Analysing the Renewable Energy Transition in Indonesia: An Examination Through the Actors, Objectives, and Context Framework

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Thesis
Master of Environmental and Energy Management
University of Twente
2024

Acknowledgement

I express my profound gratitude for their guidance and unwavering support by my supervisors Dr. Letizia Chiappini and Dr. Florence Metz during the process of writing this thesis and journey to submission.

I would like to acknowledge to the faculty and fellow students of the Master of Environmental and Energy Management program at the University of Twente for their support and shared knowledge during my studies. Furthermore, I would like to give thank you to everyone giving their insights and data that contributed to the research, without the participants and the data the thesis would not have been possible. Finally, I would like to thank my family for your support and strong belief in the goals I set.

As I write the closing words of this chapter of my academic journey, I leave the University inspired to act and promote sustainable lifestyle and impactful change in my personal and professional life.

Abstract

To meet increasing energy demand and global climate goals, Indonesia plans for improvements in the energy sector but will need to cope with a series of complex challenges such as government regulation, economic considerations, the prioritization of renewable energy and stakeholder's prioritization. This study evaluates how well the Indonesian energy sector is positioned to achieve its renewable energy targets, involving pivotal entities such as the Ministry of Energy and Mineral Resources (MEMR), National Energy Council (NEC), industry stakeholders and NGOs with the ability to drive renewable energy adoption. Through the lens of the framework Actors, Objectives, and Context (AOC), the research highlights the structural and strategic components of the renewable energy sector, identifying the actors and stakeholder effects. Drawing from interviews and analysis of policy documents, the study reveals a complex web of barriers and incentives for an energy transition in Indonesia, exposing gaps between Indonesia's energy ambitions and actions thus far. The barriers include policy misalignments and insufficient infrastructure, with recommendations offered for stakeholders, along with suggestions to support better policy that may enable greater renewable energy growth in Indonesia.

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List of Abbreviation

AOC	Actors, Objectives and Context
CCS	Carbon Capture and Storage
COP	Conference of Parties
DGE	Directorate General of Electricity
DNRE	Directorate General of New Renewable Energy and Energy Conservation
GHG	Greenhouse Gas
GW	Giga Watts
IEA	International Energy Agency
IESR	Institute of Essential Services Reform
IRENA	International Renewable Energy Agency
KEN	National Energy Policy
MEMR	Ministry of Energy and Mineral Resources
NDC	Nationally Determined Contribution
NEC	National Energy Council
NRE	New Renewable Energy
PLN	National Electricity Company
RUEN	National General Energy Plan

Chapter 1 Introduction

1.1 Background

Arnell et al. (2014) suggests that the implications of environmental change will invariably intersect different sectors and potentially broaden further in the context of interest in global calls to tackle climate change and its impacts. Water scarcity is an emerging issue, which could be exacerbated by climate change, with a projected 1 billion people throughout the world facing water issues by 2050. Further, the implications of river flood inundation in South and East Asia could impact 450 million people annually and likely see an increase in regularity (Arnell et al., 2014).

The Paris Agreement that was established at the 21st Conference of Parties (COP21) in 2015 sought to establish an important agreement for nations of the world to reach and had the goal to keep the global temperature to 1.5°C (Dafnomilis et al., 2024). The submission of Nationally Determined Contributions (NDC), which become legally binding with a country's official ratification of the agreement, is a crucial tactic for accomplishing these audacious targets. Countries can specify their specific pledges to lowering greenhouse gas (GHG) emissions that contribute to climate change using these NDCs as a pledge and review mechanism (Dafnomilis et al., 2024).

Indonesia's NDC signifies its robust commitment to addressing climate change while pursuing sustainable development (Republic of Indonesia, 2022). This commitment is underpinned by comprehensive strategies spanning across key sectors, including renewable energy adoption.

However, Indonesia heavy reliance on fossil fuels has played a role in the increase of global greenhouse gas emissions worsening climate change concerns. Moreover, Indonesia abundant natural resources offer an opportunity for the development of a renewable energy sector signalling hope for sustainable progress and environmental protection (Pambudi et al., 2023). The shift in Indonesia energy focus aims to decrease its dependence on fossil fuels and address GHG emissions. The government's pledge to raise the share of renewable energy demonstrates a strategic approach toward securing a sustainable and resilient energy landscape (Pambudi et al. 2023). As Indonesia moves closer to embracing energy sources, it is crucial to examine its status, opportunities, and strategies for utilizing its extensive renewable energy resources.

1.2 Problem Statement

While countries worldwide agree on the need to lower GHG emissions and strive for progress the reliance on fossil fuels poses a major obstacle. Moving towards energy is vital. Requires a cautious approach to prevent hindering economic growth. Indonesia as a participant in the Paris Agreement has pledged to meet goals outlined in its NDC focusing on cutting down greenhouse gas emissions and boosting renewable energy production.

Indonesia bold move to update its energy goals highlights an effort to transform its electricity sector, which has long been reliant on fossil fuels (Maulidia et al., 2019). This update not shows a shift towards eco friendly energy sources but also calls for extensive changes in policies,

regulations and organizational cooperation to attract the necessary investments. The push toward these objectives is spurred by increasing need for energy, driven by development and improving quality of life.

Rehiara et al.'s (2023) research reveals that Indonesia has the potential to exceed its targets for reducing greenhouse gas emissions through the adoption of policies and utilization of energy sources such as solar, wind and hydropower. The research highlights the significance of speeding up the transition to renewable energy options for a future.

Kanugrahan and Hakam's (2023) research provides a look into the future of Indonesias power sector in the term particularly in meeting the NDC goals by 2060. It is recognized that transitioning to an energy system relies on having a variety of energy sources. Their findings indicate that solar power is expected to play a role in the electricity mix alongside substantial contributions from hydro, geothermal and wind power sources.

To achieve the ambitious NDC targets, Indonesia needs to shut down fossil fuel power plants and focus on expanding energy infrastructure. This shift is not just in line with climate targets. Also offers a roadmap for Indonesia to boost its energy security, lessen reliance on fossil fuels and promote a sustainable economic strategy (Kanugrahan & Hakam 2023).

Bakhtyar et al. (2013) reported that Indonesia was interested in renewable energy, which resonates with the actual situation in Indonesia. With Indonesia progress and energy usage trends there is a pressing need for a focus on renewable sources. To meet their NDC goals, Indonesia must review their energy approach to ensure a transition towards renewables with thought out planning and execution. The conversion to renewable energy in Indonesia is not without its challenges. Existing energy infrastructure, financial issues for the transition and regulatory frameworks pose challenges. However by prioritizing Indonesia energy resources there is an opportunity, for substantial economic growth, enhanced energy security and improved environmental sustainability.

1.3 Research Objective

An assessment on the transition in energy resources in Indonesia, covering sections that introduce concepts like the AOC (Actors, Objectives, and Context) framework to understand the influences of stakeholders on Indonesia's energy sector.

The success of managing the Indonesian energy sector to meet its objectives is partly determined by the output of this analysis. The main target is divided into the following items:

1. Evaluate Indonesia's energy objectives (energy set) and the progress achieved.
2. Assess the present state of Indonesia's energy sector organised.
3. To propose recommendations for accelerating the achievement of Indonesia's energy targets

1.4 Research Question

Main research questions of the thesis:
How well is the Indonesian energy sector is currently positioned to meet the established energy related goals?

To answer the main research question, the following research sub questions are addressed:

1. What are the specific renewable energy targets set by Indonesia and what year are they be achieved ? and How far has Indonesia progressed in order to meet the these target?
2. How is the Indonesian energy sector structured and which stakeholders play pivotal roles in terms of energy sector decision?
3. What are improvements can be made to achieve the set goals?

1.5 Thesis Outline

This thesis consists of five chapters that delve into Indonesia transition towards renewable energy through the AOC framework. Chapter 1, Introduction lays out the background, research objectives and guiding research questions. Following that (Chapter 2) the Literature Review delves into existing literature on Indonesia energy sector particularly focusing on the transition to renewable energy and the challenges faced. Chapter 3. Methodology explains the AOC framework as the perspective and details research methods used for data collection and analysis. Chapter 4 Results showcase research findings examining actors within the AOC framework their objectives, context on these objectives along with discussions and suggestions for improvement integrating findings with existing literature. Lastly Chapter 5. Conclusions wrap up study insights by providing recommendations for stakeholders and suggesting directions for renewable energy policy in Indonesia.

Chapter 2 Literature Review

2.1 Indonesia Energy Sector

Indonesia is located in Southeast Asia and consists of more than 17,000 islands. In 2023, its population increased to more than 275 million people. Indonesia is ranked fourth in the world in terms of population. Most Indonesians live on Java Island, but they are spread across other islands of the country such as Sumatra, Bali, Sulawesi, Kalimantan, Nusa Tenggara, Maluku, and Papua (Tharakan, 2015).

As Indonesia stands out as the largest archipelago in the world showcasing significant variations among its islands. Among these islands Java takes the lead as the populated one boasting a robust interconnected power system that links Java and Bali. This network holds the title, for being the power system in the region. Together with its neighbouring island Sumatra, these power systems cater to an 80% of Indonesia electricity (IEA, 2022). Notably Indonesia heavily relies on coal in its power sector with fossil fuels contributing around 70% of the electricity production.

Indonesia was once renowned as a coal exporter. However, the drop in coal prices has prompted the country to scale back its exports and prioritize meeting demand instead. It is predicted that coal will continue to be a source of fossil fuel due to its affordability (Islami & Aditya 2020). Beyond generating export revenues coal remains an energy source that will hold significance in the years. The economic viability, accessibility and ease of extraction and transportation make coal as a major component in Indonesia energy landscape.

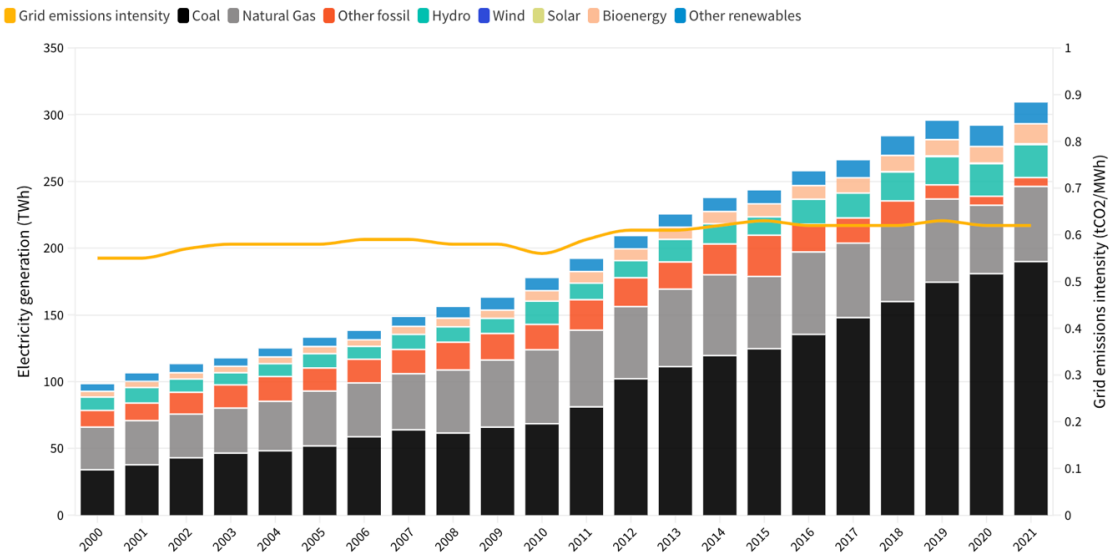

Figure 1. Electricity Generation in Indonesia (Ember., 2024)

Ordonez et al. (2022) emphasize the importance of coal representing, over half of the nation's power generation capabilities. This strong reliance on coal has resulted in a surge in CO_2 emissions positioning the power generation industry as the leading contributor to pollution.

In the past decade there has been an increase in coal production in Indonesia. Being a coal exporter globally Indonesia sends out eighty percent of its coal mainly to China and India. The appeal of Indonesian coal lies in its energy content and low sulphur levels for these countries. Factors such as proximity of mining sites to the coast connected transportation networks from mines to ports. Particularly in South and East Kalimantan, affordable port charges and minimal coal processing requirements all contribute to the competitiveness of Indonesian coal on the international market (Tharakan, 2015).

Indonesia faces a challenge in reducing carbon emissions due to its reliance on coal. To address this issue, it is crucial that any new coal powered plants are designed to be highly efficient and minimize losses by using latest technology. Fortunately, the Indonesian government is making strides in this direction motivated by both concerns and the economic benefits of power generation needed for the country's new large-scale plants. A recent study on carbon capture and storage (CCS) potential in Indonesia suggests that gas and coal power plants could become key sites, for implementing commercial scale CCS technologies in the future (Tharakan, 2015).

2.2 Transition to Renewables Energy in Indonesia

Indonesia faces a challenge with greenhouse gas emissions that come from sectors like changes in land use, forestry, energy production, peat fires, waste management, agriculture and industry. Due to the increasing dependence on fossil fuels, it is estimated that Indonesia CO_2 emissions from energy will increase dramatically potentially surpassing 800 million tons by 2035. The power sector is predicted to experience the growth in emissions with transportation also expected to see a significant increase (Tharakan, 2015).

Indonesia is currently facing a moment, confronting the dual challenges of economic development and climate change mitigation. Being the largest economy in Southeast Asia, Indonesia has predominantly relied on fossil fuels in its energy approach (IRENA, 2022). However, the country has committed to reaching zero emissions by 2060 or earlier. To meet this objective step such as implementing energy efficiency practices boosting the share of renewable energy, promoting electric vehicles, and increasing residential electrification are essential. A significant transformation in the power sector is vital for achieving this goal. Rahman et al. (2021) suggest that Indonesia's energy security and sustainability objectives can be achieved through a deliberate focus on renewables, which can substitute for fossil-based fuels and help diversify energy sources.

Indonesia is facing a growing need for energy now. Additionally, the goal of this effort is to bolster energy security by ensuring a supply of energy resources. The shift towards using renewable energy is seen as a strategy to safeguard energy security by reducing dependence on fossil fuels and imported energy (Islami & Aditya 2020).

The shift towards a sustainable energy system in Indonesia comes with challenges but also abundant in opportunities. Indonesia's rich natural resources, notably its significant potential for solar, wind, hydro, and geothermal energy, put it in a prime position to embrace renewable energy sources (IRENA, 2022).

The benefits of this energy transition extend beyond environmental preservation, promising economic revitalization through job creation, energy security enhancement, and reduced dependence on energy imports. As such, Indonesia's journey towards energy sustainability is not just a pathway to mitigating climate change but also a strategic move to bolster national development and resilience in the face of global energy market fluctuations (IRENA, 2022).

Indonesia stands out in Southeast Asia for having the emissions intensity in its power sector industry. To move towards achieving zero emissions, it is crucial to adjust power sector policies and regulations. Despite Indonesia energy sources such as geothermal, hydro, and solar power their utilization remains minimal offering various options for reducing GHG emissions in the power sector (IEA, 2022).

According to the Indonesian Energy Law, Indonesia has established goals for energy. These objectives are vital in reducing the nations impact and bolstering energy security. The legal framework outlines the guiding principles for Indonesia energy policies focusing on ensuring access to energy for its citizens. It underscores Indonesia commitment to achieving energy independence enhancing energy security promoting energy practices and improving energy accessibility for all those in remote areas or facing financial constraints (Islami & Aditya 2020). While renewable energy sources are not explicitly addressed in existing legislation certain forms of energy are acknowledged within the scope of the country energy laws.

The government of Indonesia has launched initiatives to support solar, wind, hydro and geothermal power. For instance, the government’s policy on energy pricing aims to attract investments in the sector acknowledging the significant role of renewable energy in fulfilling Indonesia energy goals. Nevertheless, obstacles such as financing, infrastructure readiness and regulatory hurdles persist. Overcoming these challenges is essential for Indonesia to achieve its energy targets and ensure the execution of its energy strategy (IESR, 2024).

Addressing climate change is a focus for the government as it connects its climate efforts to wider economic objectives and poverty reduction goals. Numerous projects highlight the nations dedication to a future like reducing deforestation promoting energy sources and incorporating technologies that lower emissions such as CCS. Giving importance to enhancing climate resilience in the energy field could greatly enhance Indonesia energy security (Tharakan, 2015).

2.3 Indonesia Renewable Energy Sector and Its Challenges

Renewable energy is generated by processes that often regenerate themselves, examples include solar power, geothermal, wind, tides, hydropower and various kinds of biomasses (Yudha et al., 2021). This energy is infinite. Always capable of regenerating itself. Shifting to renewable energy is vital for addressing climate change and reducing the reliance on fossil fuels. Indonesia's energy future is important because they have natural resources in abundance. Indonesia offers lucrative potential for solar, wind, hydro and geothermal opportunities (Tharakan, 2015). Indonesia is a leader in renewable energy potentials globally, because of promising resources. The Indonesian government is aware of these advantages and is working to harness these resources.

Hydropower in Indonesia has become one of the renewable energy alternatives widely being considered, employing flowing water to generate electricity, and is a potential category of clean energy with little greenhouse gas emissions according to Yudha et al. (2021). These resources are more prevalent in outside Java Bali Power System areas which includes Sumatra, Sulawesi, Papua and East Kalimantan.

Geothermal energy is commonly found in the form of steam, hot water or a mix of both serving as energy solution. It has emerged as an sustainable alternative to fossil fuel based energy sources helping to tackle issues related to carbon emissions and reducing reliance on fossil fuels (Yudha et al., 2021).
This geological positioning grants Indonesia heat resources establishing it as a nation with geothermal possibilities. Indonesia holds the potential globally estimated to represent roughly 40% of the total global capacity (Yudha et al., 2021). Indonesia is known for its resources, but its existing geothermal capacity is relatively low, ranking third globally after the US and the Philippines. Recognizing the benefits of energy in bolstering energy security and promoting sustainability the Indonesian government has prioritized it in their plans for expanding power generation (Tharakan, 2015).

Biomass energy, sourced from materials, like crops, residues, forest waste, animal waste and food leftovers are an eco-friendly form of renewable energy. Unlike sources biomass can be transformed into three distinct fuel types: liquid, solid and gas. Indonesia, known for its biomass resources. These various biomass sources have the capability to provide both heat and electricity offering benefits to households and small scale industries (Yudha et al. 2021).

Solar power, which uses the suns energy to generate electricity is experiencing growth worldwide compared to types of renewable energy. It is increasingly seen as a sustainable energy source, with the potential to address energy challenges (Yudha et al., 2021). Indonesia, located near the equator in a zone, for harnessing energy is believed to have the capacity to produce up to 207.8 gigawatts peak (GWp) of power (Yudha et al. 2021).

The goals outlined in the National Electricity Plan highlight a move towards expanding energy resources focusing on solar, hydro, biomass, and wind power to lessen reliance on fuels and conform to global climate target. This change is pivotal for Indonesia as it grapples with being a contributor to greenhouse gas emissions largely stemming from its use of coal (IESR, 2024).

Unlocking the benefits of energy in Indonesia comes with its fair share of challenges. One major hurdle is the development of infrastructure in regions where many renewable sources are situated without proper connections to national power grids. Additionally enhancing the framework and policies is crucial to attract both international investments in renewable energy sector. Simplifying permit acquisition processes and offering incentives like tax reductions and subsidies play a role in enticing investors. Challenges hindering the progress of energy in Indonesia consist of investments tough competition from fossil fuels. These barriers are slowing down the country's transition towards an energy mix highlighting the importance of implementing policy changes (Rahman et al., 2021).

When discussing the phasing out of coal power plant, it is important to consider how it will impact the jobs, in the communities where these plants are located. It is crucial to address how this transition will affect communities to ensure a smooth shift. In coal plants most jobs are related to operations and maintenance tasks. In addition to the job losses in the power industry there are also concerns about how shutting down coal plants could harm the upstream coal mining sector particularly affecting low skilled workers in underdeveloped areas (Transition Zero, 2024).

Furthermore, reaching the energy goals in Indonesia faces various obstacles such as the need for significant investments, regulatory challenges and a supportive policy framework to engage private sector participation. Despite these hurdles the report highlights a framework and continuous policy initiatives to boost investments in renewable energy. This comprehensive strategy emphasizes the intricacy of shifting towards renewable energy, necessitating actions, investment and regulatory sectors to achieve the desired energy transformation (IESR, 2024).

2.4 Indonesia Energy Organizational Structures

When it comes to energy entities the MEMR plays a role (Islami & Aditya, 2020), in shaping energy policies in Indonesia. The MEMR is divided into Directorates, each with its focus on overseeing different parts of Indonesia energy industry. The Directorate General of Electricity (DGE) along with the Directorate General of New Renewable Energy and Energy Conservation (DNRE) are responsible, for overseeing the electricity sector. MEMR not handles responsibilities but also supervises the functioning of state owned utilities and energy service providers conducting research to aid Indonesia energy goals (Tharakan, 2015).

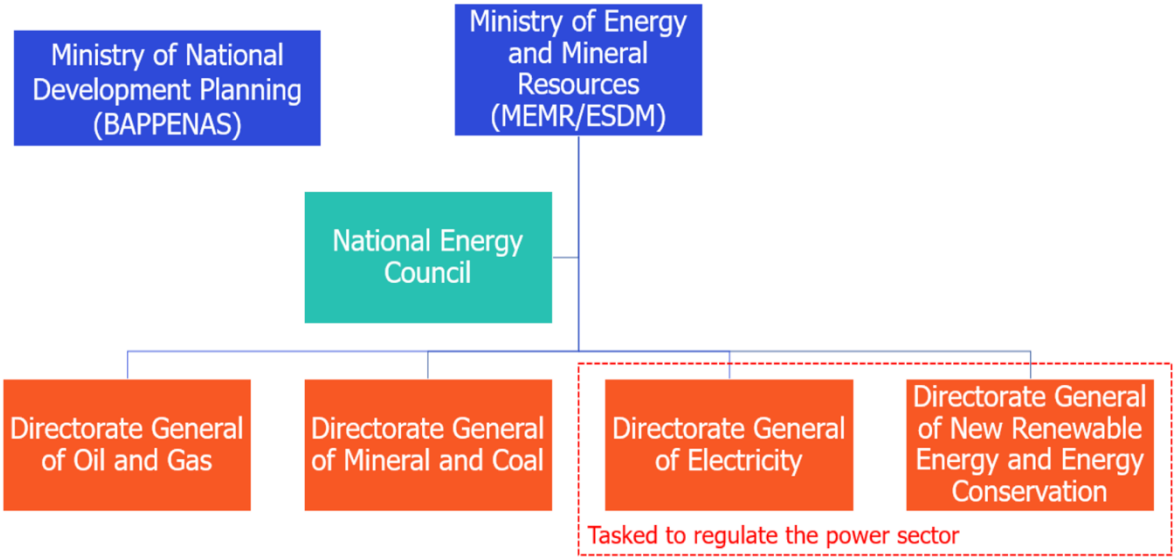

Figure 2. Organizational Structures (Transition Zero, 2024)

In shaping the country's energy direction, known as the president's energy vision, the National Energy Council (NEC) collaborated with The Ministry of Energy and Mineral Resources (MEMR) to outline the National Energy Policy (KEN) before presenting it to the legislature, for approval. The KEN cannot move forward. Be put into action without the endorsement of the legislature. Subsequently the KEN will serve as a guideline for MEMR, which acts as the lead in energy matters to formulate the National General Energy Plan (RUEN) in collaboration with technical ministries and PLN. PLN is the government owned power company in Indonesia that handles all electricity services, including power production, distribution and sales (Tharakan, 2015).

On a national scale, MEMR plays a role in overseeing and directing energy affairs compared to other ministries since it serves as a central hub for all things related to energy. Additionally, MEMR has the authority to shape and enforce energy policies and initiatives to ensure that the energy vision outlined in KEN and RUEN is faithfully carried out at both national and local levels (Islami & Aditya, 2020). The MEMR plays a role in overseeing the energy sector in Indonesia. Additionally, there are laws and regulations established in the country. The NEC has crafted two

documents, RUEN, and KEN outlining Indonesia energy plan up to 2050. Meanwhile PLN holds authority over electricity transmission, distribution, and retail services in Indonesia.

Chapter 3 Methodology

3.1 Actors, Objectives and Context (AOC) Framework

This study is structured by the AOC (Actors, Objectives, Context) framework. The framework explains that policies reflected in policy decisions most closely represent the objectives of the most powerful actor in decision-making. The policy process framework is comprised of the actors who matter, their objectives, and the context of how important that objective is to the actor (Jakob et al., 2020).

A comprehensive political economy model called AOC has been created to analyze and assist in understanding how systems, government institutions and political environments, in countries influence policy results. The AOC model posits that policies are crafted and put into action based on the objectives or aims of those in positions of power (Jakob et al., 2020).

The AOC framework involves three steps; The first step involves recognizing the relevant societal and political actors engaged in creating, implementing, and enforcing energy policies; The second step is outlining the underlying objectives of these actors; The final step is assessing the economic, political, and environmental context that determine how objectives are prioritized and examining the dynamic interaction among these factors (Jakob et al., 2020). The context in which policy choices are made includes aspects like the country dependency to fossil fuels; political factors encompassing decision making processes and the activities of societal group; and environmental factors involving issues such as air pollution and climate changes impact. These contextual elements significantly influence the policy making process.

It is crucial to grasp how various parties interact in the process of creating policies, in the energy sector to ensure their development and implementation. According to Dzikrurokhim (2021) examining the actors involved provides an insight into their roles and impact on policy outcomes essential. This method emphasizes the significance of understanding the motives and contributions of all stakeholders including government entities, businesses and community organizations. The AOC framework plays a role in identifying and mapping out the responsibilities and impact of stakeholders in energy policy. It also offers an approach to analysing how these stakeholders' goals align with or differ from energy objectives. By examining the connections between actors, goals and the prevailing circumstances this framework can unveil potential conflicts or collaborations. This thorough examination is essential for predicting policy outcomes and assessing their effectiveness in implementation.

In Indonesia significant players, like the MEMR and the NEC may support energy policies when there is a high influx of investments in renewable energy. On the hand NGO who have influence might find it challenging to push for decentralized renewable energy systems due to their limited impact.

By using the AOC framework, this study highlights the importance of implementing energy policies supported by chosen policy tools. It also explains that regardless of the economic settings, the formulation of energy policies universally depends on the interactions among relevant actors, their objectives, and the context that influences these objectives.

This framework sheds light on how different stakeholders, each, with their goals and levels of impact through varying contexts to influence the Indonesia energy direction towards renewable energy.

3.2 Research Object, Research Unit and Research Boundary

Drawing from Jakob et al.'s AOC framework, selected for scrutinizing the Indonesian energy sector, actors are categorized into two groups: political and societal actors (Jakob et al., 2020). Within this framework, political actors are identified as those wielding supreme legislative authority in the Indonesian electricity sector, notably the Ministry of Energy and Mineral Resources (MEMR), National Energy Council (NEC), Societal actors, conversely, are those who exert influence over the sector's processes either directly or indirectly, devoid of any legislative clout such as International Energy Agency (IEA) and National Electricity Company (PLN).

The primary focus of this study is the Indonesian electricity sector, serving as the research unit. Given the extensive array of stakeholders impacting or impacted by the Indonesian electricity sector, establishing a research boundary was essential to manage the scope of required information and data effectively.

In this study, attention is narrowed to entities that play a pivotal role in policy formulation and the generation of Indonesia electricity sector. Moreover, in instances where multiple organizations perform identical functions (e.g., companies involved in electricity generation and distribution across Indonesia such as PLN, Medco Power and Pertamina NRE), they will be collectively considered as a single entity.

3.3 Data Collection

Earlier, the aims of the research were defined, accompanied by the formulation of research questions essential for their resolution. To address the sub questions of the research, data and information are garnered through multiple approaches. This encompasses the scrutiny of diverse documents and official reports available through Scopus and the official web pages of relevant organizations (MEMR, NEC, PLN, IEA).

Additionally, to gather information about how the Indonesian energy sector's structured and organized as well as the objectives of its key stakeholders and why those objectives matter to them interviews are conducted as part of this study. The questions cover a range of topics both ended and closed ended (semi-structured).

The participants chosen for this research project and for the interview purpose, consist of figures and decision makers, across sectors of Indonesia energy sector. They include individuals from MEMR, NEC, IEA and PLN. These individuals were selected based on their insights, expertise and influential roles in shaping and executing energy related policies. It is crucial that these interviewees come from organizations and possess integrity as their insights will shape the conclusions of the research and must align with the perspectives of actors in Indonesia energy sector.

Actors were selected for their established roles, involvement in shaping energy policies and impact on decision making. This selection process draws inspiration from stakeholder analysis to acknowledge influences among actors as detailed in Section 2.4 and guided by the chart depicted in Figure 2. Organizational Structures.

This research involves actors classified as having levels of influence. 'high' and 'medium'. To capture a range of viewpoints, within the energy industry. The criteria for actors with 'high' influence include authority, control of resources and active involvement in policy making demonstrated by organizations like MEMR, NEC and PLN. Actors with 'medium' influence, such as IEA are included for their advisory and advocacy roles that can shape policy discussions but do not directly determine policies.

Table 1. Classification of Actors in Indonesia's Energy Sector

Actor	Influence Level	Role
MEMR	High	Policy Formulation
NEC	High	Advisory
PLN	High	Operational
IEA	Medium	Consultative

3.4 Data Analysis

It is crucial to validate data by utilizing multiple sources and cross checking the information to ensure the accuracy of the results. To prevent research bias, the triangulation technique has been employed to validate the data analysis. This method involves gathering data from different sources and method. The data utilized primarily come from literature (Scopus) and interviews.

The conclusions drew based on the results derived from addressing the research question through three sub questions outlined in section 1.4. Research Question. By employing both data collection methods any potential bias from authors of literature or interview participants can be offset, ensuring a representation, without one viewpoint dominating over others.

The research consisted of conducting eight interviews to collect information on how the renewable energy industry in Indonesia aligns the goals of actors within the context. During these interviews a set of ten questions (detailed in Appendix A) were posed. Table 2. Provides The names of the institutions that were interviewed and the dates when these interviews took place.

Table 2. Name of Institutions and Interview Date

No	Name of Institution	Actor Name	Interview Date
1	Ministry of Energy and Mineral Resources 1	MEMR	6 June 2024
2	Ministry of Energy and Mineral Resources 2	MEMR	7 June 2024
3	National Energy Council 1	NEC	10 June 2024
4	National Energy Council 2	NEC	11 June 2024
5	National Electricity Company 1	PLN	12 June 2024
6	National Electricity Company 2	PLN	12 June 2024
7	International Energy Agency 1	IEA	14 June 2024
8	International Energy Agency 2	IEA	14 June 2024

In order to ensure the research makes a contribution in the field of Indonesia energy transition, this study concentrates on new updates and policy changes that have not been widely explored in earlier studies. Using the Actors, Objectives and Context (AOC) framework offers an angle on how stakeholders interact and impact policy implementation in Indonesia renewable energy sector. This method helps in gaining a grasp of the intricacies within Indonesia energy industry. Provides valuable insights that could shape future policymaking decisions.

When choosing policy documents the research follows a set of guidelines to guarantee relevance and precision. It focuses on the documents and regulations that pertain directly to Indonesia energy industry. These consist of policies issued by the government, national energy plan and recent legislative changes that impact the renewable energy landscape. The chosen documents are ones released to depict the condition of energy policy in Indonesia ensuring that the analysis reflects the latest regulatory and policy environments.

3.5 Ethical Consideration

Before starting the interviews, the interview protocol was conducted to ensure it aligned with standards and avoided ethical violations. Participants were informed about the study objectives when they were invited for an interview. Consent to record the conversation was explained. This agreement was documented in the recording itself. The audio recording was only used for transcription purposes and was not shared publicly.

The interview recordings were stored securely on a drive accessible only to the researcher. To minimize bias, this study combined findings from both document analysis and interviews to present a perspective.

Chapter 4 Result

4.1. Indonesia Energy Target Set

Indonesia has set goals in the energy sector to move towards a sustainable and resilient energy system. By 2023 the country has already achieved an 11% share of energy in its energy mix supported by a 12 GW capacity from New Renewable Energy (NRE) sources. The target for 2025 is to increase this capacity to 45 GW. Moreover, Indonesia aims for renewables to account for 23% of its energy mix and plans to decrease energy intensity by 1% (Maulidia et al., 2019). To encourage energy consumption, the goal is for renewables to contribute 11% of final energy consumption by 2025. Looking ahead to 2030, Indonesia is dedicated to reducing greenhouse gas emissions by 29% up to 41% with assistance. The countries NDC outline strategies for achieving these emission reduction targets demonstrating Indonesia commitment towards addressing climate change as outlined in the Paris Agreement.

By the year 2050, it is projected that renewable energy will account for 31% of the energy mix with the aim being to reach carbon neutrality by 2060 (Kanugrahan & Hakam, 2023). These objectives highlight Indonesia commitment to combating climate change bolstering energy security and fostering development through energy initiatives.

Table 3. Indonesia's Energy Targets

Year	Goal	Description
2023	Current Renewable Energy Share	Approximately 11% of Total Energy Mix; 12 GW of NRE Installed Capacity
2025	NRE Installed Capacity	45 GW
2025	Renewable Energy Share	23% of Total Energy Mix
2025	Energy Intensity Improvement	Reduce Energy Intensity by 1% per Year
2025	Energy Consumption from Renewables	11% of Total Final Energy Consumption
2030	GHG Emissions Reduction	Unconditional 29% Reduction; Conditional 41% Reduction with Support
2050	Renewable Energy Share	31% of Total Energy Mix
2060	Carbon Neutrality	Achieve Net-Zero Emissions

The government's objective is to shift from fossil fuel sources to sustainable energy alternatives. Numerous initiatives and activities are currently in progress to bolster the infrastructure for these developments.

In 2021, Indonesia made progress towards expanding its energy capacity from renewable energy sources. The total installed capacity of NRE was around 8 GW. The installed capacity of NRE in Indonesia is shown in the table 4. There are different types of NRE listed so it has a diversity. The potential capacities of NRE are larger than the installed capacity of each renewable energy source. It is noted that the installed capacity in the hydropower, geothermal, and biomass categories is relatively larger. Among the renewable energy sources, hydropower has the largest installed capacity, while solar and wind energy have potential capacity of 1102 GW rated capacity, but existing capacity is very small, only 0.1 GW and 0.003 GW, respectively compared to the potential capacity (Kanugrahan, & Hakam, 2023).

Table 4. The Installed Capacity of NRE in Indonesia

NRE Source	Potential Capacity (GW)	Installed Capacity (GW)
Hydropower	75.1	4.8
Geothermal	29.5	1.4
Biomass	32.7	1.7
Solar	1052	0.1
Wind	50	0.003
Ocean	18	0
Total	1257.3	8.02

The National Energy Policy (KEN) is a plan established in 2014 outlining Indonesia goals for the year 2050. The key objectives of this energy strategy focus on ensuring energy security and self-sufficiency achieved through conservation efforts and diversifying energy sources (IEA, 2022).

Table 5. Target under KEN

	Unit	2020	2025	2050
Primary Energy Supply	EJ		>16	>42
Share of Primary Energy				
New and renewable energy	%		>23	>31
Oil	%		<25	<20
Coal	%		>30	>25
Gas	%		>22	>24
Installed power capacity	GW		>115	>430
Electricity access rate	%	100		
Electricity consumption per capita	kWh/capita		2 500	7 000

4.2. Indonesia Energy Policy

The Indonesian government has put in place a range of rules and guidelines to steer the countries energy progress and shift towards renewable energy sources. These regulations are detailed in energy laws, as presidential and ministerial directives showcasing Indonesia dedication to ensuring energy security protecting the environment and fostering economic growth (Maulidia et al., 2019).

Table 6 provides an overview of the rules and regulations concerning energy in Indonesia. The table acts as a glimpse into Indonesia regulations for energy. Each regulation plays a part in Indonesia energy sector. Meanwhile, Table 7 provides detailed descriptions of key regulations related to energy. This table aims to give a deeper understanding of the specific provisions of each regulation

Table 6. List of Regulation Related to Energy in Indonesia

Regulation/Policy	Year	Description
Law No. 30/2007 on Electricity	2007	Regulates production, distribution, and use of electricity.
Law No. 30/2009 on Energy	2009	Increase the use of renewable energy, aiming for 23% by 2025 and 31% by 2050.
Presidential Regulation No.79/2014 on KEN	2014	Outlines plans for energy security, self-reliance, and sustainability. Advocates for a variety of energy sources.
Presidential Regulation No.22/2017 on RUEN	2017	Guides energy development plans up to 2050.
Ministerial Regulation No.50/2017	2017	Provides directions for using renewable energy sources for electricity. Covers pricing, licensing, and incentives to encourage renewable energy projects.

Table 7. Detailed Descriptions of Key Regulations Related to Energy

Regulation/Policy	Detailed Information
Law No. 30/2007 on Electricity	The Electricity Law provides a structure that addresses facets of the electricity sector spanning from power generation to its delivery to consumers. Also, outlines the duties of entities participating in its production to uphold reliability and effectiveness. The regulations outline how electricity is distributed and transmitted across the nation to develop a grid network of meeting the growing electricity needs and integrating energy sources. Furthermore, the Electricity Law covers the establishment of electricity rates and pricing strategies to maintain an equilibrium between supplying power to consumers and ensuring stability for electricity providers. Additionally, the legislation mandates compliance with safety regulations in electricity generation and distribution. Its objective is to minimize the impacts of electricity generation and prioritize the safety of workers and the community.
Law No. 30/2009 on Energy	Indonesia's Energy Law lays out a structure aimed at boosting the incorporation of NRE within Indonesia's energy portfolio. It establishes goals for increasing the utilization of NRE to 23% by 2025 and 31% by 2050. These targets are designed to lessen reliance on fossil fuels and decrease greenhouse gas emissions. To encourage funding in the energy sector, laws provide perks like tax advantages, feed in tariffs and subsidies. These financial incentives aim to make NRE projects financially viable and attractive to investors for projects thereby minimizing bureaucratic hurdles (Maulidia et al., 2019). Moreover, the regulation includes initiatives to educate the important stakeholders about the benefits of transitioning to renewable energy sources.
Presidential Regulation No.79/2014 on KEN	Presidential Regulation No. 79/2014 focuses on Indonesia's National Energy Policy (KEN) to ensure energy security, self-reliance and sustainability (Sharvini et al., 2018).

	The KEN acts as a roadmap for overseeing the country energy resources through the promotion of NRE. Its objectives involve decreasing dependency on fossil fuels and updating energy infrastructure.
Presidential Regulation No.22/2017 on RUEN	Presidential Regulation No. 22/2017 which addresses the National Energy General Plan (RUEN) serves as a guiding document for Indonesia energy development strategies until 2050. Its primary aims include ensuring energy security fostering growth. The regulation sets out objectives to diversify the energy mix by emphasizing the increased utilization of NRE. The RUEN provides a plan to reach these goals by outlining the duties of government and parties engaged in executing energy strategies (Rahman et al., 2021).
Ministerial Regulation No.50/2017	Ministerial Regulation No. 50/2017 offers instructions and rewards to support the incorporation of energy initiatives into the electricity network (Rahman et al., 2021). The regulations address aspects such as determining electricity prices simplifying licensing procedures and offering incentives to promote investments in energy. The main objective of this regulation is to accelerate the incorporation of energy technologies such as solar, wind, hydro and biomass into the electricity generation mix.

During an interview, a representative from MEMR emphasized, "The regulatory structure, especially outlined in the National Energy Policy and the National Energy General Plan is crucial in propelling Indonesia shift towards renewable energy. These regulations are not just guidelines; they are the backbone of Indonesia strategy to secure a sustainable energy future for Indonesia. Through establishing goals and offering incentives." The statement highlights the role of key regulation in renewable energy in promoting Indonesia energy objectives and highlights the governments dedication to the implementation of renewable energy in Indonesia.

4.3. Analyzing Renewable Energy Transition in Indonesia through AOC Frameworks

4.3.1. Actors

In the energy sector different groups have roles in influencing policies and can be classified into two sub-categories: political actor and societal actor. Political actor consists of government departments, regulatory agencies and local authorities. Societal actor includes energy firms, research organizations and non-governmental organizations (NGO) (Jakob et al., 2020).

Government entities, like the MEMR and NEC play a role in creating policies setting rules and overseeing the energy industry. On the side societal players such as energy companies, research institutions and NGO often push for practices significant influence in shaping public opinion and policy decisions. These societal players are crucial in implementing energy initiatives and directly reap the benefits. Their perspectives and actions have an impact on the effectiveness of the energy sector. In contrast political figures hold the power to establish and enforce regulations (Jakob et al., 2020).

Table 8. The Actors Involved within the AOC Framework.

Stakeholder	Role in AOC Framework	Note
MEMR	Political Actor	Key policymaker and regulator
NEC	Political Actor	Key policymaker and regulator
PLN	Societal Actor	Major Player in Energy Production
IEA	Societal Actor	Policy Support

4.3.1.1. The Ministry of Mineral and Energy Resources (MEMR)

The Ministry of Energy and Mineral Resources (MEMR) plays a role in overseeing and regulating the nations mineral and energy reserves. This ministry significantly influences the development of energy policies. Monitors the utilization of energy sources. MEMR is tasked with formulating and implementing energy policies that align with Indonesia goals of ensuring energy security and promoting sustainability (IESR, 2024). It is responsible for ensuring that advancements in the energy sector positively impact the country economy while adhering to standards.

MEMR is divided into four directorates, each with its specific focus on different aspects of Indonesia’s energy and mineral resources.

1. The Directorate General of Oil and Gas oversees Indonesia's exploration, exploitation, and distribution of oil and gas.
2. The Directorate General of Electricity is responsible for regulating, developing, and supporting the supply of electricity.
3. The Directorate General of NRE will be providing national oversight of NRE to enhance its use nationwide.
4. The Directorate General of Mineral and Coal is responsible for monitoring the legality mining sector.

Each department plays a role in addressing the energy trilemma, which focuses on maintaining energy security, affordability (equity) and environmental aspect.

1. Energy Security: MEMR contributes to enhancing Indonesia's energy security by diversifying energy sources boosting production capabilities and ensuring a stable energy supply in Indonesia.
2. Energy Affordability (Equity): It oversees the regulation of energy prices. Ensures access to energy resources across various regions aiming to make energy accessible and affordable for all segments of Indonesian society.
3. Environmental Aspect: The ministry advocates for the adoption of NRE and enforces regulations that aim to reduce the environmental impact.

4.3.1.2. National Energy Council (NEC)

NEC in Indonesia known serves as a group that helps steer the government in developing strategic plans and policies for the energy sector. Its contributions are important to ensuring the long-term sustainability and security of Indonesia's energy sectors.

The primary role of the NEC is to provide guidance and strategic insights to the government on energy policies. It acts as a think tank that brings together expertise from fields to ensure an approach to managing energy. NEC key functions include.

1. Strategic Planning: Assisting in developing plans for energy development.
2. Policy Suggestions: Providing recommendations on energy policies, pricing and subsidies.
3. Energy Security: Advocating for diversification of energy sources and reducing reliance on imported fuels.
4. Environmental Compliance: Supporting policies that adhere to regulation.

The suggestions given by the NEC play a role in influencing Indonesia's energy strategy. The council collaborates closely with MEMR to ensure that its strategic objectives are in line with both local and international agreements, like the Paris Agreement (ICLEI, 2020).

A representative from NEC stated, "Our main duty is to ensure that Indonesia energy plans are not well thought out but environmentally friendly striking a balance between the importance of energy security and our dedication to protecting the environment. The NEC plays a role in advising the government on diversifying energy sources and reducing dependence on imported fuels aligning Indonesia strategy with international standards." The statement underscores NEC influence on shaping Indonesia energy strategies towards a sustainable future showcasing the council's dedication to both domestic and international energy objectives.

4.3.1.3. Indonesian Electricity Company (PLN)

PLN is the government owned electricity provider in Indonesia which overseeing most of the power production, transmission and distribution in the nation. With a presence in the energy industry PLN plays a role in guaranteeing electricity supply throughout Indonesia (Maulidia et al., 2019). Indonesia is working towards a continuous improvement and the role of PLN is becoming more important in this transition towards NRE implementation. The company's activities are in line with the countries energy policies that focus on ensuring energy security, economic stability and environmental aspect.

PLN key responsibilities involve.

1. Generating Power: Running power plant facilities that produce electricity using many sources, like coal, hydro, gas and NRE.
2. Managing Transmission: Supervising the high voltage transmission grid that carries electricity from power plants to distribution networks nationwide.
3. Retail Services: Supplying electricity to households, businesses and industries ensuring accessibility.

4.3.1.4. International Energy Agency (IEA)

IEA focuses on securing eco-friendly energy for its member nations and beyond. IEA has roles in the energy sector.

1. Policy Guidance: It offers policy recommendations.
2. Data Compilation and Analysis: IEA gathers and examines data to generate detailed statistics on worldwide energy consumption, production and trade.
3. Energy Security Measures: It bolsters the energy security of its members by encouraging diverse energy supply sources.
4. Economic Insights: Providing economic analysis and market projections to assist countries in making well informed decisions regarding their energy policies.

4.3.2. Objectives

There are two kinds of objective. The first one is societal objective, which are directly related to societal actors, and the second one is political objectives, which are indirectly related to political actors. Although the societal objectives are closely related to the societal stakeholders, and the political objective are default related to political actor, but have influence over social actors as well, such as functional in influencing how public perceive about the election result (Dzikrurokhim, 2021).

Three primary goals for energy policy within the energy sector, which are also known as the energy trilemma (Marti & Puertas, 2022). Because there are multiple actors involved, all of whom have their own objectives. Radar charts visualizing the alignment of stakeholders' objectives to energy objectives. There are three energy policy goals that are each component of the energy trilemma including: affordable energy costs (energy equity), secure energy supply (energy security), and environmentally aspect (environmental sustainability). For governments to develop new energy policies, the principal challenge will involve balancing these three competing goals (Marti & Puertas, 2022).

Interviews are conducted concerning the aims of different stakeholders. From this analysis, Indonesia's primary energy policy goal is determined, along with the objectives and key interests of various stakeholder groups.

4.3.2.1. The Ministry of Mineral and Energy Resources (MEMR)

MEMR plays a role in shaping Indonesia's energy policies (IESR, 2024). Its objectives revolve around the energy trilemma focusing on managing energy costs ensuring an energy supply and reducing the impact of energy production and consumption. Guided by the National Energy Policy (KEN), the MEMR works especially towards achieving energy security and equity for all Indonesians. MEMR's objectives is to ensure that energy remains affordable for everyone by overseeing energy pricing. This includes implementing price limits providing support to low-income families and fostering competitiveness among energy companies.

The objectives of MEMR have been validated through interviews with individuals in the ministry. These talks affirm that MEMR is dedicated to fulfilling the goals specified in the KEN. During the interview the representative was questioned about the significance of goals in developing and executing energy policies in Indonesia. As, per the discussion the crucial objectives are ensuring energy supply (energy security) given a rating of 5 followed closely by Decreasing energy costs (energy equity) also rated at 5. Environmental protection (including reduction of GHG emissions as part of NDC) received a rating of 3. These ratings reflect MEMR emphasis on securing a sustainable energy security and energy equity for Indonesia.

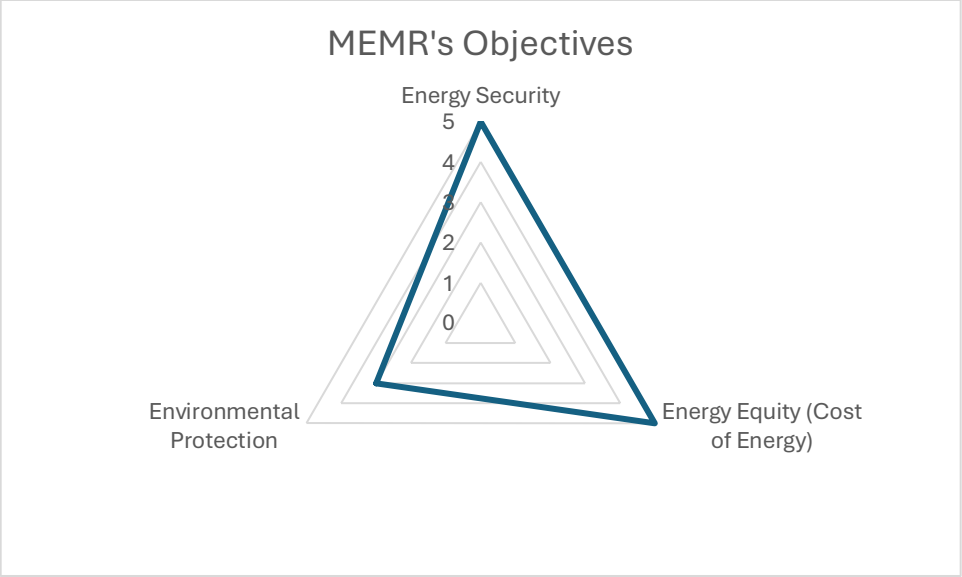

Figure 3. MEMR's Objectives

4.3.2.2. National Energy Council (NEC)

NEC plays a role in influencing Indonesia's energy policies by offering expert guidance and suggestions to the government (Islami & Aditya, 2020). Their tasks involve creating the National General Energy Plan (RUEN) which lays out the countries energy sectors strategies. Through their efforts the council guarantees that energy policies promote growth while also upholding social aspects.

The objectives of the NEC were confirmed in an interview. The interviewee underlined the council's commitment to these goals emphasizing the importance of securing an energy supply to support Indonesia growth while transitioning to environmentally friendly energy sources. During the conversation, it was noted that the NEC prioritizes balancing the energy trilemma. The interviewee highlighted the progress achieved highlighted remaining challenges, particularly in terms of financial incentives.

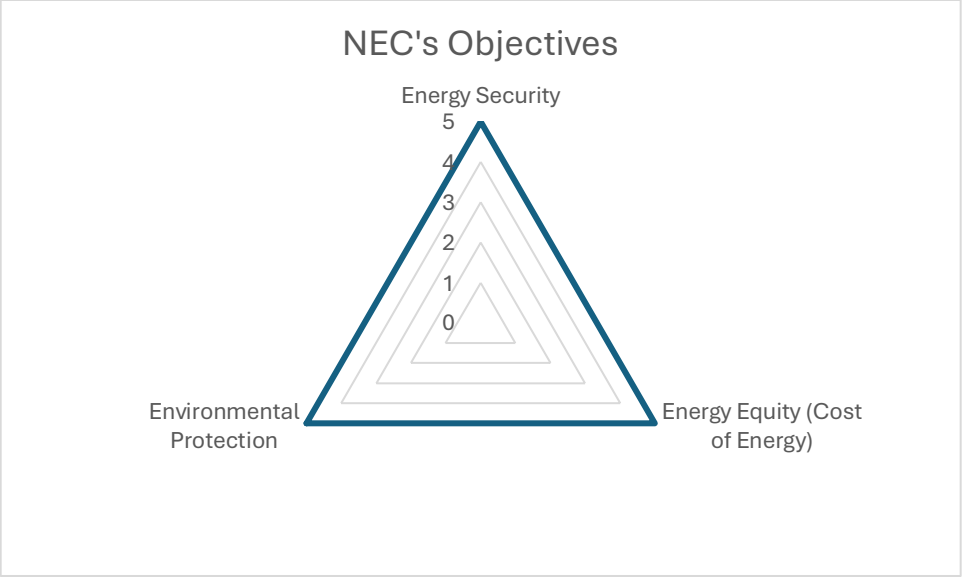

Figure 4. NEC's Objectives

4.3.2.3. Indonesian Electricity Company (PLN)

PLN plays a role in the energy industry of the country mainly handling the production, transmission and distribution of electricity throughout Indonesia archipelago (Islami & Aditya, 2020). Their main objectives are in line with the objectives outlined by MEMR and the NEC.

A radar chart provided in Figure 5 titled "PLN's Objectives" demonstrates how PLN prioritizes its goals within the energy trilemma. Energy Security, providing reliable and continuous energy, is the highest priority for PLN, scoring a 5, while Energy Equity, reflecting the affordability of energy, follows closely with a significant emphasis. Environmental Protection is still important, but is given a lesser priority, scoring a 3, which brings attention to a balanced but less emphasized goal than the other two objectives.

During an interview a representative from PLN stressed the PLN dedication to upholding energy security as their focus expressing, "Our main objective is to guarantee that all regions of the archipelago have dependable electricity access. Energy security is not just important to us; it forms the foundation of PLN activities." This focus on energy security is clearly reflected in the radar chart, which places the highest score on this objective.

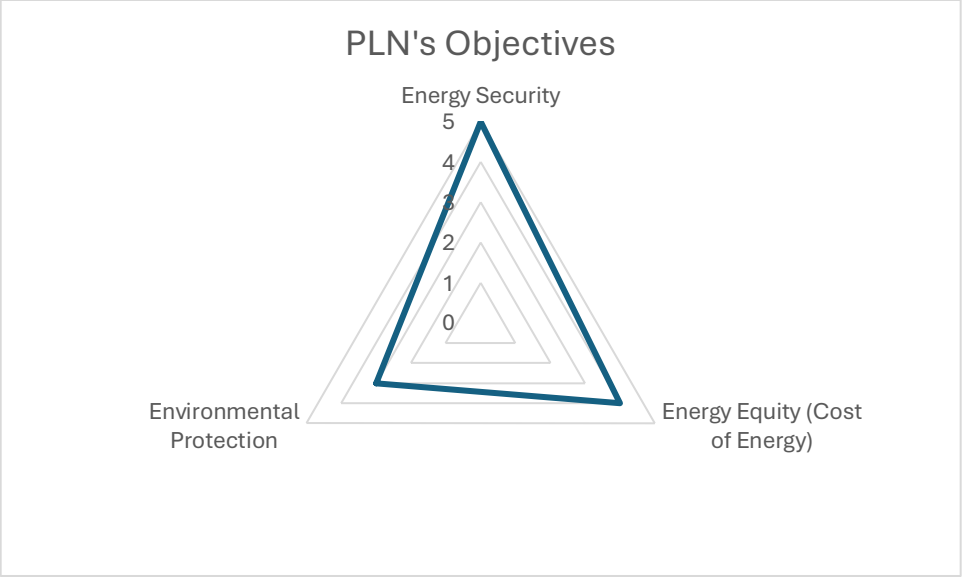

Figure 5. PLN's Objectives

4.3.2.4. International Energy Agency (IEA)

IEA stresses the significance of emissions mitigation in the energy sector to reduce global greenhouse gas emissions. This includes the need to change their energy choices to green energy resources such as wind, and hydroelectric power. They advocate for developing and deploying carbon capture and storage (CCS) technology in the oil and gas sector in Indonesia. Investment in energy technologies to enable a shift from dirtier fossil fuels will also limit impacts on environment including air pollution and habitat loss. The IEA has global viewpoints that often emphasize the actions needed to reach environmental goals the entity may help in compliance with the Paris Agreement goal.

During an interview with a representative from the IEA, it was mentioned that the agency is strongly focused on supporting Indonesia goals for energy and environmental protection. The representative pointed out that the IEA works closely with policymakers (NEC and MEMR) to align the country energy plans. This collaboration involves offering reports and policy guidance based worldwide energy trends.

In view of the Energy Trilemma, Figure 6, the IEA's objectives, shows their energy objectives ranking. The first priority of the IEA is both Energy Security and Environmental Protection, as demonstrated by its high-ranking of 5 points, indicating its commitment to maintaining energy supplies secure and its priority for environmental protection is seen by the same high rating. Energy Equity is rated 4.

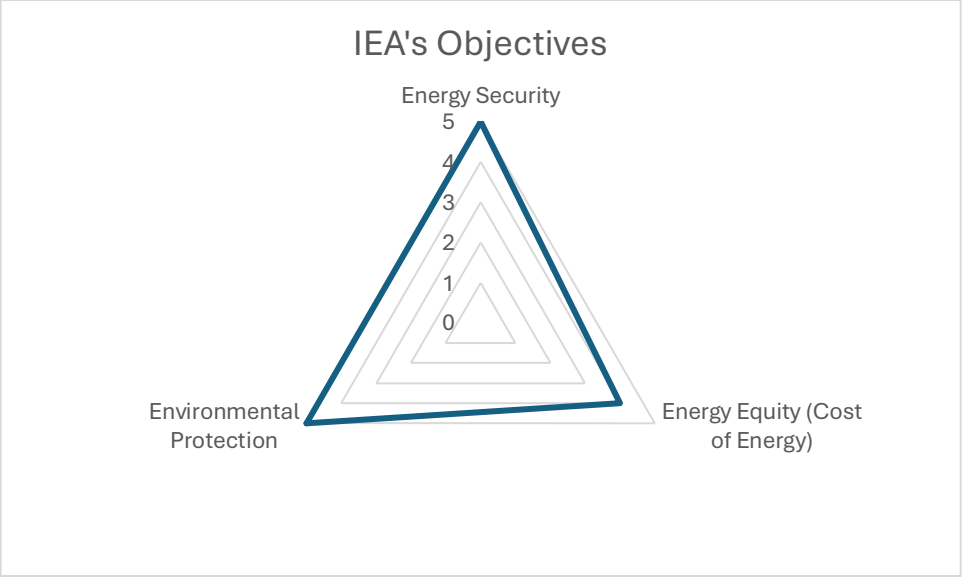

Figure 6. IEA's Objectives

4.3.3. Context

Once the objectives for all parties have been identified it is crucial to delve into the reasons behind these goals. When discussing this matter in interviews one of the questions raised was why these objectives hold significance for the actors involved. In addition, context is a very broad perspective that can be made up of numerous contexts, including economic, institution, environmental, or other contexts that are seen to be relevant. Context has been argued to be important within the framework because the context can shape how certain policy objectives are relevant to societal actors can elucidate the form and extent to which societal actors can influence political actors, and can illustrate how political objectives becomes relevant to individual political actors (Dzikrurokhim, 2021).

The insights gathered from these interviews shed light on the motivations driving the objectives of each actors;

1. Supporting Social Equity
2. Environmentally Responsible Manner
3. Organization Performance and Image
4. Ensure Sustainable Development in Power Sector
5. National Energy Demand and Economic Growth

These contextual elements for MEMR, NEC, PLN and IEA mirror their direction and operational priorities. These specific factors play a role for each organization in shaping and executing energy policies in Indonesia especially related to renewable energy implementation.

4.3.3.1. The Ministry of Mineral and Energy Resources (MEMR)

In Indonesia, the MEMR prioritizes equality showing a commitment to making energy policies inclusive and beneficial for society as a whole. Additionally MEMR places importance on meeting the country energy needs and driving progress to support growth and energy requirements in Indonesia.

MEMR acknowledges the significance of protection although it views concerns as being of lesser priority compared to ensuring economic and social stability. The role played by MEMR is crucial in upholding Indonesia energy security and fostering development. Interviews indicate that these aspects are fundamental as they influence the energy landscape of Indonesia. Additionally MEMR places importance on maintaining energy prices to drive growth by reducing business operational expenses.

It is vital to consider these elements when determining MEMR’s context. The radar chart (Figure 7) is a visual representation of MEMR context (derived from from interviews). As shown, although Supporting Social Equity and National Energy Demand and Economic Growth are the highest rated elements, both marked by a score of 5, this does not mean that other elements such as Environmental Responsibility, Organizational Performance, and Sustainable Development in the Power Sector are ignored, but instead are rated 4. This nuanced prioritization sheds light on MEMR's strategy aims to balance both economic development and sustainability in the long term interests.

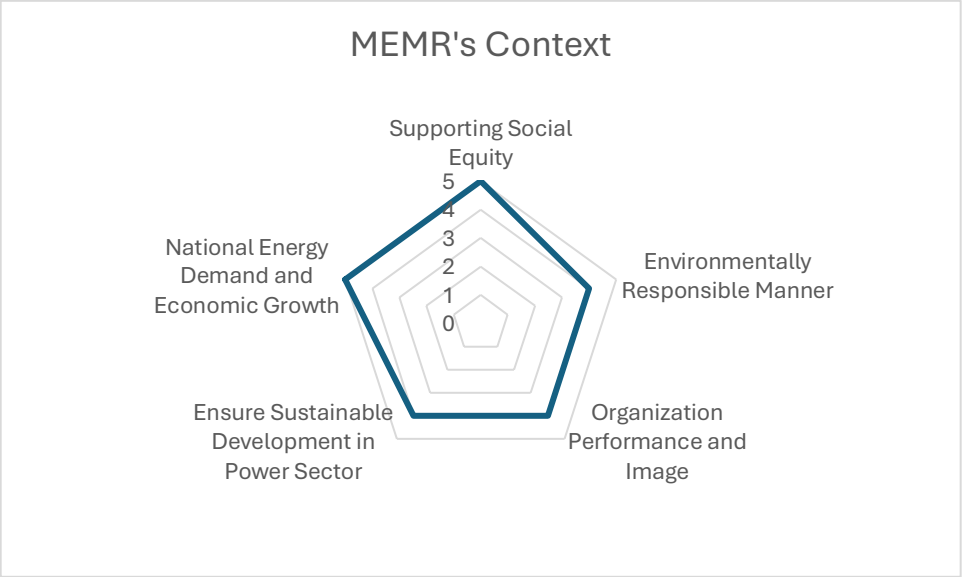

Figure 7. MEMR's Context

4.3.3.2. National Energy Council (NEC)

During the interview with NEC, it mentioned that NEC plays a role in influencing Indonesia energy strategies by emphasizing planning and collaboration among different actors (MEMR, PLN, IEA). The council is concerned with maintaining economic stability. NEC believes that its mandates are intended to create policing structures that are inclusive and representative of larger societal values. Through a social equity lens, NEC is emphasizing the need for accessible, equal, and fair energy distribution among all societal levels. NEC also values sustainable development within the power sector and looks to find a balance that includes economic development, environmental and social sustainability.

NEC also places a high emphasis on environmental aspect. This view supports the broader aim of NEC to guide energy development in a way that provides a reliable and sustainable energy supply (NRE) to support Indonesia's long term economic growth as well to address society's current needs.

NEC radar chart, shown in Figure 8 (derived from from interviews), outlines a balanced prioritization across the dimensions of energy policy within Indonesia. Social equity is a key priority and emphasizes the NEC's commitment to fairness and inclusion in access to energy resources. These are underpinned by equally strong priorities for national energy demand, economic growth, organizational performance and sustainable development in the power sector. Each dimension of the energy policy framework receives significant attention illustrating a comprehensive approach to energy policy making at a national level where no single goal is achieved at the expense of another.

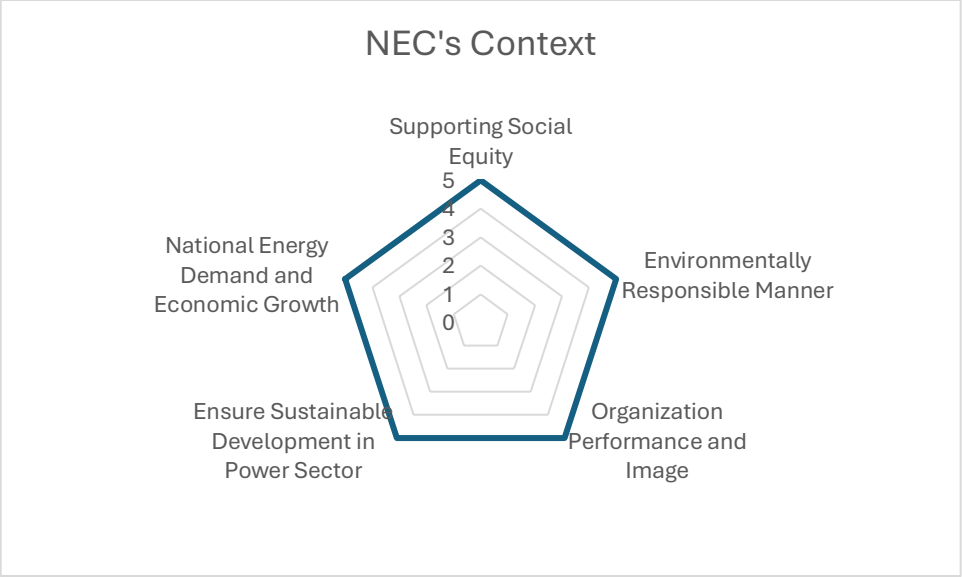

Figure 8. NEC's Context

4.3.3.3. Indonesian Electricity Company (PLN)

During an interview with PLN representative, PLN shared about the emphasizes the importance of maintaining economic stability. PLN plays a role in promoting economic growth through the provision of dependable and cost-effective electricity. A steady supply of electricity is crucial for businesses to function, attracting investments and facilitating tasks that drive economic progress. By increasing electricity accessibility in underserved areas PLN boosts economic endeavours and narrows developmental gaps nationwide.

The power sector of Indonesia is primarily operated by PLN, which centers its support around social equity, as well as energy demand and economic growth which are critical and highlighted. The radar chart in Figure 9 which derived from from interviews, emphasizes that PLN is driven by a sense of social justice, by ensuring that those in different classes have access to reliable energy to leverage various economic opportunities that are available across Indonesian society.

Lower priority has been given to the environmental responsibility of PLN, albeit, which demonstrates a strategic balance in which operational demands and green practices are ranked. The environmental responsibility of PLN is rated at a level of 3, which indicates a pragmatic consideration given to the environment in relation to core operational objectives. The scores of 4 for the organizational performance category and the pursuit of sustainable development in the power sector demonstrate a commitment toward improving operation and the sustainable growth.

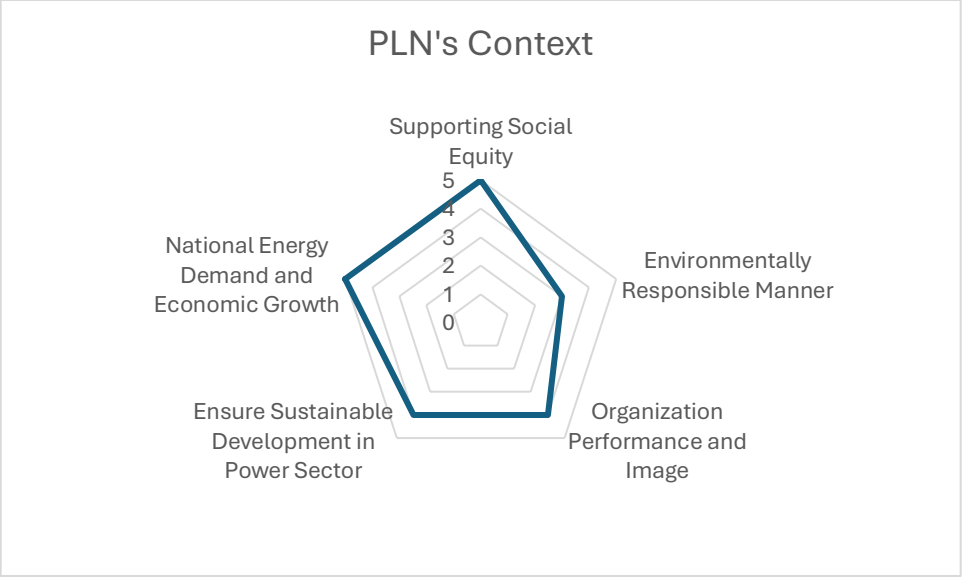

Figure 9. PLN's Context

4.3.3.4. International Energy Agency (IEA)

The interviewer talked to IEA representative about the contextual factors that impact the organization's objectives for Indonesia's renewable energy policies. IEA is encouraging environmental protection in the global energy sector. To support sustainable energy practices, IEA includes environmental considerations in their analyses, recommendations, or policy frameworks, to benefit their member countries and other countries.
IEA encourages the clean energy transition for a reduction of environmental consequences of energy production, in particular, greenhouse gas emissions. The promotion contributes to combat the global warming and is consistent with international agreement.

The IEA emphasizes sustainable energy that protect environmental integrity. It supports measures to stimulate the integration of renewable energy sources in national power systems and to enhance the reliability and sustainability of energy sources. IEA operates within a complex energy context characterized by a high degree of interaction between the global and the local comunities.

As revealed by Figure.10, IEA in Indonesia has placed the most emphasis on four areas: national energy demand and economic growth, sustainable development in the power sector, environmental responsibility, and organizational performance and image, with each area scoring a five. This chart highlights the IEA's commitment to focus policies on sustainable development that ensures efficient economic growth and development. Aside from these primary emphases, the IEA is also attentive to fostering social equity with occupying a 4 on the chart. Although a tier lower, it still illustrates that the IEA employs a holistic approach.

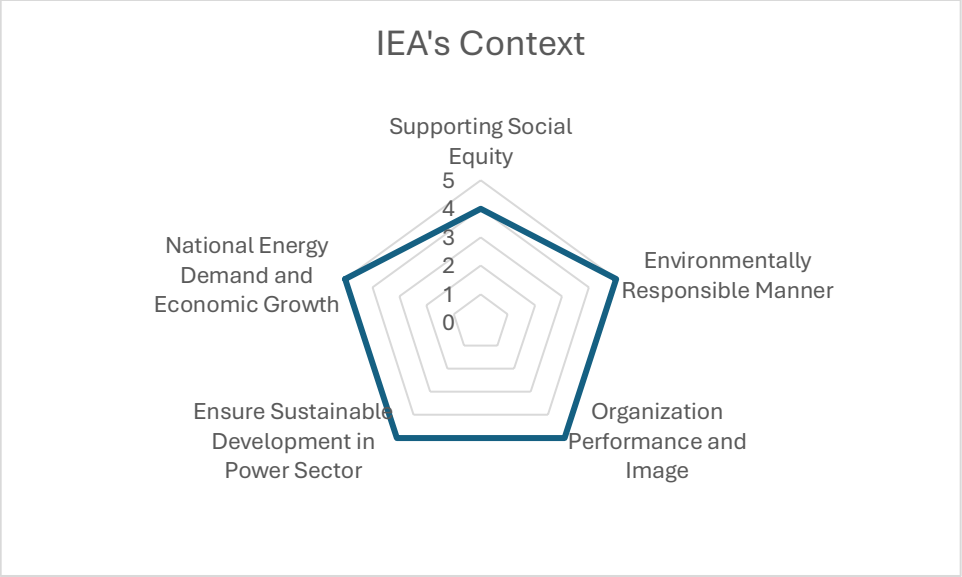

Figure 10. IEA's Context

Based on the interview with the IEA representative, it was highlighted that the IEA places importance on incorporating energy into both global and local energy transitions. Their goal is to ensure that economic progress goes hand in hand with development. By collaborating with member nations to achieve the targets set. the IEA demonstrates a commitment to advocating for a comprehensive energy policy that considers environmental, economic and social aspects.

4.4. Review AOC Framework related to Energy Sector in Indonesia

4.4.1. Actors

In Indonesia the energy industry involves actors, with roles, influence levels, aims and purposes. These actors can be classified as either political actors or societal actors. Understanding their dynamics is crucial for evaluating the shift towards renewable energy in Indonesia through the AOC framework.

Political actors operating in the area of renewable energy in Indonesia are predominately the MEMR and the NEC. MEMR is the top authority for energy policy in Indonesia. It is responsible for energy policy formulation and implementation which aligns with the nation's national targets concerning energy issues. MEMR has two primary ways to influence the national energy sector. The first is that the MEMR's contribution impacts the direction of the renewable energy sector directly through the selection of investments, infrastructure development, and regulatory frameworks in Indonesia. Secondly, MEMR is vital for promoting the renewable energy agenda. In contrast, the NEC is an advisory body to the Indonesian government on energy policy as well as being important within the field of energy. NEC makes a substantial contribution to the regulation of long-term energy policy amongst other policies, such as the KEN and the RUEN. The suggestions it makes to energy strategies provide the informal guidance in Indonesia's renewable energy policy in connection with sustainable development goals and international standards.

Societal actors can be international organizations like IEA and various NGO. IEA supports Indonesia on energy policy, data analysis, and recommendations in order to help Indonesia meet its energy objectives. The IEA focuses on the sustainability and environmental measures. Through its global perspective and expertise. IEA does not have any legislative power directly, however IEA actions draw attention to opportunities for policy change to create more sustainable and equitable energy. Also PLN, as a major actor in energy, has a strong influence over Indonesian energy and its operations steer the national energy landscape.

Stable governance of Indonesia's energy is incomplete without these interactions among actors. For example, MEMR and NEC as political actors provide strategic direction and create regulatory frameworks, while societal actors provide support, advocacy, and investment to Indonesia's energy targets. The political actors remain crucial for setting rules, establishing strategic direction, and ensuring policy coherence with national and international commitments. Societal actors contribute to broader social issues related to environmental sustainability and social equity, influencing public opinion, and advocating for inclusive energy policy also facilitate the implementation of policies and invest in renewable energy infrastructure. The overall interaction cultivates a comprehensive and inclusive policy framework that can address the various objectives of all actors in the renewable energy sector in Indonesia.

4.4.2. Objectives

The primary objectives of actors in the Indonesian energy sector identified using the AOC framework include maintaining energy security, lowering energy costs and environmental protection. This being said, the targets that various actors aim for are listed out differently because they play different roles and have different motivations and influences.

For every actor involved ensuring energy security is a priority. This focus stems from the existing challenges in providing access to energy resources throughout the archipelago. The MEMR is committed to enabling all regions and communities to access ample energy resources. This initiative aims to stimulate growth improve quality of life and minimize disparities. State owned electricity provider PLN has taken on the task of enhancing and expanding energy infrastructure to meet the rising demand for energy and ensure access across Indonesia. One of the goals is to lower energy costs, which holds importance for governmental bodies like MEMR and NEC due to its direct influence on economic development and societal well being. Decreasing energy expenses plays a role in making energy affordable for people across all socio-economic strata, which is crucial for inclusive growth. Affordable energy also helps in cutting expenses and generating economic activity.

In Indonesia significant differences exist in energy access across regions. In areas access to energy is greatly limited leading to frequent power shortages and inconsistent delivery that hinder the progress and advancement of society. The solution begins by focusing on marginalized regions in Indonesia improving energy infrastructure in areas and introducing energy sources where possible.

Among stakeholders like IEA, environmental protection, with a focus on reducing GHG emissions is an important goal. Although perhaps not as valued as energy security and economic cost, environmental protection is considered extremely important for ensuring long term sustainability as well as to comply with international commitments. MEMR and NEC are also aware of the importance of environmental sustainability, and have set targets in renewable energy within national policies in exchange for reducing GHG in the long term. Although global trends emphasize renewable energy, within the context of the current objectives of Indonesia, renewables have not been a key concern. This is partly due to the urgent requirement to address energy shortages and infrastructure challenges taking precedence in delivering basic energy access. Although it does not feature as a central issue at present, there is potential for renewable energy to be integrated more prominently into national energy policy in the context of long-term sustainability and energy independence objectives and would involve balancing immediate needs for energy security and environmental sustainability objectives.

In countries, like Indonesia the priority is often on guaranteeing energy security and affordability over prioritizing development. However there is an increasing acknowledgment of the significance of integrating energy sources in Indonesia. The governments dedication to enhancing the share of energy in the energy mix as detailed in KEN and RUEN clearly demonstrates this commitment.

Figure 11 visualizes the mean ratings of the most important actors of Indonesia's energy sector based on energy security, the cost of energy (energy equity) and environmental protection. Energy security is shown to be most prioritized across the actors, with energy equity following behind, and environmental protection as the lowest priority but still recognized by the actors as important in comparison to the other objectives.

Summing it up, there are actors in the energy industry of Indonesia each striving to achieve their goals. Ensuring energy security and affordability is crucial for operation. It is also important to integrate environmental goals into Indonesia vision for achieving sustainable development. The AOC framework outlined here serves as a tool for examining these differences with policymakers and decision makers who are focused on comprehending and fostering a robust and inclusive energy transition in Indonesia.

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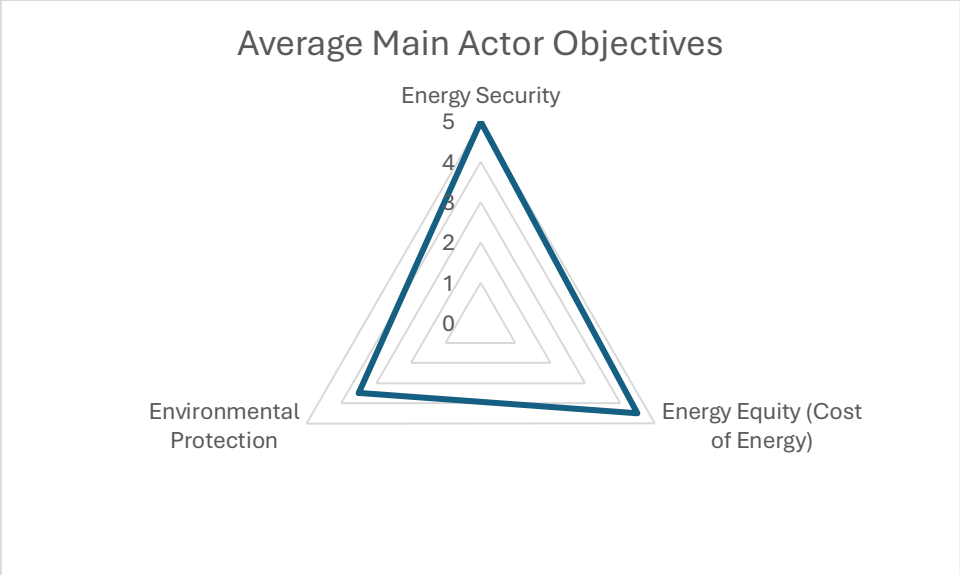

Figure 11. Average Main Actor's Objectives

4.4.3. Context

In the AOC framework, context is described as the conditions that make the goals of individuals to them. The intricate network in which energy policy is formulated and executed in Indonesia encompasses elements. These factors play a role in shaping the preferences and actions of both societal figures. Grasping the setting within which energy policies are crafted and put into practice is essential for understanding why different actors act as they do. This setting comprises institutional, environmental and other aspects that impact objectives and interactions, among societal and political actors.

The MEMR prioritizes promoting fairness and fulfilling the country energy needs while also giving importance to sustainability. Economic progress is another aspect, for MEMR as affordable energy rates are crucial for driving growth and enhancing the spending power of people in Indonesia. MEMR plays a role in upholding the nations energy security and supporting stability. Meanwhile, the NEC aims to strike a balance between promoting advancement maintaining environmental sustainability and upholding social responsibilities.

PLN focuses primarily on social justice, energy demand, and economic development. PLN has a lower priority for environmental considerations, but still account for the organisation as a strategic framework. The focus of the operational priority of PLN is to provide reliable and cost-effective electricity, which is crucial for economic progress and bridging developmental disparities throughout Indonesia. Finally, IEA’s mission includes incorporating more renewable energy sources and environmentally sustainable energy practices into the global energy matrix in line with global agreements such as the Paris Agreement and advocating for actions to reduce the greenhouse gas emissions.

Each organization's contextual setting influences its strategic formal operational priorities, which make a unique and comprehensive, well-rounded approach to Indonesia's energy policymaking. The actor’s context becomes relevant as the organizations formulate effective and sustainable energy policy that reflects the needs and aspirations of a wide range of Indonesia's actors in playing their role.

4.5. Improvement Suggestions

After conducting in depth interviews with actors in the energy industry, the proposed recommendations are intended to improve the regulatory structure for renewable energy in Indonesia. These suggestions aim to stimulate progress reduce dependence on fuels and encourage participation from key stakeholders in influencing energy policies.

1. Existing fossil projects require more environmental safeguards in more clearly defined and more inclusive development energy policy. Renewable energy will benefit and be enhanced, as policy support will reinforce the movement to more sustainable energy. The government is expected to create processes to make energy policy decisions, include other actors in this process. Regularly recurring consultations or at the forming of boards of advisors, will involve NGOs and consumer groups, with a relevant steering role, and can objectively participate. The inclusion of the aforementioned groups as participants in the energy policy process will have a positive effect on the variety of perspectives, and will reinforce strategies for Indonesia energy planning.
2. There is a gradual decrease necessary support for funding of fossil fuel infrastructure from governments. In order to prepare especially direct resources for renewable energy alternatives and to advance and reinforce the transition towards more sustainable energy, ambitious resources are to be redirected from fossil fuels. This new order of priorities and resources is why renewable energy projects will be enabled, and the country will be moved away from fossil fuels towards renewable energy.
3. Enhancing the framework in the energy sector is crucial to attract private investments and ensure adherence to global standards. The Ministry of Energy and Mineral Resources (MEMR) and National Energy Council (NEC) should update regulations, addressing any ambiguities that could hinder growth. Clear and transparent rules can boost investor trust streamline approval procedures, for energy initiatives and minimize delays caused by bureaucratic issue.
4. Shifting from Fossil Fuel Subsidies to Renewable Energy: A gradual transition from providing financial assistance to support renewable energy technologies is critical. The shift from fossil fuel subsidies to renewable energy can create an enabling environment for cleaner energy technologies to develop. However, Indonesia significant dependence on fossil fuel industries and people who rely on affordable energy pose obstacles to reforming energy subsidies underscoring the difficulties in transitioning to sustainable energy policies.
5. In an effort to foster the growth of smart grid applications and energy storage and ony other renewable energy technology related in emerging energy technologies, it is essential for Indonesia to contribute resources.
6. A feed-in tariff to increase future private sector investment in Indonesia, particularly in renewable energy such as solar, wind, and hydro power plants. Enhancing and expanding feed-in tariffs will also be essential to a renewable energy investor. Those investors could offer Indonesia with another source of NRE, which could help to lower the overall carbon emissions in the country.
7. Public Awareness and Education Campaigns: Public awareness and educational programs to promote renewable energy and inform the general public of the benefits of renewable

energy is necessary. Public interaction with the renewable energy sector can be made easier by public informational campaigns.

The study was conducted by examining government document and policy, studies and discussions with actors from MEMR, NEC, PLN and IEA. Participants were questioned about the obstacles faced by their organizations in their activities and the key advancements required. The study subsequently consolidates these insights into suggestions for enhancements to tackle the hurdles and enhance the sustainability of Indonesia energy sector.

Indonesia has shown progress in advancing its energy sector. There is still room for improvement. The country is aware of the challenges it faces. By putting into action, the suggested solutions provided, Indonesia can showcase its expertise in energy projects. There's a chance for Indonesia to lead the way towards a future by building upon its work and moving ahead together on this transformative path.

Chapter 5. Conclusions

Using the Actor, Objectives and Context (AOC) framework, this study thoroughly examined the transition to renewable energy in Indonesia. The research aimed to evaluate the readiness of the energy sector to achieve its energy goals understand the roles and motivations of key stakeholders and provide recommendations for improving policies to support goal attainment.

5.1. Summary of Key Findings

The shift towards using renewable energy sources in Indonesia faces obstacles due to limited infrastructure and a reliance on fossil fuels. These hurdles hinder Indonesia ability to fully tap into its renewable energy sources. Financial limitations and the need for investments are factors particularly as Indonesia must allocate resources to meet its ambitious renewable energy goals.

Indonesia has set objectives for energy in its KEN and RUEN strategies. Yet reaching these goals relies on cooperation among actors. Defined and thorough regulations are crucial to improve the execution of energy projects.

Reducing government support for fossil fuels in Indonesia poses a challenge due to a complex mix of economic, political and social factors. Various stakeholders, such as the industries benefiting from subsidies and the general population relying on energy all have a stake in maintaining the situation. The government places importance on stability and political feasibility fearing that cutting subsidies could lead to unrest especially among lower income citizens. Additionally the country heavy reliance on fossil fuel industries further complicates efforts to reform energy subsidies within the context.

Recommendations for improvement: Engaging stakeholders plays a role in enhancing policy development. Regular consultations and involving a range of stakeholders in the policymaking process can lead to comprehensive and impactful energy policies. Gradually phasing out subsidies for fossil fuels. Redirecting those resources towards energy initiatives can promote cleaner energy sources and reduce greenhouse gas emissions. Simplifying regulations to improve the framework can bolster investor confidence. Attract increased private investments in the renewable energy sector. Lastly raising awareness through campaigns is vital. Educating the public about the advantages of energy can garner support for transitioning to sources of energy.

5.2. Recommendations for Future Research

The future studies on the transition from fossil fuels to renewable energy in Indonesia should consider the economic aspects of transition that go further than job creation to consider economic growth and potential for new industries to emerge. Additionally, the impacts of renewable energy projects on society and the environment deserves focus in future research projects. Understanding the local social and environmental impacts on the community, ecosystems, and biodiversity has the potential to lead to renewable energy project investors to develop projects that benefit people and the environment.

Studying the alignment of energy policies with other national policies in Indonesia like economic growth and transportation could lead to a more cohesive and successful overall national policy structure. Additionally comparing Indonesia shift to renewable energy with that of developed nations may uncover valuable insights and strategies that could be useful for the Indonesia situation.

Studying policy things over time for renewable energy implementation in Indonesia will be helpful in understanding policy change and possible over time effects. This sort of information can help us understand the effectiveness of the renewable energy policies and potentially make necessary changes.

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Appendix A Interview Question

1. Apart from MEMR NEC IEA PLN do you believe there is someone else involve in energy sector?
   MEMR : Ministry of Energy and Mineral Resources
   NEC : National Energy Council
   PLN : Indonesian Electricity Company
   IEA : International Energy Agency
   Others : (Please Specify)

2. Could you rate actor hirarchie (MEMR, NEC, PLN, IEA, Others) based on legistative power in term of decision making process?
   1 is very unimportant and 5 is very important

3. From the perspective of your organization, how important are the objectives below for formulating and implementing renewable energy policy in Indonesia? Rated the energy Trilemma matter to you?
   1 is very unimportant and 5 is very important

Objectives	1 - 2 - 3 - 4 - 5
Secure Energy Supply (Indonesia energy security)	
Reducing Cost of Energy (Affordability)	
Protect Enviroment (GHG Emmision as part of NDC)	
Other (…)	

4. From the perspective of your organization, how important are the issues (Context) below for formulating and implementing renewable energy policy in Indonesia?
   1 is very unimportant and 5 is very important

Context	1 - 2 - 3 - 4 - 5
National Energy Demand and Economic Growth	
Environmentally Responsible Manner	
Organization Performance and Image	
Ensure Sustainable Development in Power Sector	
Supporting Social Equity	
Other (…)	

5. How does your organization influence policymaking and implementation in the Indonesian renewable energy sector?

6. Do you believe that Indonesia energy sector related to renewable energy is advancing adequately to achieve the goal set refere to NDC agenda?

7. What do you think are the main problems that should be tackled in Indonesian renewable energy sector to be implemented?

8. What improvements do you believe can solve them?
9. From your perspective, how effective have Indonesia's policies (for example Kebijakan Energi Nasional) been in promoting renewable energy?
10. How do you envision the future of Indonesia's energy mix over the next decade?