MASTER'S THESIS

ENERGY DIPLOMACY: MANAGING ENERGY DEPENDENCE

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Anastasios Genitsaridis

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ABSTRACT

This master's thesis commences with a brief history of energy diplomacy and how it is interrelated with foreign policy, national security and energy security. Afterwards it provides an insight into the complicated field of energy diplomacy, viz how the major energy players perceive energy security, what energy policies have adopted so far and how they attempt to cope with their energy dependence. At the core of the thesis lie the cases of the European Union, United States of America, China and Russia. In each specific case, the level of their energy dependence is analyzed and solutions are provided in order to amplify energy security and reduce energy dependence. Last but not least, the role of energy transition is outlined and how it affects energy diplomacy and how it has redefined the term energy security.

Keywords: Energy, energy diplomacy, foreign policy, national security, energy security, energy dependence, European Union, United States, Russia, China, energy transition

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List of Abbreviations & Acronyms

Abbreviation	Definition
Bcf/d	Billion Cubic Foot Per Day
Bcm	Billion Cubic Meters
Bp/d	Barrels Per Day
CAFE	Corporate Average Fuel Economy
CBAM	Carbon Border Adjustment Mechanism
CEE	Central and Eastern Europe
CNPC	China National Petroleum Corporation
CPEC	China Pakistan Economic Corridor
DSO	Distribution System Operator
E.U.	European Union
ECF	European Climate Foundation
ECSC	European Coal & Steel Community
EEC	European Economic Community
EIA	U.S. Energy Information Administration
ESG	Environmental, Social & Corporate Governance
ESPO	East Siberia-Pacific Ocean
ETS	Emission Trading System
Euratom	European Atomic Energy Community
FYP	Five-Year-Plan
G20	Group of 20
G8	Group of Eight
GDP	Gross Domestic Product

GECF	Gas Exporting Countries Forum
GW	Gigawatts
IAEA	International Atomic Energy Agency
IAP	Ionian Adriatic Pipeline
IEA	International Energy Agency
IGB	Gas Interconnection Greece-Bulgaria
IHO	International Hydrographic Organization
IMO	International Maritime Organization
IRENA	International Renewable Energy Agency
Km	Kilometers
LNG	Liquefied Natural Gas
MMb/d	Million Barrels Per Day
N.G	Natural Gas
NDC	National Determined Contribution
OPEC	Organization of the Petroleum Exporting Countries
OTC	Over The Counter
PoS	Power Of Siberia
PV	Photovoltaic
RES	Renewable Energy Sources
SCPX	South Caucasus Pipeline Extension
SDGs	Sustainable Development Goals
SEE	Southeastern Europe
SGC	Southern Gas Corridor
SLOCs	Sea Lines of Communication
SMR	Small Modular Reactors
SPR	Strategic Petroleum Reserve

STEO	Short-Term Energy Outlook
TANAP	Trans Anatolian Natural Gas Pipeline
TAP	Trans Adriatic Pipeline
Tcf	Trillion Cubic Foot
U.K.	United Kingdom
U.S.	United States
U.S.A.	United States of America
WTO	World Trade Organization
WWI	World War I
WWII	World War II

Research Questions, Methodology & Aim

Since 2019 and the global pandemic of the corona-virus disease, the world is continuously on the brink of a global energy catastrophe. This became even more evident with the Russian invasion of Ukraine, which shocked the world and laid the foundation for a new global energy crisis. This new energy crisis has induced profoundly volatile and high prices, especially for fossil fuels.

During this period countries struggle to meet their target of decarbonizing their economies by 2050, however, the energy sector has to comply with the processes of energy saving, energy transition and energy efficiency. All these developments have not only accelerated the shift to renewable energy sources but also showcased the need for improving overall energy security.

Research Questions

- How is energy diplomacy connected with national security and foreign policy?
- How energy dependent are the United States, the European Union, China and Russia?
- How could these countries and alliance of states solve or minimize their dependence on energy?

Methodology

This master's thesis is a collection of materials from books, journals,articles and internet sources.After reading and researching through thousands of pages I decided to focus on the cases of United States, European Union, China and Russia.

During my research I noticed a common pattern among the most articles and books. This pattern is the relationship between the European Union and Russia. Especially, the dependence of EU to the Russian imports of fossil fuels. In order to learn more about energy security, energy diplomacy and energy dependence, I had to move past

this pattern and not only focus on EU and Russia but also include other key energy players.

After hours and days of researching, a gap was discovered in the literature. Most articles focused only on the dependency from the demand side and did not mention the dependency that energy-supplying countries face. Not only that but also the immense role of United States in the contemporary energy system was not mentioned.

So, I decided to focus on the energy dependence on EU, Russia, United States and China. The reason I chose these cases is extremely simple. I chose EU and Russia because they are extremely dependent to each other for energy demand and supply, the United States because it is currently almost energy independent and the leading energy exporter of oil gas, and finally, China because it is the spearhead amongst the emerging economies and energy markets.

After analyzing the degree of their dependence or independence, I decided to adduce an array of solutions and policies for each country based upon their level of dependence and suitability.

Aim

The aim of this master's thesis is to answer the above-mentioned research questions and provide an insight to how dependent is these countries and how they can solve their dependency. Specific solutions suitable for each one of them will be given and new trends will be analyzed. To conclude with, this master's thesis will attempt to fill the gap in the literature review which was discovered during the research about energy dependence, energy diplomacy and overall energy security.

CHAPTER 1

INTRODUCTION

Energy, the capability to perform any task, powers the economy. It is necessary to secure its uninterrupted flow inwards and outwards at all times, for both importing and exporting countries. Until the latter few decades of the twentieth century, energy had not been seen as such an urgent matter, nor as an important geopolitical issue. Specifically, availability, affordability, and supply were not considered as security issues. The industrial output and consumption capacities were relatively smaller and the energy flow was safer and more reliable overall. The demand for energy grew at an alarming rate throughout the industrial revolution, spiraling into the twentieth century.

The altered circumstances have generated several factors that called for energy diplomacy and energy security to be included and raised higher in the national security agenda. It is worth mentioning that national security agencies around the world pay close attention to the rapid increase in energy use. Consumers and economies in the modern era have increasingly come to rely heavily on energy. Therefore, the notions of energy and economy have become inextricably linked. Energy has become synonymous with power and economy, and shortage of supply has become the primary concern of national security.

The availability of energy supplies has determined the outcome of wars, and the security of supply has influenced domestic and global priorities. Additionally, gas and oil producing nations have formed alliances in order to exploit newly discovered energy resources which will allow them to support their political and geopolitical objectives. Oil and gas firms have grown to be some of the most powerful entities in global business and power-influence arena in general. Numerous players on the world arena experienced either prosperous economic outcomes or disasters as a result of the oil price fluctuations brought on by the oil crises, which impacted national and geopolitical strategies. Energy must be considered a national security and foreign policy concern because the economic ramifications could potentially be substantial.

Energy diplomacy is considered to be a unique kind of diplomacy, and especially a sub-field of international relations. Additionally, energy diplomacy is intertwined

with foreign policy, which is its principal, and to national security, especially via energy security. The term emerged during the second oil crisis and was used in order to describe OPEC's[1] actions. Specifically, energy diplomacy originated in the first half of the twentieth century and was primarily concerned with the securitization of energy supplies, principally of fossil fuels.

This master's thesis will try to provide an insight into the complicated field of energy diplomacy, in particular on how the major energy players perceive energy security, what energy policies have adopted so far and how they attempt to cope with their energy dependence. To be more specific, the cases of the European Union, the United States of America, China and Russia will be analyzed in this thesis. However, before commencing with the analysis of these specific cases, it is deemed necessary to provide the most essential details concerning energy diplomacy and display how and why is interrelated with national security, foreign policy and energy security.

1.1 The ontological relationship between foreign policy, national security and energy security

Foreign politics has existed in our civilization for thousands of years, whereas energy has only entered the global "arena" the last 150 years. However, over the span of these years, energy and foreign policy has had an augmenting amount of overlapping and interrelated components. For its part, foreign policy is inextricably related and reliant on the notion of national security. National security is the assortment of actions that governs the relationship between a state and other countries determined by geographic location, external threats, and other national security challenges like energy which is considered one of them.

These terms, namely foreign policy, national security and energy security are structured ontologically. Among them, national security is the most generic notion, foreign policy is one level lower and covers the national security issues at international level, and the lowest in the hierarchy is energy diplomacy. Furthermore, foreign policy is closely related to national security because it is a instrument for achieving and implementing total national security. Moreover, national security is directly related to energy diplomacy and signifies a country's ability to overcome its

[1] Organization of the Petroleum Exporting Countries

domestic and foreign multidimensional threats by harmonizing all national policy tools through governance. Its goal is to safeguard national independence and security, but also the territorial, political and economic integrity by coping with an extended number of national security hazards.

Energy is key topic on the national defense agenda. The implementation of homeland security strategies that involve external variables and foreign affairs is implemented by the government's foreign affairs departments via foreign policy tools viz diplomacy and international relations. Additionally, energy diplomacy is primarily concerned with foreign energy interconnections. Although these three concepts have a specific ontological order-hierarchy, their continuous intersection in the practical diplomatic life and geopolitical reality is a recurring theme.

Energy diplomacy primarily concerns diplomatic activities which aim at strengthening the accessibility to energy resources and markets. It is a apparatus that employs peaceful means like diplomatic dialogue, negotiation, lobbying, and advocacy in order to influence resolutions, policies and initiatives of foreign governments and other global actors. According to scholars, generally the association between energy diplomacy and foreign policy is conceptually one of "agent and principal". Foreign policy establishes general political objectives and strategies, while energy diplomacy is an instrument for achieving these objectives. Energy diplomacy is a foreign policy tool of which purpose is to maintain and ensure economic and energy security. Additionally, energy diplomacy guides a country's economic and commercial relations with organizations and other countries in order to achieve and safeguard energy security through dependability, affordability and availability.

Diplomatic attempts to provide energy security have become increasingly important and complex. Energy diplomacy, primarily since the oil crisis of the 1970s, has matured and as a result it has separated itself from general foreign policy and public diplomacy and as such it has become an independent diplomatic niche. There are several other popular names for this kind of diplomacy, such as "geopetroleum politics", or "petro–politics", or pipeline diplomacy, but most of them cover exactly the same area of expertise. Energy diplomacy has devised its own plans, objectives, tools, strategies, instruments and programs, such as the EU's Energy Diplomacy Action Plan.

Therefore, at institutional scale, energy diplomacy usually tends to concentrate on issues like statutes, norms, energy conservation, nuclear energy development, oil

distribution, exploration and transportation of energy, early energy warning and response especially anent the global warming, and finally, sustainability and transition away from fossil fuels.

Energy diplomacy usually adopts foreign policy techniques to guarantee the continuous flow of energy and the security of energy supply. These methods are applied differently amongst the energy producing and energy consuming countries. On one hand, the energy producing countries predominantly concentrate upon using energy diplomacy as a tool in order to increase their exports and also their involvement in the global markets. For instance, Russia's energy diplomacy, which is an energy-exporting state, is to ensure access to buyers for its energy supplies. An analogous situation occurs with OPEC's energy diplomacy, which mainly focuses on exports and maintaining external demand. On the other hand, the energy consuming and also importing countries use energy diplomacy to guarantee a continuous and uninterrupted influx of energy supplies. The oil diplomacy of China with Iran or in Africa is a typical example of energy-importing state's diplomacy. Apart from these strategies, countries which are both large consumers and producers implement hybrid approaches. Typical instances of this approach are India and United States.

1.2 History of energy diplomacy

The early era of energy diplomacy commenced at the beginning of the twentieth century and was dominated by corporate players. Specifically, instead of the sovereign governments, the enterprises that produced and transported fossil fuels dominated the early era of such diplomacy. Examples of such corporations are Shell and Standard Oil.

On a domestic level, energy security as an autonomous notion had not been established yet, however energy matters were becoming increasingly important. The markets and the global oil reserves were carving up consistently and the multinationals were contending for allocations, privileges and quotas. The governments, which supported and facilitated the competition, were not too far behind, although the influential corporations were those that dominantly shaped the foreign policy and the industry.

The period following World War II featured the rise of colonies, the fall of empires and finally, global oscillates in geopolitical influence and power between U.K., U.S.,

Russia and others. Another major event in the post WWII era is the creation of the OPEC in 1960. This immensely important organization in the 1960s and 1970s succeeded in gaining momentum in relation to the international oil multinationals by nationalizing and reclaiming control over the national fossil fuel resources in numerous major producing nations. Furthermore, the oil crises of this period (1960s-1970s) were those that greatly affected and contributed to the augmentation of security issues and diplomatic attempts in the energy sector.

Many incidents affected the energy sphere and the international politics, with the Suez Crisis and the OPEC oil embargo crisis of 1973 being two of the most significant. These occurrences brought entire economies to a halt, creating security concerns and elevating matters concerning energy to the top of the security priority list. Soon after these crises, other, albeit small, disruptions came that were caused by the Iranian Revolution of 1979, the 1980 Iraq-Iran War and finally, the First Persian Gulf War in 1990. Moreover, the oil market was disturbed by turbulence which endangered economies. This turbulence was caused by the 20003 invasion of Iraq, the oil price spike of 2007, the 2009 Ukrainian-Russian gas dispute and other smaller disruptions. Additionally, the oil routes are still considered to be a worldwide security issue due to the fact that more of 40 percent of all oil transits through four conduits, namely the straits of Malacca, Hormuz, Rab-el-Mandeb and the Suez Canal. According to the IEA, the share of transited energy is expected to grow and especially, the percentage will rise from 40 to 60 percent by 2030. As a result, it is evident that any long-lasting interruption could potential cause a far-reaching economic disaster.

Consequently, energy diplomacy has successfully accomplished to enter the sphere of foreign policy via the thoroughfare of national security. Additionally, many severe international and national hazards which are correlated with energy diplomacy and energy security have made possible for energy to be considered and evaluated as a major security concern.

CHAPTER 2

SPECIFIC CASES OF ENERGY DEPENDENCE

Since the analysis of how energy diplomacy is intertwined with national security, foreign policy and energy security is concluded, it is now the appropriate time to commence the analysis of the specific cases. This analysis will demonstrate how the European Union, the United States, China and Russia perceive energy security, what energy policies have adopted so far and how they attempt to cope with their energy dependence.

2.1 The case of the European Union

The analysis will begin with the case of the European Union, which is considered to be amongst the biggest consumers of energy and at the same time one of the most energy dependent players in the global scene. Additionally, the European Union is extremely dependent on imported fossil energy. These imports of energy primarily derive from one big player, namely Russia. In particular, the dependency of EU on energy imports, especially natural gas and oil, shapes the backdrop for severe policy concerns in relation to the security of energy supplies.

2.1.1 Europe's Energy History

Energy has played a vital role in the history of the European Union and also was the starting point of the European construction. Coal was the first fuel to be exploited. On May 9th 1950, Robert Schuman, French foreign minister, proposed the establishment of the European Coal and Steel Community (ECSC). In particular, the 9th of May became later the “Europe Day” (The European Union, n.d.). The ECSC was established in 1952 when France, Italy, West Germany, Luxembourg, Belgium and the Netherlands decided to create a common market for coal and steel. These six countries handed over their powers to a High Authority, therefore making the ECSC the first European organization to be founded on the principles of supranationalism.

The intention of this organization was to make “materially impossible” another war between Germany and France and also to ensure the modernization and profitable development of the European coal and steel industries. Additionally, military and strategic concerns were also part of the equation, at a time when the Cold War was beginning to heat up.

Five years later, on March 25th 1957, this sense of common purpose resurfaced when the same six countries signed in Rome two treaties that laid the foundation for a unified Europe. Specifically, the first treaty established the European Economic Community (EEC), whilst the second treaty created the European Atomic Energy Community (Euratom).

The Euratom Treaty was devised in order to promote the peaceful use of nuclear energy and issue a common system for procuring supplies of fissile materials, such as uranium. The core objective was to enhance Europe's energy independence and guarantee the supply of raw materials in the wake of the Suez Crisis, which threatened to cut off oil supplies. Several regulations of the Euratom treaty are still in force until this day. It is evident that by signing the treaty, energy became once again the backbone of the European integration.

The economic base of energy cooperation was further strengthened with the creation of the EEC, the predecessor of the current EU.

The early years of the European integration was primarily dominated by energy-supply issues. However, national energy markets remained largely isolated from one another due to the fact that they were governed by protectionist policies. Galvanized by the 1973 oil crisis, the European leaders developed a more coordinated approach to jointly tackle energy shortages. The Single European Act of 1987 was the first serious attempt to remove barriers to cross-border energy trade and deepen integration (The Global Energiewende Wiki, n.d.). With the entry into force of the Single European Act under the leadership of Jacques Delors, who was president of the European Commission at the time, energy issues reemerged and were of special consideration. As mentioned before, the main goal was to complete the internal market by removing obstacles to the free movement of services, goods, capital and people. In order to liberalize the energy sector, a variety of measures were taken to motivate competition between operators and establish a trans-European network. Additionally, efforts were made in order to unbundle production, distribution and transportation operations and introduce market prices. The core idea was to adapt to the general rules of a single

market, not to invent an energy policy. It is worth mentioning that during this period, investments in gas-fired power plants grew sharply.

The realization that humans are influencing the climate came in the 1980s. In 1997, the Kyoto Protocol was adopted and E.U. committed to a cut of eight percent in greenhouse gas emissions by 2012 compared to its 1990 levels. Additionally, in the same year, the Amsterdam Treaty included sustainable development as a general objective.

A huge obstacle to cross-border energy trade was the monopolistic structure of the national markets for transmission and generation, which prevented third parties from accessing the grid. In order to overcome this, in 1996 and 2003, the European Union adopted the first electricity directives which aimed at increasing competition in the power market and ensuring a free choice among electricity suppliers. The same applied for gas where similar directives were issued in 1998 and 2003. Finally, in 2009, the third energy market package aimed to break up the vertically integrated energy utilities.

In 2007, the Lisbon Treaty was signed and the treaty made energy policy a shared competence between the Member States and the European Union. Although, it preserved each Member's right to choose its energy sources, determine the conditions for exploiting these resources and establish the general structure of its energy supplies. As a consequence, Member States remain sovereign in many decisive areas of energy policy. These restrictions reflect the major differences in the energy mix in each country and the diverse range of views regarding nuclear energy.

In 2009, for the first time, the Lisbon Treaty included a separate section on energy. This section of the Treaty outlined the objectives of the EU energy policy, namely ensuring the functioning of the energy market and the security of energy supply in the Union, promoting energy saving, energy efficiency and the development of new and renewable forms of energy, and finally, promoting the interconnection of energy networks.

In the past decade, climate threats have increasingly constituted a driving force for EU’s energy policies. Specifically, in 2007, an “energy and climate” package was agreed that set binding sustainable energy targets for 2020. These targets are a 20 percent cut in greenhouse gas emissions, an indicative target of 20 percent improvement in energy efficiency and a 20 percent share of renewables in final energy consumption.

At the turn of the century, the energy picture became extremely more complex due to the growing concerns regarding climate change. A new market came into existence in 2005, namely a carbon market based on an emissions trading system (ETS). Three years later, in 2008, the European market adopted binding legislation so as to meet the climate targets for 2020. The legislation and the targets were modified in 2014 aiming for 2030. Specifically, in order to achieve these objectives, Member States have resorted to various regulatory tools and government subsidies that sometimes clash with market liberalization measures. For instance, in the electricity market, the integration of renewable energy sources, which is already paid for by taxpayers, have driven out gas-fired power plants, which are financed by the market. So, it is evident that this situation has led to certain new plants being mothballed, which is considered to be absurd from an economic standpoint.

In 2011, the Energy Roadmap 2050 was adopted, which contained targets for 2050. The objective of this project was to provide an independent, practical and objective analysis of pathways to achieve a low-carbon economy in Europe, which would not only be in line with the European energy security, but also with the economic and environmental goals of the European Union. This project was an initiative of the European Climate Foundation (ECF) and was developed by a consortium of experts who were funded by the ECF.

The Energy Roadmap 2050 is also considered to be a strategy paper, although as its name suggests, with a longer time-frame. Specifically, the Roadmap is an answer to the long-term investment cycles of energy infrastructure, and intended to give a direction for after 2020. Additionally, the Commission followed a market based, and supposedly “technology neutral” approach. Moreover, the Roadmap aimed to provide planning certainty for investments, particularly as in the coming decade a lot of infrastructure will have to be replaced. By 2050, EU is committed to reduce greenhouse gas emissions to 80-95 percent below 1990 levels and the Roadmap shall point the way to achieving these decarbonization goals and ensuring the core targets of competitiveness and energy security.

In 2014, the European Union adopted its “2030 energy and climate framework” which called for a greenhouse gas reduction goal of at least 40 percent, at least a 27 percent improvement in energy efficiency and at least a 27 percent share for renewables in the energy sector. These targets formed a basis for the “Clean Energy Package” which was adopted during the course of 2019. The Clean Energy Package

laid out the legal groundwork for future energy policies and consisted of eight legislative acts as well as other measures and initiatives which aimed at facilitating the clean energy transition. Specifically, the rules which were issued are expected to bring considerable benefits for the environment, the consumers and the economy. By moderating these changes at EU level, the legislation underlined the EU leadership in tackling global warming and made a vital contribution to the EU's long-term strategy of achieving carbon neutrality by 2050 (European Commission, 2021). Despite these policies and cuts, it is evident that they are still not steep enough in order to fulfil the EU's commitments under the Paris Agreement and keep the global warming below 2 degrees Celsius.

In early 2015, taking into consideration these inconsistencies, the European Commission presided by Jean-Claude Juncker, proposed the creation of a European Energy Union. In the aftermath of the Ukraine crisis, energy became once again a separate policy area requiring not only technical expertise but a comprehensive, strategic and political approach as well.

As it will be mentioned later, Europe imports 60 percent of its energy, yet the European Commission has limited competency in its external energy policies. The Member states have sovereignty over security and foreign matters, and they find themselves in different positions in terms of reliance on imports and on different transit countries and suppliers. The enlargement of the European Union in 2004 gave itself a new push for a more coordinated external energy policy, primarily due to the fact that the new eastern members were extremely dependent on Russian gas supplies.

The European Neighborhood Policy, which was launched in the same year (2004) and revised in 2015, set the framework for how EU should engage with its neighbors to the south and east in order to advance its sustainable energy goals. Finally, the Energy Community Treaty that was signed in 2005 aimed to extend the EU energy market rules to non-members in southeastern Europe.

Furthermore, 2005 was also the year that EU leaders committed to develop a coherent energy policy which will focus on three pillars, namely sustainability, competitiveness and security of supply. The repeated gas disputes between Ukraine and Russia in 2005–2006, 2008 and 2009, as well as the geopolitical tension in Middle East and the Northern Africa, which was leading to the increasing vulnerability of the external energy supplies, had reinforced the need for such a policy.

Nowadays, the shift towards renewable energy holds untapped potential for reducing the continent's dependence on external suppliers and enhancing its energy security. Additionally, Europe is commencing to look inwards and is moving forward with the development of its internal energy market. Moreover, the Energy Union, which is a project that was launched in 2015, tries to bring the energy security strategy and the 2030 climate and energy framework under one roof.

Overall, it is evident that energy policy is shifting from a phase of fragmentation to a period of gradual synchronization between EU and its member states. However, energy lies at a crossroads between national interests, climate objectives, supranational regulation, geopolitical conflicts and sectoral dynamics.

To conclude with, the EU energy policy is also undergoing another major change. There is not only a shift from fossil fuels to renewable energy sources, but also to new ownership models, and to increased democratization and decentralization of energy distribution and supply. Europe has a historic mission, namely to serve as a global model for green innovations and energy transition, and finally, to lead the way in curbing global warming (The Global Energiewende Wiki, n.d.). However, history has not followed a linear progression and 71 years later, the European Union is still trying to coordinate its energy policies, while grappling with the threat of global warming and climate change (Planète Énergies, 2016).

2.1.2 How dependent is the European Union

The European Union is considered to be a net importer of energy and one of the largest importers and most dependent players in the global energy scene. In order to understand how dependent EU is and on which countries, it seems necessary to state some facts about the European Union.

The energy in the European Union derives from energy which is imported from third countries and from energy which produced internally in the EU. In 2020, the European Union produced around 40 percent of its own energy, while 60 percent was imported.

To begin with, the production of energy in the European Union is extended across a range of various energy sources such as crude oil, solid fossil fuels, natural gas, nuclear energy and renewable energy (such as wind, hydro and solar energy).

Specifically, renewable energy was the largest contributing source to energy production in the EU for 2020 (Eurostat, 2016).

However, the production of energy is quite different among the Member States. For instance, in France, nuclear energy production is particularly high. Furthermore, renewable energy is the primary source of energy produced in a number of Member States, with over 90 percent of the energy produced within the country, this happens in Malta for example. Solid fuels have the highest importance, for instance in Poland, 77 percent of total energy production derives from solid fuels, while on the other hand, natural gas is the main source of energy produced in the Netherlands with 72 percent. Finally, crude oil is the major source of energy produced in Denmark with 41 percent.

For its own consumption, the European Union also needs energy which has to be imported from third countries. In 2020, petroleum products, including crude oil, were the most imported energy products, accounting for almost two thirds of the energy imports into the European Union. Crude oil was followed by gas and solid fossil fuels.

Russia still remains the main EU supplier of natural gas, crude oil and solid fossil fuels (Eurostat, 2021). It is evident that the stability of EU's energy supply could potentially be threatened if a high proportion of its imports are concentrated among relatively few external partners. The same holds for natural gas where almost 75 percent of the EU's imports of natural gas derive from Russia (almost 44 percent), Norway, Algeria and Qatar. Finally, concerning the imports of solid fuels, three quarters of solid fuel imports, especially coal, originated from Russia (almost 45 percent), the United States and Australia (Eurostat, 2021).

Except for the differences in energy production among the EU member states, there are also different patterns regarding their imports of energy. For instance, in Cyprus and Greece, more than 80 percent of their energy imports are petroleum products. On the other hand, in Hungary and Italy, more than a third of their imports is natural gas. Finally, in Poland and Slovakia, more than 20 percent of their energy imports are solid fuels.

As a consequence, it is evident that the European Union in order to cover its needs for energy it has to import energy from abroad. Especially, it is clear that EU is dependent from energy produced outside of the EU. According to an indicator which represents the dependency rate of a country or a group of countries, the European Union in 2020 had a dependency rate of more than 60 percent. The dependency rate displays the extent to which an economy relies upon imports so as to meet its energy

needs. Specifically, the ratio is measured by the share of net imports in gross inland energy consumption, which means the sum of net imports and energy produced. The rate differs among the member states. Unfortunately, the dependency rate on energy imports has increased since 2000, when it was only 56 percent.

2.1.3 Solutions to deal with the energy dependence of the European Union

The concept of energy security traditionally has referred to "uninterrupted availability of energy sources at an affordable price" (IEA, 2020). Although, the concept of energy security has become highly normalized, meaning different things to different actors at different times. As a consequence, introducing energy into the security domain has different political implications which depend on the context. In the case of the European Union, energy security predominantly refers to the security of supply, however, nowadays has been re-conceptualized in order to include sustainability along with secure and affordable energy (Puntaru, 2015).

As mentioned before, EU's energy security came to the top of its agenda in recent years due to the augmenting concerns about Russia as an unreliable supplier. Additionally, the gas disruptions in Ukraine, which affected the EU members, and the more recent Crimean crisis, heavily contributed to the EU's feelings of insecurity, which led to the development of strategies in order to address energy supply crises.

The European Union acts as a price taker agent in the global market and is extremely dependent on the fluctuations of global gas and oil prices, which are caused by changes in production and export strategies of major suppliers of natural gas and oil such as OPEC and Russia. Additionally, EU is dependent on long-term gas contracts, which are mainly linked to oil prices and bonded to rigid clauses such as the Take-Or-Pay clause. Finally, the European Union is dependent on the fluctuations of global coal prices, which are still extremely low, impacting the gas demand of their power generation sectors in a negative way, leading to an increased energy intensity.

It is true that EU currently pays around 400 billion euros per year for imported fossil fuels and because of that the European Commission and its member states had set priorities and targets, like cutting energy use and diversifying supplies and suppliers.

Many of these targets are becoming the solutions to Europe's energy vulnerabilities. In particular, the solutions to EU's energy dependence that will be

analyzed in the next paragraphs are the EU's decarbonization targets, the role of natural gas, the alternative gas routes, the role of Central and Eastern European countries and the significance of the Eastern Mediterranean region, the role of clean energy and renewables and finally, the single market and its benefits.

2.1.3.1 Decarbonisation targets and energy security

The attempt of the European Union to establish a carbon-neutral economy constitutes a timely and unique chance to reinforce its energy security. Specifically, in late 2019, Ursula von der Leyen, the European Commission President, proposed the "European Green Deal", which is considered to be Europe's new development strategy and aims to transform EU into a climate-neutral economy by 2050. Especially, the core objective of the European Green Deal builds upon the European Union's pledges under the Paris Agreement to cut greenhouse gas emissions by at least forty percent by 2030. Despite the opposition of Poland, the European Council supported and promoted the "Green Deal" goals. According to the fundamental aspiration of the "European Green Deal", carbon emissions would have to be decreased by 2030 by at least fifty percent in comparison to the 1990 levels. Nevertheless, the European Environment Agency noted that, without additional measures, the European Union would probably fail its 2030 goal of abating greenhouse gas emissions.

The new decarbonization agenda of the European Commission has enormous prospects to boost energy security, but solely if the EU member states maintain an emphasis on prioritizing it in their efforts to decrease carbon dioxide emissions. By the end of 2019, member states were supposed to file national energy and climate plans outlining how they intend to execute the 2030 Clean Energy Package's targets, which incorporate a 40 percent cut in CO2 emissions. It is evident that the member states will govern the roles of conventional and clean energy technologies in Europe through their policies for attaining the specified climate targets, which must comply with the 2030 Clean Energy Package Act. With their strategies for meeting the set climate targets, which must comply with the 2030 Clean Energy Package legislation, the member states will guide the roles of conventional and clean energy technologies in Europe. As a result, it is evident that the energy security of the European continent

will be fundamentally affected by how the EU member states will choose to implement such strategies.

These plans are anticipated to specify each country's contributions to the EU-wide target of climate neutrality. Afterwards, the European Commission will evaluate these proposals in order to decide whether additional actions are required. Finally, the European Commission will assess these national plans in terms of competitiveness, decarbonization and energy security targets. As a consequence, it is a unique chance to enhance energy security not only at domestic level, but also at regional and international level.

Technological advancement and innovation could potentially aid the decarbonization process, which will subsequently lessen the dependency on fossil fuels and support energy security through abolishing the reliance on sole and dominant suppliers. Furthermore, it is important for the member countries of the EU to take into consideration source-neutral and technology-neutral strategies to comprehensively achieve carbon reduction goals. Such adaptability could streamline choices for member states with varying energy mixes, needs, financial resources, infrastructure and domestic energy potential.

2.1.3.2 Natural gas and liquefied natural gas enhance energy security

Whilst the overall energy consumption of EU is expected to remain relatively unchanged over the next three decades, the International Energy Agency (IEA) anticipates that the electricity demand in European Union will rise between twelve to twenty-six percent by 2040. In order to fulfill this augmenting electricity demand, the European Union will have to elevate the role of clean energy, natural gas and advanced technologies. Even though gas consumption is predicted to remain unchanged, reduced European gas output will eventually necessitate increased imports.

In particular, natural gas will boost energy accessibility, reliability and affordability in Europe while assisting with energy transition, especially when it replaces coal-fired power generation. Nevertheless, certain challenges must be tackled in order to optimize natural gas's role in the European energy market. Specifically, these obstacles include deficiencies in strategic infrastructure, minimizing methane emissions, implementing the proper regulatory framework, and finally, threats from geopolitical rivalries and societal attitudes towards fracking (Hunziker, 2020).

It is evident that natural gas can play a vital role in transitioning member states away from coal. Access to diverse natural gas supplies reinforces the European energy security by reducing reliance on a salient supplier. The same applies for low-carbon energy sources, which could also enhance the European efforts for decarbonization and at the same time decrease the dependence on Russian imports.

In 2019, Von der Leyen and Kadri Simson, President of the European Commission and European Commissioner for Energy respectively, noted that natural gas will play a significant role in the transition towards a carbon-neutral economy, especially through carbon capture and storage. Furthermore, the exports of liquefied natural gas (LNG) from U.S. to Europe, in addition to other LNG supplies, will be critical in assisting the European Union's transition away from coal. Kadri Simson also underlined the notion that the U.S.-EU LNG trade collaboration has been tremendously effective and it should be sustained.

While substantial nuclear capacity and coal will be withdrew from the European energy markets in the upcoming years, natural gas will play a crucial role, not only in ensuring baseload capacity in the energy mix of EU, but also in the energy transition towards climate neutrality. Furthermore, the global supply glut, competitive prices and the growing interchangeability make natural gas fundamentally important for meeting European energy demand and also aiding in the European energy security. Additionally, extreme weather conditions and growth in renewables will drive up demand for natural gas in order to fulfill baseload capacity with assistance from battery systems. Finally, according to projections of IEA, even though the European natural gas absolute consumption fell to 394 billion cubic meters (bcm) in 2020, in the upcoming years natural gas is projected to gain significant market share. It is worth mentioning that in the first quarter of 2021 natural gas consumption rose by 7.6 percent.

2.1.3.3 Alternative gas routes

As mentioned before, natural gas will play a critical role in Europe's energy transition and diversification efforts. As the indigenous output is declining, the process of diversifying the energy import routes is becoming increasingly crucial. According to IEA's "Analysis and Forecast to 2024", the gradual phase out of the

Groningen field in northern Netherlands and the depleting resources in the North Sea will result to an additional resource-deficit of around 50 bcm per year.

Whilst European Union has made tremendous progress on constructing LNG terminals, pipelines and reverse-flow infrastructures, several countries in Central and Eastern Europe (CEE) lack diversified natural gas supply options. However, there are certain regional initiatives which are instances of strategic infrastructures that could potentially further assist Europe achieve energy independence. It is worth mentioning that access to different natural gas channels means that fossil-fuel dependent countries could shift quicker from coal to gas in heating and electricity generation.

An opportunity to bolster market competition and energy security is presented via the projects in Southeastern Europe (SEE). Especially the region of Western Balkans, as a part of SEE, has not received yet as much attention as the CEE region in the conversations regarding Europe's energy security. Specifically, this part of Europe is significant dependent on Russian-sourced gas, coal and hydropower. As a consequence, it is evident that there is an enormous opportunity to construct natural gas infrastructures in the Western Balkans in order to diversify the area's energy mix and provide alternatives to the Russian gas supplies and coal-powered generation, which is particularly fueled by coal that is mined in the region of Western Balkans.

A potential extension of the Southern Gas Corridor (SGC) might assist diversifying the Western Balkans while also providing the European energy market with a new gas import source, namely from the Caspian region. Specifically, the SGC gas infrastructure project consists of three major pipelines, namely the South Caucasus Pipeline Expansion (SCPX), the Trans-Anatolian Natural Gas Pipeline (TANAP), and the Trans Adriatic Pipeline (TAP). Especially, TAP first travels through Greece and Albania and its final destination is Italy.

Moreover, the Ionian Adriatic Pipeline (IAP) project, which is considered part of TAP, is a planned natural gas pipeline from Albania via Montenegro and Bosnia and Herzegovina, with a split in Croatia. The output of this bidirectional pipeline is expected to be 5 bcm of gas per year. Preliminary designs were completed in September 2020, although there has been only limited progress since then (Melvin, 2021).

Furthermore, in Croatia, the Krk Island LNG terminal will further guarantee a critical point of natural gas distribution into an area with scarce gas infrastructure while offering additional storage capacity. The consortium, which includes the

Croatian government, the European Commission and shareholders of LNG Croatia company, has made the ultimate choice to invest in the project and EU antitrust officials have already granted Croatia's funding for the terminal. Nevertheless, in order for this floating terminal to be viable, customers must pre-book substantial capacities in order to guarantee its profitability. Specifically, Hungary, a landlocked country, which is heavily reliant on Russian gas supplies, could potentially be one of the primary customers. Nonetheless, Hungary has not committed yet to book any capacity. It is worth mentioning that the LNG terminal was inaugurated by Croatia's Prime Minister on January 29th 2021 (Marinova, 2021).

Moving on, the Hellenic Republic is currently enhancing its status as a major gas hub in the region via commissioning an offshore terminal at the northern Alexandroupolis port, as well as the Gas Interconnection Greece–Bulgaria (IGB), and expanding the import capacity of the Revithoussa LNG terminal. Specifically, the IGB gas pipeline represents a viable alternative for minimizing the Bulgarian reliance on gas deriving from Russia. The interconnection will allow Bulgaria to acquire natural gas from Azerbaijan through TAP and, and via this connecting link, to receive liquefied natural gas from Alexandroupolis's LNG Terminal. Finally, the commercial launch of the Greek-Bulgarian IGB gas pipeline it is expected to be on June 30th 2022, as a consequence of the pandemic-related obstacles that were faced during the project's development (EnergyPress, 2021).

To conclude with, it is evident that the increasing number of projects in SEE augments market competition and enhances the region's energy independence. However, the Russian TurkStream gas pipeline might endanger these initiatives.

2.1.3.4 Strategic Projects in the CEE region and in the Baltic states

The Central and Eastern European countries[2] especially those located around the Black Sea area mostly have economies that require a lot of energy. Specifically, the majority of these countries primarily imports Russian gas and lacks alternative gas channels. As a consequence, a disadvantageous natural gas pricing is inflicted in these countries. Additionally, certain nations of the region are also in significant debt to

[2]Czech Republic, Bulgaria, Estonia, Lithuania, Hungary, Poland, Latvia, Romania, Slovakia and Slovenia.

Russia. Despite these circumstances, the region is experiencing various promising developments and its progress is promising.

Whilst Poland is one of the countries in the region with a successful course of action with the construction of a new liquefied natural gas terminal and its pipeline diversification investments, which include the Baltic Pipe, other nations of the CEE, Bulgaria for instance, continue to work on establishing new and diversified routes for imports of natural gas.

Moving on, the Baltic states[3] have already taken major steps towards the diversification of their gas supplies, for instance, via infrastructures, namely the Klaipeda LNG terminal. Nevertheless, the Russian company "Novatek", and its augmenting exports of liquefied natural gas in the area, could potentially block other alternatives for imports of LNG and fundamentally jeopardize any opportunity for diversification. Additionally, the gas imported from the energy giant "Gazprom" accounted for almost 50 percent of Lithuania's total gas imports.

Due to the fact that the Russian Federation will maintain its significant role in certain countries' as a dominant energy supplier because of its geographical proximity, it is vital to guarantee that the Russian companies adhere to the precisely same energy and market competition regulations as all the other suppliers in Europe.

2.1.3.5 Eastern Mediterranean

The Eastern Mediterranean region is inextricably correlated with the energy security of Europe. Specifically, the region is currently attracting worldwide interest because of the substantial gas finds off the coasts of Egypt, Cyprus and Israel. However, the progress has been hampered due to geopolitical conflicts over these valuable energy resources.

Whilst many countries of the region have been crippled by disagreements and disputes, Egypt succeeded in exploiting its gas discoveries. As a consequence of the exploitation and exploration of two offshore gas fields, namely Zohr and Nour, Egypt is currently achieving self-sufficiency in terms of production of natural gas. With the domestic production rising, the imports of natural gas are declining and Egypt is saving around 3 billion USD per annum. Taking into consideration the Israeli and

[3] Latvia, Estonia and Lithuania.

Cypriot output, and the infrastructure of LNG in Egypt, the country has the means to morph into a very stressful gas hub in the region. Furthermore, the pipeline that would connect Egypt and Israel will bring 7 bcm per annum of natural gas to Egypt for export. In the next ten years, the amount of delivered gas could possibly be raised to more than 10 bcm per annum. Additionally, Egypt could offer an alternative source of energy in the region, especially in the form of LNG, by reexporting natural gas, deriving from adjacent nations, principally if the prices are competitive. To conclude with, it is evident that the Eastern Mediterranean region and its discoveries bring opportunities but also challenges.

2.1.3.6 Clean energy and Renewables

As mentioned before, one of the core objectives of the European Union regarding decarbonization and energy security is to become the world's first climate-neutral continent until 2050. Especially, this objective is the reason behind the European Green Deal, which is a very ambitious package of measures that would facilitate the above-mentioned objective and also should enable the European businesses and citizens to benefit from the sustainable green transition.

The use of clean and renewable energy has many potential benefits, including the diversification of energy supplies, the reduction in greenhouse gas emissions and the reduced dependency on fossil fuel markets, especially those of gas and oil. Finally, the growth of renewable energy sources would also stimulate employment in the European Union, through the creation of jobs in the new 'green' technologies.

2.1.3.6.1 Clean Energy Package

The "Clean Energy Package" was adopted in 2019 and consists of 8 legislative acts and other measures and initiatives which aim at facilitating the clean energy transition. Specifically, it constitutes the latest update in the framework of the European energy policy aiming to facilitate a clean energy transition and to make sure that the strategic goals of the Energy Union will be implemented. Additionally, the package lays the ground for the establishment of a new electricity market design and in order to achieve that it introduces a new Regulation on Risk Preparedness, an updated Electricity Directive and Regulation and finally, a revised ACER Regulation. These

new rules lay the foundation for further improvements to the network codes, the introduction of a European Distribution System Operator (DSO) entity, the establishment of regional coordination centers, the implementation of risk preparedness measures and finally, the implementation of a system operation region.

The main objective remains the same, namely to foster and enhance the coordination of the European electricity market. The package revolves around five key dimensions. These dimensions are firstly, energy security, secondly, internal energy market, thirdly, energy efficiency, fourthly, decarbonization of the economy and finally, fostering innovation, research and competitiveness.

2.1.3.6.2 Nuclear power

Among the carbon-free energy sources in Europe nuclear power is considered to be a major one, however, its long-term viability is quite questionable absent societal acceptance and robust government support. In 2020, around 130 reactors spread in 16 European countries (Statista Research Department, 2021), without including the United Kingdom, generated more than 31 percent of the total electricity output in the European Union (European Regional Group of the World Energy Council, 2007). There are diverse opinions amongst the member states of the European Union concerning the process of phasing out of nuclear power and its impacts on decarbonization. It is worth mentioning that the primary reason fueling the phaseout is the fear of the public regarding the price and safety of this type of energy. Contrary to public opinion and according to IEA, it is far more costly constructing new solar and wind farms than extending the operational life of the current nuclear reactors, resulting in investment-expenses between $0.5 to $1 billion per GW of capacity. Baseload capacity will be greatly impacted by the absence of government support.

As a result of this absence, Russia and China are stepping up to fill the gap and gain ground in constructing new nuclear reactors. In particular, the Russian Federation has long been active in the energy markets of Europe with providing a business model which mixes nuclear fuel and technology, raising questions about nuclear technology and the diversification of fuel supply. The Euratom Supply Agency, an organization in charge of ensuring a diverse supply of nuclear fuels to European users, advises the facilities that operate nuclear power plants to possess reserves of nuclear materials and to meet their needs by signing long-term contracts with different suppliers.

It is evident that nuclear power contributes significantly to energy security while also providing carbon-free baseload power. The European Union should continue cooperating with the United States on new technologies like the small modular reactors (SMRs). In conclusion, the European countries should continue advancing nuclear innovation in order to reach their environmental targets without compromising resilience, reliability and development, or endanger falling behind major energy actors like China and Russia.

2.1.3.6.3 Threats posed by the supply chain risks of materials required for clean energy technologies

The process of comprehensively decarbonizing the European Union will fundamentally depend on expansible investments in renewable energy, namely solar and wind, and new advanced technologies linked to sustainable and renewable energy like battery storage and new electric vehicles. However, in order to achieve complete decarbonization the production of rare earth metals is necessitated.

The most significant security risk to these renewable energy systems, which focus on technologies based upon clean energy, is supply disruption. A typical instance of this kind of security risk is China's monopolization of supply for materials vital for the production of solar panels, electric vehicles and other newly-discovered and highly-advanced technologies. The hegemony of China is an alarming security issue due to the fact that this dominance on rare earths could potentially pose a threat to the European energy security and also could be exploited as a tool for gaining geopolitical influence or leverage on trade negotiations. Specifically, due to the lack of internal production the European Union needs to import more than 90 percent of these metals, primarily from China (European Rare Earths Competency Network, 2017).

The European Union in order to address these security concerns should focus on the diversification of its supply chains through the expansion of domestic production and processing. Additionally, should focus on building partnerships with potential producers worldwide, such as Australia or Africa. Finally, competition over rare earth minerals could potentially pose a threat to energy security and also to meeting the set climate targets. Finally, the European Union will have to compete with other nations

worldwide for China's rare earth materials which could further jeopardize energy security and obstruct the continent reaching its climate goals.

2.1.3.6.4 Renewable energy sources

Renewable energy could further bolster energy security by adding diversity to the energy portfolio. Specifically, promoting the use of renewable energy sources is vital both for the reduction of the energy dependence of the European Union but also for meeting the targets necessary to combat global warming. The use of renewable energy sources has a positive impact on security of supply due to the fact that they reduce dependence on imported fossil fuels. Especially, many renewable energy sources are particularly locally generated or could be supplied on a local or regional basis if the production is incentivized or commercially viable (European Parliamentary Research Service, 2019). It is worth mentioning that renewable energy sources are more likely to be domestically produced than fossil fuels, with the latter being mostly imported from third countries.

In 2020, renewables generated 38 percent of EU's electricity and overtook gas and coal to become the main source of electricity for the first time since ever (Taylor, 2021). Additionally, in 2020, both solar and wind generation increased capacity, producing 5 and 14 percent of EU's electricity respectively. This means that together they generate a fifth of EU's electricity. The remaining share of renewables, 19 percent, was supplied primarily by bioenergy and hydropower. Although, these renewable energy sources have remained relatively stable over the years and have mainly stopped growing.

2.1.3.6.5 Solar and wind

As production efficiency augments and prices fall, solar and wind could potentially add a huge amount of renewable energy to Europe's energy market. According to IEA's projection, the offshore wind projects will augment from 25 gigawatts (GW) in 2020 to around 150 GW in 2040, relying on the scenario that the European Union will follow. Additionally, solar, in 2040, will add minimum 30 percent of energy in the European energy overall capacity.

Wind power, and particularly power generated by wind farms located in sea, has the opportunity and capability to assist in meeting energy demand especially as an intermittent supply source which could be more reliable if coupled with a backup generation and potentially with storage, as grid-scale batteries are becoming commercially viable and the new technologies enable long-term storage. It is worth mentioning that nowadays countries like Finland, Denmark and Sweden invest in offshore wind farms which consist of turbines that are larger, more efficient, and can substantially benefit from the globally rising wind speeds. Therefore, this phenomenon could potentially result to an increase in the energy generated by a sole turbine to around 40 percent. In addition, wind farms that are spread across several regions and have access to better transmission infrastructure, possess significantly lower wind intermittency.

2.1.3.6.6 Hydrogen

Except for renewables like solar and wind, employing hydrogen and other low-carbon gasses in Europe's energy mix could be extremely important not only for decarbonizing the continent but also for achieving energy independence. Specifically, hydrogen is extremely versatile and as such is the optimum fuel for a decarbonizing economy. However, in order to reach its full potential substantial funding and new regulations must be established.

Furthermore, hydrogen could be produced with different methods and consist of variable levels of carbon intensity. On one hand, the hydrogen, produced with the utilization of renewable energy through electrolysis, is called "green" hydrogen and has no carbon emissions. On the other hand, the hydrogen, which is produced using natural gas via the method of steam methane reforming, is called grey hydrogen. Additionally, if the carbon dioxide emitted from the process of producing grey hydrogen is captured and stored, then the hydrogen it is called blue hydrogen. It is worth mentioning that biomass could be converted to hydrogen through the process of pyrolysis or gasification.

Because of its versatility and various sourcing options, hydrogen can be used in a wide range of energy-related applications. Specifically, the World Energy Outlook 2020 of IEA highlights the potential employment of hydrogen in the future energy mix and mentions its various applications like its usage in heating or transport, in

electricity, in ammonia, in synthetic methane or liquid fuels. Finally, IEA states that hydrogen could also facilitate the integration of significant amounts of electricity derived from renewable sources by offering a dispatchable low-carbon power generation and a long-term storage option.

A significant indicator of hydrogen's importance in the clean energy transition is the European Union's growing consideration of hydrogen as a renewable energy storage option, particularly for extended periods of time.

Whether the European agenda concerning decarbonization will be a success or a failure story, will be substantially relied on how well hydrogen will be incorporated into the carbon-decreasing solutions, which includes also its function in the natural gas supply chain. Certain of the quickest ways to employ hydrogen would encompass mixing “low-carbon” hydrogen into the existing natural gas system absent making any major infrastructure improvements. For instance, Snam, a natural gas infrastructure company from Italy, is currently attempting to introduce hydrogen into its gas pipeline network.

2.1.3.6.7 Energy efficiency

Energy efficiency is considered to be one of the most economically feasible methods of reducing carbon dioxide emissions, and the European Union is projected to accomplish some of the most significant advancements worldwide. Specifically, it can assist boosting energy security by decreasing substantially the amount of importing energy. The European Union met its objective of reaching 20 percent energy efficiency for 2020, which approximately equals to shutting down 400 power plants. The objective of achieving 20 percent energy efficiency (saving) was revised and became 32.5 percent until 2030 including an additional proviso; allowing a potential upward modification until 2023. Energy conservation and the “Energy Efficiency First” principle is a priority in Europe and requires renewed focus. Especially, this principle is the acknowledgment that the biggest European domestic energy source is the energy efficiency. The principle was introduced for the first time in 2015 and was included in the European Commission's Energy Union Strategy (European Commission, n.d).

Moreover, energy efficiency is sometimes referred to as the “fifth fuel”. By increasing energy efficiency, the use of other sources of energy is reduced. Efficiency

is considered to be on the demand side of energy use due to the fact that it affects energy demand. On the other hand, the energy sources are the supply side of energy use due to the fact that they supply the energy. As a consequence, by reducing demand via energy efficiency, you decrease the need for supply, which is practically like having more supply. Therefore, this is why it is sometimes called the "fifth fuel". Finally, there are some advocates of energy efficiency who refer to efficiency as the "first fuel", because they believe that it should be top priority in relation to energy management (Kasper, 2017).

2.1.3.7 Single market equals lower prices

The European Union imports 60 percent of the energy it consumes and is considered to be the world's largest importer of energy resources. Additionally, the European Commission estimates that the European Union pays around €400 billion a year for its imported energy.

Certain countries[4] depend for their gas imports mainly on one external supplier, whilst twelve Member States[5] do not even meet the EU's minimum interconnection target, which is considered to be the ability of at least ten percent of the installed electricity production capacity to be able to cross borders. The reason why these states do not meet their target is the lack of interconnections.

According to estimates of the European Commission, a properly interconnected European energy grid and a common energy policy could potentially save consumers up to €40 billion a year. The savings commensurate with €80 a year per capita in the EU (Latvian Presidency of the Council of the European Union, 2015). The primary focus of the strategy is on consumers, industry and households, as they are the first who should benefit from this new approach to energy policy, which would be oriented towards lowering energy costs and prices.

It is evident that a European gas market, which would be integrated and competitive, would create the maximum possible degree of solidarity between the European gas consumers. Additionally, it would ameliorate the collective energy

[4] Estonia, Bulgaria, Latvia, Slovakia, Lithuania and Finland.

[5] Italy, Ireland, Estonia, Cyprus, the United Kingdom, Latvia, Malta, Lithuania, Portugal, Poland, Romania and Spain.

security by enabling the reallocation of gas across the entire market especially in times of demand or supply shocks (European Council on Foreign Relations, 2008). Furthermore, a single competitive gas market would assist depoliticize gas, which would result to major foreign policy benefits for Europe. Moreover, it would improve the security of supply for all European gas consumers. Finally, the union could help the member states, particularly those in Central and Eastern Europe that are extremely dependent on Russia, not only to develop national action plans but also to implement them in order to improve their gas security.

2.2 The case of United States of America

The United States uses and produces a mix of different types and sources of energy. In particular, fossil fuels have dominated the United States' energy mix for more than 100 years. However, the mix of U.S.'s energy production and consumption has changed over time. Currently, the United States produces more than 70 percent of its energy requirements domestically. Despite that there are certain key sectors of its economy that are heavily dependent on imported energy. Nevertheless, the United States possesses vast, and in many cases underappreciated, resources.

The diplomacy of United States concerning energy related issues was predominantly concentrated upon oil, although, most recently began focusing on the oil and gas boom. It is worth mentioning that the country's mercantile energy-related diplomacy objectives and ambitions range from the usual and conventional Middle East exporters of fossil fuels to countries in the Central Asian region, namely Kazakhstan. Furthermore, the United States has traditionally supplied worldwide nuclear energy reactors, especially through its unique program called "Atoms for Peace".

Up to early 1950s, United States was importing relatively small amounts of energy. It was in the mid-1950s when the United States began importing greater amounts of petroleum products, such as distillate fuels, gasoline and crude oil in order to fill the gap between domestic production and petroleum consumption. The total U.S. annual primary energy net imports were increasing in most years since the mid-1950s and especially reached a record high in 2005. Specifically, they were equal to about 30 percent of the total U.S. energy consumption. Since 2005, on one hand, the total annual energy imports have decreased and on the other hand, total energy exports have increased. It is worth mentioning that in 2019 United States became a net total energy exporter for the first time since 1952 and also achieved to maintain that position in 2020 even though both its total energy consumption and production were lower in 2020 than in 2019.

2.2.1 Events that formed the energy diplomacy of the United States

Before mentioning how U.S. achieved energy independence, it seems only fair to refer to the events that exhorted each U.S. Administration to take measures in order to deal with energy dependence and enhance energy security.

The dependence of United States on imported energy, especially oil, has historically affected its foreign policy. Its path to energy independence was long and was marked by various events along the way (Sergie, 2017). The first time that the U.S. had to import oil was at the beginning of World War I. Oil had become vital for fueling ships, modern warfare, land vehicles and planes. The attacks of the German forces disrupted the U.S. oil exports to France and Great Britain, which as a consequence caused oil shortages in the aforementioned nations. In, 1917, U.S. joined the battle versus Germany and as a result, the U.S government under Woodrow Wilson increased its endeavors in order to deliver oil to France and Britain. However, the output of the United States could not meet both the war demand and the domestic needs, as a consequence the United States had to commence importing Mexican oil in order to close the gap.

Shortly after WWI, in late 1910s, the Department of Interior estimated that the country's oil reserves will be exhausted in the next decade, triggering unprecedented energy security concerns. At that time, United States produced almost 70 percent of the global oil supplies, which amounts approximately to one million barrels per day, however, 90 percent of it was consumed domestically. Not later than 1920, crude oil prices had increased to three dollars per barrel, twice the amount of 1914. In order to cope with these energy security fears, the Congress passed the "Mineral Leasing Act" of 1920, for the first time necessitating the leasing of federal lands for oil prospecting. Additionally, American oil companies began pursuing concessions in Latin America.

The projections made by the Department of Interior were disproved and in just a few years the U.S.'s oil output doubled in comparison to the production of 1920. This merely happened due to technological breakthroughs. The increased output of oil in United States, Latin America and Middle East led to overproduction and in early 1930s, the prices fell rapidly to only a handful of cents per barrel. The Roosevelt Administration, by imposing a quota system on production in 1933 and a duty tax on the oil deriving from foreign sources, tried to retain the cheap and foreign oil from monopolizing the markets. In 1935, prices began to recover.

In 1938, United States like other nations throughout the world had to deal with the trend of nationalization. Governments around the world began being increasingly

involved in the energy industry, especially of oil. For instance, in late 1930s, the government of Mexico nationalized its energy industry and revoked the concessions given to United States in order to manage and extract oil in its territory. Mexico's decision presaged the series of oil nationalizations that would occur in several years after WWII. Throughout WWII, United States was in charge of roughly 60 percent of the world oil output, with Russia and Venezuela following.

Like in World War I, German submarines hindered the American convoys of oil the to reach the European allies. During the period that the United States decided to enter the battle, it enforced a rationing plan throughout the country which not only included gas coupons but also decreasing the driving speed to 35 miles per hour. Additionally, it tried to support the domestic oil production.

Around the same period as the Mexican oil nationalization happened, Saudi Arabia emerged as a resource-wealthy nation possessing substantial amount of fossil fuels. Following increasing fears regarding the diminishing oil output capability of the United States, in 1943, Roosevelt declared Saudi oil extremely vital to United States' energy security and provided financial aid. The nation instantly became the largest exporter of oil in the world.

By the conclusion of WWII, U.S. was a military and economic giant. Additionally, it played a vital role in the worldwide recovery, especially through the "Marshall Plan", which is officially and formally known as the "European Recovery Program". With this program, the United States provided energy aid, particularly assisted the war-torn European continent to get access to imports of petroleum products.

Europe commenced becoming more reliant on oil for fulfilling its energy needs as the continent began phasing out coal. However, the oil needs of the European Union began to be more frequently satisfied by Middle Eastern exporters rather than United States. It is worth mentioning that in 1945 the States was considered to be net oil exporter, although by the end of 1950 it had to import almost one million barrels per day and in just a brief period it was acquiring from foreign sources over six million barrels a day, which was more than thirty percent of what the nation required at the time.

In 1959, once again, the world faced a surplus of oil and as a result the prices were significantly decreased. Dwight Eisenhower, the imposed a quota system on imports of oil via the "Mandatory Oil Import Program" in order for imports not to surpass more than nine percent of the nation's internal consumption. The aforementioned

quota system lasted for fourteen years. With the help of the program, the oil prices of the United States remained consistent, and almost a decade later, were around 70 percent above the Middle East prices.

The next year a landmark event occurred, which fundamentally changed the oil industry. The Arab countries were significantly dependent on the revenues from exports of oil and were becoming dissatisfied by the oil price cuts which were primarily imposed by the major oil companies of the Western hemisphere. Additionally, the import caps imposed by United States, which depressed the prices, frustrated these nations. On August 1960, the major oil companies of the West once again decreased the prices without consulting the exporting countries. As a response, in September of the same year, representatives from Venezuela, Qatar, Iran, Saudi Arabia, Kuwait and Iraq gathered, and on 14th of September, decided to form the Organization of the Petroleum Exporting Nations (OPEC) with core objective to defend the prices of oil (Zycher, n.d.). It is worth mentioning that these countries together they represented around 80 percent of the exports of crude oil worldwide. At the beginning of its operation, OPEC exerted little influence and as a consequence was practically disregarded by the United States.

The first major action of the organization resulted to the First Arab Oil Embargo. At the 6th of June 1967, Israel engaged in war with Syria, Egypt and Jordan. This armed conflict is widely recognized as the “Six Day War”. The day after the onset of the conflict, energy ministers of Arab countries called for an embargo on the countries which were friendly and associated with Israel. Specifically, cargoes of oil destined for the United States and U.K. halted. Fortunately, the internal production of United States surged by one mmb/d and as a consequence it offset the interim loss of oil. The embargo was revoked till September.

As the years went by, the reserve capacity of the U.S. production of oil was diminishing and in order to cope with the looming gasoline shortage, President Richard Nixon, in April 1973, announced that he was ending the “Mandatory Import Program” whose purpose was to set limits on oil imports. Additionally, he rejected the proposed recommendations which aimed to implement conservation initiatives and develop alternatives to the fuels currently using. It is worth mentioning that in 1973 oil imports were representing about 30 percent of the U.S. consumption, percentage which increased to nearly 50 percent of consumption within four years.

The next big oil crisis was realized in 1973. On October 6th of 1973, Egypt and Syria attacked Israel. This armed conflict is also known as Yom Kippur war due to the fact that it started on the Day of Atonement (Yom Kippur), which is considered to be the most significant holiday in the Jewish faith. Few days later, on October 19th, the Nixon administration decided to take part in the war and announced a $2.2 billion military aid package to Israel.

In response to the American aid, the OPEC countries responded by proroguing all shipments of energy products to countries that supported Israel. This embargo reduced by 14 percent the internationally traded supplies of oil. Consumers in Japan, Europe and the United States began to panic over possible oil shortages. Specifically, in the United States hours-long lines were formed at petrol stations as people began to hoard supplies after the imposition of rationing and price controls. Almost a month after the onset of the war, on November 7th, President Nixon announced a large number of new energy policies and the "Project Independence", whose main purpose was to lay the foundation for U.S. achieving energy independence by 1980.

The 1973 oil embargo wreaked economic havoc. With sole purpose not to prolong this havoc, Henry Kissinger, the U.S. Secretary of State, began in January 1974 "shuttle diplomacy"[6], especially assisted in order to achieve detachment between Israel and Egypt. Furthermore, with core objective to protect themselves, the principal economies of the world formed the International Energy Agency, aiming to work together in times of oil supply "emergencies". Additionally, in 1975, the heads of these states met in France in order to confer about energy dependency and the global economy. This summit was called the Group of Six, which later became the G7. Moreover, the oil crisis of 1973 exhorted the U.S. to pass the " Energy Policy and Conservation Act of 1975 ". For the first time, United States established a Strategic Petroleum Reserve and issued fuel efficiency standards for new automobiles. From 1974 till 1978, the U.S. need for imports nearly doubled. In 1977, energy agencies were organized into the U.S. Department of Energy. In addition, a variety of energy-related measures, primarily emphasizing on the conservation of energy, were proposed. Also, the next year, legislation in order to promote energy efficiency in

[6] Negotiations especially between nations which are carried on by an intermediary who shuttles back and forth between these disputants.

electric utilities and other industries were established and fuel switching was encouraged (Carter, 1979).

In October of the same year, thousands of Iranian oil workers went on strike in order to protest against their leader, Mohammed Reza Shah. As a result of the strike, the Iranian production of oil dropped from five mmb/d to zero by December, which amounted to a global production loss of around five percent. Additionally, in 4 November 1979, a cluster of students originating from Iran, assumed control of U.S.'s embassy in Tehran, taking more than 60 American hostages for 444 days. The United Stated via President Jimmy Carter, responded by severing diplomatic ties with Iran and also by embargoing the imports of oil deriving from Iran.

The Iranian revolution sparked havoc over another shortage of supply of oil, and as a consequence the prices doubled. President Jimmy Carter in July gave a major speech on energy policy, which included the announcement of a phase-out of oil price controls and of more energy conservation measures. In 1980, he signed the "Energy Security Act" which contained initiatives for solar, geothermal and biomass energy in order to provide new alternatives to electricity producers instead of using oil. Additionally, with this act, the U.S. Synthetic Fuels Corporation was established, aiming to produce within a time-frame of half a decade two mmb/d in liquid fuel from non-petroleum sources.

On September 22nd 1980, Iraq and Iran went to war. Despite the fact that United States decided to remain neutral, it renewed diplomatic relations with Iraq, which since 1967 had been extremely severed especially due to the conflict between Israel and the Arab countries. The continuing attacks on oil facilities of both Iran and Iraq removed from the global market roughly four mmb/d in oil production. The new American Administration, the Reagan administration, issued, in 1983, a national security directive to increase the U.S. military presence in the Persian Gulf with main purpose to assist protect the oil facilities and shipments of its allies. Unfortunately, the war lasted eight years.

Furthermore, in 1981, President Reagan fully deregulated the price of crude oil, enabling the domestic producers to raise prices to market levels. It is worth mentioning that the non-OPEC production began to outstrip that of OPEC, which also hindered the cartel's influence on oil prices. The demand for oil around the world commenced to diminish due to conservation measures and high prices, which led to another excess of oil in the global market. Between 1977 and 1982, the imports of oil

for United States were decreased from 50 percent to 28 percent. By 1985 (Abelson, 1990), the initiatives for fuel economy in automobiles, fuel switching for electricity and heating assisted in lowering the overall oil consumption. However, low market prices encouraged oil companies to move to foreign exploration, which was considerably cheaper, and as a consequence, the oil imports began to steadily augment again.

On August 2nd 1990, Iraq invaded Kuwait mainly due to a dispute over an oil field located in their mutual borders in the south. This oil field is called Rumaila. A few days later, on August 8th, President Bush in his speech declared that United States could be facing a significant economic threat due to Iraq's aggression. It is worth mentioning that this economic threat could be devastating due to the fact that United States at that time imported half of its oil from Iraq (Office of the Press Secretary, 2011). Additionally, he declared that the sovereign independence of Saudi Arabia is of vital interest for the United States and for this reason he deployed troops to the country. Various nations reliant on imports of oil from the Persian Gulf, Japan for instance, contributed substantially to the funding for a multinational military effort, led by the United States, in order to liberate Kuwait. In anticipation of an oil shock, the Bush Administration released from the U.S. Strategic Petroleum Reserve thirty-four million barrels of oil. However, contrary to predictions, the oil prices dropped.

As the years went by and climate change became a fact, various nations tried with domestic measures to cope with it. There was not a noteworthy collective international effort until 1997. Specifically, in 1997, the majority of the leaders around the world signed the Kyoto Protocol. With this treaty countries aimed to reduce the increasing greenhouse gas levels in order to cope with climate change. Remarkably, despite being the largest greenhouse emitter, United States refused to ratify the treaty. As a consequence, it faced international criticism not only for not ratifying the treaty but also for not adopting in a quick manner policies for reducing emissions.

Trying to keep up with the rest of the world, the U.S. Congress in 2005, passed the " Energy Policy Act ", which contained new inducements for dual-fuel cars and alternative fuels in transportation. However, this act included new governmental funding for internal oil exploration as well as. Specifically, the law mandated that 7.5 billion gallons of renewable fuels must be blended into gasoline by 2012. Extremely noteworthy is George W. Bush's statement in the 2006 State of Union where he said

that America is addicted to oil. The new law was heavily criticized because it added billions of dollars of governmental funding to the oil industry. Especially, the funding of corn-based biofuels were reproved due to the fact that posed a potential threat to the security of the food chain and the environment.

Building on the " Energy Policy Act ", in 2007, Congress passed the " Energy Independence and Security Act ", which aimed to increase the Corporate Average Fuel Economy (CAFE) standards by 2020 and also end the light truck exclusion. Additionally, the new act mandated greater output of ethanol, which will be not based on corn, and also required the biofuels that are blended with gasoline and diesel to emit 20 percent less greenhouse gases in comparison to the fuels based on petroleum. In May 2009, Obama announced the acceleration of the CAFE standards for cars and light trucks, which were highlighted by the administration as part of its climate change policy goals.

In 2011, Libya became the first major oil-producing country to participate in a spate of popular uprisings in the wider region, which overthrew regimes in Tunisia and Egypt. The uprisings in Libya, though it did not contribute to the oil imports of United States, and the unrest in other oil-producing nations created concerns about a new global oil crisis. On March 30th, President Obama said in a speech that United States will keep on being a victim to the shifts in the global energy market until it decides to focus seriously on a long-term policy for secure and affordable energy (The State of the Union, 2006). Additionally, he pledged to reduce U.S. oil dependence by one-third within a decade. Moreover, the Obama administration released thirty million barrels from the Strategic Petroleum Reserve in order to offset Libya's 1.5 million bp/d production loss from the time that the civil war commenced in early 2011. Simultaneously, members of IEA released another thirty million barrels from their reserves. Specifically, the agency mentioned that the delicate recovery of the global economy is threatened and could be significantly undermined by the greater tightness in the global energy market, especially for oil. The simultaneously release, which was coordinated by IEA, came shortly after the members of OPEC failed to concur on increasing output.

According to the U.S. Energy Information Administration, the imports of petroleum products and crude oil fell to less than 260,000 bp/d, which were the lowest the last two decades. With the reduction of imports, the reliance on foreign energy resources also decreased. This outcome was achieved thanks to both declining

domestic demand and the revolution of the energy industry, which through the combination of horizontal drilling and hydraulic fracturing, unlocked vast reserves of "tight oil" in shale rock formations (Friedman, 2013). By December 2015, tight oil production surged to over four mmb/d, which exceeded the individual production of almost every OPEC member except for Saudi Arabia. It is worth mentioning that in 2010 the domestic output of tight oil was less than one mmb/d.

A highly controversial project is that of Keystone XL pipeline[7]. Specifically, President Obama rejected the project (Koring, 2015), which would have potentially provided the United States with more than 800,000 bp/d from Canada. Since its conception in 2008, the pipeline has been reviewed multiple times by the State Department. On one hand, those who supported the pipeline claimed that it would have enhanced energy security and created jobs. On the other hand, its opponents express concerns about potential environmental damage, especially from oil spills and augmented emission of carbon dioxide. In March 2017, President Donald J. Trump announced the granting of a permit for the construction of the Keystone XL pipeline, which he called "the first of many infrastructure projects" that he intended to approve putting more Americans to work. The granting of the permit came two months after Trump has signed an executive order which aimed at reviving the Keystone XL and Dakota Access pipelines while being only a few days into his presidency (Dennis & Mufson, 2017). The debate over the merits of the cross-border pipeline continues until today. Specifically, on his first day in the office, President Joe Biden cancelled the permit that was given by the Trump Administration to allow the project to cross into the US due to concerns that it would worsen the climate change. As a result, the developer of the Keystone XL pipeline halted all constructions on the project.

A landmark in the oil industry history was the annulment of the oil export ban which was imposed in 1975. Specifically, the Congress voted to abrogate the restrictions on crude oil exports, which were imposed for forty years. In December 2015, the oil export ban was officially lifted and immediately an oil tanker left the Texan port of Corpus Christi in order to supply oil to Europe. The tanker contained light sweet crude oil, which was mined from the oil shale reserves in south Texas.

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[7] The Keystone XL pipeline, which would extend from Alberta to the Gulf Coast, would expedite processing of the Canadian oil.

Although, the country still imports oil, opportunities for exporting oil globally would certainly arise since the majority of the existing refineries of the country are not yet streamlined to process the type of oil that is mined from shale deposits. The preponderance of analysts consider that the ramifications of the abrogation of the restrictions on output, global prices and geopolitics was and will potentially be modest at best.

In May 2017, President Donald J. Trump promised to achieve “complete” independence from foreign sources of oil. Additionally, he announced that he was officially seeking a review of U.S. energy policies, aiming to assist the nuclear power industry to prosper. Furthermore, Trump announced that the Department of Interior would begin the formal process to expand the areas available for offshore drilling of natural gas and oil. It is evident that Trump committed to establish “American energy dominance”.

A year later, in May 2018, the U.S. liquefied natural gas exports had quadrupled and the value of the LNG exports was estimated to reach around $5 billion in 2018 and $12 billion the next year. Finally, in early December 2018, the United States had turned into a net exporter of oil, therefore breaking around 75 years of dependence on foreign oil. According to reports, United States sold overseas a net of 211,000 bp/d of refined products and crude oil.

In 2019, on one hand, the United States imported about 9.14 MMb/d of petroleum from about 90 countries. The top five countries from where the U.S. imports of petroleum derived from were Canada, Mexico, Russia, Colombia and Saudi Arabia. On the other hand, the United States exported about 8.47 MMb/d of petroleum to 4 U.S. territories and 190 countries. The top five destination-countries of U.S. petroleum exports were Canada, Mexico, Japan, Brazil and South Korea. It is clear that U.S. imported more than it exported. The resulting total net petroleum imports were about 0.67 MMb/d in 2019 (EIA, 2021).

Contrary to 2019, in 2020, the U.S. total annual petroleum net imports averaged -65 mmb/d, which means that the total annual U.S. petroleum exports were 0.65 billion barrels per day greater than the petroleum imports. Remarkably, this was the first year since 1950 that the total annual petroleum imports were less than exports. It is worth mentioning that petroleum includes petroleum products and crude oil as well. Specifically, the petroleum products that are included in this category are diesel fuel,

gasoline, heating oil, jet fuel, asphalt, chemical feedstocks, biofuels (biodiesel and ethanol) and other products (EIA, 2021).

Decreases in natural gas and crude oil imports were those that largely drove the change in U.S. energy trade in 2020. Crude oil is considered to be the largest source of (EIA, 2021) U.S. energy imports.

Despite a four percent drop in the domestic crude oil production in 2020 in relation to 2019, net imports of crude oil were the lowest since 1985. Additionally, the total crude oil exports per annum of the United States have been steadily augmenting every year since 2010 and in 2020 reached a record high of roughly 3.18 mmb/d. On the other hand, U.S. crude oil imports fell to around 5.9 million b/d in 2020.

Total exports of natural gas are augmenting every year since 2014, and especially in 2017, for the first time since the late 1950s the United States became net exporter of natural gas. Especially, in 2020, natural gas gross exports reached a record high of 14.43 billion cubic feet per day (Bcf/d) and also gross imports of natural gas fell to 6.99 Bcf/d, which is the lowest level since 1993. The factors that contributed to the growth in natural gas exports are the increases in domestic natural gas production and the increases in liquefied natural gas (LNG) export capacity.

All these events that was mentioned above formed the U.S. energy diplomacy, however, they do not show how the United States at last reached the desideratum, the energy independence. According to experts, the amazing tale of U.S and its path to energy independence happened and is happening primarily by accident.

2.2.2 The path of the United States towards energy independence

Before commencing with the story of how United States are currently reaching energy independence, it seems only necessary to provide clarity and explanation to the notion of "U.S. energy independence".

To begin with, "U.S. energy independence" , as a concept, primarily focuses on extirpating the necessity of the country to import foreign energy sources. This notion is embraced by those who support that the U.S. should be left insusceptible to global disruptions regarding supply of energy, and also the reliance upon politically unstable states for its energy supplies should be restricted. Finally, energy independence as a concept is primarily fixated on oil because it is the principal fuel of the country's transport industry.

Many experts around the world believe that the notion of "U.S. Energy Independence" as controversial as it may be, it could possibly lay the groundwork for a new American Century. Specifically, it is expected that the United States will be energy independent by 2023, which is the 50th anniversary of President Richard M. Nixon announcing his "Project Independence". Energy independence refers to United States being able to export more energy than it imports. In 2023, U.S. will be exporting petroleum products, natural gas, coal and crude oil. Regarding crude oil, the U.S. in December 2015 lifted the crude oil export ban, which was in effect since 1975. The United States will also be importing some oil, on balance though, the country will be a net exporter. It is worth mentioning that U.S. will reap major economic benefits in achieving energy independence due to the fact that in the past it did not follow the approach which was proposed by President Nixon and his advisers. His plan can be described as a high-cost and dirty path to energy independence. Specifically, Nixon advocated the pursuit of the extraordinary but expensive fast breeder reactors, the increased coal use, an aggressive boost in offshore resource development and expanded shale oil development in Colorado using the very expensive techniques which are currently used on Canada's tar sands.

By implementing the strategy that President Nixon suggested, the United States would have been saddled with very high emissions of harmful global warming gases and high-cost energy supplies. The path that was actually taken was very different and could be called the low-cost clean path to energy independence. Remarkably, the United States came upon this course by accident. In other words, they are commencing reaping the benefits of large, low-cost supplies of clean natural gas by luck. Nobody could claim that the energy independence- achieved thanks to fracking, horizontal drilling, the auto industry's deathbed conversion to fuel economy and futures markets- was planned.

As mentioned before, energy independence could make this the new "American Century" due to the fact that it would create an economic environment where the United States will enjoy access to energy supplies at much lower cost than other parts of the world. That advantage in combination with competitive domestic labor costs and the construction of new advanced manufacturing facilities, could give U. S.'s economy an unprecedented edge over other nations, especially China and Northern Europe. This energy cost-advantage was extremely visible in January 2012

when corporations in U.S. paid less than $3 per million BTU for natural gas while South Korean buyers paid $13.5.

Ironically, U. S.'s edge will be further strengthened by energy exporters like Russia and OPEC members. If they succeed in holding up crude oil and in particular, natural gas prices, then they will strengthen United States' 21st century economy. The aforementioned exporters require that buyers in China and Europe pay natural gas prices which are linked to crude oil since they are trying to keep the crude prices high. The greater their success in this attempt, the greater the U.S. competitive advantage could potentially be.

The contrast between the path President Nixon proposed forty-eight years ago and the path that was actually taken is evident. If Nixon's plan was realized, the United States would currently be vulnerable to competition from countries with low-cost supplies. Fortunately, the opposite occurred. The approach United States took has provided the country with low-cost clean energy. This could substantially reduce U.S. vulnerability to global economic cycles, especially those tied to energy price fluctuations.

Furthermore, efforts to limit greenhouse gas emissions could further strengthen the U.S. economic hegemony. Countries currently relying on coal, such as China, will be eventually forced to make significant reductions and as a consequence will seek, among other solutions, to replace coal with natural gas.

The U.S. benefit will be strong, although not impregnable or permanent. It is possible that other countries will follow United States' example and pursue shale gas and oil. Eventually these countries will succeed in developing these resources. However, until then, they will be saddled with long-term contracts for high-cost natural gas supplies which will be delivered as liquefied natural gas. Additionally, many countries, especially those in Europe, will also be stuck with long-term pipeline agreements for natural gas with prices tied to crude oil.

Howbeit, it is completely wrong to believe that the U.S. experience could be replicated just by importing U.S. technologies. Specifically, United States' breakthrough was not only achieved through new technologies, but also through the entrepreneurs who were freed from the multinational oil industry's high-cost yoke and also the development of the financial markets. Therefore, it is not evident that the large bureaucratic organizations, such as the state-run oil and gas companies or the multinationals, could replicate the success achieved by the smaller, far more agile

firms that caused the U.S. energy revolution. Furthermore, experience suggests that countries like China and major oil companies will not be able to duplicate the success of the American entrepreneurs. Surely, shale gas and oil reserves will be developed elsewhere, but the costs involved will be much higher.

As mentioned before, United States could potentially experience a New American Century due to the fact that entrepreneurs flourished here first and because no other country would have the economic flexibility needed for such a development.

To conclude with, achieving energy independence will revolutionize the United States and the global economies over the next decade. As a consequence, many firms that have played a vital role in the energy sector for the last fifty years will probably diminish in importance or completely vanish. In June 2011, IBM[8], when celebrated its first century of existence, published a remarkable advertisement which said that nearly all the companies which our grandparents admired have disappeared. Additionally, the company expects that in twenty years from 2011 most large firms, which seemed important at the time, will have disappeared as well. According to IBM, it is possible that a person born in Europe or the United States in 2020 will never know about Exxon.

2.2.3 Is the United States really energy independent?

As mentioned before, the United States, almost throughout its history, has imported more petroleum, including refined petroleum products, crude oil, and other liquids, than it has exported. In 2020, this situation changed. According to the Short-Term Energy Outlook (STEO) of February 2021 provided by the U.S. Energy Information Administration (EIA), 2020 was the first year that the United States exported more petroleum than it imported. However, EIA expects that, mainly due to declines in domestic crude oil production and subsequent increases in crude oil imports, the United States will return to being a net petroleum importer both for 2021 and 2022.

According to EIA's reports, the growing crude oil imports will subsequently lead to the rise of the net petroleum imports and more than counterbalance the changes in the refined product net trade. Specifically, the Administration expects the augmentation

[8] International Business Machines Corporation

of the net imports of crude oil from their 2020 average of 2.7 mmb/d to 3.7 mmb/d and 4.4 mmb/d in 2021 and 2022 respectively.

In comparison with crude oil trade, net exports of refined petroleum products did not change as much during 2020. EIA foresees that the net petroleum product exports will be accretive for 2021 and 2022 as global demand for petroleum products continues to grow. Moreover, EIA forecasts that the United States will have to import more crude oil in order to fill the widening gap between the domestic crude oil production and the refinery inputs of crude oil in 2021 and 2022. Specifically, the U.S. crude oil production declined by eight percent in 2020 because of well curtailment and a drop in the drilling activity which was related to low crude oil prices. To conclude with, U.S. is expected to import 62 percent more crude by 2022 due to domestic production declines, according to EIA (French and Macintyre, 2021).

2.3 The case of People's Republic of China

China has in its possession abundant and easily recoverable coal resources, which in most areas are located near the surface. This could be seen especially in the north of the country centered around the province of Shanxi. On the contrary, easily exploitable sources of gas and oil have proved to be consistently disappointing and nowhere near enough in order to meet China's rapidly growing need for energy. As a consequence, gas and oil imports have become not only an increasing burden on China's balance of payments but also a threat to its national security.

In the 1960s, the discovery and development of the supergiant Daqing and Shengli oilfields briefly promised to cease China's heavy reliance on coal, and even turn the country into a major oil exporter. In 1963, China was oil self-sufficient thanks to its domestic reserves, primarily deriving from the Daqing oil field, and the conveyance of oil extraction technologies from the Soviet Union prior to 1960. From 1950 to 1970, the Chinese oil industry was isolated due to the U.S.-led embargo, which prevented China from participating in the world oil market and subsequently from exporting its excess of oil. With the revocation of the embargo, the country reestablished its ties with the developed countries, especially Japan. With the inflow of foreign currencies by dint of exporting oil, China was able to fund key industrial technologies and plants in order to establish an economy based on exports. However, by the late 1980s, the production from Shengli and Daqing was peaking, and no further readily exploitable major discoveries had been made, situation that forced a renewed focus on coal. Specifically, the exports of oil spiked in 1985 at 30 million tons.

In China, since the 1990s, the consumption of oil and gas has been increasing in harmony with the increase of the level of urbanization, industrialization and market orientation. Abrupt reforms, and subsequently, augmented demand for oil established China as a net oil importer in 1993. Since 1993, the annual volume of imports has been increasing considerably. At the same time, at the turn of the century, the domestic oil output slowly and continuously began diminishing, whilst imports and demand steadily began augmenting. By 2019, China had become the largest importer in the world, relying on imports to meet approximately 75 percent of its consumption and importing more than 10 mmb/d. In particular, China has become one of the world's largest natural gas importers, relying on imports in order to meet roughly 40 percent of its domestic needs.

To conclude with, it is forecasted that the oil and gas demand will continue to grow in the upcoming years. The demand for natural gas and oil is rising considerably faster than that of the potential domestic supply, and as a consequence, the already existing gap between demand and supply is growing each passing year.

2.3.1 China's Energy Diplomacy

At the beginning, energy diplomacy did not receive sufficient attention in the country's total diplomacy. When the economic boom hit the Chinese economy and subsequently necessitated for increased imports of energy, the target of significantly widening the channels for supplies of imported energy became a vital task for China's energy strategy and security.

Due to the strategic significance of oil as an asset, the core of the global oil production has emerged as a focal point of contest among various political groups. Incited by the universal right of every country not only to survive but also to grow, competition over energy resources will continue to be very fierce and brutal. Especially, China, along with the European Union, is going to encounter significant strain from competing over future energy supplies. It is is evident that safeguarding oil security and energy security in general will become increasingly challenging in the upcoming years.

In order to satisfy China's growing energy demand, the Chinese government has began developing a national oil security supply system which is centered on diverse sources of imported oil and national oil reserves. This means that China should neither rely on a sole region nor on a single oil transport route for imports of oil. Therefore, it is evident that energy diplomacy has come to be a vital component of the overall diplomacy of the nation. In addition, in recent years, energy diplomacy has evolved into a significant aspect of the country's multilateral diplomacy.

In 2006, the Chinese government adopted the 11th Five-Year Plan for National Economic and Social Development. The plan clearly stated that China should promote cooperation in international gas and oil development in conformity with mutual benefit and equality. In addition, China should fully utilize the global energy market, actively engage with the international energy system, and finally, ensure the security of its energy supply (National Development and Reform Commission, 2007).

In 2006, Hu Jintao, the Chinese president at the time, at the Summit of the G8, which was held in St. Petersburg, stated that the fundamental objectives of the country's energy strategy is to center on domestic conditions, prioritize and improve energy efficiency, protect the environment, engage in diverse development, strengthen international cooperation which is considered to be mutually beneficial, and finally, promote the establishment of an energy supply system that would be stable, economic and clean. As a consequence, the energy diplomacy of China will have to deal with quite formidable obstacles, which not only include the need to guarantee the transportation security and maintain the stability and adequacy of energy supply from abroad, but also the need to expedite energy technology advancement, ehance environmental protection and facilitate energy efficiency.

Until recently, China lacked a coherent and comprehensive international energy policy, however this did not imply that the Chinese government lacked energy diplomacy. Considering China's status, by being a huge importer China shall implement major initiatives to decisively establish deeper energy relationships with various entities in order to guarantee that its international energy interests will be achieved. Specifically, concerning the goal of employing diversified energy relations, China has already accomplished a lot in the application of energy diplomacy. There are two instances that could provide a broader overview.

To begin with, the first instance is the energy collaboration between China and suppliers from Central Asia. The Chinese government considers this region as extremely vital in terms of international energy strategic cooperation. Throughout the span of over a decade of experimenting, exploring and practicing, a pattern has been formed in the aforementioned cooperation. Specifically, this pattern includes investment predominantly in Kazakhstan, commitment to promote the construction of oil and gas pipelines between Kazakhstan and China[9], and finally, proactive involvement in the oil and gas exploitation of other nations, such as Uzbekistan and Turkmenistan. As mentioned before, China in order to minimize its rising dependence on imported energy, it has to "pluralize" its oil and gas sources so as to enhance energy security. As a consequence, and under these circumstances, the status of

[9] The CCPC Oil Pipeline from Kazakhstan to China Xinjiang began to transport oil at the end of 2003

Central Asia has been intensified even more in the implementation of the country's energy diplomacy and strategic plan.

The second example is the energy cooperation of China with India, which is an enormous consumer of energy like China. Although both are competing in the same market over energy supplies, India and China have commenced to work together in the exploitation of Kazakhstan's oil and collectively entered into the Sudan oil exploitation venture, therefore establishing themselves as business associates. Additionally, they have begun to collaborate in Iran. In the upcoming years, India and China ought to work alongside by participating in international energy exploitation and distribution, diversifying risks, and gaining access to substantially more supplies of energy than currently obtainable. In 2005, foreign affairs officials from Russia, China and India held an informal meeting in Vladivostok. In this meeting, they issued a joint statement, which stressed that together they will cooperate in the fields of energy, agriculture and high technology, and will capitalize on this opportunity by developing a strategic energy triangle. It is worth mentioning that the predominant reason why India applied to become a member to the Shanghai Cooperation Organization[10] was the ambition to cooperate with China in exploiting gas and oil in Central Asia.

2.3.2 The Energy Security of China

Energy is one of the five vital components for human survival of people, and serves as an essential strategic asset for social development in national economies. In the case of China, securing the supply of energy is not only connected to the country's rapid economic growth but also with its strategic development and overall security. Additionally, the sustainable growth of the Chinese economy is inextricably associated with the sustainable development of the global economy. Therefore, the

[10] Known as the Shanghai Pact and is a transcontinental economic, security, political and military alliance. It is the world's largest regional organization and is the successor to the Shanghai Five, which was a mutual security agreement formed in 1996 between Kazakhstan, China, Russia, Kyrgyzstan, and Tajikistan. The Organization was formed in 2001.

energy security of China is a very significant component of the global energy security, thus China’s energy diplomacy has major consequences for the global energy security.

China's crude oil consumption has increased due to the country's rapid economic growth, as well as its growing need for energy optimization. As a result, the augmenting demand for energy will have to be satisfied primarily via imports. So, it is evident that energy diplomacy has become increasingly significant for China’s energy security.

For China, the concept of energy security is conceived as “the need to guarantee itself and its industries long-term access to sufficient energy and raw materials”. Specifically, China has been attempting to sign international agreements in order to secure such supplies. It is worth mentioning that China’s energy security involves the internal and foreign energy policy of China.

The energy portfolio of China consists primarily of domestic coal, gas and oil from domestic and foreign sources, and small quantities of uranium. Furthermore, China has created a strategic petroleum reserve so as to secure emergency supplies of oil for temporary supply, especially in cases of extreme price disruptions. Finally, the nation’s core energy strategy revolves around diversification and reduction of oil imports with primary objective bolstering energy security. Specifically, for the aforementioned imports China is predominantly contingent on Middle Eastern producers.

In accordance with the opinion of Zha Daojiong, who specializes in non-traditional security issues, China's dependency on imported sources of energy should not be regarded as a threat to the nation’s energy security, due to the fact that the global energy market does not disapprove of China's quest for prosperity and growth (Daojiong, 2006). The major challenge is actually internal, meaning that rising internal consumption without bolstering energy efficiency endangers both global oil markets and Chinese growth. The Chinese imports of energy are a new variable that stimulates global oil price hikes, triggering alarm in Western countries.

For China to fulfill its obligations as an integral part of the international community, the international community urges Beijing to take steps toward more transparency in its global pursuit of importing energy and achieving energy efficiency. In addition, energy efficiency is considered to be the only feasible method of avoiding the exorbitant demand of the country for fossil fuels to the detriment of other industrializing and industrialized nations. Finally, China is attempting to establish a

long-term energy security strategy by investing in gas and oil fields abroad and also by diversifying the country's suppliers of energy (Pham, 2011).

2.3.3 Managing China's dependence and bolstering its energy security

There are various approaches that could be applied and measures to be taken in order to tackle the aforementioned problems that China is facing. In this master's dissertation seven measures will be analyzed. The first one would be China's Silk Road Strategy. The second measure concerns the improvement of the existing Strategic Petroleum Reserve. The third and the fourth measures that will be analyzed are the demand management and the potential of new oilfields. Moreover, the need for securing the sealanes and the maritime energy transports will be analyzed. Furthermore, the role of clean energy and renewables in decreasing energy dependency will be analyzed. Last but not least, the measure of limiting coal imports and diversifying the oil portfolio will be mentioned.

2.3.3.1 The Silk Road Strategy

Considering the continued American worldwide naval supremacy, which in the foreseeable future is improbable to be effectively disputed, China's top strategic objective is to guarantee its energy security via linking with China friendly big gas and oil producers through pipelines which would transit via land routes that are outside the effective control and military reach of the United States. If China's venture would be flourishing, in a short period of time, the country's new land pipelines along with roads and railways ("Silk Roads") will be able to transport enough gas and oil to satisfy its import requirements (Tata, 2017).

Presently, in order to satisfy its energy needs, China is extremely reliant on gas and oil imports, primarily from Africa and the Persian Gulf, which are principally transported by tankers across sea lines of communication (SLOCs) and via maritime choke points which are under the control of the United States' Navy. As a consequence, a temporary halt of energy imports, imposed by a naval blockade, would cause a swift economic collapse and immobile China's military forces, transforming the nation from a superpower to a paper dragon.

There are only two major energy exporters who not only are adversaries of the United States but also have substantial gas and oil reserves to probably meet China's entire import requirements on a long-term basis. These two energy exporters are Russia and Iran. Taking into consideration these two energy exporters, then, China's energy security agenda revolves around a quite plain and uncomplicated accord. Specifically, it provides economic security for Iran and Russia, on the basis of fixed Chinese demand, and in exchange China receives energy security, by means of secure and reliable supply through land-pipelines from Iran and Russia. In this particular instance, interdependence is deemed to be mutually advantageous.

2.3.3.1.1 Planning a Moscow Pivot

By 2035, the Energy Information Administration (EIA) of United States projects that the Russian energy output will rise to 29.3 Tcf of gas and around 12 million b/d of oil, half of which will be exported. So, in 2035, Russia could satisfy China's total import needs for natural gas (around 5 Tcf) and about 90 percent for imports of oil (around 9 million b/d). It is quite rational to speculate that Russia could augment its oil output above EIA's projected numbers by at least two percent per annum over the next fifteen years so as to entirely satisfy China's oil import requirements.

Since China and Russia share a land border of 4,200 kilometers (km), it is evident that pipelines, which would connect the Russian gas and oil fields with the northeastern China, not only would be safe but also the United States could not effectively shut down the energy flows (Tata, 2017).

However, transforming this possibility into a realistic choice will be not only expensive but also extremely time-consuming. In order for this prospect to come to fruition, the production must be increased, the already existing gas and oil fields should be further developed, and finally, the old pipeline networks should be expanded and new one's must be constructed. In terms of energy diplomacy, Russia would have foremost to shift its attention from Europe to China. Presently, Russia's economic security is inextricably linked with its energy exports to the European countries. Although, the Russian Federation has been forced to refocus its energy export strategy from Europe to China as a result of the EU and US sanctions enforced on the nation following its annexation of Crimea in 2014. In addition, China's

necessity for economic security in the form of consistent supply of energy in order to satisfy its domestic needs and import requirements is flawlessly conformed with Russia's necessity for economic security in the form of consistent demand for its energy exports.

The commencement of the energy partnership between China and Russia is symbolized through the function of two pipelines, namely the Power of Siberia (POS) and the East Siberia-Pacific Ocean (ESPO). The ESPO pipeline connects the Siberian oil fields with China and is about to be expanded in order to reach 1.6 mmb/d by 2025 (Global Energy Monitor, 2021). The POS gas pipeline connects the Russian gas fields of Siberia with the northeastern China and with its scheduled expansion will reach 50 bcm of exports per year. However, the East Siberia-Pacific Ocean oil pipeline network's capacity would need to quadruple at the very least, and the Power of Siberia gas pipeline network's capacity would have to be doubled at the bare minimum in order to satisfy the country's whole requirements for imports of energy.

Complementary to the ESPO expansion initiative, the existing pipeline network that connects the eastern and the western Siberian oil fields should be expanded so as to expedite Moscow's pivot from Europe to China. These expansions will have to be finished within the following 20 years. This undertaking is considered to be very aggressive but not insurmountable.

2.3.3.1.2 The Persian Hedge

Strategic conservatism and long history of animosity between China and Russia, suggest that both Beijing and Moscow would attempt to mitigate their mutual interdependence. Therefore, Russia will endeavor to preserve its energy ties with the European countries while augmenting its energy partnership with China. Similarly, China will attempt to diversify the sources of its energy supply.

If anybody were to solely concentrate on the energy security of China, Iran constitutes the ideal option for hedging the dependence on Russia, due to the fact that it is outside the camp of both Russia and the United States (Tata, 2017). Additionally, Iran needs an alternative to the European energy exports because it has suffered greatly from the crushing impact of the energy restrictions imposed by the United States. Certain Chinese demand for Iran's gas and oil exports would guarantee its economic security.

According to recent data, Iran is considered to have reserves of 209 billion barrels of oil (The Global Economy, 2021) and 1.300 Tcf of natural gas, which places the country second in global natural gas reserves and especially second to Russia. Furthermore, both China and Iran border with Pakistan, as a result land-pipelines, which connect Iran and China through Pakistan, would be the most logical and feasible option. Moreover, these countries have never been involved in hostilities against each other, and also Pakistan has been an ally to China for over half a century.

The first part of the pipeline, which connects Iran with Pakistan, has already been constructed, however, an expansion would probably be necessary in order to transport substantial amounts of gas and oil. The second part, which would connect Pakistan and China, it will probably take more than 30 years to come to fruition. The Chinese government has attracted an investment of $46 billion, which was later increased to $60 billion, for the construction of the China-Pakistan Economic Corridor (CPEC) (Jaybhay, 2020) that would link the Pakistani port of Gwadar on the Arabian Sea (Erythraean Sea) to the Chinese province of Kashgar.

Among the main obstacles would be maintaining the security and functionality of the CPEC's vital infrastructure, which includes the network of roads, pipelines, and railroads that pass via Pakistan. The Pakistani army is currently up against radical Sunni fundamentalist groups like the ethnic Pashtun Pakistani Taliban along the Pakistan-Afghanistan border, as well as ethnic Baloch separatists near the Pakistan-Iran border. Nevertheless, the Government of Pakistan has committed to create a special security force of more than 13.000 soldiers in order to ensure the safety of CPEC (Tekwani, 2020).

2.3.3.2 Strategic Petroleum Reserve

Another way through which China is attempting to mitigate its dependence on foreign oil is by building a strategic petroleum reserve (SPR), which is planned to protect China from external market shocks. In 2014, for the first time, China’s Bureau of Statistics stated the size of China’s SPR, which was claimed to have 91 million barrels or around nine days of reserves. China’s most recent update on SPR levels came on March 2020, when the reported volume was 1.15 billion barrels, which is equivalent to 83 days of oil demand (Sun, 2020). However, in order to meet the OECD standard, China must accumulate 90 days of import reserves.

2.3.3.3 Demand Management

Across the fuel spectrum, demand management is also an important tool. In its 11th and 12th Five-Year Plan, China adopted ambitious energy intensity targets, supported by a broad set of policies, including policies that aim to facilitate structural changes in the economy. That broad set of policies included $21 billions of tax incentives for industrial energy efficiency investments, fuel economy standards for personal vehicles, efficiency codes for new building stock, and capping the consumption target of large enterprises and provinces.

Furthermore, the country is pursuing the implementation of these policies by creating detailed plans for different sectors, on both the demand and the supply sides, as well as setting of local and regional targets. Moreover, China is pursuing the implementation of these policies through the creation of implementing mechanisms and via providing support through the enforcement of tax incentives and other financial measures.

However, even with all these efforts, energy self-sufficiency is still not a realistic prospect for the foreseeable future. Although energy self-sufficiency could not be a panacea for achieving energy security, it would be naive to see energy insecurity solely as a direct function of energy trade dependence. On the contrary, well-functioning international markets tend to enhance energy security for all involved. As a result, while it is true that China is pursuing policies that limit the imports of fossil fuels, at the same time its policies also aim at diversifying supplies and managing import risk.

2.3.3.4 New discoveries & new oil fields

China's already existing oil fields are exhausted and despite a sustained exploration effort, including the region of South China Sea, few new resources have been found. However, in early 2021, a new one-billion-ton extremely deep gas and oil area was discovered in the Tarim Basin (Global Times, 2021), which is located in Northwest China and specifically in the Xinjiang Uygur Autonomous Region. According to the China National Petroleum Corporation (CNPC), which is a Chinese state-owned energy giant, the discovery mentioned above constitutes the largest discovery in the

basin in nearly 10 years. Additionally, the newly discovered well is located in the Fuman Oilfield area, which is a key block for crude oil production in the Tarim Oilfield.

According to the general manager of Tarim Oilfield Co, namely Yang Xuewen, the area was found only after the drilling of 56 different wells in the Fuman Oilfield. Yang Xuewen stated that the new oil reserve area could potentially be the largest discovery in the Tarim Basin in the last 10 years.

The Fuman Oilfield is considered to be one of the most difficult oilfield areas to explore in the world due to the fact that its major oil producing zone is about 8,000 meters underneath the surface of the Earth. Despite that, the exploration success rate of the new wells in the Tarim Oilfield has improved from 75 percent to more than 95 percent.

More than six years have passed since the discovery of the Fuman Oilfield and it is noteworthy to point out that the field’s annual production has substantially increased from 30,000 tons to 1.52 million tons in 2020. The production for 2021 is estimated to be around 2 million tons.

To conclude with, the Tarim Basin is extremely important for China because it is the largest gas and oil-bearing area in China, with about 16 billion tons of gas and oil proven reserves.

2.3.3.5 Securing the sealanes and the maritime energy shipments

China is currently the second largest oil consumer and the first LNG consumer in the world. According to statistics, around 23 percent of its LNG imports and 75 percent of China's crude oil imports are transported via the Malacca Strait from the Middle East, Africa and Europe into China every single year. Except for the Malacca Strait, a great share of foreign energy has to be transported through choke points and sea lanes in the South China Sea. Therefore, the Chinese government must attach importance to the energy trade routes with this region. As mentioned before, China's foreign energy dependence not only remains high but it is estimated to keep strengthening in the following decade. As a consequence, maintaining sea lane security, especially the sea lane security of the LNG and oil trade routes, conforms with the country's strategic concerns and national interests.

2.3.3.5.1 Dependence on maritime energy shipments and certain marine transportation routes

One of the major priorities of China for bolstering energy security is securing the maritime energy shipments (Wang, 2015). Except for only a small portion of oil that is imported via pipelines, the majority of the remaining oil has to be imported via sea transport in order to reach the country. For China, currently, three are the principal routes for importing oil. The first one is the "Middle East route"[11]. The second route is the "Africa route"[12]. The final and third route is the "Southeast Asia route"[13]. The above-mentioned routes reveal firstly, the excessive Chinese dependency on African and Middle Eastern oil, secondly, its excessive dependency on the Straits of Hormuz and Malacca, and finally, the country's monotonicity of marine transportation routes, which will eventually induce the vulnerability of these imports. If extraordinary conditions arise, usual oil imports could not be successfully guaranteed. This could negatively influence the country's economic operation, people's health, and internal security. Due to the fact that China is a major importer of energy, it depends profoundly on sea lanes for the transport of its energy imports. More than 60 percent of China's trade in value travels by sea, as a result its economic security is closely tied to the South China Sea. Almost 90 percent of China's maritime crude oil shipments are transported through the South China Sea. Additionally, more than 80 percent of the Chinese maritime oil imports pass through the Strait of Malacca. Once these sea passages are restricted, China's energy security in terms of energy availability would be severely impacted. Therefore, securing the supply of energy has become one of the core issues in the Chinese energy security strategic agenda. The threat to China's economic security has increased due to the augmenting amount of energy imports, and China is now obligated to take action to address the problem of oil dependency because it is seen to be impossible to overcome. It is worth mentioning that there is a significant portion of these incremental volumes that are sent from eastern Russia to

[11] The Persian Gulf-the Strait of Hormuz Strait-Malacca (or Makassar Strait-Taiwan) Strait-Mainland China.

[12] North Africa-the Mediterranean-the Strait of Gibraltar-Cape of Good Hope-the Malacca Strait-Taiwan Strait-Mainland China or West Africa-Cape of Good Hope-the Malacca Strait-Taiwan Strait-Mainland China.

[13] Malacca Strait-Taiwan Strait-Mainland China.

northern China by shipping vessels and by pipeline that does not pass through the South China Sea (Dunn and Barden, 2018).

2.3.3.5.2 Resolving sealane insecurity

In order to bolster the sea-lane security and secure the maritime energy shipments China must take specific actions. To begin with, the cooperation of the regional and international maritime security should be strengthened. It has been demonstrated that "zero-sum game" approaches are not beneficial to the security challenges concerning international marine lanes, instead, they escalate the gratuitous competition and confusion. As a consequence, the optimum course of action is a “win-win” cooperation. With the emergence of new and unconventional threats to security, leading countries acknowledge that collaboration is essential to effectively combat these threats. The distinct features of the major sea lanes indicate clearly that the best course of action for ensuring the safe transportation of its energy via maritime routes is international cooperation.

The country not only ought to prioritize establishing relationships with major maritime powers, especially the United States, but also should attempt to improve communication and collaboration in the area of marine security, as well as to boost military and strategic trust among nations. Additionally, it should enhance strategic collaboration with the coastal states that are situated along these maritime channels, in order to cooperatively safeguard maritime security while progressing towards establishing an early warning system to avoid maritime conflicts. Ultimately, but equally crucial, China's involvement in the development of a global maritime security regime needs to be intensified. Beijing should leverage its membership in the International Hydrographic Organization (IHO) and the International Maritime Organization (IMO) and enhance its diplomatic role in these international marine multilateral organizations. This includes exchanging information, facilitating efficient communication, and promptly implementing cooperative measures to combat pirate attacks and deter terrorist threats, ultimately ensuring the safety of maritime lanes.

The second action that China must take in order to resolve the sea-lane insecurity is to construct and strengthen the Chinese naval forces, especially abroad. A strong and efficient fleet is necessary for a state to safeguard its interests in resources and maritime commerce. Due to the world maritime powers’ monopoly and subsequent

exclusive control of the maritime lanes, China is destined to be subject to others in the maritime transportation security issues. Therefore, in order to safeguard the security of the maritime transportation of its imports of energy, the nation's naval force should be strengthened even faster so as to become a modern navy power. To conclude with, if China wishes to protect its national interests and guarantee the security of Chinese energy's maritime transportation, its military might needs to be reinforced.

The third and final action is the exploration of new avenues for energy transportation in order to mitigate any risks associated with transportation. For instance, in the case of the Chinese petroleum trade, diversification of the oil import routes is necessary for establishing an additional path that will bypass the "bottleneck" of the Straits of Hormuz and Malacca. Moreover, an alternative base for the supply of oil needs to be established, the Middle Eastern imports should be purposefully averted and the majority of imports should be directed toward regions and countries with the ability to produce substantial capacity of gas and oil, such as Russia, and Latin America. All these actions aim to lessen the undue reliance on the Straits of Hormuz and Malacca and as a consequence resolving issues like the “Malacca dilemma”[14]. To summarize, with primary target the enhancement of the security of its offshore energy channels, China needs to discover an alternative energy transportation route, expand land the existing transportation pathways, and minimize transportation risk. China has begun moving towards this direction by implementing a number of policies and constructing major projects. Among these projects are the Sino-Kazakh oil pipeline, the Thailand Kra canal, the CBI oil pipeline, the train line between Russia and China, the new Pan-Asia Network of railways, the oil pipelines between China and Canada and the oil development and cooperation between Vietnam and China. With these measures, the country would accomplish vital objectives including diversifying the resources of the imported energy and the mitigation of grave risks.

2.3.3.6 Clean energy & Renewables

Nowadays, Beijing is progressively attempting to focus on sustainable alternatives in order to guarantee its future energy needs. This was emphasized especially in 2012

[14] Refers to the lack of alternatives and the vulnerability of the Chinese maritime imports of energy to a naval blockade.

in an in-depth report on the Chinese energy policy where the importance of "vigorously developing new and renewable energy" was mentioned. China, conforming with the Paris Agreement, pledged to peak CO2 emissions by 2030 and to generate one-fifth of its energy from non-fossil fuel sources. In addition, the Chinese President Xi Jinping expanded on that commitment and announced in a speech to the United Nations in September of 2020 that China aims to achieve carbon neutrality by 2060.

China is currently leading the world in the deployment of renewable power, with capacity more than twice as any other nation. About 30 percent of the renewable power capacity of the world is located in China. Especially in 2017, half the renewable power capacity that was added globally was in China (IRENA, 2019).

Furthermore, China is currently the world's largest investor in clean energy. Specifically, in 2017, China announced that it will be spending $360 billion over the next four years (till the end of 2020) in order to build up its renewable energy sector. There are various reasons behind this move, namely Beijing's rising concern regarding the impact of climate change and the political imperative of reducing the low-level pollution especially in the smog-ridden cities. However, the scale of this investment suggests that there are two closely related policy objectives which drive this energy strategy. These objectives are firstly, the effort to create a modernized economy that could provide employment for the Chinese workforce and secondly, the determination to limit China's dependence on imported supplies. It is worth mentioning that the production from renewables, with wind power leading the race, has more than tripled in the last five years (Butler, 2017).

Moreover, China is becoming the world's largest market for renewable energy. It is projected that China will generate one in every four gigawatts of global renewable energy by 2040. In the past decade, China has become a leader in solar photovoltaic (PV) energy and wind power. In particular, in 2020, renewables accounted for 27 percent of China's power generation, with hydro, wind and solar accounting for 18, 6 and 3 percent respectively (Göß, 2021). By 2035, China's investment in wind power infrastructure will be greater than in all of Europe, accounting for more than 30 percent of the global investment. Additionally, China will account for 14 percent of global investment in bioenergy, 15 percent in solar photovoltaics and almost 25 percent in nuclear.

China is currently the world's largest consumer and supplier of solar photovoltaic (PV) technology. This is due to the rapidly decreasing costs, low-interest loans offered by regional governments, and aggressive policy incentives, which enabled China to increase its solar panel production tremendously. In fact, China became the world's largest producer of solar panels in 2014, and one year later surpassed Germany's solar power generation capacity. Nowadays, China accounts for two-thirds of the world's solar production capacity.

Finally, in an effort to minimize its reliance and decrease overall imports of fossil fuels, the country has recently begun exploring nuclear power as an alternative energy source. However, in the last decade, at least two nuclear projects have been canceled because of strong public opposition. These projects include a proposed nuclear fuel reprocessing facility in Jiangsu, which was cancelled in 2016, and a proposed uranium processing plant in Guangdong, which was cancelled in 2013 (Jing, 2016). Furthermore, in 2018, out of the nine nuclear power plants in the world, which were connected to the grid for the first time, the seven were located in China. In 2019, China had 11 nuclear power plants under construction and 45 operational nuclear power plants. All these plants are primarily located in coastal provinces (Zhikai & Ling, 2019).

China currently has the third largest nuclear power fleet in the world. It is third only to the United States and France. In addition, around 20 percent of the nuclear power plants that are currently being constructed in the world are located in China (IAEA, 2019). As of January 2021, China has 49 nuclear power reactors in operation. To conclude with, it is evident that the government has ambitious plans and aims to expand China’s nuclear generating capacity.

2.3.3.7 Diversifying the oil portfolio and limiting the imports of coal

Moving on, another way for China to reduce its energy dependence and bolster its energy security is to diversify its energy portfolio, especially its oil portfolio. Additionally, China in order to limit its dependence on foreign energy sources should reduce its imports of coal. This reduction not only will assist in achieving energy independence but also it will contribute to the country’s climate targets.

2.3.3.7.1 Diversifying China’s oil portfolio

The demand for crude oil outpaces China's domestic production. Specifically, China has been a net importer of crude oil since 1993 and in 2017, it surpassed the United States as the largest importer in the world. According to EIA's data, around 67.3 percent of China's crude oil supply in 2019 derived from imports. This dependence on foreign energy is expected to increase.

Current trends suggest an increasing reliance on supplies especially from problematic countries such as Saudi Arabia, Iraq, Venezuela and Nigeria and on vulnerable trade routes through Malacca and Hormuz Straits. As history suggests, those who become dependent on particular suppliers tend to get drawn into local politics. This situation the Chinese have wisely long preferred to avoid it, although the real question is whether they can nowadays as their import dependency is augmenting. Coal and oil have fueled the spectacular economic growth of China for the last four decades (Butler, 2017). In addition, it is forecasted that by 2040, almost 80% of China's oil requirements will be sourced from other countries. This implies that securing reliable access to foreign energy sources is crucial for China's continued growth and development. Especially, Middle East, given the political instability, represents a complex challenge for China in terms of energy security, as almost half of its imports of oil derive from this area. However, its dependency on oil deriving from the region of Middle East is expected to grow in the upcoming years, with IEA forecasting that these imports will be doubled by 2035.

In order to confront this security the country must diversify its oil sources, and one way to achieve this is by investing more in the African region. Although Africa has only around 10 percent of the world's proven petroleum reserves (compared to 60 percent in the area of Middle East), there is a lot of potential for discovering new and untapped resources. For instance, the country has already been providing economic development loans to African countries, like Angola, in exchange for favorable access to their oil reserves. In 2015, China sent troops to South Sudan to assist the UN peacekeeping operations, where it has substantial oil investments. Whilst South Sudan's oil exports only account for a small percentage of China's total imports, in 2018, 23 percent of its oil exports were sent to China. It is evident that the untapped resources of the African region represent an unparalleled opportunity for China to counter its dependence against the Middle Eastern political instability and energy

insecurity. As a consequence, China must continue investing in the region and promoting bilateral relationships.

2.3.3.7.2 Limiting the imports of coal

China possesses the fourth-largest coal reserves in the world, which it has historically used to meet its requirements for energy. However, China has progressively become more reliant on imported coal as the nation's economy has expanded. Specifically, in the turn of the century, China was producing one billion tons of coal, and only needed around two million tons of imported coal for domestic consumption. However, by 2009, the augmenting demand had made China a net importer of coal, requiring 126 million tons of coal to import in order to meet domestic demand. Moreover, it primarily imports coal from neighboring countries, with around 96 percent of its imports in 2020 deriving from Australia (85 million tons), Indonesia (53 million tons), Mongolia, and Russia (36 and 32 million tons, respectively). Prior to 2017, North Korea was considered China's fourth-largest supplier of coal, ahead of Mongolia and Indonesia. However, due to sanctions on North Korea from the United Nations, China stopped coal imports from the country and now relies on Mongolia and Russia.

China has already begun to take actions in order to limit the imports of coal. The rapid growth that imports of coal had until 2014 has been halted, with imports used sparingly and primarily as an interim source of supply while the domestic coal industry is fundamentally restructured. Moreover, a large number of small and inefficient mines are being closed, although the trend of total coal consumption is expected to grow further, towards the target ceiling of power production from coal, namely 1,100 gigawatts, that the National Energy Administration has set. Whoever is under the impression that the coal industry of China is in terminal decline should observe and understand that new mines are still being opened and new coal-fired power stations are being brought on stream each week. Increasingly, coal is supplied by new and modernized local mines and it is quite possible that coal imports will be reduced to a minimum until 2030 (Butler, 2017). To conclude with, despite the fact that the total coal consumption is expected to grow further, China must continue restructuring the coal industry and taking actions to limit the imports of coal.

2.3.4 The current strategy of the 14th Five-Year Plan

In the 14th Five-Year Plan (Kemp, 2021), which was approved by the National People's Congress in March 2021, China has outlined climate and energy policies for the upcoming decade. However, these policies are considered to be an extension of its current strategy rather than a radical departure. Specifically, the new Five-Year Plan (FYP-14) recommitted the government in very broad terms to "anchor efforts to achieve carbon neutrality by 2060" and to "formulate an action plan in order to peak carbon emissions before 2030". At the core of the document there are familiar concerns about boosting efficiency, reducing wasteful energy consumption, curbing pollution and improving energy security. These concerns have been central objectives for more than 40 years.

In most respects, as mentioned above, the strategy outlined in the new five-year plan is a natural extension of these earlier policies, and mainly represents a cautious evolution rather than a revolution. In particular, FYP-14 outlines new targets for reducing emissions and increasing energy efficiency[15] , new targets for reducing the share of fossil fuels in energy consumption[16] and cutting air pollution[17] and finally, targets for increasing energy security[18].

Over the past few decades, China has keenly embraced zero-emission energy from hydro, solar, wind and nuclear, as well as the electrification[19] of the transportation and energy systems, due to the fact that it offers the opportunity to reduce its reliance on coal without augmenting its dependence on imported gas and oil.

China is currently the world's largest producer of renewable and hydroelectric power because there is a compelling national security and economic case for moving to non-fossil fuels. The fact that the promotion of emissions reduction and non-fossil energy sources allow China to claim a diplomatic benefit by displaying that the country is serious about tackling global warming is an additional bonus. Although most of the policies that are outlined in FYP-14 would be extremely essential for the

[15] Chapter 3 – Main goals.

[16] Chapter 11 – Building modern infrastructure.

[17] Chapter 38 – Continuous improvement of environmental quality.

[18] Chapter 53 – Strengthening national economic security.

[19] It is the process of replacing technologies that use fossil fuels as sources of energy.

economic development of the country even if the government was not concerned about climate change.

If the 14th Five-Year Plan is analyzed from a Chinese perspective, rather than a Western one, it is evident that the need to provide increasing volumes of affordable, secure and non-polluting energy in order to ensure the continuous economic growth and increasing living standards is the core of the plan, precisely as it has been at the heart of each plan since the early 1980s.

2.4 The case of Russia

Russia is currently the world's second-largest producer of dry natural gas and the third-largest producer of crude oil. Not only that but also produces substantial amounts of coal. If anyone combines the proven gas and oil reserves, Russia is the world's leading energy producer, with roughly 15 percent more proven reserves than Saudi Arabia.

Energy plays a central and vital role in the Russian economy since it drives all the other elements of the system, namely the agricultural, commercial, industrial and government sectors. In addition, energy, particularly natural gas and petroleum, is the most significant export-commodity and source of foreign exchange for the Russian economy. Many experts foresee that the energy sector will continue to occupy a central position until the manufacturing sector of Russia reaches a competitive-enough level in relation to the West.

2.4.1 Russia's dependence on energy

Russia is considered one of the most energy-dependent countries. Multiple years of high energy prices bolstered its economy with an infusion of cash, although other industries were left completely underdeveloped, making the nation especially vulnerable to declines in oil prices and in cases of declined demand.

The immoderate consumption of energy in Russia derives from the Soviet system, which artificially priced energy far below the level of the prices of the world market and therefore had to subsidized it. The energy-pricing policies of the Soviet system not only disregarded the resource utilization in the quest for higher output volumes but also discouraged the adoption of conservation measures. Additionally, Soviet executives skewed resources toward the heavy and defense-related industries, which consume energy more intensively in relation to other sectors of the economy. Unto the 1980s, the national economy managed to survive under such policies due to the rich endowment of natural resources of the Soviet Union.

The problems that tormented the Russian energy sector in the last decades of the Soviet Union were exacerbated during its transition period. Since 1991 the output of all types of energy and fuel has declined, partially due to the plummeting demand for energy during a time of general economic contraction. However, the energy sector, in

general, has predominantly suffered from the intrinsic structural defects of the central planning system, namely the under-investment, the poor management of the country's resources and the outdated equipment and technology.

The structure of fuel and energy production commenced to change fundamentally in the 1980s with the exploitation of huge deposits of natural gas. In particular, in the mid-1990s, natural gas accounted for more than half of the Russian energy consumption, a share that is still increasing and is expected to increase in the future. In addition to natural gas, oil accounts for roughly 20 percent, a proportion which is expected to remain approximately constant. Other solid fuels and coal, water-power and nuclear energy account for smaller shares. The share of the majority of those sources is expected to further decline in the upcoming decades. In spite of the waste of fuel in the economy, Russia manages to produce a surplus of energy for export. Specifically, exports of natural gas and oil, have accounted for more than 30 percent of the Russian energy production, and the share is expected to hold steady.

Russia's drive to become a market economy could assist to alleviate some of the core problems of the energy sector. Nowadays, core Russian energy pricing policies have already changed. Since 1992, energy has been gradually deregulated, forcing consumers to conserve energy and closing the gap between domestic and world market prices. Finally, Russia is also adopting more efficient management techniques and Western technology that will improve productivity in the sector.

2.4.2 The Russian Energy Diplomacy

As mentioned at the beginning of this dissertation, energy diplomacy concerns the norms and practices by which large energy companies and political institutions cooperate in order to advance energy commerce. Specifically, in countries that are considerable producers of energy such as Russia, the dominant energy companies collaborate with the political institutions to ensure the demand for export of energy commodities like oil, natural gas, uranium, and coal.

Energy diplomacy involves diplomatic practices applied to energy trade, with both private and public actors and their interests often intertwined. A prime example of such linkages is the Russian energy diplomacy. The Russian Federation is the only Great Power where essential foreign policy interests coincide with powerful energy business interests, particularly in relation to Europe, East Asia, and the countries that

formed the former Soviet Union. Currently, the country is the world's second-largest exporter of gas and oil and third-largest exporter of coal. This makes it the most significant energy exporter among the great powers. As a consequence, Russia's foreign policy interests in the energy sector are unique and unmatched by any other major energy exporting country. These interests are rooted in Russia's legacy as a superpower and its diverse neighborhood.

The President of Russia represents an integral element in the country's energy diplomacy. This is especially evident during the four presidential terms of Vladimir Putin, who is considered to possess extensive knowledge of the energy industry (Lough, 2011). The President receives support from the Presidential Administration and the Government. On the other hand, the Prime Minister's role is to coordinate the specific tasks of various line ministries. Furthermore, the President is responsible for supervising the strategic operations of enterprises that are involved in energy exploration, production, transport, and commerce. Since energy is viewed as a crucial sector of a nation’s security agenda, these companies must adhere to the strategic objectives laid out by the political institutions.

It is the responsibility of the state to issue licenses for the exploration, development, export, and trade of all subsoil resources. Among the major energy companies, Rosneft and Gazprom are 70 and 50 percent state-owned, respectively. Additionally, Zarubezhneft is fully owned by the state, and Bashneft was renationalized in 2014. On the contrary, Novatek, Lukoil, and Surgutneftegas are principally owned by individuals. All these companies must be profitable enough to generate income for both the state and their shareholders while also serving the interests of the state.

The intricate nature of the Russian energy diplomacy, which stems from the federal institutions involved, resource-rich regions, and enterprises with competing interests, make its coordination an extremely difficult undertaking (Tkachenko, 2007 & Filimonova, 2013). Russian oil companies operate on global free markets, although, rely on infrastructures that are owned by the state like the railways, the port, and Transneft, which is an oil pipeline transit company. Gazprom, which is 50% state-owned, holds a monopoly on pipeline-based exports of natural gas, however, Rosneft and Novatek have begun to challenge this monopoly by exporting liquefied natural gas via tankers from the Yamal Peninsula and Sakhalin Island in 2017 and 2018, respectively.

The political institutions must not only understand the diverse interests, but also the different business models and operating environments of the Russian energy companies (Aalto, Dusseault, Kennedy and Kivinen, 2013). This is deemed necessary in order to assist these companies gain profits from the energy exports, and to, subsequently, tax these profits in order to support the state budget. Specifically, the fiscal interest of the state is extremely significant since energy exports make up almost half of the state budget and more than two-thirds of the value of foreign trade.

In addition, the political institutions of Russia, in order to promote the interests of the Russian energy companies, primarily rely on bilateral energy diplomacy. These dialogues have taken different forms, including summits, negotiations, and institutionalized dialogues. The EU-Russia energy dialogue is the most developed among them. In order to prevent disruptions in supply or demand, the parties have established an early warning system and coordinated their energy trading across all market categories. Despite the fact that this dialogue has helped to depoliticize energy commerce between them, it has not been able to prevent several energy trade disruptions since 2006. The dialogue also failed to mitigate the negative effects of the 2014 sanctions that the European Union imposed on Russia regarding long-term credit and exports of offshore and Arctic oil drilling technologies, following Russia's annexation of Crimea.

As mentioned before, Russia is involved in multilateral energy diplomacy through various institutions. Typical instance of this multilateral diplomacy is Russia’s participation in the Group of Eight (G8), the Group of Twenty (G20), and the Gas Exporting Countries Forum (GECF). The primary endeavor of the country is to represent the standpoint of energy producers with regards to the security of demand. Specifically, this objective is aimed at balancing the overwhelming concerns of consumer countries regarding the security of supply (Lesage et al., 2010). In 2006, the aftermath of the summit of the G8, which was held in St. Petersburg, is considered a success of Russia’s energy diplomacy. The summit marked a commitment to the "interdependence" between the interests of consumers, producers, and transit. Additionally, it pledged to improve risk-sharing among all stakeholders in the energy supply chain (The Group of Eight, 2006). In 2013, the Moscow declaration in the Gas Exporting Countries Forum also emphasized the interests of Russia. Among these interests were the absolute and permanent sovereignty over natural resources, the preference of Gazprom for long-term gas supply contracts so as to recover its

investments and the preference for gas pricing based on oil in order to ensure fair prices (Gas Exporting Countries Forum, 2013). Moreover, Russia participates as an observer in OPEC and the country's energy analysts also are involved and exercise energy diplomacy in the "Track Two" meetings. Finally, the Russian energy corporations also practice "soft diplomacy" by sponsoring team sports like football and ice hockey. Finally, the country's energy corporations exercise "soft diplomacy" by sponsoring team sports such as football and ice hockey. Even though Russia is a member of the World Trade Organization (WTO), the impact of its regulation on energy trade is minimal. Since 2009, Russia has not implemented the provisions of the multilateral Energy Charter Treaty, which was signed in 1994 but never ratified. The treaty regulates investment, commerce, transit, energy efficiency, and also contains a mechanism for settling disputes. Therefore, Russia's energy diplomacy is mainly supported by domestic rules and regulations, along with bilateral supply agreements, declarations, and memorandums of understanding with partner and customer countries. It is evident that strengthening the country's strategic partnership with major energy producers and promoting dialogue with transit and consumer countries are among the core objectives of Russia's foreign policy (The Ministry of Foreign Affairs of the Russian Federation, 2013).

In early 2014, the European Commission challenged Russia's agreements made with several transit countries in bilateral basis for the construction and function of a new natural gas pipeline project led by Gazprom. This pipeline is called South Stream and it would deliver gas from Russia to Europe via the Black Sea. The challenge was based upon the suspicion that these agreements might violate the competition laws of the European Union. Later that year, the country abandoned the project altogether. There are several reasons for Russia's decision. Firstly, stricter regulations in the European energy markets and political reservations after the Ukrainian-Russian conflict made it extremely difficult to pursue the project. Secondly, demand for natural gas in Europe was at best mature, whereas demand in Asia was increasing. As a result, Russia turned its attention to the East to secure demand. To demonstrate the growing importance of Asia in Russia's energy diplomacy, in May 2014, Gazprom and the Chinese company CNPC agreed to a sales and purchase agreement for mutual natural gas trade. The agreement began in 2017 and is expected to reach over 40 billion cubic meters per year via the Power of Siberia pipeline (Motomura, 2014). One year ago, in 2020, Russia adopted the draft Energy Strategy of Russia until 2035,

which aims to diversify Russia's energy exports away from the European markets to Asia where around 12 to 23 percent of oil exports and 6 to 31 percent of natural gas exports are intended to go.

It is worth mentioning that the formal regulations that Russian actors face in European markets and the emerging markets of Northeast Asia could become more similar as the latter introduces more competition into their energy sectors (Aalto, 2014). Additionally, the formation of multilateral energy diplomacy in the area, namely among energy purchasers under the leadership of Japan, might potentially place additional limitations on Russia's inclination towards bilateral energy diplomacy and agreement (Shadrina, 2014 & Vivoda, 2014).

Many experts argue that Russia has been strategic, consistent, and focused in its energy diplomacy, particularly with its greatest consumers, such as the European Union (Dimitrova, 2010). Other experts noted how, as oil prices dropped in the mid-2000s, fears of Russia becoming a "energy superpower" and dominating Eastern Europe, as well as the influence and earnings of Russia and its energy businesses, vanished. The lack of a comprehensive strategy, which would have guided Russian actors on what to do, where, and when, contributed to this outcome, despite the presence of existing energy strategies (Monaghan, 2007).

Moreover, despite the fact that it is evident that the Russian actors are still learning how to balance the political, economic, and business interests, some experts believe that the president's direct and explicit involvement makes Russian energy diplomacy effective (Lough, 2011, p. 4, 16). In thirty-one cases between 2000 and 2010, Russian official entities utilized energy issues to advance their political agendas (Orttung and Þverland, 2011). The Russian political establishment made numerous initiatives, particularly in Europe, to encourage the investments of Russian oil corporations, which in turn politicized energy and hindered the signing of agreements (Poussenkova, 2012).

To conclude with, when attempting to accurately assess Russia's energy diplomacy, all the different markets involved must be taken into account. For instance, Russia's political interests, especially in the area of the former Soviet Union, have been very obvious. Despite the fact that in early 2000s Ukraine was deprived of its status as a favorable nation, close partner nations like Belarus and Armenia still benefit from lower natural gas prices. Russian energy diplomacy varies for specific countries in each of the major markets. This is due to their divide-and-rule policies, where Russian

players try to discourage cooperation among the countries that are purchasing Russian energy commodities. Furthermore, the various interests of the firms in charge and the differences in the oil, natural gas, and nuclear power industries cause Russia's energy diplomacy to vary from one area of the energy industry to another (Stulberg, 2007).

In late 2010, Russia encountered various obstacles in its energy diplomacy. Among those was the anticipated rise in new oil and gas exports from Canada, the USA, and Australia. In addition, the introduction of novel energy sources like unconventional gas and oil, along with larger-scale renewables, had a detrimental impact on the prospects for Russian exports in a number of markets. The augmenting availability of LNG poses a challenge to Rosneft, Gazprom, and Novatek, as they are considered to be relative newbies in this quickly growing energy segment. Gazprom's preference for long-term contracts, oil price linkages, and pipeline deliveries is disputed by the rising spot and short-term market pricing for natural gas. Aside from these resource and market-specific obstacles, the efforts of fitting the political interests with business interests until this day remain a persistently complicated balancing act.

2.4.3 The Russian energy security

The energy security of Russia is intertwined with its national security and its strategic objectives as a nation. Russia can only achieve its grand strategic objectives inter alia, for the time being, primarily by using the country’s vast natural resources. Except for depending on its oil and natural gas resources, Russia must continue leveraging Europe’s scarcity of energy commodities and choice of suppliers.

The Russian Ministry of Energy, in the Energy Strategy 2035 draft document, highlighted that the gas and oil industry amounts to a quarter of the nation’s GDP, around a third of investments, more than half of exports and around 40 percent of the federal budget revenue. The relevance of energy and energy security is further emphasized in the Foreign Policy Concept, the Energy Strategy of Russia through 2030, and the National Security Strategy of the Russian Federation until 2020.

In particular, the National Security Strategy to 2020 asserted that Russia’s principal goal was to become a global military and economic power. Therefore, Russia’s national security is dependent above all on energy security, which is primarily subject to the European dependency on the Russian natural gas and on the economic benefits associated with oil and gas. It is evident that energy security is closely identified with

both national and economic security, and threatening it could potentially lead to military confrontations, especially in Russia's near abroad. In addition, it is well known that the military and economic potential of Russia is extremely limited, leaving the energy sector as the core source of the Russian power and influence.

The role of energy security is also asserted in the Foreign Policy Concept, where it is stated that energy has become a consistent part of Moscow's security agenda due to its ability to produce extremely high revenues and its use as an instrument of power and influence. Finally, energy security is also mentioned in the Energy Strategy of Russia through 2030, where is described as one of the most important components of national security and is defined as the protection of the country, its citizens, society, economy and state against potential threats to energy demand and supply. As a consequence, it is obvious that the status of Russia as a global power can not be achieved without the use of natural gas to promote its national interests, and without the use of oil to increase national wealth.

2.4.3.1 Securing energy revenues from the European markets

As mentioned above, Russia's primary concern is to secure the necessary energy revenues (Mathioulakis, 2020) that would enable Moscow to exercise and project, if needed, its hard power to various areas, thus rendering Russia eager to manifest a more assertive posture by aspiring to gain greater leverage within the European energy markets (Mankoff, 2012). The developments in the Eastern Mediterranean region raise both challenges and opportunities for Moscow. It is evident that Kremlin's overall energy efforts have been focusing on securing its energy sales revenues especially from the European markets while avoiding Ukraine. Moreover, the Eastern Mediterranean offers Russia the opportunity to attempt to influence and control future flows of natural gas from Iran via Syria or Turkey towards the European markets. However, the recent discoveries of natural gas resources in Israel, Egypt and Cyprus pose a potential threat for Moscow.

Russia's security objectives in relation to its energy export capacity are expressed predominantly via the materialization of two major natural gas pipeline systems, namely the TurkStream and the Nord Stream 2 pipelines. The TurkStream pipeline starts from the Russkaya compressor station, which is located in the Krasnodar region of Russia, and crosses the Black Sea in order to reach the receiving terminal at

Kıyıköy in Turkey. Additionally, it consists of two lines with combined capacity of 30 bcm per year. Among these lines, the first one is already in operation, delivering 15 bcm per year of gas to Turkey for the internal needs of the country. The second line is designed to run from Turkey to Bulgaria, crossing Serbia to reach Hungary and Slovakia.

The second major natural gas pipeline is Nord Stream 2 which is designed to carry 55 bcm per year of natural gas from the Russian port of Ust-Luga in the Leningrad region, via the Baltic Sea to Germany in the Greifswald area, which is very close to the exit point of Nord Stream 1. There, the new pipeline connects with the existing OPAL pipeline which runs across the eastern part of Germany to the Czech Republic. Nord Stream 2 stopped in December 2019 due to the fact that the Swiss company Allseas[20] opted out of the construction of the pipeline. Specifically, this happened because the company was frightened of the sanctions behalf of the U.S. .However, the construction restarted on the 11th of December 2020. Furthermore, the construction in the Danish Exclusive Zone had stopped in late December 2010 as well due to the U.S. sanctions. The construction restarted in Denmark on the 6th of February 2021. Many believe that with the construction of Nord Stream 2, Russia will further expand its influence in Europe and as a result it will intensify Germany's dependency to Russia's gas and consequently it will lead to the amplification of EU's energy dependency to Russia. Among these countries that consider the project as a serious threat is Poland, which led the EU countries that consider the project a direct threat to EU's security and diversity of supply.

Therefore, it is evident that Russia's energy interests, regarding the regional subsystems of the Southeast Europe and the Eastern Mediterranean, relate predominantly to the development of the TurkStream pipeline which will pass through Bulgaria and Serbia to the rest of Europe. Except for securing its influence over the European markets, this pipeline will also enhance Russia's position in Serbia and Bulgaria. The capacity of this pipeline (15 bcm per year) will offer an abundance of cheap Russian gas flowing through the Balkans, hence rendering any competitive gas project (Greek-EU-U.S.) in the area economically non-viable.

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[20] Allseas Group S.A is a Swiss-based company, which constitutes a global leader in subsea construction, offshore pipeline installation and heavy lift.

With TurkStream, Russia practically blocks the access for the U.S. or for the Eastern Mediterranean natural gas to reach the Balkans and also the access to the route leading up to Ukraine. However, the challenge that the TurkStream pipeline is facing is that passing through Bulgaria, which is an EU member state, the pipeline needs to comply with the European energy regulation framework. Especially, this requires changes in the access offered to third parties that want to sell gas via the pipeline, namely the "Third Party Access" principal which is included in the EU's Third Energy Package, as well as adaptations to natural gas contracts with domestic providers where the regulatory framework of the European Union includes Over-the-Counter (OTC) bilateral contracts predominantly negotiated in an Energy Exchange platform (European Commission, 2011).

Hence, it is clear that the Russian energy interests have a three-dimensional objective. These three dimensions are firstly, to maintain the sales of the Russian natural gas to Western Europe via alternative-to-Ukraine routes, secondly, to assert and strengthen the influence of Russia in the Balkans, and finally, to avert and disrupt the competitive energy systems of Europe. It is worth mentioning that all these three dimensions are in a direct collision to the strategic interests of EU and U.S. in the area concerning the European energy security and the liberalization of the European energy sector.

2.4.3.2 Diversifying the energy exports and Pivoting to the East

Russia must accelerate the long-overdue geographical diversification of its gas exports by delivering LNG to the Asia-Pacific region and pipeline gas to China. While Gazprom still remains the national leader in the gas pipeline business, Novatek has emerged as a leading force behind the drive to establish Russia as one of the primary global LNG players along with Australia, Qatar and the U.S. in the upcoming decade. It is worth mentioning that the gas industry of Russia has demonstrated a lot of ingenuity in overcoming tough engineering and technological challenges, especially by successfully completing challenging projects in the harsh environment of the Arctic region and building high-diameter subsea pipelines at record depths.

As mentioned before, Russia is among the leading energy exporters. It possesses abundant gas and oil reserves that have the potential to meet China's gas and oil import needs in a sustainable manner. A new energy relationship between Russia and

China could potentially lead to a mutually beneficial interdependence. Specifically, Russia will achieve economic and energy security in terms of assured demand and China will achieve energy security in terms of security of supply.

According to estimates from EIA, in 2020, the Russian Federation led the globe in terms of proven reserves of natural gas, standing at 37.4 tcm. Additionally, it had 107.8 billion barrels of proven oil reserves. Furthermore, in accordance with the agency's assessment, by 2035, Russia could supply all of China's natural gas import demand (7 Tcf) and approximately 85% of its oil import requirements (8.5 of 10 million b/d).

It will require a significant investment of time and money to transform this potential into reality, as it involves the development of gas and oil fields, increasing output, and expanding pipeline networks. From an energy security standpoint, Russia would need to shift its focus from Europe to the East, especially towards China. Russia's ability to bolster its economic security is currently greatly reliant on its energy exports to the European Union. Nearly 40 percent of Russia's government revenue derives from these energy exports. In particular, the European Union is the intended recipient of about 60 percent of its oil and 75 percent of its gas exports. However, the sanctions imposed by the EU and the US on the country in 2014, after it annexed Crimea, have compelled Moscow to reorient its energy export strategy towards China and away from Europe.

China's need for a stable and dependable energy supply to fulfill its imports requirements aligns perfectly with Russia's necessity for economic stability through a reliable and stable demand for its energy exports. The emerging East Siberia-Pacific Ocean (ESPO) pipeline and the Power of Siberia (POS) gas pipeline, which both connect the Russian oil fields of Siberia with China, are the first two projects that marked the beginning of this new energy partnership between these two nations. These two projects signaled the commencement of a brand-new era of cooperation between the two countries, especially in energy-related issues.

2.4.3.3 Diversification of the energy mix and the economy

Russia is currently one of the top producers and suppliers of fossil fuels in the world, although it has to deal with many difficulties. As the world moves towards zero-emission, Russia's future depends greatly on diversifying its economy and

decarbonizing its energy sector. More nations are establishing net-zero goals and creating decarbonization plans, which present new economic risks, particularly for major gas and oil exporters like Russia.

The nation has already acknowledged these risks, although there is still no clear plan in place to deal with these issues. For an extended period of time, the country has not been actively involved in the international debate regarding climate change and global warming. In particular, the phenomenon of climate change and its repercussions on the political, social, or economic spheres has not received much attention. In many respects, Russia is just now making an effort to make up for having realized how important this issue is much later than it should have.

Around 2009, Russian climate policy underwent a "turn" and became more concentrated when then-president Dmitry Medvedev visited the COP-15 in Copenhagen and signed the Climate Doctrine, which served as the cornerstone for all subsequent climate policies. Since then, Russia has taken several steps towards reducing its carbon footprint. It has adopted the Paris Agreement and filed its first Nationally Determined Contribution (NDC), which outlines its emission reduction goals. However, the NDC is not very ambitious. Furthermore, Russia has prepared its first long-term low-carbon development strategy, which is likewise unambitious. The country is also currently drafting its first legislation, which will introduce carbon reporting for large polluters and voluntary carbon projects for businesses. However, there is no indication of a binding carbon price in the near future.

There were various drivers behind the changes that are currently pushing the nation towards recognizing the significance of a climate agenda. Some of these drivers include observed and forecasted climate threats such as melting permafrost, forest fires, droughts, and floods. In addition, Russia appears to have become more aware of climate change as a result of the realization of the economic risks associated with the decline in global demand for coal, oil, and natural gas as a result of other nations' decarbonization policies, as well as the European Union's plans to implement the Carbon Border Adjustment Mechanism (CBAM) as part of the Green Deal plan.

Even though Russian professionals, researchers, and environmentalists have long studied the repercussions of global warming and climate change policies abroad, evidently businesses and political elites still view it as a very distant and long-term concern. At least until 2030, most producers of fossil fuels still anticipate growing or at the very least steady markets for their commodities. As a consequence, is quite

challenging to change the current system because of the producers' optimism as well as the general desire for rapid profits and short-term planning.

In recent times, the CBAM has emerged as a significant force in reinvigorating climate discussions and, potentially, prompting action at both business and governmental levels. Representatives and officials from Russian companies have been having open and confidential discussions and consultations over this new mechanism since the summer of 2020, both informally and officially. Various estimations of possible economic losses by Russian exporters of metals, chemicals, and fossil fuels have been made public, yet the scope of the CBAM rule-set is still unclear. As a result, businesses became more interested in the decarbonization and climate change agendas, as well as ESG (environmental, social, and corporate governance) investing and reporting. Many Russian companies are actively engaged in their ESG and SDG (Sustainable Development Goals) corporate reporting and especially in their interactions with European Union partners, investors, and customers. Still, major energy-producing corporations in Russia continue to oppose and obstruct any initiatives to enact stringent carbon regulations.

While the nation has made considerable headway in the last several years toward the development of renewable energy sources, it still lags well behind the worldwide trends in green energy. With the emergence of hydrogen as a new trend, the government has authorized a strategy for the development of hydrogen energy, with Novatek, Gazprom, and Rosatom positioned to be key players in this emerging market.

Furthermore, the Russian government plans to advocate for the global acceptance of nuclear energy as a zero-emission and environmentally-friendly substitute to fossil fuels. Numerous nuclear energy projects are being developed by Veb.RF, a state-owned development corporation, as part of its "green" initiatives. However, Russian and international environmentalists criticize and question Russian officials' plans to advocate the use of nuclear energy as a remedy to climate change, citing its slow and ineffective nature in addressing the climate crisis and the inherent risks associated with nuclear energy.

To conclude with, until this day, Russia lacks a specific strategy for transitioning in low-carbon energy sources, decarbonizing its economy and diversifying its energy sources. The majority of papers on energy and economic development, together with socioeconomic plans, forecast rising use and production of fossil fuels, therefore foreseeing increasing GHG emissions. However, it is essential to recognize that

Russia has significant economic and physical potential in the fields of renewable energy, "green" hydrogen generation and other promising “green” industries, such as climate-smart and resource-efficient agriculture, as well as sustainable forestry. The most crucial query at this point is when these strategies, plans, and policies will be revised to take into account the current and always evolving global reality.

2.4.3.4 The role of renewable energy in energy security

The energy transition of the world is underway, and Russia’s renewable energy potential is massive. This was ascertained by a new research made by the International Renewable Energy Agency (IRENA, 2017). As a prominent player of the traditional energy sector, Russia has the chance to extend its leadership to the renewable energy sector as well. According to the research, Russia can boost the proportion of renewables in its energy mix from about 4 percent in 2020 to over 11 percent by 2030.

To begin with, all types of renewable energy in Russia have significant potential. Currently, the primary sources of renewable energy in the nation's existing energy system are hydropower and bioenergy. As of late 2020, the nation's equipped capacity for renewable energy generation had grown to over 54 gigawatts (GW), which represented almost 21 percent of the total capacity in Russia. Specifically, large hydropower plants contributed the majority of the installed capacity. According to Russia's Ministry of Energy, solar, hydro, and wind power comprised roughly 21 percent of Russia's total installed power capacity, which is, as of 2020, around 246.34 GW as of 2020.

Russia can achieve its core economic objectives by further developing its abundant and varied renewable energy resources. These objectives include creating more employment opportunities, promoting economic growth, enhancing energy security, diversifying the energy mix, and finally, reducing the cost of supplying energy in remote regions.

All these targets are considered achievable. According to current estimates, the Russian energy mix is forecasted to consist of a renewable energy share of nearly 5 percent by 2030. However, this falls short of its potential capability of over 11 percent. In 2030, the electricity industry is projected to have the largest share of renewable

energy, at almost 30%, with 20 percent attributed to hydropower and the remaining 10 percent to solar photovoltaic (PV), wind, and geothermal power.

Apart from hydropower and bioenergy, which as mentioned before are the primary renewable energy sources in the nation's existing energy mix, Russia has already implemented several measures to hasten the adoption of additional renewable energy technologies. The current policy on renewable energy is specifically focused on hastening the installation of solar and wind power plants. It is worth mentioning that approximately 70 megawatts of new renewable energy capacity were added in 2016 in accordance with this program.

However, in order to achieve and surpass the 2030 target of having 11 percent of renewables in the energy mix, investment in renewable sources of energy is extremely necessary. To make this happen, an investment of around $15 billion per year between 2019 and 2050 is necessary. The benefits of such an investment will outweigh the costs, especially when considering the externalities associated with climate change and human health. Additionally, renewable energy sources have the potential to save up to $9 billion annually by 2030, and the advantages could extend to exporting hydropower and wind power to Asia, as well as biofuels to Europe. Finally, it is worth noting that Russia has the world's largest potential for wind energy generation, as per current estimates.

The government target for a 2.5 percent share of solar and wind in electricity generation by 2020, which was stated at the “State Programme on Energy Efficiency and Energy Development” in 2014, has not been reached (0.3 percent in 2020). Finally, in 2021, the authorities plan to award RUB360 billion, which is around $4.9 billion, of state support for renewable energy projects through 2035. With this state support, the country aims to introduce, by 2035, 12 GW of renewable power generation capacity (Enerdata, 2021).

2.4.4 Russia’s new Doctrine of Energy Security and its new energy strategy until 2035

On May 2019, President Vladimir Putin signed into law the “Doctrine of Energy Security of the Russian Federation”. This document replaced the 2012 version of the Russian energy security strategy, which could be considered to be a classic example of security strategy adopted by an energy-exporting country. It is worth mentioning

that hydrocarbons are responsible for almost a quarter of the gross domestic product (GDP) of Russia and for two-thirds of its earnings from exports. Despite the fact that the share of revenues from exports of fossil fuels in the federal budget of Russia has decreased, from 50.2 percent to 39.3 percent in the last five years, it is still vital to the Russian state and the wider economy. It is forecasted that Russia will remain one of the largest hydrocarbon exporters in the world, with its exports corresponding to more than 5 percent of global energy demand. As a consequence, the economy of the Russian Federation is overly sensitive to fluctuations of international energy prices and to the overall demand for hydrocarbons.

The government experts, after the oil price plunge of 2014-2016, began to acknowledge the dreadful threats to the energy security of Russia posed by lower demand in the low-carbon future. After many years, it was openly admitted that the rapid development of renewables would potentially result in a major decrease in the energy export revenues and as a result it would be detrimental to the Russian economic security. Additionally, after the recent oil price drop, Alexander Novak, the Russian Minister of Energy, admitted that due to the COVID-19 pandemic, the energy sector will experience a structural change. In particular, less energy will be generated from hydrocarbons and more from renewables. For that reason, government energy experts have called for new economic and energy policies that will assist the country in adapting to energy transition, also warning that the country has only 7 to 10 years to complete this transition.

Until recently, the analysis of Russia's energy security strategy was extremely complicated due to the variety of existing legal documents covering this topic, such as the National Security Strategy of 2015, the Strategy for Scientific and Technological Development of 2016, the Economic Security Strategy of 2017, and the Fundamentals of State Policy in the Field of Industrial Safety of 2018.

The 2019 Energy Security Doctrine of the Russian Federation has clearly absorbed many ideas from the documents mentioned above. Specifically, it provides a unified and condensed official reflection of the Russian energy policy concerns, especially regarding energy security. The 2019 doctrine defines the concept of energy security, addresses global energy challenges such as the increasing share of renewables and the economic sanctions targeting the Russian energy sector, and finally, the diversification of supply and suppliers, as they are perceived by Russian energy experts. The recent National Energy Strategy, which was adopted by the Russian

government on 9 June 2020, is to a considerable extent based on the Energy Security Doctrine.

On April 6th 2020, Russia adopted a new energy strategy until 2035 (Ministry of Energy of the Russian Federation, 2020). Specifically, the Russian government approved a new draft energy strategy, which sought not only to maximize the contribution of the hydrocarbon industry to the development of Russia but also to strengthen the position of the country in the global energy sector. In addition, Russia, by adopting this strategy, aimed to modernize and develop its infrastructure, develop and diversify its energy exports, boost the competitiveness of its fuels and of the energy sector and finally, achieve technological independence (Enerdata, 2020).

In order to achieve these goals, the government intends to improve the efficiency, the accessibility, the quality of its energy supply (gas, oil products and electricity). The government also envisages developing the production and consumption of hydrogen with the objective to make Russia a global leader in the field, and increasing the production of liquefied natural gas with the formation of a cluster on the Gydan and Yamal peninsulas.

Furthermore, the strategy aims at boosting innovation in energy companies and at developing gas infrastructure in the Russian Far East and in Eastern Siberia in order to integrate the country into a single gas supply system. To conclude with, it aims at introducing digital technologies in the energy sector, namely smart grids and smart metering.

2.5 Emerging Energy Economies: A brief reference to the cases of Brazil and India

Except for China, Brazil and India are also typical instances of emerging markets and economies that would influence future flows of energy. Brazil is self-sufficient in electricity, 80 percent of which is generated from renewables primarily hydropower. Additionally, it produces the eighth biggest output of oil worldwide and the largest in South America. On one hand, Brazil has enough crude oil not only to satisfy its domestic needs but also to export substantial amounts of oil to U.S., Chile, China, India and Portugal. On the other hand, Brazil has to import natural gas in order to fulfill its needs.

India is a significant participant in the world energy market. Its continuous industrialization and urbanization will impose tremendous pressure on the country's energy sector and policy makers. India's energy security revolves around the affordability and dependability of energy supplies which are are considered major concerns for the Indian consumers. Contrary to Brazil, India is extremely energy independent. In 2022, India was ranked third globally in terms of energy consumption. Its dependence on imported crude oil has been increasing and currently stands at 80 percent and by 2030 it is expected that it will amount to more than 90 percent. Nevertheless, it is forecasted that India will be energy independent by 2047.

2.6 Energy Diplomacy and Energy Transition

Despite the fact that some countries have integrated energy diplomacy into foreign policy through security and others via economy, energy transition is reshaping the dynamics of energy diplomacy to such an extent that it has created a new geopolitical reality and raised questions of security and economy. It is obvious that the dynamics of energy diplomacy's link to national security and foreign policy are changing fundamentally.

Historically, the term "energy security" has included numerous vital concepts, like affordability, availability and reliability. However, over the last two decades, a new critical component has emerged, which focuses on environmental sustainability and the transition to low-carbon energy. This new aspect has triggered a significant shift in how energy is regarded, the impact it has on the environment, and the need for legislation to combat climate change. Especially in the European Union environmental sustainability is used as a spearhead by various policy makers.

It is clear that with the incorporation of more renewable energy sources in the global energy mix, such as tidal, solar, wind, water, and energy efficiency, the geography of resources will no longer be restricted to a small number of resource-wealthy countries, but will be more evenly distributed throughout the world.

National energy hazards, as well as how they are perceived, are gradually changing. The world will experience a significant improvement in energy availability as a result of the proliferation of RES in the global energy mix. The dynamic interaction between national security strategies, geopolitics, energy diplomacy, and foreign policy is fundamentally changing on account of transitioning to low-carbon energy, as was previously highlighted. Several experts believe that renewable energy may lessen the danger of large-scale conflicts between states, although it would probably cause more small-scale conflicts.

2.7 The Index of World Energy Trilemma

In 2010, the World Energy Council, for the first time announced the World Energy Trilemma Index. Before explaining what this index is, it is necessary to mention some details about the organization.

The World Energy Council is an independent and non-government controlled entity, which was established in 1923. Before the foundation of this non-commercial organization is Daniel Dunlop, whose vision brought together around 40 countries in order to discuss issues concerning the global energy industry. Its core objective is to advance sustainability in terms of usage and supply of energy for the welfare of all mankind.

As mentioned before, in 2010, the organization announced the World Energy Trilemma Index, which is an measurement and a comparative ranking of 127 countries' national energy systems and their performances across three dimensions per annum. These three dimensions are energy equity, energy security and environmental sustainability. Specifically, energy security includes the resilience of an energy system to shocks and the overall resilience of its infrastructure. Furthermore, energy equity refers to accessibility, reliability and affordability. Finally, environmental sustainability concerns energy efficiency, decarbonization and energy transition.

The role of this index in providing qualitative and quantitative data concerning overall energy security is huge. This index could potentially point out weaknesses in any country's energy system and subsequently assist countries achieving better energy security. By incorporating the dimension of environmental sustainability, the influence and the impact of energy transition on contemporary energy policy trends is proven yet again.

2.8 The Russian-Ukrainian War

On February 2022, Russia invaded Ukraine. The invasion shocked the world and constituted the biggest attack in a European country since WWII. This war proved the Russia's aggressiveness and the need of any energy-importing nation to move away of Russian supplies.

The war necessitated and sped up the energy transition process. This was particularly true in the case of the European Union. Specifically, it caused the EU to refocus its overall energy policy and end its dependence on Russia by gradually halting any imports of fossil fuels deriving from the country. In 2022, the share of European gas derived from Russia fell from 23 percent to around 10 percent in early 2023. The European Union commenced substituting the Russian gas with LNG from other countries. However, it is evident that E.U. will have to compete with the Asian countries for the LNG and especially, the American LNG, 75 percent of which is destined to these countries.

With sole objective ending reliance by 2027, the European Union adopted the REPower EU action plan. The core goals of this action plan was the diversification of gas supplies, a decrease of around 65 percent in demand for gas deriving from the Russian Federation, the substitution of gas in heating and power generation and finally, the acceleration of the roll-out of renewable gases.

In 2022, the usage of coal was risen and is forecasted to rise even more. The competition with the countries of the South for the imports of LNG is leading to high global prices. The same year, European Union imposed a price cap on the Russian oil and started investing heavily in LNG. An excellent instance of phasing out Russian oil and gas is Poland which began investing in heat pumps. Heat pumps are considered the fastest growing market in the area and constitute a green effective alternative to fossil fuels in order to cover the needs for electricity.

Except for EU, United States and Japan also adopted groundbreaking action plans and strategies. Specifically, U.S. adopted the U.S. Inflation Reduction Act and Japan adopted the GX Green Transformation Program. The Inflation Reduction Act of U.S is the largest investment concerning the climate in the entirety of the U.S. history. It aims to boost clean energy and mobilize capital in order to meet the country's climate targets and enhance long-term growth. Similarly, the Green Transformation Policy (GX), is an initiative which will transform the industrial structure from being

dependent on fossil fuel to being centered and based upon clean energy. Its provides a investment roadmap of around 1.1 trillion U.S. dollars necessary in achieving carbon neutrality and assisting to the energy transition in Asia. Overall, this program aims to assist Japan meeting its core climate targets.

To conclude with, nowadays a new term has emerged, which primarily concerns instances when governments pushes enterprises to reorganize their supply chains from geopolitical competitors and towards more favorable nations. This term is called allyshoring. A typical instance of this kind of practice is the E.U.'s tax and aid packages, whose primary goal is to develop nuclear, hydrogen, solar and wind resources in order to offset the undisputed dominance of China in the production of solar panels and also the mining process of material necessary for constructing batteries. The cost is considerable higher, however, in this way the European Union avoids China and Russia.

CHAPTER 3

CONCLUSION

It is evident that dependency on foreign resources not only restricts every country's policy options, but also makes a country more vulnerable as a whole. Additionally, overseas political instability and unforeseen shifts in the energy market dramatically augment the cost for imports of energy and diminish the access to foreign energy sources. As a consequence, import-dependent countries find it extremely challenging to achieve their national objectives due to their reliance on foreign resources, especially energy, which limits their ability to enhance and exercise their national power.

The universal energy map is currently shifting, and especially China leads the emerging economies as a fundamental driver of that change. Whilst energy self-sufficiency and energy independence could seem to provide a degree of security from fluctuations in global energy markets, in some countries like China they are considered unrealistic prospects and could only offer an illusory safety. The energy markets are becoming more integrated, open and liquid, particularly for oil but also increasingly for natural gas. This means that nations are still susceptible to market risks and price fluctuations regardless of their level of import dependency. This applies to both developed and emerging economies as well. For instance, the prospect of the American oil output, which augments thanks to the unconventional extraction method of hydraulic fracturing and horizontal drilling, will do little to shield it from the global market forces. It is evident that the actual energy security lies in supply diversity, well-functioning markets, emergency planning, sufficient investment and an array of similar policies.

Such evolution will be critical due to the fact that, in the future, the previous distinctions between the interests of consumers and producers will no longer be valid. A few of the countries most concerned about the increasing domestic consumption could be the ones with the most fossil fuel reserves, as subsidized prices could potentially lead to a surge in demand. At the same time, the United States, a "spearhead" behind the establishment of IEA, is on its way to establishing itself as the world's largest oil and gas exporter. Emerging markets such as China, Brazil,

India, Russia, and others will become increasingly vital not only as producers in some sectors but also as rising consumers. International energy policies cannot and should not be written in stone in a world where the energy landscape is constantly and rapidly changing; rather, they must be developed with broad and extensive consultation. Furthermore, international energy governance cannot be dictated by the 1970s energy balances, nor by a few consumers and producers, nor by such simplistic interpretations of interests.

Whilst managing domestic production, reducing import dependence, and facilitating energy efficiency will all be important components of a comprehensive energy security policy, energy self-sufficiency in isolation will not suffice. The world's energy security must be a unified front. Only when every government in the world recognizes that they should not only take measures to bolster their own energy security but also contribute to the security of other countries, only then national and international energy security can be guaranteed.

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