causes them both to have similar difficulties in producing blue energy resources. A good example of what a fragmented governance system (like the one the Philippines has) does to slow down the rate at which something can be developed is that there are multiple agencies (e.g., the Department of Energy and the Department of Trade and Industry) that have overlapping jurisdictions – in essence creating lots of problems for how renewable energy (blue) can be developed in the Philippines and that is caused by the Philippine's inability to have a very efficient nation – meaning that the overall bureaucratic systems are not effective. There are numerous studies that illustrate that the lack of cooperation among different levels of government in the Philippines and the inconsistency of regulations between agencies of government are two key barriers to developing renewable energy resources in the Philippines. A report published in 2026 explicitly flagged the issues noted in this report as being two of the main barriers to achieving the development of renewable energy resources in the Philippines.

The comparative analysis of Philippines' and Indonesia's Governance Systems shows that while they are different and both have institutional constraints, both countries have the same barriers to the development of blue energy. The primary gap in renewable energy supply growth in the Philippines has been caused by completely fractured governance with a clearly inefficient bureaucracy and lengthy permitting. Thus, the studies examining the Philippine energy transition identify the lack of or lack of coordination and/or consistency in the regulatory framework of the Philippines as a significant barrier to achieving renewable energy (Renewable Energy Transition in The Philippines - Trends, Opportunities and Challenges, 2026).

Indonesia's energy governance situation is quite different from that of the Philippines. For instance, the central government in Indonesia has implemented a centralized system of decision-making on energy production that has placed a longterm commitment to the coal and natural gas industries, as well as continuing to heavily subsidize the fossil fuel sector through state-owned enterprises. Consequently, new renewable technologies are facing large barriers in developing blue energy (Rangelova & Setyawati, 2024; Kemplay, 2024). This paper uses a method of comparative analysis known as the Most Similar Systems Design (MSSD) to examine the case studies of Indonesia and the Philippines, as these two archipelagic countries are both located in the Coral Triangle and affected by climate change, as well as experiencing increasing demands for energy. Both countries have several similar geographical features, such as their location within the Coral Triangle and the geography of their land masses; however, the different volumes of renewable energy production by each country cannot be attributed to physical geographical similarities, but rather the differences in their government structures can fully account for this discrepancy in developing and implementing blue energy technology.

There are various government structures arcing across both countries but yielding nearly identical end outcomes. For example, due in part to the distributed nature of the Philippine government, there are many levels of bureaucratic barriers preventing foreign direct investment from occurring. Also, Indonesia has a centrally governed energy sector that has caused a stale policy creation process and a heavier dependency on land-based energy production and reliance on traditional fuels. Both nations utilize their respective institutions to aid in the development of fossil fuel resources (abstinently established) over long-term growth of

alternative marine energy technology. This is in keeping with Path Dependence Theory; the development of selfreinforcing discipline or factors to maintain fossil-fuel power supply is derived from historic governmental decisions regarding regulations, policies and investment decisions made over time (Liebowitz and Margolis 1995; Cecere et al 2014; Eitan and Hekkert 2023).

Our findings mirror results of previous studies showing that the performance of renewable energy products in the marketplace depends on more than the technology itself (e.g., political infrastructure support). There are many factors involved in the development of blue energy technology (the type of renewable energy in the marine environment); the political infrastructure and vested interests associated with fossil fuels negatively impact the ability for this type of energy technology to be successfully proliferated (Satrianto et al 2024; Kemplay 2024). In the Indonesian & Philippine location for Blue Energy development -- the challenge in moving towards developing Blue Energy is not really due to a lack of access to funds or technology but rather because change is happening too slowly (particularly when applying traditional energy generation and governance concepts). There will need to be much greater systemic and regulatory reform in each of these locations in order to create more appropriate, supporting policy frameworks. There will be a desire to move from their reliance on fossil fuels as part of this process. It will be virtually impossible to make any progress as it relates to Blue Energy in the Coral Triangle until these changes have happened.

IV. RECOMMENDATIONS

The results of this Research indicate that blue energy development has faced multiple institutional constraints that have impeded investment and governance over suitable coastal and oceanic sources of renewable energy. While the abundance of rich coastal and marine resources in both the Philippines and Indonesia presents an opportunity to further develop blue energy technologies, blue energy projects in both nations have been subjected to failures in governance and investments, which impede the establishment of proper infrastructure and create barriers to investment. The recommendations outlined below are based upon these findings.

To address the disjointed nature of governance, bureaucratic delays and cumbersome permitting given the current situation in the Philippines; there should be improved coordination by the government agencies and clearly define roles related to the development of blue energy to expedite project implementation and enhance private sector engagement.Reducing Indonesia's dependence on fossil fuels and old-style energy systems through an expanded use of new clean energy resources such as blue energy will be critically important to creating a long-term energy transition plan. More help from strict renewable energy projects as well as less barriers to developing non-renewable energy sources will result in many innovative developments in the technologies used for marine energy production.

To lessen the dangers associated with investing and finding a source for financing between Countries X and Y, both governments should create additional financial assistance programs to help fund renewable energy projects in both countries. In addition, both governments must work toward creating a better partnership between the private sector and the public sector. They can do this by providing financial incentives to investigate and research blue energy technology and providing funds to promote blue energy projects that involve risk-sharing.

The final area of importance in overcoming this challenge to create a new technology for the creation of electricity from salinity (water containing salt) gradient power generation (SGP) through the use of...is to achieve the best possible results as a result of the collaboration between the government, scientists/academics and the R&D organisations in conducting feasibility studies of the SGPG technology, conducting pilot projects using SGPG technology, and conducting demonstrations of SGPG technologies. Through this work the experiences gained there will be beneficial for understanding the total potential of the blue energy technology to produce energy and how to demonstrate to coastal communities how practical blue energy can be as a source for meeting their electrical needs.

To conclude, there remains little research on the use of renewable ocean-based technologies, known as 'blue energy', in Southeast Asia. Therefore, future researchers may want to investigate the technological, environmental, economic and policyrelated issues associated with developing this renewable energy resource and transitioning from traditional methods. Research results from this research effort could help both the Philippines and Indonesia realise their full potential and use their coastal resources more effectively for economic development through blue energy programme implementation.

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