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EXPLORING ENERGY TRANSITION BASED ON RENEWABLE ENERGY PRACTITIONER PERSPECTIVES: QUALITATIVE CONTENT ANALYSIS

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Abstract

The energy transition is driving a greater emphasis on using renewable energy sources because there is broad agreement on the critical importance of preventing further warming of the environment. The ASEAN nations, however, need help with this process because the consumption of energy from fossil fuels is the main factor driving their economies' expansion. Consequently, this transition presents a challenge for these nations. The qualitative content analysis study with in-depth semi-structured interviews in face-to-face dialog explores the phenomenon of the energy transition based on the practical and empirical views of a selection of individuals who work in the renewable energy business. The primary data based on the interview is transcribed into the text using MAXQDA 2022 to develop the core category within the Qualitative Content Analysis. The results of the data analysis led to the formation of six core categories, which derived from the current economic development characteristics, the renewable energy challenges (regulation, investment, market structures, and technology), encouraging customers, energy transition potential, measuring green growth, and the impact of the national determination contribution (NDC) on catastrophic and sustainable development. Both participants' empirical points of view demonstrate a relationship between energy security and the current state of economic development. The current state of economic development is heavily dependent on fossil fuel energy, which is in high demand and produces high CO2 emissions, which can result in potential catastrophic or natural disasters. The energy transition is presently confronted with challenges in regulations, financing and investment, market structures, and individual behaviors regarding the consumption of clean energy, fostering renewable energy, and environmentally friendly products. This study recommends adjusting the existing energy regulations, democratizing infrastructure and market structures, encouraging customers to consume clean energy, and accelerating the energy transition.

Keywords: *Energy Security, Energy Citizenship, Energy Democracy, Energy Transition, Green Growth, Sustainable Development, Qualitative Content Analysis*

JEL Classification: *F63, O44, O53, Q01, Q43*

INTRODUCTION

The energy transition is a phenomenon that has evolved as a global reaction to the challenge of addressing climate change and social justice (Jenkins et al., 2014). It has been determined that energy transition is an emerging field combining energy and social science (Sovacool et al., 2015). However, this energy transition phenomenon remains to be seen. At the same time, ASEAN countries depend primarily on consuming fossil fuel and coal energy to drive their economic development, which contributes to 4.2% of the world's greenhouse gas emissions (IEA, 2022). In addition to this, the demand for primary energy is expected to rise from 29 EJ in 2020 to approximately 50 EJ in 2050, which will result in an increase in CO2 emissions from 1.6 GtCO2 in 2020 to over 2 GtCO2 in 2050 (IEA, 2022). This paradoxical situation provides opportunities to explore the energy transition phenomenon by addressing qualitative content analysis in a systematic exploration of texts, webinars, video data, and in-depth interviews with selected practitioners working in the renewable energy business.

A method that allows for the subjective interpretation of data through systematic categorization is known as qualitative content

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analysis, and it can be applied to explore the subject of the energy transition phenomenon (Hsieh and Shannon, 2005). The amount of published work that uses content analysis has increased by 70 percent in the 21st century in nursing administration, informatics, quality assurance, psychology, and public health (Elo & Kyngäs, 2008). This concept applies to comprehending text meaning and examining critical processes (Cavanagh, 1997; Lederman, 1991). This content analysis addresses meaning, intentions, consequences, and context (Downe-Wamboldt, 1992). In addition, content analysis is the most commonly chosen method because it examines many different kinds of communication, such as texts and images. It calculates the frequency of particular words, phrases, and other linguistic elements posited in the context of a phenomenon (Allen, 2017). Content analysis is a research technique that takes a systematic approach to describing and quantifying a phenomenon (Downe-Wamboldt, 1992; Krippendorff, 1980). It analyzes specific data in specific contexts within individual, group, or cultural characteristics (Krippendorff, 1989). Investigating the energy transition occurrence might yield helpful information by interviewing a selected person. The documents can be analyzed by grouping them all into the same categorization and then grouping related words, phrases, and meanings (Cavanagh, 1997).

Problem Statement

Researching the energy transition phenomenon using qualitative content analysis techniques is necessary to gain empirical understanding. The unreadiness of ASEAN countries to accomplish the energy transition is still a question. At the same time, they continue to significantly contribute to the consumption of energy derived from fossil fuels. As a result, several questions have arisen: *What are the perspectives of the participants doing renewable energy business on the energy transition?* Second, *what kind of boundaries does the energy transition have?* Third, *what types of responses are needed from participants to accomplish the energy transition practically?*

LITERATURE REVIEW

Qualitative Content Analysis

In the nineteenth century, content analysis was applied to investigate political speeches, hymns, news articles, magazine articles, and advertisements (Harwood, 2003). Even though content analysis was initially a quantitative method, it led to a qualitative content analysis, and it was born as a result of a means of *"systematically describing the meaning of qualitative material"* (Berelson, 1952; Mayring, 2004; Priest et al., 2002; Schreier, 2012). Kracauer, 1952 supported a qualitative approach to content analysis to obtain meanings and insights from text more holistically. Content analysis dissects the information in communication, whether spoken, written, or visual (Cole, 1988). Using a method known as content analysis, one can determine the frequency with which particular words, phrases, or other linguistic elements surrounding a phenomenon appear in various modes of communication (Allen, 2017).

Content analysis has become significantly more widespread over the last few decades, particularly in communication, journalism, sociology, psychology, and business (Neuendorf, 2022). For researchers to better understand the data, content analysis may be used to investigate theoretical challenges. Large quantities of text can be broken down into smaller, more manageable chunks of subject matter with the help of a technique called content analysis. It is reasonable to assume that similar elements, such as word sentences, all have the same meaning if placed in the same classifications (Cavanagh, 1997). Despite this, content analysis has yet to be utilized further in the research that's been done on energy transition issues throughout the ASEAN countries.

Justice in Energy Transition

With energy poverty, climate change, and energy security all contributing to a new comprehension of the relationship between energy and social justice, energy transition become the most prominent topic in social science energy research (SSER) (Jenkins et al., 2014; Stern, 2017). Policy and political discourse are beginning to incorporate the concept of a *"just transition"* in their pursuit of a future with reduced carbon emissions (Newell & Mulvaney, 2013), providing a new framework for bridging the gap between climate energy and environmental justice (Heffron & McCauley, 2018).

Energy justice has been applied to energy transition to determine the justice applicable to energy production and consumption (Jenkins et al., 2016). Distributional, recognition, and procedural concepts are emphasized to determine whether energy services justice across multidimensional serve as decision-making tools (Heffron & McCauley, 2017)). The distribution reflects where injustice occurred, recognition reflects who is ignored, and procedural emphasizes a fair process (Heffron & McCauley, 2018).

Energy transition and energy justice are extensively debated and interchangeable as emerging phenomena to apply distributional, recognition, and procedural concepts (Jenkins et al., 2014). Both energy transition and energy justice require an empirical perspective informed by qualitative content analysis through in-depth interviews with individuals who work in the renewable energy industry.

The Interrelationship Between Energy Transition, Green Growth, and Sustainable Development

This study uses qualitative content analysis to explore how information regarding energy transition, green growth, and sustainable development is collected, utilized, and disseminated. Energy transition implies a winner and a loser regarding seizing opportunities and the absence of opportunities (Carley & Konisky, 2020). This shifting fossil fuel energy to renewable energy is inevitable, beginning on small local scales and eventually becoming global (Smil, 2010). The energy transition can predict that lowering CO2 emissions has implications for creating green job opportunities supporting sustainable growth (Moe, 2020). Current and prospective green growth depends on energy supply and decarbonization, which require investment and labor. This form of economic growth is called *"green growth"* (Ayres, 2017). The clean energy transition may facilitate the creation of green jobs, the acceleration of green economic development (Moe, 2020), and the extraction of GDP growth from resource use and carbon emissions (Hickel & Kallis, 2020). Global organizations advocate green growth to achieve sustainable development to combat climate change and the threat of natural disasters (Gates, 2021; Hickel & Kallis, 2020).

Transitioning to renewable energy has the potential to reduce CO2 emissions as a response to mitigate climate change, create new green jobs, and is relevant to sustainable development indicators such as SDG-01 in no poverty, SDG-02 in zero hunger, SDG-07 in affordable and clean energy, SDG-10 in reduced inequality, SDG-11 sustainable cities and communities, and SDG-12 responsible consumption and production (Sachs et al., 2021). For these reasons, qualitative content analysis is required to investigate perspectives on energy transition, green growth, and sustainable development from an empirical perspective based on text, department interviews, and videos to determine their correlation.

The Driving Forces Behind the Energy Transition

The energy transition requires actors to participate actively in the energy production and consumption cycle. Energy democracy and citizenship have been introduced to support the energy transition (Wahlund & Palm, 2022).

The terms energy democracy and energy citizenship are sometimes interchangeable. Sweeney, 2014 determined that energy democracy focuses on resisting, reclaiming, and restructuring goals to fight the current domination of fossil fuel energy. As a reflection of the democratic process applied to fossil fuels, a new social movement

known as "energy democracy" is advocating for the decentralization of energy systems, the shift to renewable energy sources, and more community control of energy infrastructure (Burke & Stephens, 2017; van Veelen & van der Horst, 2018; Wahlund & Palm, 2022). Szulecki, 2018 suggested that the concept of energy democracy consists of popular sovereignty, participatory governance, and civic ownership are the element of energy democracy. Indicators of welfare and energy access, service quality, consumer pricing, prosumer governance, prosumer support, and prosumer accountability in energy decision-makers all point to the citizen as the beneficiary, stakeholder, and accountholder, which is how popular sovereignty is turned into action. Public consultation, increased understanding, open and honest processes, impartial research, and the availability of specialized training are all features of participatory government. Civic ownership translates into control and ownership regarding the production, distribution, and energy use.

Meanwhile, Energy citizenship is an emerging position in research and development related to energy poverty, energy injustice, and environmental injustice, and it actively participates in the energy transition (van Wees et al., 2021). Individual engagement in the energy transition that results in equitable, fair, inexpensive, and climate-responsible energy provision is an example of "energy citizenship" (Wahlund & Palm, 2022). Energy citizenship is defined as active citizen support for the goals of energy poverty in shaping the energy system to address high energy costs, low income, and energy-inefficient housing (Campos & Marín-gonzález, 2020; DellaValle & Czako, 2022). The shift to renewable energy sources requires citizens' help to realize the need to alter their behavior. Increasing the proportion of renewable energy relative to fossil fuel energy can be accomplished by fostering "energy citizenship" (DellaValle & Czako, 2022; Wahlund & Palm, 2022).

With the 4A idea of availability, accessibility, affordability, and acceptability, including energy poverty, energy security, and energy sovereignty, energy is a crucial natural resource for the growth of the national economy (Shojaeddini et al., 2019; Sovacool et al., 2015). Energy security is defined as the condition in which end-users have equitable access to energy that cost-effectively meets their needs while protecting the environment and promoting sustainable development (Sovacool, 2013; International Energy Agency (IEA), 2021). The classification of studies on the topic of energy security may be evaluated from any angle, including supply risk, resource diversification, political access, policy, economics, and the environment (Winzer, 2012). Song et al., 2017 suggested that energy performance enabled by energy security, energy justice, and environmental sustainability and the capacity of energy businesses to effectively manage internal and external sources and energy infrastructure in order to fulfill current and future energy demand is the definition of energy security. National energy security measures a country's readiness to meet its immediate and projected energy needs (International Energy Agency (IEA), 2021). When a country has achieved energy security, it can meet its current energy demands and prepare for future energy needs without negatively impacting the environment (International Energy Agency (IEA), 2021; Sweeney, 2014) Energy security is an effort to secure dependencies by replacing them with renewable energy connected to the energy transition. According to Sovacool & Mukherjee, 2011, energy security includes aspects related to accessibility, cost, technological progress, sustainability, and oversight, all of which may be measured. The winner and loser will be determined by how well they navigate the energy transition, which involves reducing dependence on fossil fuels while exploring the possibilities of renewable energy sources (Carley & Konisky, 2020). Reducing reliance on fossil fuels and carbon dioxide emissions necessitates an energy transition (Intergovernmental Panel on Climate Change, 2019; Sovacool & Mukherjee, 2011).

In the context of energy dependence and transition, energy security's role is to assure the dependability of current and future energy supplies regarding their availability, affordability, accessibility, and acceptability on our planet. By employing qualitative content analysis, however,

exploring energy democracy, energy citizenship, and energy security as the central discussion that contributes to the energy transition and how this phenomenon interacts is limited.

RESEARCH METHOD

Research Design

This study applied a qualitative content analysis proposed by (Elo & Kyngäs, 2008) with deductive modeling consisting of four main phases: preparation, organizing, abstracting, and reporting. The preparation phase is determined that many words of the text are classified into smaller content categories (Burnard, 1990; Weber, 1990). Choosing a unit of analysis reflects a word or a theme (Polit & Beck, 2004). The sample must represent the entirety of the research and tie into the research question. The unit analysis can be a letter, word, sentence, portion of a page or word, number of people, or period (Polit & Beck, 2004; Robson, 1993). The organizing phase involves open coding, creating categories, and abstraction, (Elo & Kyngäs, 2008). With open coding, readers can annotate the text as they go along by adding headings and comments. After a second reading, the text is annotated with as many subheadings as to explain its contents (Burnard, 1991, 1996; Hsieh and Shannon, 2005). When this open coding is complete, the categories are sorted according to their level of abstraction (Burnard, 1991; McCain, 1988). The goal of data grouping was to decrease the total number of groups by combining ones with similar or dissimilar characteristics into larger, more generalized ones (Burnard, 1991; Dey, 2003; Downe-Wamboldt, 1992). Developing classification schemes helps explain phenomena, broadens our perspective, and fosters new insights (Cavanagh, 1997). In inductive content analysis, the researcher interprets what items belong in each group, (Dey, 2003). Creating an abstract description of the research subject by developing categories is what we call abstraction (Burnard, 1996; Polit & Beck, 2004; Robson, 1993). Words indicative of their contents were chosen for the naming of each section. According to the literature (Dey, 2003; Kyngas & Vanhanen, 1999; Robson, 1993) subcategories with similar events and occurrences are grouped as categories, and categories are grouped as main categories. The process of abstraction will go on as far as is practical and feasible.

Deductive content analysis is frequently used when novel contexts for previously collected data are desired (Catanzaro, 1988). It may entail putting together and evaluating different models or hypotheses (Marshall & Rossman, 2015). Theories, models, mind maps, and literary reviews are commonplace starting points for this qualitative content analysis (Hsieh and Shannon, 2005; Polit & Beck, 2004; Sandelowski, 1995).

Data Sources

Data is digested from two selected individuals who work in the renewable energy industry using in-depth interviews.

Data Collection

Collecting the data from in-depth semi-structured interviews in face-to-face dialog and 1 to 2-hour sessions were conducted in two phase interviews on February 23, 2023, for the first participant and March 9, 2023, for the second participant. The data collection and analysis took four months, starting with the first participant interview. The discussions were recorded into video and audio files using the media Zoom meeting application. At first, the topic-energy transition is introduced to both participants to align while interviewing. Questions such as *"What is your opinion regarding the energy transition phenomenon? What are the critical factors to address for shifting to renewable energy? Furthermore, please explain the concern related to the energy transition regarding your work experience?* These questions are also addressed to both participants at the beginning stage. Open questions are designed to explore this energy transition phenomenon. Based on recorded Zoom media file video and audio, transcription into the texts is done, and the document texts are examined to look for errors in the empirical perception of the text.

Data Analysis

Open coding, category development, abstraction, and reporting were required in qualitative content analysis (Elo & Kyngäs, 2008). Before proceeding to the open coding phase, the transcripts of the interviews were read multiple times to ensure comprehension. During the open coding phase, units of meaning were assigned codes. The codes were evaluated for similarities and differences, and those that conveyed the same meaning were grouped. After a review of the existing categories, new codes were assigned, and the categories grew as more interviews were conducted. During the phase of abstracting, the researcher employs the codes and content to provide category and subcategory names. The data was analyzed using the MAXQDA-2022 Analytic Pro Academia software.

Participant Characteristic

The selection criteria for participant interviews follow the two main concepts: first, *"Select people or identify individuals with the expertise and knowledge necessary to understand the topic under investigation comprehensively"* and second, *" To develop a detailed understanding that might provide- useful information, learn about the phenomenon, and give voice to silenced people"* (Creswell, 2002). The two participants selected in this study are directly involved in renewable energy solar PV, Wind Turbines, Hydrogen, and Battery Technology with different renewable energy companies at the managerial level. They have characteristics of opposite sites from recent fossil fuel businesses, which have a core dimension on how the energy transition would be implemented based on their practical implementation and deep-down understanding of the obstacles to the energy transition in their perspective.

RESULTS AND DISCUSSION

This investigation identified six core categories, six categories, and eighteen subcategories. Six core categories reflect energy transition concepts and describe previous theories and concepts to be tied to empirical categories from both participant perspectives, including current economic development characteristics, renewable energy challenges (Regulation, Investment, Market Structures, and Technology), Encouraging Customer, Energy Transition Potential, Measuring Green Growth, Impact of National Determination Contribution (NDC) to catastrophic and Sustainable. The remaining 18 subcategories are derived from text document-based, as shown in Table 1.

Conceptual Map Base on Experiences

The qualitative content analysis generates a conceptual map based on experiences that tie into energy security, energy democracy, energy citizenship, energy transition, green growth, and sustainable development. The deductive content analysis is approached in this study by coding, categorizing, abstracting, reporting, and conducting interview result text to develop a conceptual map in exploring the energy transition phenomenon. Figure 1 shows the conceptual maps based on the experiences of two interviewee participants.

Justice in Energy Transition

The energy transition is a core category initially conceived as the justice transition, which has opportunities for green jobs, distributed resources/access for all people, enormous potential renewable energy eligible to execute, and disrupting fossil fuel jobs linked to the research objective. These categories and core categories described by both participants said;

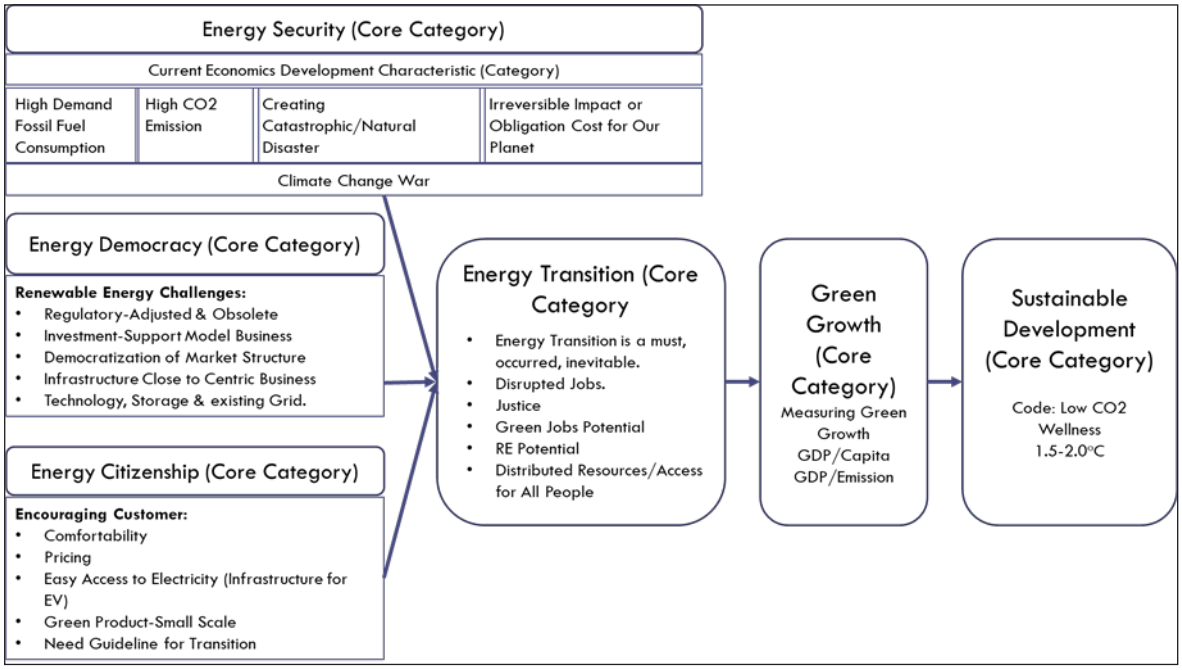
> *"It's valid, ... they said someone already calculated this for work potential, right? I used to read it for a really long time, but look at the exact number, in my opinion, the simplest thing with the job record is the opportunity for a green job, yes, as a result of such a long job, maybe those from the fossil fuel sector were moved there. So actually, in terms of jobs, they are created with such kind of mode of personal opinion. Well, if it's just that, then it just makes sense…..", [01. Participant 01-Interviewed].*

> *"As soon as the market opens, does Pertamina lose customers like that? Will Telkomsel lose to Indosat and Telkomsel and so on? No, it's not, in fact, the opposite is true. The dominant market is still on the street of the company. With Telkomsel, Pertamina is in their field, but then*

Table 1. Core Category, Category, and Subcategory from the empirical view of both participants.

Core Category	Category	Sub Category
Energy Security (ES)	Current Economic Development Characteristic	Relationship Energy Security with Economic Development and Emission. Current Economic Development. Dependency to Fossil Fuel. Climate Change War.
Energy Democracy (ED)	Renewable Energy Challenges (Regulation, Investment, Market Structures and Technology)	Adjusting or Obsolete Regulation Financial & Investment Challenges RE needs close-to-centric business Democratization of Market Structures Storage Technology & Existing Grid
Energy Citizenship (EC)	Encouraging Customer	Individual Behaviors
Energy Transition (ET)	Energy Transition Potential	What is energy transition? Is it important? Participatory all parties ET inevitable ET is a MUST Disrupted Jobs Renewable Energy creating Green Jobs Renewable Energy Potential
Green Growth (GG)	Measuring Green Growth	GDP/Capita or GDP/Emission-Indicators
Sustainable Development (SD)	Impact of NDC (Target 1.5-2.0oC) on Catastrophic and Sustainability	NDC, 1.5~2.0 target preventing Catastrophic and Sustainability

Source: Interviewee Participant (2023).



Source: Interviewee Participant (2023)

Figure 1. Conceptual Maps Based on the Experiences of Two Interviewee Participants (Author Arrangement).

other regions. More Market participation means the level of involvement of many people here, so there is a private sector, right? It's not just state one plate roll per roll, right? Then then, there are job creations.", [02. Participant 02-Interviewed]

As the current economic development is dependent on the consumption of fossil fuels, an energy transition is necessary. Climate change is illustrated by the high demand for fossil fuels energy and high CO2 emissions causing catastrophic events or natural disasters. The catastrophic event brought on by climate change could have irreversible social, economic, and environmental consequences. From both participants' points of view, the obligation cost level must be paid in the event of catastrophic climate change-related costs and action costs for the current and future carbon tax. Factories, agriculture businesses, and central business entities operate in an environment with a high-risk profile regarding climate change risk costs. For instance, floods, fires, and global warming, which harm agricultural businesses, generate additional environmental and business restoration costs. In the meantime, cost actions for a future carbon tax are defined. If the business is conducted as usual, even now or in the future, the cost actions could be applied or taxed by a carbon tax to reduce CO2 emissions.

Energy transition as energy justice can be described as a transition that creates green employment without sacrificing perilous jobs; even coal-fired power plants may be displaced by renewable energy jobs. To achieve a balance or justice between fossil fuel energy and renewable energy, the transition to justice must be maintained through capacity development and increased upskilling of energy workers.

Energy justice is defined as distributing energy services fairly among all individuals. Solar PV, wind, hydro, hydrogen, biomass, and geothermal energy can balance access to electricity in rural and urban areas. Renewable energy is the antithesis of fossil fuel, consisting of distributed surface resources and decentralized energy. Renewable energy can be accessed anywhere based on the comparative advantage of a nation, region, or community, as demonstrated by these two classifications.

> " So when transitioning, what's the name, the fairness aspect is maintained. Because for example, we are talking about retirement coal, so carbon coal is one of the elements, isn't it. So what will the transition be like for people who have worked there? They can switch functions like that. Hopefully, he switches to a green job, where he participates in another fossil fuel" [01. Participant 01-Interviewed].

In terms of technology, the capacity of renewable energy to provide electrification can be defined by the ability to attach to the existing grid using a combination of solar photovoltaics (PV) and hydro to balance the load and maintain the energy's ability to provide electricity into the existing grid with affordable. The price per kilowatt-hour of renewable energy must be competitive with fossil fuel energy for the energy transition to be feasible.

Renewable energy is comparable to fossil fuel energy in terms of energy security factors such as availability, affordability, and acceptability. Both participants mentioned that generating electricity from renewable energy could be accomplished with a single implementation or a combination of these renewable energy applications. Moreover, ASEAN developing countries possess abundant solar PV, wind, hydro, H2, biomass, and geothermal energy resources.

> "Even in one moment, we also develop green hydrogen or hydrogen according to the available. There were 6. Last year, we started at our group level at the time for Focus on reducing the scope. Now, we are focusing on three technologies, namely Solar PV, Wind and Batteries", [02. Participant 02-Interviewed].

> "A little bit. You could say because we are agnostic, while we don't care about being a customer as long as that's the energy client, we can do anything like that. It could be hydro-geothermal if that's the public narrative, the current narrative. If you talk about renewable energy, it's limited, let's say four technologies, actually that's it. Talking about solar wind batteries and one more green hydrogen," [02. Participant 02].

The Interrelationship Between Energy Transition, Green Growth, and Sustainable Development

Indicators of green growth include the ratio of GDP to GDP per capita and the ratio of GDP to emissions per capita. Both this category and the core subcategory are related to the overall objectives of the study to indicate green growth.

Renewable energy has the potential to displace fossil fuels, as evidenced by its widespread presence and the rapid advancements in technology that have made it possible to use alternative energy sources like solar photovoltaics (PV), wind turbines (WTs), and hydrogen fuel cells (FCs) to generate and distribute electricity. Both participants agreed transitioning to these cleaner power sources would create new green jobs and positively impact economic growth.

Promoting capacity building is essential to prevent job loss or disruption in the fossil fuel industry and upskilling efforts even as the energy transition is kept just by balancing Brown jobs from fossil fuel energy and green jobs from renewable energy. The decentralization of the existing energy structure through an increase in the proportion of renewable energy is another aspect of the transition to make it equitably distributed.

> "Now talking about emissions per capita, per capita emissions are the same as our per capita GDP, right? Those two things we're still far away from" [02. Participant 02-Interviewed].

> "What is our GDP per capita at the level of 4 thousand, 5 thousand dollars per year. Our per capita emissions are also still low. While countries that are more advanced, the two variables are already because they have been a hundred years ahead of us in terms of economic development and so on. While their emissions are also the highest" [02. Participant 02-Interviewed].

Green employment or job creation, low carbon dioxide emissions, health, and prosperity are all characteristics of sustainable development. What they each had to say is included below.

> "So maybe Align is the same as a country to make NDC. Now what is it called? Is that the target? What basically tackles sustainability is the original temperature limit of 1.5. For example, well, because, or maybe a maximum of 2, right? And of course, with this catastrophic presence, yes...it won't create a sustainable business anyway, that's it. So I think there's still a connection there", [01. Participant 01-Interviewed].

> "The open is continuous, actually their job is offered. Maybe even with what is called a benefit-cost-to-benefit ratio that is better with the environment because then they spend less time there, or the wellness is better and so on and so on. That's a lot of studies, later you can read it in that section", [02. Participant 02-Interviewed].

The Driving Forces Behind the Energy Transition

Challenges in making the energy transition were revealed in interviews with both individuals. Reforming the existing regulation by bringing it up to date with the present situation is a challenge in energy democratization. The ecosystem, business model, and banking system must be promoted to encourage the development of renewable energy share to make the transition to renewable energy economically viable. The market structures are crucial to ensure that people have the opportunity to select renewable energy sources. Incentivizing renewable energy, providing access to the market, and establishing affordable prices for renewable energy are all crucial steps toward breaking the fossil fuel market monopoly. It is recommended that facilities be built close to central businesses to ensure a steady supply of customers. By improving storage technology, we can better arrange the electrification of supply and demand between fossil fuels and renewable energy. (8)

Energy Security

The core category of energy security was developed from a category of contemporary economic development characteristics. This category considers the high demand for fossil fuels, the high levels of CO2 emissions, the creation of catastrophic or natural disasters, the irreversible effect, and the environmental obligation cost. All of those are connected to the main objective of the study.

The two participants reached a consensus that the transportation industry, the petrochemical and semen industry, and the electricity industry are the

three that require the most attention. Consuming fossil fuels consistently, such as oil and coal, can have effects that are potentially catastrophic and irreversible on the environment—in addition, ignoring the issue of climate change and adopting a "do-nothing" stance both result in the creation of a case that bears the costs of three different criteria. These costs include the costs associated with the danger of climate change and the costs of acting right now and in the future. The cost for today occurs while the agricultural industry is immediately impacted by climate change in the form of floods, wildfires, and landslides. One of the participants described the cost for now and future carbon tax as follows: if the investment is ignored or does limit the CO2 emission, it creates consequences in the future, such as remedial costs for our nature and carbon tax, and creates a cost for now and future carbon tax.

> "Anyway, there's a sustainable way, right? We've become a phase of privilege to be able to keep pollution, right? Because the signs are so clear. What is the name? Now, I'm afraid that if you continue, you'll reach a stage that's already irreversible, you can't fix it anymore. Is that there, too? There are also peak points like that. If we've missed it, we can't fix it anymore. Or as simple as. If the difference is between 1.5 and 2, 1.5 is already a catastrophic fall, so we are already struggling" [01. Participant 01-Interviewed]

> " If the cost is near the post for the action, if it is calculated, it is much cheaper than the cost for in-action. What to pay next?" [01. Participant 01-Interviewed].

> " Or even the transition costs related to that risk. Risk. For example, if he has a factory in …, If he has a factory in an area that is prone to climate change, it can flood, it can do whatever it is and also with fast development. Usually, the supply rate will also have an impact, especially those engaged in all kinds of agriculture" [01. Participant 01-Interviewed].

As a result of these variables, energy security, which is based on the heavy consumption of fossil fuel energy at present, may generate a potential eagerness to shift toward renewable energy to respond to climate change and the natural disasters that are occurring currently. In addition, countries that are either highly dependent on fossil fuel energy or do not have access to fossil fuel resources actively seek possibilities to transition to renewable energy sources to reduce their dependence on fossil fuel energy. For these reasons, energy security supports energy transition.

Energy Democracy

Regulatory-adjusted and obsolete, Investment-Support Business Model, Democratization of Market Structures, Renewable Energy Infrastructure to Centric Business, and Availability Storage Technology and Existing Grid are the renewable energy challenges associated with Energy Democracy as the core category.

Both participants agreed that the present energy policy, which is still based on fossil fuels, is obsolete due to the rise of renewable energy as a new competitor. The energy policy must include a financial and investment policy leaning toward renewable energy investment and incentive-based business model support. Energy efficiency yields competitive operating expenditure (OPEX) costs, allowing the profit to be redirected to subsidize the price of renewable energy through cost efficiency subsidies.

One of the participants argues that market structures are crucial to the expansion of renewable energy. Market structures entail democratizing the fossil fuel energy market by distributing a portion to renewable energy and transforming it into an oligopoly rather than a monopoly market. The democratization of grid infrastructure then followed. As a matter of electricity distribution, existing infrastructure is divided between 80% fossil fuel energy and 20% renewable energy by state-owned Companies (SOC) to support renewable energy development. By these means, democratization infrastructures, energy policy, and market structures enhance the energy transition as the process to reduce the dominance of fossil fuel energy, so long as all government, private, and local communities are actively involved.

Energy Citizenship

Energy citizenship is addressed as a core category with two components referring to encouraging individuals to consume renewable

energy and green products, such as electric vehicles (EVs). Both participants stated in their interview texts that individual behavior reflects comfortability and pricing to attract customers.

> *"Must be understood. Behavior from here means individual" [01. Participant 01-Interviewed].*

> *" Hmmm for those at the community or household level, I think their behavior should be looked at….." [01. Participant 01-Interviewed].*

> *"So, if you really want to onboard the community, what I think you really have to look at is what can drive you, that's the level of Comfortability? And then processing like that huh? The level of comfortability may be an interesting case. It's like an EV, including what it's like the name" [01. Participant 01-Interviewed].*

> *"In the past, at the beginning, right when EV was new, there were issues, so there was quite a lot of community resistance, right? That's fast, so the progress is like maybe those who haven't the confidence to transit to move to EV, so they can still survive like him. Of course, the first one is expensive. But apart from that, the problem is that it's not expensive. But Practicality is like Practicality. So much stress for each of them. So even if I had money, wouldn't I buy it? Because if you charge it later, it's difficult, right?" [01. Participant 01-Interviewed].*

> *"We need cheap energy to be competitive" [02. Participant 02-Interviewed].*

Both participants mention the potential for renewable energy to develop by encouraging individuals to consume it through their behaviors. Individuals and households will be encouraged to switch to renewable energy based on comfortability and pricing. One participant interprets comfortability as easy access to competitively priced, renewable energy-generated electricity. Another participant states that market structures can drive competitive prices by providing a changing market for renewable energy rather than a fossil fuel monopoly market. Flexible bureaucracy in renewable energy permits facilitates the integration of renewable energy-generated electricity into the existing grid.

According to these findings, the ability of individuals and societies to receive renewable energy is determined by three parameters-comfortability, energy pricing, and excellent flexible governance—the alignment of existing energy to renewable energy. Encouragement of energy citizenship has the potential to accelerate the energy transition, as evidenced in this empirical interview.

Connecting to Prior Theories and Concepts

According to an empirical point of view, both participants agreed that the energy transition is necessary due to the current economic development based on fossil fuel energy, resulting in climate change. Investing in renewable energy is recommended to avoid irreversible environmental damage, creating potential unexpected and remedial costs for our planet or nature. Four industries, such as coal-fired plants, petrochemical plants, cement industries, and transportation, significantly contribute to CO2 emissions in developing countries. The focal point falls on the government to make guideline transition to support small and medium enterprises by high investment in renewable energy. This notion of "the energy transition is a must" reflects the emergence of the transition. This finding is aligned with highly consuming fossil fuel energy from ASEAN countries creating high CO2 emissions from current economic development, creating climate change, global warming, and potentially catastrophic, called global challenges (International Energy Agency (IEA), 2021; Mercedes & Cantarero, 2020). These global challenges are addressed as capital misallocation to fossil fuel energy drives the global consensus to shift fossil fuel energy to renewable energy through the energy transition (Lopez-Claros et al., 2020; UNEP, 2011).

Both participants mentioned that energy transition is possible due to the rich resources available in ASEAN countries to achieve 100% renewable energy as long as supported by all parties (Vidinopoulos et al., 2020). Both participants also convinced the energy transition to have the opportunity to create green jobs, measure GDP per capita and GDP per emission, and address disrupted jobs-fossil fuel and coal energy jobs (Moe, 2020). Capacity building and upskilling are promoted to fill the gaps

and injustice while transitioning (DellaValle & Czako, 2022). Renewable energy as distributed resources can potentially distribute energy services-electricity to all people as energy justice. Energy transition and green growth as decoupling variables with the ingredient of renewable energy create opportunities for green economic growth, lowering CO2 emissions and sustainable development. Creating new jobs by reforming the market structure, democratization infrastructure, and regulation raise potentially the share of renewable energy with accessible, affordable, and equity. The Empirical perspectives align with the prior theory and concept. According to (Hickel & Kallis, 2020), decoupling energy transition embedded with justice and green growth enhances sustainable development in multi-dimension of social, economic, and environmental. Energy transition to clean energy can create green jobs and facilitate green economic development, (Moe, 2020) and substitution to permit us to decouple GDP growth from resource use and carbon emission (Hickel & Kallis, 2020). Looking for opportunities and lacking opportunities are faced with consequences of doing the energy transition (Carley & Konisky, 2020). The energy transition concept is embedded with the energy justice concept, how energy services are distributed equally, affordable, and accessible following the term of *distribution, recognition*, and *procedures*, called just transition (Heffron & McCauley, 2018). Meanwhile, green growth is economic development suitable to our planet's ecology. Clean energy is essential for current and future green growth depending on energy availability and requires decarbonization that employs investment and labor (Ayres, 2017).

Both participants mentioned that ASEAN country consumes heavy fossil fuel energy, creating CO2 emissions rapidly increasing. Energy security lies in fossil fuel energy, creating dependency for all nations and geopolitics issues. They describe fossil fuels as centralized resources, high investment, and fluctuating prices. Dependency is one element for the nation to drive energy transition by looking for alternative energy. Rising CO2 emission enormously also pushes the nation to do the energy transition. Energy security dominated by fossil fuel has the potential to raise the CO2 emission by more than 4.2% from total global emission of 33 GtCO2, creating potential natural disasters such as floods, wildfires, landslides, and rising sea water levels.

This empirical perspective has a relationship with prior theories and concepts. Energy security is defined as securing supply and demand, creating potential remedial costs for business and our environment. Moreover, energy security is defined as the capacity of a nation to secure its current and future energy supply (International Energy Agency (IEA), 2021). With the notion of 4A availability, accessibility, affordability, and acceptability covering energy poverty, energy security, and energy sovereignty, energy is a crucial natural resource for the country's economic development (Shojaeddini et al., 2019; Sovacool et al., 2015). It also equitably provides available, dependable, affordable, and efficient alignment to environmental aspects and good social services for end users (Sovacool, 2013). According to IEA, 2021 ASEAN countries are consuming fossil fuels 80% to support their economic development. Current economic development is blamed for creating CO2 gas emissions reaching 1.5 GtCO2, almost 4.7% of total CO2 global emissions, potentially damaging our planet and creating natural disasters (Gates, 2021). In sum, energy security complements supporting energy transition while securing energy from fossil fuels blamed as missed capital investment to create a global concern about climate change (UNEP, 2011).

Both participants argue that energy transition remains the challenges that appear in the form of guideline transition, obsolete energy policy or need an adjustment energy policy, open infrastructure, open market structure, and permitting issues. These challenges reflect energy democracy and would have a dimension of *resisting, reclaiming,* and *restructuring* the governance (Sweeney, 2014) and come up as the gaps for energy democracy in developing countries. Energy democracy is the democratization of dominant fossil fuel energy regarding governance, infrastructure, and material itself involving the actors (Szulecki, 2018). Sweeney, 2014 argued that achieving the goals of democratization needs participation from the

government and local community as the prosumer with *resisting, reclaiming*, and *restructuring*. Resisting translates to the democratization of fossil fuel materials and infrastructures. Reclaiming translates as the prosumer reclaiming the economic potential and opportunities from renewable energy. The last, restructuring, translates as the prosumer's active participation in developing and restructuring existing energy policy by increasing the domination of renewable energy against fossil fuel.

Meanwhile, in terms of comfortability, energy pricing, electricity access, and green products appear as individual behaviors to make energy citizens more attractive to consuming renewable energy. Wahlund & Palm, 2022 argue that energy citizenship is participatory and active from the individuals who act as prosumers involved in all energy production and consumption processes against the domination of fossil fuel energy rooted in the notion of energy access and energy poverty. Encouraging energy citizenship is impacted by renewable energy consumption by encouraging through media online, education, and socialization (DellaValle & Czako, 2022).

CONCLUSION AND RECOMMENDATION

The six core categories and six categories are identified to reflect energy transition from the point of view of practical experience. The six core categories are derived from prior theory and concepts connected to the energy transition. Meanwhile, the six categories derived from the text's document align with prior theories and concepts. The six categories are *current economic development characteristics, renewable energy challenges (Regulation, Investment, Market Structures, and Technology), Encouraging Customers, Energy Transition Potential, Measuring Green Growth, and Impact of National Determination Contribution (NDC) to catastrophic and Sustainable*.

This study found that the energy transition is a must for both participation perspectives due to accumulating CO2 emissions rising exponentially caused by fossil fuel energy as the ingredient of economic development. The primary sector has been identified as the most contributing to climate change: Coal Fired-Power Plant Electricity, Petrochemical and Cement Industries, and Transportation. The energy transition is inevitable and needs a new energy policy to guide everyone to transition as the gaps for energy democracy. The remaining work to solve this in the short term is developing *a new energy policy or adjusting the existing energy policy, democratizing the market structure, infrastructure*, and *the dominance of fossil fuel by decreasing the share*. From the viewpoint of both participants, recent energy security widely represents the domination of fossil fuels, creating global concern, climate change, or climate war. Decreasing CO2 emissions is supposed to make a better future by shifting fossil fuel to renewable energy. The energy transition requires the same action on fossil fuel dependency for developing countries or nations looking for alternative clean energy. Energy security supports the energy transition from fossil fuel energy to renewable energy.

The role of participatory, active energy democracy and energy citizenship in supporting energy transition are remaining questions. However, the democratization of fossil fuel came up with the suggestion to have democratization to energy democracy by adjusting the energy policy, democratization infrastructure, and market structures as the point of view both participants reflect energy democracy. Meanwhile, encouraging energy citizenship by considering individual behaviors, such as comfortability, product substitutes, and energy pricing, is essential for empowering energy citizenship.

Energy transition impacts green growth by looking at the number of green growth GDP per capita and GDP per emission reflects green growth. Energy justice is embedded into an energy transition as long as electricity access is guaranteed to be reformed. Decoupling energy transition and green growth is supposed to create sustainable development, laying on clean energy with affordable prices, creating green jobs, a sustainable environment, and social and economic development. This study recommends changes to the current energy policy, opening up

the energy market and infrastructure, encouraging consumers, and accelerating the energy transition.

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