

CHAPTER I

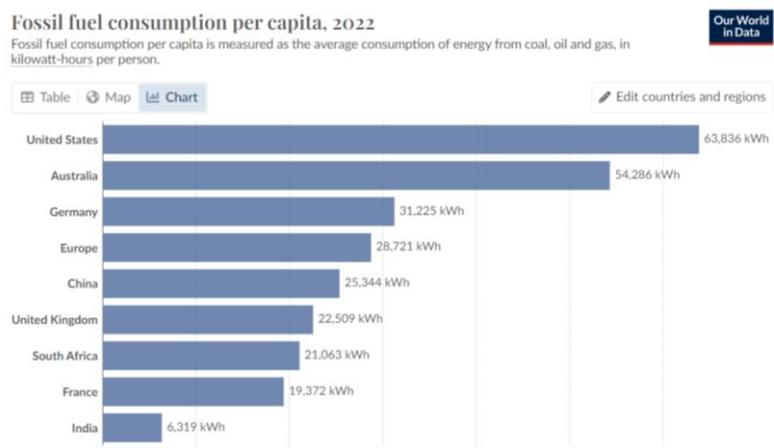
Introduction

1.1 Background

Energy has been one of the world's most important aspects, it has been giving many reasons for potential cooperation and potential clashes between nations to acquire such substance to meet its domestic demands. Cooperation can be made through the realization of common grounds to acquire energy to achieve adequate power for the citizens. For instance, the United Kingdom and the United States agreed upon establishing a Strategic Energy Dialogue (SED) in the year 2024 as the primary bilateral forum to create resilience, enhance cooperation, and achieve net zero objectives (Department of Energy, 2024). However, energy can become a two-sided blade which has other facets, it can become the reason behind the clash of nations. For instance, Germany under the Nazi's control attempted to acquire Caucasian oil fields to power the military in World War II. Not to mention, at the same time Japan also invaded countries to access resources they needed to fuel the ongoing Pacific War against the United States of America (USA) (André & Månsson, 2014)

Those substance which have been called 'energy' have been very crucial for human lives due to their presence that has always been demanded by everyone to continue their activities in supplying electricity, transportation fuels, government

and private sector services, and many other. In order to form modern society, they need renewable and non-renewable energy as their primary sources of energy to produce hydrogen, fuels, heat, kinetic energy, and many other forms of energies (US Energy Information Administration, 2023).



Graph 1.1 Countries and Regions ranks on fossil fuels consumption per capita in 2022

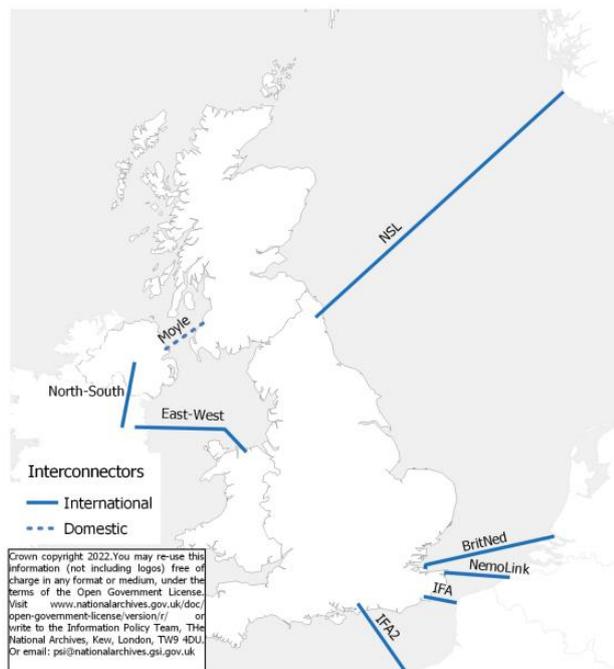
(Energy Institute, 2023)

The United Kingdom's energy perspective, accounted for 734 thousand jobs, and in total of 149 billion GBP worth of economic activity, and 16.7 billion GBP investment in 2022 (Energy UK, 2023; Department for Energy Security & Net Zero, 2023). Unfortunately, several events influenced His Majesty's government¹ to introduce several adjustments for the United Kingdom to meet its demand for energy. Those events have been influential for the United Kingdom to rethink its

¹ The official name of the United Kingdom of England and Northern Ireland Government

position in the new higher standards of social, economic, and environmental requirements.

In the pre-Brexit era, in 2020 prior to the full detachment with the European Internal Market of the European Union, approximately 40% of the United Kingdom’s energy supply consisted of natural gas which was distributed through a system called “interconnectors”. These so-called “interconnectors” connect gas from neighboring countries to the United Kingdom and vice versa (Department for Business, Energy & Industrial Strategy, 2022). Interconnectors are defined as cables beneath the subsea that carry High-Voltage Direct Current (HVDC) (Bush, 2024). This is important to understand its vital position for UK electricity imports, especially its role in helping the UK increase the number of electricity imports from adjacent countries to almost ten-fold at 28.7 TWh during the course of 2010 and 2021 (Department for Business, Energy & Industrial Strategy, 2021)



Graph 1.2 Interconnectors Domestic and International Map to the UK

(Source: Department for Business, Energy & Industrial Strategy, 2022)

Approximately, 80% of Britain's energy supply came from interconnectors in 2019 and has kept rising since then with approximately every six interconnectors having the capacity to supply 25% of Britain's electricity by 2024, sadly these giant projects can no longer be relied upon for the United Kingdom due to this no longer covered by Single Day-Ahead Coupling agreement between the European Union and the United Kingdom (SDAC).

According to the Briefing Paper issued by the House of Commons, the discussion to leave the EU was declared by former Prime Minister David Cameron in 2013, this event led to another event which unraveled on 23 June 2016 or just one day prior to his resignation as the Prime Minister, the UK holds referendum in which the majority voted to leave the European Union with 51.9% against 48.1% voted for the UK to remain inside the European Union (Walker, 2021). This action marked the invocation of Article 50 by the Prime Minister of the British at that time Theresa May that allowed the United Kingdom to start withdrawal procedures by undergoing certain negotiations for up to two years (European Council, Council of the European Union, 2017). Brexit has been influenced by a very fundamental change which then also influences constitutionally, this event indeed has an absolute implication for the politics and the society inside and outside the United Kingdom and the British government territories, and this will burden the economy of the United Kingdom and send difficulties for Britain to ensure better energy

security for the people.

As the consequences of Brexit. On 31 December 2020 at 11.00 pm, The United Kingdom and the European Union reached an agreement for the British to officially leave the Internal Energy Market (IEM) of the European Union (Norton Rose Fulbright, 2021). This has resulting Great Britain limiting its access to intraday market coupling arrangements, the United Kingdom is increasingly reliant on external energy imports, not to mention there have been very broad changes in the UK Energy Landscape, especially in making sure that the energy is enough to make the country live. Studies that have been done by Durham University inside the United Kingdom show that the UK can no longer meet its own heat and power demand by only relying on indigenous conservative supply, this should be worrying since the UK is infamously and unimpressively reliant on gas for electricity production for the Domestic Industry (Durham University, 2024).

Not to mention, this condition is also worsened by the unprecedented world changes such as the COVID-19 pandemic which became the cause of inflation and the Russian invasion towards Ukraine crisis has been deteriorating for the United Kingdom due to the spillover effects of rising energy prices. This leads to an event called the 'supply-chain disruptions. The price of fossil fuels can no longer be tamed and controlled by any party. The volatility of fossil fuels showed its dangerous nature in 2022, the price of crude oil and gas rose consecutively in 5 months, from 92.77 USD per barrel on February 24 to the level of 123.64 per barrel on March 8. This sudden surge in prices was due to the massive inflation driven by the state of

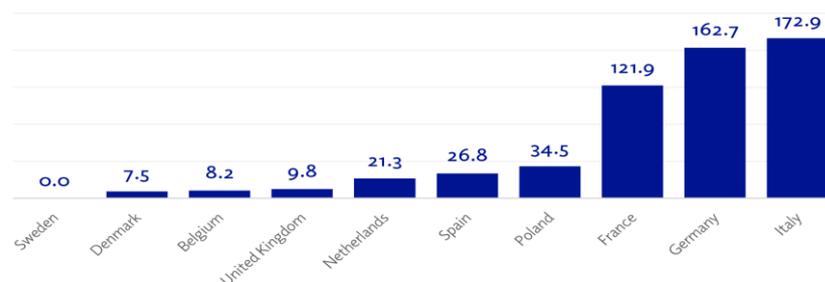
volatility as the characteristics of fossil fuel prices, this phenomenon is called “fossilflation” (Wagner, 2024, Durugbo and Al-Balushi, 2022, Butler, S & Wood, Z, 2021).

The price of energy in the United Kingdom was surging quadrupled only in the year 2021, this is very impactful on domestic energy prices especially electricity and heat bills (Reland, 2021). It is reported that British Energy bills have been swelling as much as 1.1 billion GP caused by the departure from the European Union (Werberm 2023). According to the Bank of England, Consumer Price Index (CPI) inflation rates in March 2021 was at the level of 2.1 % and soared to the level 5.4% in December 2021, the rising trend continued to the level of 7.0% in March 2022 and achieved its peak level in October 2022 at 11.1%. The substantial reason behind this was oil prices peaked at around 100 GBP per barrel in 2022 and gas prices at over 350 pence per therm in Q3 2022 (Haskel et.al, 2023).

The UK has very limited reserve gas storage compared to its major European neighbours

Gas in storage (terrawatt-hours) at end of gas day, 17 October 2021, among selected European countries.

**UK IN A
CHANGING
EUROPE**



Source: agsi.gie.eu/#/.

Graphic 1.3 UK gas reserve compared to the European Union countries in
2021

Source: <https://ukandeu.ac.uk/explainers/energy-prices-and-supply-in-the-uk/>

This phenomenon of *fossilflation* has become increasingly important for the country to be resolved as fast as they can. In order to perform the solution, the government of the United Kingdom should continue working *vis-à-vis* to collaborate with many stakeholders notably British energy private sectors as the executors.

Several British-owned energy private sectors are selling energy commodities both renewable and non-renewable energy. In the bigger picture, there are at least three key players in the chemical, oil & gas business which are INEOS, Royal Shell, and British Petroleum. However, there are also energy companies that are quite low in terms of their valuation, For instance, Octopus Energy, British gas, Sainsbury's Energy, Scottish Power, Scottish Gas, Scottish & Southern Energy (SSE), Thames Water, Harbour Energy, Tullow Oil, EnQuest, Ithaca Energy, Sercia Energy, Vedanta Resources, Centrica, Ascent Resources, Capricorn Energy and many other small subsidiaries and companies (Swallow, 2023)

However, this research will choose the INEOS Group and its subsidiaries as the prime example to uncover the British Energy private sector role in helping HM government in their effort on securing energy. The owner Sir Jim Ratcliffe also has been really vocal on this matter, he is fully aware and acknowledges that Gas Prices in the UK are almost 10 times higher than the US, this conditions also worsened by the geopolitical tensions in Europe as a result of the Russian Invasion of Ukraine

(INEOS Group, 2022). He later mentioned and acknowledged the British government's failures in transforming many opportunities for the possibility of increasing Britain's energy security. However, INEOS has made several significant investments for the betterment of the United Kingdom's energy landscape, included in its 6 billion EUR investment plans are advancement of technology to drive the new hydrogen economy inside the United Kingdom and throughout the European Continent (INEOS, 2023).

In these past years, the world has also set higher standards in social, economic, and environmental requirements. For instance, the Paris Agreement which was adopted and ratified by 196 countries including the United Kingdom of England and Northern Ireland in Paris France 2015 is a legally binding international treaty. Its main goal is to hold the increase of global temperature to just below 2 degrees Celsius and work *vis-a-vis* many parties to limit the temperature increase to 1.5 degrees Celsius (UNFCCC, 2015). This means that the whole wide world has set higher standards of demand and requirements which the United Kingdom has agreed upon. This also means that the United Kingdom has pledged its loyalty to join the effort to reduce 70% of global emissions in 2030 and to promote zero-carbon solutions or Net Zero (UNFCCC, 2015).

Those higher standards are the correct coping mechanism especially for the United Kingdom to respond to the availability of the United Kingdom's fossil fuels reserve which has been depleting over time. In 2021, The United Kingdom only had 9.8 terawatts of gas reserves, this number is very low compared to France, Germany, and Italy. Moreover, in 2023, the availability and ability of the United

Kingdom to produce oil decreased by roughly 8.9 percent from the year 2022. The total production of oil in a year from the United Kingdom has been decreased to the point of only 100.4 million tonnes in the last year 2023, this reported as one of the recorded lowest levels of oil production figure (Department of Energy Security & Net Zero, 2023)

In order to achieve energy security, The United Kingdom should continue to work *vis-à-vis* with several adjustments to accommodate the advancement of technological capability to move towards renewable and sustainable energy. This demand for adaptation is required due to fossil fuels' worrying state of availability, affordability, accessibility, and acceptability which can no longer become the backbone of energy security. Therefore, the HM Government needs to strengthen its role in providing regulations and opportunities while the British Private Sectors increase its role as the executors to help achieve energy security while also maintaining social, economic, and environmental requirements.

1.2 Research Question

How does the United Kingdom's energy private sector INEOS Group help His Majesty's Government in its effort to achieve energy security after Brexit amid the Fossil Fuel Crisis?

1.3 Purpose of the Research

1.3.1 General Purpose

The general purpose of the research is to comprehensively analyse the energy security state before and after Brexit, and how the British Private Sector effort notably INEOS Group in helping His Majesty's government to secure energy for the masses. This effort will utilize better and more reliable energy sources of renewable and sustainable energy sources.

1.3.2 Specific Purpose

A thorough analysis will be performed with the help of energy security and sustainable energy development concepts. This research will perform analysis with the help of 4 A's energy security principal which are *Availability, Accessibility, Affordability, and Acceptability*. Moreover, this research will conduct a comprehensive examination of the role of the private sector according to the concept of Sustainable Energy Development including the effort to increase the usage of energy alternatives, increase efficiency through innovations, and decrease greenhouse gas pollution. Not to mention, this research will perform a thorough examination of the relations between His Majesty's government and private sectors notably INEOS Group in conducting energy transitions towards renewable energy to achieve energy security, Analysis will be carried out with the direct assistance from INEOS Aromatics as British energy private sector.

1.4 Research Benefits

1.4.1 Theoretical Benefit

This research will help to provide an analytical discussion of the challenges and implications faced by the energy sectors of the United Kingdom. This will help to understand the private sector's engagements in helping the economy, energy supply, and energy prices. Notably, the important role of the private sector in helping the government to achieve the 4 As of Energy Security which includes *availability, accessibility, affordability, and acceptability*.

Those benefits are as follows:

1. Understanding private sector engagement to achieve energy security: This research helps to uncover the implications of the role of the private sector in helping His Majesty's government to achieve the 4A's state of *availability, accessibility, affordability, and acceptability* to fully obtain the status of energy security.
2. Understand the leading role of private sectors in energy transitions towards renewable energy: This research will help people who are seeking to understand the complexity and dynamic of Britain's energy transitions. This will uncover the best position of the private sector as the leading key transition towards renewable energy.

1.4.2 Practical Benefit

Public awareness: This research helps to raise awareness of the importance role of the executor notably the private sector to help the government

achieve energy security by helping them move to renewable. This research also helps to raise awareness towards the higher social, economic, and environmental requirements.

1.5 Theoretical Framework

For this research to be conducted properly and to provide significant benefits for society as it is intended in the section above, this research will be using international relations concepts of Energy Security and Sustainable Energy Development for the appropriate part of the development concept.

Many of those which are published currently analyze the same topic of this research but in different matters and manners/focus, For instance, there are many studies on researching UK energy security but focus more on climate change, two papers published by the ELSEVIER “**Energy Security and Climate Change: Constructing UK energy discursive realities**” and “**A Neo-institutional perspective of supply chains and energy security: Bioenergy in the UK**” are more focusing on how the energy security conducted with the better care for the environment as well as how to perform the energy more sustainable (Mafakheri & Genus, 2014; Hayden & Lorenzoni, 2011). The latter is actually kind of similar to this research, however, the research is not focusing on the role of the private sector in advancing bioenergy as part of the sustainable energy development agenda. As for Sustainable Energy Development (SED), if we take the comparative point of view from existing instances, all of those papers are more focused on climate action and renewable. The articles above do not necessarily emphasize the role of the private sector in the advancement of such an agenda.

Not to mention, an article titled “**Perceptions of accountability and trust in the regulatory governance of wood burning stove sustainability: Survey evidence from the post-Brexit UK**” which put emphasise more on the government side to be held accountable in advancing towards more unconventional energy which in this case wood burning stove. However, sustainability is not a one-part game, it is more toward a synergy process which includes many stakeholders both the regulators and the executors. Another article published by Elsevier “**Sustainable strategic investment decision-making practices in UK companies: The influence of governance mechanisms on synergy between industry 4.0 and circular economy**”. When the first put the emphasize more on the government side to be held accountable in advancing towards more unconventional energy which in this case wood burning stoves. The second puts emphasis and links towards private sectors in which it recognizes the role of private sectors in advancing the energy industry as part of sustainable strategic investment of the United Kingdom’s companies. However, the latter does not emphasize the role of the private sector in advancing renewable energy to help achieve energy security, it puts more contention in the synergy between industry and the circular economy.

In other instances, also mentioned about the synergy of private sectors helped to shrink the gap between the global north and the global south in terms of clean energy mentioned in “**Technological Capacity Building through Energy Aid: Empirical Evidence from Renewable Energy Sector**”. This research discusses more aid in the form of technological capacity building which helps to improve the renewable energy sector. However, it does not put the point of

contention towards the private sector's intention, since the private sector is driven by economic aspects rather than merely aid without any economic aspect. Moreover, there is an article that shows how education is also relevant in building sustainable energy generation “**Sustainable Energy Generation and Use in SIDS and Beyond-Introducing the L3EAP Online Learning Approach**”. However, to create a sustainable energy generation, it requires multiple aspects notably the creation sustainable energy environment in every aspect. Some relevant papers show how the UK and India performing collaboration to identify the barriers to the transfer of low-carbon energy technology (Alkaraan et al., 2023; Wood et al., 2023) but not specifically for the energy security of one’s country.

1.5.1 State of the art

Existing research shows different points of contention from this research, many of which emphasize more towards one part or role more than the others, but not limited to energy security and climate change, the role of government in sustainability, the role of private sectors in advancing bioenergy, and the role of technology aid in renewable advancement. However, there is an article that wrote about private sector investment strategy towards the advancement of renewable energy. There is quite a profound gap in the discussion of energy security which also puts emphasis on the private sector's role in the advancement of energy transition towards the renewable, rather than only putting emphasis on investment or in the government. Therefore, this research will be using **Energy Security**

concepts and for an appropriate part of International Development will be using **Sustainable Energy Development**.

1.6 Conceptual Framework

1.6.1 Security

Begin from the discourse of a very broad concept of Security, indeed there are plenty of broadly defined security concepts within the security realm, from the traditionalist to critical theorists. For instance, the Realism school in International Relations theory generally resolved around political and military issues very much in the same context of security and power capabilities which states capable as the object of security. The infamous Hans Morgenthau in his book “Politics Among Nations: the Struggle for Power and Peace” laid out that the objective to acquire power is the rationale inside one’s country’s action to secure national interest (Wirtch, C, 2010).

Although security is a very simple term that is quite self-explanatory, there is also growing concern over decades on re-conceptualizing security in which the meaning become much deepened and broadened by many unprecedented events that were occurred in these several decades. The growing anti-traditionalist movement which grew exponentially over time called the *wideners* came up with a new point of view which so-called the Copenhagen School and Aberystwyth School. The latter argues that security is all about surviving in that sense a threat can be broader than only traditional military but also any form of something that is defined by certain actors as an object of

existential threat, the later argues that so-called “*True Security*” can only and solely be achieved by looking more anticipation towards human emancipation (Diskaya, 2013).

For this research to be fully conducted, the most appropriate security concept that will help the most would be the one that came from the widest Copenhagen School. One of the most prominent Copenhagen Scholar laid out several security discussions to become more inclusive and to also put respect on social factors of security, national security turns out to be more systematic than only regime playing or militarization, to achieve national security one needs also expanded the concept of security towards political, economic, societal and environmental aspects of a nation (Mohamed, 2023). By also putting more effort into looking at societal and economic aspects, in this case, energy is part of the most prominent sectors in which the national interest of one’s country also deeply relies on the availability of energy inside the country to run properly.

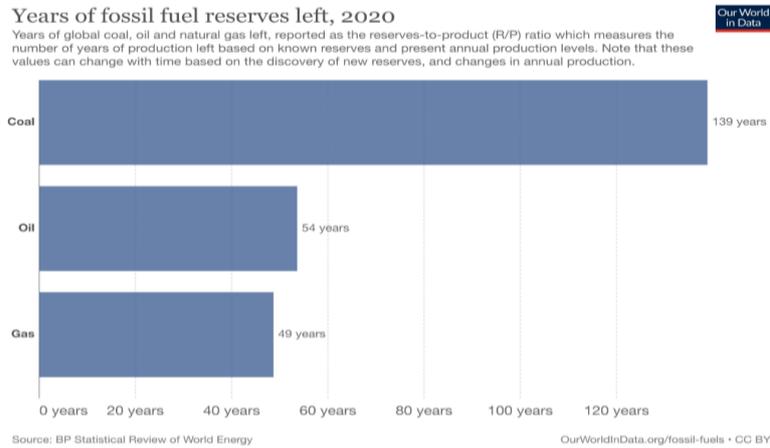
1.6.2 Energy Security

Energy Security: the concept of energy security as it is defined by the International Energy Agency (IEA) is the state in which a nation has the uninterrupted availability of energy sources at a price that is affordable, this energy security has many long-term benefits which helps nations supply its energy for the betterment of economic developments and environmental needs (International Energy Agency, n.d). Since the energy prices increased suddenly, this will affect the enabling of economic growth due to the unreliable energy

storage or supply of essential energy gasses. Energy security is a pretty new topic since it emerged in the discussion in the early 20th century in connection with supplying oil for national modern armies, in academia the discussion came in the 1960s and 1970s when the oil crises hit the world (Cherp, A & Jewell, J, 2014). The concept consists of 4 aspects commonly known as 4 A's in energy security contemporary studies, those are availability, affordability, accessibility, and acceptability. Those for A's are something prominent and still become a mainstream definition as it is intended to according to the International Energy Agency (IEA).

International Energy Agency (IEA) mentioned many aspects of energy security complimented the definition, such as there is long-term energy security and short-term energy security, the early focus on how to deal with and maintain energy security through timebound investments to supply energy to support better economic development of one's country, the later focuses more on the ability of one's nation to adapt and react to sudden changes in the energy balances demand-supply (International Energy Agency, 2023). The energy security concept allows us to have a better understanding of the current situation evolving around energy discussion in the United Kingdom and how significant the impact of energy supply is for one's country, this also helps in getting better explanations of how the private sectors are playing very big roles in helping the government providing adequate access for the people of United Kingdom to enjoy energies.

1.6.3. Sustainable Energy Development (SED)



Graph 1.4 Years of Global Fossil Fuel Reserves Left

Source: BP Statistical Review of World Energy

Since fossil fuels are depleting overtime, in rough estimation people have a very limited lifetime reserve. For instance, the Oil will be depleted in 54 years, followed by natural gas in 49 years. Although coal energy still has 139 lifetime reserves, it burns the most carbon compared to the rest of fossil fuel energy. This cannot be good in the higher standards made by the world through the Paris Agreement 2015. Therefore, to achieve energy security, there is a dire need to search for alternatives that are not only in line with higher current social, economic, and environmental requirements but also adequate to achieve energy security.

This is when this particularly new discourse steps in. As part of the component of the Sustainable Development Goals (SDG), the International Atomic Energy Agency (IAEA) defined Sustainable Energy Development (SED) as “the provision of adequate energy services at affordable cost in a

secure and environmentally benign manner, in conformity with social and economic development needs”.

As for the development view, it will always and always have been focusing on the end goal of energy peace and prosperity for people and all uses. This is interlinked with the role of what kind of sustainable energy will be used or we shall call it “Renewable Energy”. This discourse is very relevant in this modern world in which everyone is anticipating a major decline in global oil demand from 2022 to 2028 (Olanrewaju, O & Akpan, J. 2013). Sources to perform this sustainable energy development (SED) lie in what we consider as sustainable energy and renewable energy that includes but is not limited to the energy that will be and always have been viable forever, with no need to be renewed or replenished from the face of the earth (Routledge, 2022). As for renewable energy, it is indeed quite similar to sustainable energy sources, but there is still a slight chance of being theoretically exhaustible, for instance, bioenergy uses biological masses that might be replenished someday if there is no effort to make them sustainable (Routledge, 2022).

1.7 Concept Operationalization

1.7.1 Conceptual Definition

1.7.1.1 Energy Security

The general definition of energy security has been provided by the International Energy Agency (IEA) and has been widely

accepted across the globe is defined as uninterrupted/secure access to the energy sources for one's country with a reasonable and acceptable price to support the advancement of national economic development. The importance of energy security for one's country is very substantial for providing basic to advanced needs of a society such as household needs such as but not limited to lighting, water, essential health care, and food up until the advance society needed for the economic growth, prosperity of one's country and political stability in certain nations.

The world has been experiencing a modern and newly discovered problem that also requires modern and brand-new solutions or innovation. Energy security has been experiencing complex issues most of which have been answered by advancing the answers. For instance, Melanie Kenderdine and Ernest Moniz emphasize the technological advancement to acquire better capabilities: Charles McPherson emphasises sustainable development, transparency, and good governance: Leon Fuerth put forward the important relation of energy and nuclear weapon; David Goldwyn and Michelle Bilig put more consideration in acquiring ample strategic reserves; and Kevin Baumert shared its concern in balancing energy with the newest environmental requirements (Kalicki & Goldwyn, 2005).

Methodologies proposed by the Asia Pacific Energy Research Centre (APEREC) consist of as follows:

1. **Availability:** conditions in which nations have a sufficient amount of energy to provide for basic to advanced access that itself needed to perform. According to Michele Biliq and Goldwyn who both emphasise the importance of acquiring ample strategy resources to tackle energy security issues Kalicki and Goldwyn (2005). Within this research, the availability of energy inside the United Kingdom is crucial especially for the government to provide an adequate amount of energy to the masses.
2. **Affordability:** conditions that a country can access energy a reasonable and accepted prices to provide their nations. Affordability is related to the economic aspect due to supply and demand, infrastructure availability, financing, human resources, technological capacity, and environmental concerns. Eventually, those aspects will be crucial to assessing the investment cost affordability to acquire or advance various types of energy (Indriyanto et al., 2015)
3. **Accessibility:** conditions in which all citizens of one's country can have equal access to energies, this accessibility measures how the public masses can fully access and acquire any energies to fulfill their demand and their daily life. This aspect is strongly related to the social dimension which indicates the easiness of access to the energy for public masses,

to achieve better accessibility, the government needs to provide stability inside and outside the country (Indriyanto et al., 2015)

4. **Acceptability:** The conditions that show how one's country and its society accept certain technologies in terms of their impact on the society, environment, and economy (Jones, O & Dodds, P, 2017). the principle of *Acceptability* which indicates the openness of one society to energy and its impact, *Acceptability* also plays a key role in how the transition to new energy impacts nations-wide life. For instance, if one's country deeply relied on conventional energy methods and has been deeply integrated into their life, it is indeed quite an unacceptable/long process if one needs to move towards more unconventional energy.

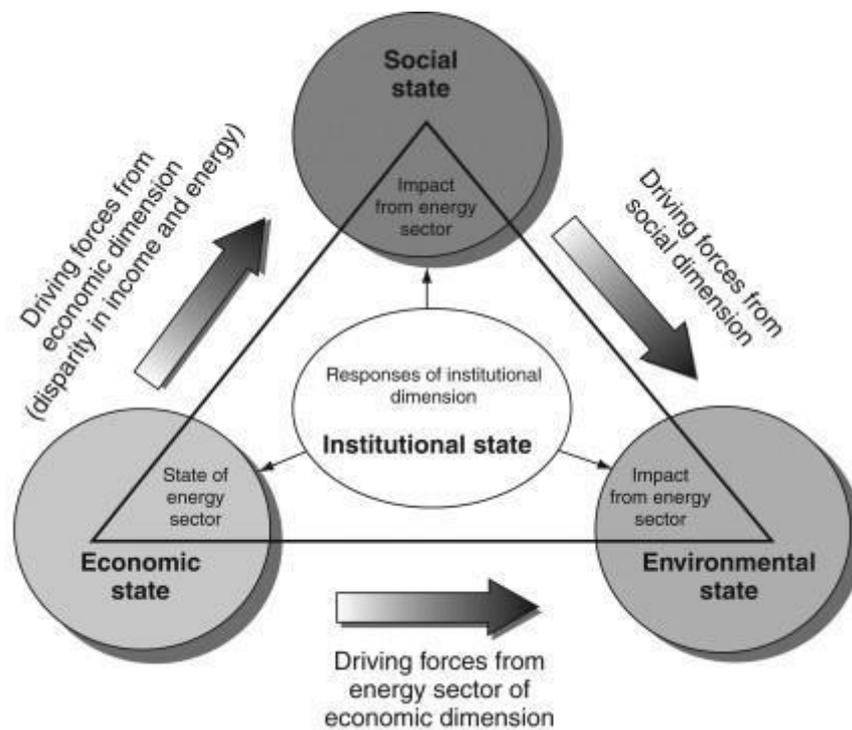
From the perspective of conventional energy such as oil-based production and consumption, it can improve towards modern sustainable energy. Based on previous research, found that there were substantial improvements in energy perspective which have shifted the more modern energy perspective, there are substantial improvements in energy security definitions which have been moving from uninterrupted oil access and supply to the security of providing society with renewable energy resources such as but not limited to biofuels, wind, sea, heat, etc (OGEL 3, 2008). and from a wide range of energy security definitions, it can be parted with two meanings, the first is how one's nation diversifies its energy resources to have betterment and improvement in energy security. For instance, how one's country develops many energies stream to provide

diversified energy from renewable energy resources. The second one is more concerned with the reliability of the resource or power system, the output, and the reliability of resources of energy needed to be optimized for one's country to have relied upon that source of energy (Berrada et.al., 2021).

1.7.1.2 Sustainable Energy Development (SED)

There are several debates and revisions in this concept, as defined by the International Atomic Energy Agency (IAEA) that sustainable energy development is achieved when energy costs become affordable but also in line with social and economic development needs. A few years later, the Organization for Economic Cooperation and Development (OECD) stepped in *vis-a-vis* with the IAEA and confirmed the position of sustainable energy development should be supported by an economically profitable, environmentally responsible, and socially responsive energy sector with a much broader view in global cooperation and long-term vision (Davidsdottir, B. 2012). Since 1998 to the present day, there have been several refurbishments on the discourse and theory of Sustainable Energy Development (SED) from merely discussing clean air, renewable energy resources, nuclear for the environment, and social justice into something much more relevant to this time of the day which consists of sustainable energy consumption, sustainable energy supply, access to affordable modern energy services and the probably the most

relevant part for this research is its relations with achieving energy security (Afgan et al., 1998) (Chen et al. 2022).



Graphic 1.5 The Relationship between Sustainable Development and Energy according to the International Atomic Energy Agency (IAEA).

(International Atomic Energy Agency)

The complex relations between the economic state, social state, and environmental state make Sustainable Energy Development a complex multi-dimensional concept that recently the government has put much contention in its policy objective (Gunnarsdottir, et.al, 2021). Sustainable Energy Development (SED) can be understood as socio-

economic development due to energy services that need to be affordable but also kind towards the environment, it is a complex multidimensional concept that can be divided into four related big topics such as but not limited to sustainable energy consumption, sustainable energy supply, affordable modern energy and energy security (Brodny & Tutak, 2022) (Chen et al. (2022)). Throughout history, there has been recent discourse on how Sustainable Energy Development (SED) can also become beneficial and interrelated with energy security and affordable modern energy supply.

In addition to that, McPherson put forward the importance of bridging energy security with the assistance of sustainable development, it requires lots of alternatives in which involving government and non-government stakeholders. Ultimately, Kenderdine and Moniz emphasize the comprehensive relations of technological capabilities for the advancement of energy security, technology advancement enables a greater impact on efficiency, alternative fuels, and acceptability while also complying with the environmental, social, and economic requirements of the modern world. (Olanrewaju, O & Akpan, J. 2013; Davidsdottir, B. 2012; Kalicki & Goldwyn, 2005).

In order for Sustainable Energy Development to be implemented thoroughly, several energy sources are potentially important, these include but are not limited to:

- a. Solar Calor/Radiation Energy;

- b. Wind Kinetics Energy;
- c. Geothermal Calor/Heat Energy;
- d. Hydropower;
- e. Hydrothermal Calor Energy;
- f. Kinetics Energy of Waves, Currents and Tides;
- g. As for Renewable Energy: Biomass, Biogas, and Bioliquids.
(Lukasiewicz, et.al 2022).

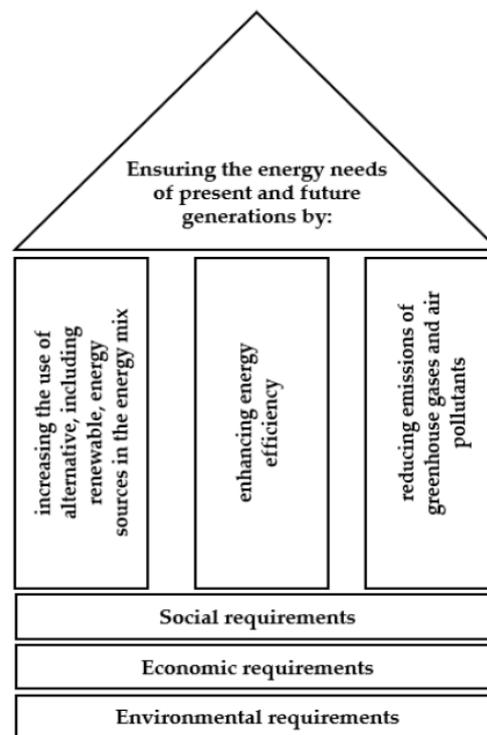
In the 2022 British Energy Security Strategy, the introduction from former Prime Minister Boris Johnson mentions the importance of energy:

“Energy is the lifeblood of the global economy. From heating our homes to powering our factories, everything we do depends on a reliable flow of affordable energy”

(HM Government, 2022)

In this comprehensive energy security strategy, it is indeed mentioned the International Delivery to maintain a stable energy market and prices that will help protect the UK consumer both domestically and internationally. This is where the Sustainable Energy Development is the appropriate theory to answer the research questions since to perform this British Energy Security Strategy 2022 better need to seek new unconventional sources to, help the British provide better efficient strategy for both domestic and international measures to tackle energy challenges.

There are two important key words in this discourse which are access to modern energy services and achieving energy security. In order to achieve those two, there needs to be much more than one party to achieve such a complex manner, there need to be several organizations that work *vis-a-vis* with the government as the regulator and private sectors as the executor or the spearhead to achieve long-term energy security. To view the relationship between Sustainable Energy Discourse (SED) and Energy Security, the graph below shows its true nature and benefits.



Graph 1.6 Sustainable Energy Development (SED) as the Foundations for Energy Security

(Lukasiewicz, K et.al, 2022)

By recognizing higher standards of social, economic, and environmental requirements that have been set by the world. It is important to learn the relationship of those standards or requirements to sustainable energy development. The standards become the fundamentals that will help the pillars of sustainable energy development which later will be made by the British energy private sector. The end goal of these fundamentals and pillars would become a strong foundation for the establishment of energy security.

1.8 Applied/Operational Definition

1.8.1.1 Energy Security

Energy security in this research is significant to explore and explain how the key private players in the United Kingdom's energy influence the United Kingdom's energy security. By providing and examining their contributions towards securing and providing energy supplies, supporting capacity-building initiatives, and to analyze how those players promote sustainable energy inside and outside of the United Kingdom. This will help us gain a better understanding of the United Kingdom's state of energy security in its *availability, affordability, accessibility, and affordability*.

According to Baldwin which stated that security has a "*low probability of damage to acquired values*", to gain a deeper understanding of underlying factors to achieve energy security, one should also consider what conditions or factors can be considered as a threat and who those need to be protected from these. Security needs also to answer Security for Whom and Security

from What Threats? This concern was also expressed by Buzan who stated that asking the Security for Whom will ease the referent object of security (Cherp & Jewell, 2014; Baldwin, 1997; Buzan et al., 1998).

However, the concern of *Security from What* has been differing in opinion, especially due to the 4 A's not specifically addressing threats. This can be seen also as the part where it is flexible enough to include any threats that are deemed as dangerous in the current or particular time, moment, and location. This flexibility allows contemporary problems in any area in the energy context can be seen as threats or vulnerabilities when the threats have been declared as a priority from political processes or political entities of a country (Cherp & Jewell, 2014). By making certain objects of threats a priority, the energy security of a state will be uninterrupted or resilient enough to endure any threats that have been identified.

As for the United Kingdom, in 2022 the parliament of the UK has issued research which implies what the United Kingdom considers as threats or risks these includes (UK Parliament, 2022):

- Inadequate fuel reserves or shortages;
- Expensive energy prices;
- Failure of energy equipment
- Net Zero transition risks, including
 - o Lack of Investment;
 - o System Operability Challenges.

Several opinions tried to define the answer to the question “*Security*

for Whom?”, especially to answer the affordability aspect of the 4 A’s. Different perspectives and opinions are changing according to the subject of beneficiary from the affordability aspect of energy security. Low energy prices will be beneficial for mass consumers including households or industries, businesses, and government which will help them to operate. However, from the perspective of energy companies and investors, what matters is affordability to invest in the industry (APEREC, 2007; Hughes, 2012; Sharifuddin, 2013; Kruey et al., 2009).

Affordability for whom?	Energy prices should be...
Households and private consumers	Low compared to household income ^{a,b,c}
Industry and businesses	Low compared to competitors' prices ^c
Nations	Low enough to ensure the energy import bill is small compared to export earnings ^c
Energy companies and investors	High enough to ensure sufficient profitability for energy companies and investors ^d

Table 1.1 Security for Whom in Affordability aspect

(Cherp & Jewell, 2014)

By Taking into account the object of threats and the security beneficiary, to fully evaluate the state of energy security in the United Kingdom, the four A’s of energy can be applied as follows:

1. Availability: Since the UK declared the fuel shortages as a risk, to increase the resilience of the energy state, adequate availability is required. This

principle allows for the evaluation of future availability of energy based on how many remaining sources and remaining energy savings.

2. **Affordability:** The threat of high prices of energy has been considered as one of the threats by the UK Parliament which will affect the operations of government, businesses, households, and energy companies. To stabilize and enhance better resiliency, affordability of energy is needed to perform important tasks. Therefore, analysing this principle of affordability allowed us to estimate the price range of certain energies and their relations with the buying power of the public masses, businesses, and government while also giving enough margin for the energy company to operate and to take an adequate margin.
3. **Accessibility:** Access to energy is fundamental, this allows us to uncover and evaluate the level of difficulties in accessing certain energy by the public masses including households and businesses or industries that require energy to operate, this will help to estimate the efficiency of private sector or energy company and government in distributing such energy to the masses.
4. **Acceptability:** Since the United Kingdom pledges and ratified the Paris Agreement, a concrete and comprehensive energy movement towards sustainable and renewable energy is a must. However, since this security is also applicable to the beneficiaries which are the public masses including households and businesses, it is important to take into account their readiness to use the energy. This principle allows us to evaluate further the

acceptability of certain energies according to the public masses, especially after private sector intervention in advancing renewable energy.

1.8.1.2 Sustainable Energy Development (SED)

In this research, Sustainable Energy Development (SED) will help to explain the private sector's (INEOS) role in responding to social, economic, and environmental requirements to achieve energy security. what are the relations between the social, economic, and environmental standards which will be achieved only with the advancement of sustainable energy development:

However, to achieve energy security, according to the graph 2.2. At least there are three ways of private sector vital role to the government those are:

- 1. Increasing the use of alternatives, including renewable energy sources and energy transitions.**
- 2. Enhancing energy efficiency**
- 3. Reducing emissions of greenhouse gasses and air pollutants.**

Those above will help to uncover the Private Sector's role in advancing towards more renewable and sustainable energy sources to achieve energy security in the future, this is important due to the nature of old energy or energy generated from fossils that is harder to be controlled in terms of prices, sources, and processes. This concept also helps to bring forward its equally importance role in achieving energy security for the

government as the regulator and the private sector as the executor to extract, access, and distribute the energy towards the masses.

1.9 Research Arguments

In the recent higher social, economic, and environmental requirements, Energy security can no longer be achieved only with the help of Fossil Fuels and Non-renewable energy sources due to their nature which is hard to control and predict. Eventually, there is a dire need to move towards energy sources from a government perspective and an economic perspective from the private sector due to the probability of long-term disinvestment effect.

In helping the government effort to achieve energy security, the private sector can assist by creating, obtaining, and transforming more renewable and sustainable energy sources due to their nature that are more controllable by the power of government as the regulator and the private sector as the executor. Not to mention, international cooperation among nations with the United Kingdom is also key to achieving a better state of energy transformation.

The main argument of this research would be the energy private sector in this case INEOS will get a very important position in helping the government of the United Kingdom and Northern Ireland fulfill the 4 A's of Energy security which are *Availability, Affordability, Accessibility, and Acceptability*. The private sector will gain the position as the leader in the energy transition effort by conducting certain things as follows:

1. Help increasing the usage of unconventional fuels, including the newest discovery of sustainable and renewable sources.

2. Enhancing energy efficiency, including but not limited to innovation in acquiring, transforming, and distributing.
3. Reducing emissions of greenhouse gasses and air pollutants, including but not limited to helping the government achieve its international stances on environmental agreement and to achieve Net Zero by 2050.

Therefore, such assistance will help the government achieve energy security by further reducing the government's dependency on fossil fuels to achieve long-term energy security. In the later stage, the private sector's role is also important as the executor to acquire, process, and distribute the energy evenly towards the masses or public market.

1.10 Research Method

1.10.1 Type of Research

This research will use qualitative research methods that are designed to help uncover the underlying behavior and perception of a certain target audience on a certain topic. Qualitative research is the opposite of quantitative research and is fully intended to gather more in-depth ideas or generate a new idea for certain research, this qualitative research is the most appropriate approach for this research since it is commonly used for the social and humanities sciences including but not limited to anthropology, international development, education, international relations, etc. (Bhandari, 2020).

To help using the qualitative method, this research will be conducting interviews, the reason behind this particular research method is

that interviews are a more appropriate approach to uncover the experiences, perspectives, and key points of view by allowing interviewees to answer using their authentic way and words on describing and explaining their life (Flowerdew and Martin, 2015). In other words, Interviews can best be described as a conversation with a purpose, meaning that this is the appropriate and comfortable approach to uncovering the ideas behind a person (Eyles, 1988).

1.10.2 Research Coverages

This research will seek to understand and uncover the private sector's role effort notably the INEOS Group in helping the effort of His Majesty's government by advancing towards renewable and sustainable energy. These efforts are still ongoing and have been the key contention inside the United Kingdom after Brexit in 2019.

1.10.3 Data Collection Methods

Data will be collected with two different methods that are seen as appropriate approaches for this research, those are primary and secondary data, and the going to be using the interview to capture more in-depth ideas behind the private sector's role in helping the government of the United Kingdom to secure energy. The latter will help to support the main data which will be collected using data collection e-libraries and the internet that can provide a better understanding of how will the efforts align with energy security principles.

1.10.3.1 Primary Data Collection

Interviews in this research can be seen as the appropriate and necessary approach which helps the researcher ask certain questions directly through face-to-face contact to the designated person who specifically has a purpose of capturing underlying ideas and information that one person has. This particular research is using semi-structured interviews which allow the interviewer to ask in-depth questions that the respondents have to answer in accordingly, this semi-structured research is utilized extensively towards individuals or groups with a possible duration of 30 minutes to 90 minutes (Jamshed, 2014). Beforehand, the interviewer has their own pre-set question that aligns with the objective of the research. This particular research will interview the United Kingdom's energy private sector perspective in this case INEOS, the researcher has successfully managed to contact and schedule a 30-minute to a 90-minute direct face-to-face interview with the President Director of INEOS Aromatics Indonesia, Mr. Fahrurrozi Zaini.

1.10.3.2 Secondary Data Collection

Secondary Data Collection or by popular name literature reviews/collection plays a very important role in this research since it helps this research to find academic references that align with the subject, literature review notably identifies research and publications such as but not limited to books, journal articles,

government documents, etc (Mohammed & Mustafa, 2020). Generally, there are six main steps in performing a literature review starting from searching the appropriate literature, reviewing references, identifying current trends, ongoing debates and gaps, and outlining the framework identified. In other words, a literature review is an approach that helps this research find and discuss published information over the world on a particular set of subjects (Ramdhani, 2014).

1.10.4 Data Analysis Methods

In order to understand better the qualitative data that the collection has mentioned above, several qualitative data analyses can be performed to analyse non-numeric data such as transcripts, audio recordings, video, images, and text documents. It will take several hours to transcribe one 30 to 90-minute interview into written page dialogue, this is important to ease the process of analysing the data (Sutton & Austin, 2015).

However, there are several steps for this research to increase its credibility over the data which has been identified and collected. Soon after the data has been collected from the informative studies, interviews, and academic observation, collected data needs to be selectively assessed which of the data correlates to the main topic and which are not, this technique is called Data Reduction. The next step after the data has been selectively assessed, the data will be

presented in ways to make the data easier to understand. In addition, the data that has been presented will undergo a deeper verification to prove its credibility prior to the conclusion from the data (Sugiyono, 2019)