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CONTEMPORARY ENERGY SECURITY: COVID-19 ERA

Review Paper

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Abstract

The 21st century is characterized by conflicts and compromises related to the supply of food, water and especially energy. There is a real need to identify threats and causes that could be serious challenges that the world could face due to the coronavirus pandemic. The paper will try to determine the factual situation in the field of global energy security of 2021 and the relationship of energy policies to situations in various energy markets of major energy actors. Just several empirical studies investigate the impacts of epidemics or pandemics on energy security. This paper describes the multifaceted nature of energy security, offers several indicators for assessing changes in energy security and outlines a variety of policy options for enhancing energy security. In order to research the topic, the paper will include a methodology that will provide insight into the importance of energy security, its scope both on the global concept of understanding and its contribution to several conceptual frameworks. The justification of the research is reflected in the need to recognize the importance of the challenges to contemporary global energy security.

Keywords

COVID-19, global energy security, energy security dilemma, global geopolitics, energy utilization, energy production

1.1 Introduction

Many nations are seeking energy security as a goal to guarantee that their economies run smoothly and that their citizens have access to sufficient, dependable, and cheap sources of thoughtfully designed energy. It's a serious problem since energy demand is rising fast as a result of strong economic development, population increase, new energy uses, and rising incomes, yet the energy resources necessary to meet these demands are finite and, in most cases, non-renewable.

Additionally, energy production, transportation, and consumption are important sources of greenhouse gases that contribute to climate change and global warming. All economies re-

quire energy to generate products and services as well as to improve individual, social, and economic well-being (Hoang et al., 2021). It is required by a variety of sectors as a raw material for the manufacture of goods and services, as well as by homes for heating, cooking, lighting, and powering household equipment. Energy consumption is positively associated with measures of economic growth and well-being, according to empirical studies. As a result, providing energy to the vast majority of the world's population has been highlighted as a criterion for measuring progress toward sustainable development. However, both rich and developing nations confront a slew of energy issues, including insufficient and inappropriate energy supplies, energy supply uncertainty, high and changing energy costs, and environmental pollution and deterioration as a result of energy production, distribution, and usage. Additional dangers arise from the potential of energy supply interruptions and the disruptive consequences of such disruptions on economies and energy markets for nations that rely significantly on energy imports from politically unstable regions. Poor nations' prospects for economic growth have been harmed by these obstacles, which have hampered their efforts to relieve poverty and raise people's living standards (Umbach, 2010).

They've had a negative influence on the balance of payments as well. As a result, addressing these issues has increasingly been a focal point of many countries' energy strategies, where the problem is presented as one of strengthening energy security. This paper focuses on the nature and meaning of energy security, as well as its various aspects, the indicators currently used to quantify energy security, and some policy initiatives that may be utilized to improve energy security.

1.2 Energy Security and its importance in 21st Century

For an efficient and successful pursuit of this policy aim, a comprehensive understanding of energy security is required. The literature on energy security, on the other hand, is marked by vastly divergent and frequently contradictory meanings of the term. This is partially due to the fact that different authors on the issue have tended to focus on different sources of risk and performed research with varying scopes of the various hazards' consequences (Durodié, 2011).

Energy security, as defined by the International Energy Agency, which was established in the 1970s to coordinate a strong response to disruptions in oil supply, is defined as the continuous availability of energy sources at a reasonable price. Energy insecurity, according to Toman, is the loss of wellbeing that might come from a change in the price or availability of energy. Energy security is defined as "minimal vulnerability of essential energy systems" and is an example of security in general. Winzer points out that energy security are frequently defined by taking into account the situation. As a result, the focus of energy security in the United States has historically been on reducing susceptibility to political extortion in the aftermath of the oil embargo imposed by the Organization of Petroleum Exporting Countries in the 1970s (Mastropietro et al., 2020).

This is also why US policymakers are committed to achieving energy independence and increasing renewable energy's share of the energy mix. Energy security has served as a safeguard for the underprivileged in a number of developing countries. Energy security, according to him, is defined as the availability of energy in relation to demand. Energy security is ensuring enough, dependable energy supply at reasonable rates without jeopardizing important national priorities and goals. Even though the descriptions of energy security presented above

are not complete, they all demonstrate the importance of energy security, its multifaceted character, and why it is a policy priority for many governments. Energy security issues in the near term are focused on the energy system's capacity to respond quickly to abrupt changes in the supply–demand balance (Axon & Darton, 2021). Long-term energy security concerns revolve around making appropriate energy supply investments in accordance with economic and environmental demands.

Energy is a key basis for economic growth, national security and sustainable development, making it a top priority in the 21st century (Bielecki, 2002). Since the outbreak of two oil crises in the 1970s, the core of the energy issue has been energy security, which has become the focus of all countries (Iyke et al., 2021). In other words, energy security is not only an economic but also a political, military and strategic issue (Le & Nguyen, 2019). The 2019 pandemic had been really devastating since its occurrence which following graph shows. It had impacted the economy in the worst possible manner.

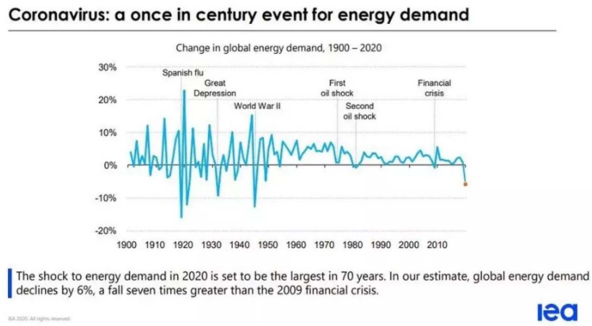

Figure No.1.1: Graph representing changes in global energy demand for 120 years (IEA, 2020)

Yet it had benefitted the atmosphere a lot. The lockdowns, low engine combustion, less traffic on roads has resulted in remarkably low emission of carbon dioxide. It had resulted in lower global warming and ultimately reducing ozone layer depletion. The following graph shows the dropdown of carbon emission whilst pandemic.

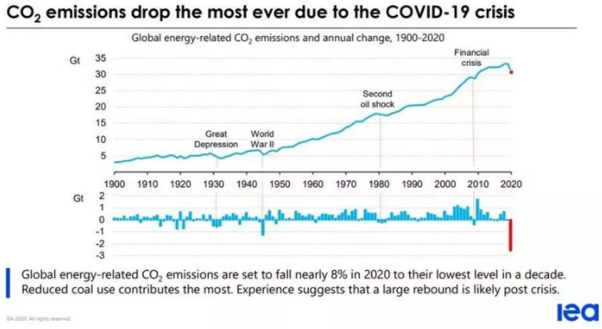

Figure No.1.2: Graph representing dropout of Carbon dioxide emission during Covid-19 (IEA, 2020)

2.0 Literature Review

The term "energy security" is not a new one. It has always existed in tandem with energy demand and supply, but it has not always received the attention it deserves. Since energy was made available to an increasing number of societies throughout the industrial revolution, when it was solely available to the industrial sector and a few rich families, the implicitness of energy has been more and more apparent. From a first-world viewpoint, it seems unimaginable that everyone's home does not have power and hot water, as well as the necessary transportation for daily movement. To characterize the specific energy situation, a differentiation between the two major energy use sectors, power and transportation, is required. Those nations that rely on energy imports in both consumption and production sectors, such as the European Union , are the most susceptible. Because the electrical sector's fuel mix consists of natural gas, coal, renewable, and nuclear power, but oil is the dominating resource for transportation, the only reliance on resource imports for power production provides at least the possibility for diversification. With the depletion of fossil fuels, global energy consumption is on the rise. In terms of energy security, diversification is a fundamental element (Varış, 2020). Diversification in terms of various providers and different resources can help to decrease the risk of energy supply interruption. Furthermore, the distribution of energy will shift drastically over the next twenty years, making it much more difficult for individual Western countries, as well as Europe as a whole, to compete for energy resources with China, Russia, and India. Even if the European Union commits to reducing greenhouse gas emissions by 20% by 2022 and increasing the overall percentage of renewable by 20% by 2022, fossil fuels will remain the primary source of energy for the next 20 to 30 years. However, Europe's fossil resources are depleting, and its reliance on foreign resources is growing (Grigoryev & Medzhidova, 2020).

2.1 Energy security in an international context

Due to its natural resources in the North, Germany, France, and the United Kingdom have the least reliance on imported fossil fuels among the European Union's three major economies. However, these resources are depleting; peak output has been achieved, and the United Kingdom is aware of this. Since 2008, many security issues have been recognized in the United Kingdom's National Security Strategy, including energy competitiveness. This is due to the UK's diminishing resources and the fact that it will soon have to compete with other countries across the world for the remaining natural energy resources (Dhaka, 2009).

China and India are cited explicitly as emerging economies with rising energy consumption. According to the National Security Strategy of the United Kingdom, rising demand for global energy consumption will be 50% more in 2030 than it is today and will raise the risk of conflict. Along with climate change and water scarcity, it [energy competition] is one of the most powerful potential causes of the disintegration of the rules-based international order, the reemergence of significant inter-state conflict, and rising regional strains and turbulence. Some countries, such as China and Russia, have already made energy security a priority in their foreign policy. The United Kingdom, like the United States, recognized the link between climate change and energy policy. As a result, the UK's objective is to combat climate change by lowering CO2 emissions and increasing energy efficiency. The United Kingdom has proposed an integrated plan to improve energy security. It is intended to secure energy supplies, decrease the UK's

susceptibility to security shocks, alleviate tensions arising from energy resource rivalry, and combat climate change (Grigoryev & Medzhidova, 2020).

The establishment of a global gas market, in particular, is being emphasized as a way to enhance the competitive energy market. To ensure secure and dependable gas imports, this will have to include Russia, the world's largest gas producer and responsible for half of Europe's gas imports. This is unsurprising, given that gas presently accounts for 40% of the UK's domestic energy output. With its own resources dwindling, the United Kingdom sees a need to bolster its energy position by competing for resources.

Particular attention should be paid to the impact of pandemic, as they can lead to cascade failure or chain reaction in interconnected energy networks (Bell & Gersbach, 2013; Namatame & Komatsu, 2011). If pandemics are not controlled, they spread rapidly through the population, with huge negative economic consequences. The COVID-19 pandemic has destroyed the health of many and has had a major impact on the social economy at all levels (Kathiresan et al., 2020). Given this context, we believe that pandemics can reduce energy security. A possible channel through which epidemics can affect energy security is as follows. First, the emergence of epidemics reduces the level of economic growth and leads to a decrease in trade openness of countries (Cuesta, 2010), which has a further negative effect on energy security. Second, infectious diseases will undermine the country's financial stability (Salisu and Obiora, 2021). Stock market reactions will further increase energy price risk and negatively affect energy security. Third, the spread of the pandemic between countries disrupts their energy security through geopolitical factors (Liu et al., 2019).

Also, global energy markets are experiencing some geostrategic historical turmoil (emergence of surplus fossil fuel, dramatic reduction in oil demand and its prices), competition between energy superpowers (USA, Russia, OPEC countries) and the emergence of a new energy opponent (China).

2.2 Nord stream pipeline

The Nord Stream pipeline is both a benefit and a curse for Europe. Strong arguments in support of Nord Stream and Europe's ability to decrease Russia's influence have been offered. On the other side, there are compelling arguments that indicate Russia has a competitive edge over Europe in terms of energy security as a result of Nord Stream. Do the benefits of Nord Stream outweigh the dangers involved? It all depends on your point of view. Both negative and positive elements contribute to energy security in one way or another, and they represent its core concepts. Nord Stream helps to increase diversity by giving Europe access to enormous natural gas reserves, and Nord Stream lets Russia provide gas to Europe without the negative influence of transit nations as third parties ("The Nord Stream 2 Gas Pipeline and Germany's Relationship with Russia," 2021).

It also enables Europe to diversify its gas supplies from insecure areas, such as the Arab Mediterranean states. On the other side, Nord Stream increases Europe's reliance on Russia, whereas diversification entails a reduction in reliance and an increase in the number of resource providers. Natural gas is a scarce resource found only in a few countries across the world. As a result, Europe does not have many alternatives when it comes to supplier variety. Greater fuel mix diversity, as desired by the Union, is difficult to attain and will not happen quickly. This will

become increasingly essential for the EU in the long run, but it will not address the short-term needs of Europe's expanding energy consumption. When it comes to gas, resilience is tough to develop. Natural gas can only be delivered through pipelines and LNG terminals, and storing it is complicated and expensive. In Europe, storage facilities are limited, and their existence is owing to government backup plans. The volume of gas in the pipeline represents Nord Stream's contribution to resilience. Although an increase in the number of storage facilities in Europe is beneficial, it cannot be linked to the goal of Nord Stream.

3.0 Global geopolitics and energy security

As the year came to a conclusion, it was clear that the US shale revolution had helped the Trump administration achieve its geopolitical and foreign policy goals, allowing it to effectively pursue its "America First" and "Energy Dominance" strategies, particularly in Europe and Asia. However, the emergence of pandemic-related lockdowns and industrial closures throughout the world has muddied the picture.

Therefore, there is no reason to presume that as additional nations emerge from economic sanctions and recover, the United States will lose its position as the world's largest oil and gas supplier. However, as energy expert Daniel Yergin puts it, "rocks don't go bankrupt." In other words, the country's oil and gas resources are still there, and when the oil market rebalances with supply cutbacks and demand rises up as nations emerge from their lockdowns, US shale output will ramp up again if oil prices rise over US$55–60 per barrel. With the necessary deep capital markets, technology, and trained labor, the United States will continue to be the world's leading oil and gas producer. Low oil and gas costs will be an additional element in Asian economies' favor as they recover from the worldwide pandemic in the months and years ahead. The big Asian economies will be able to use imports of US oil and gas as a method of lowering their trade surpluses with the US in their trade discussions with the US. In the long run, when the global economy picks up speed, Asia's emerging countries will once again emerge as the world's greatest growing market for fossil fuels, which are required to promote industrialization, urbanization, and improved living standards (Pradhan, 2021).

The Middle East is without a doubt the region that has suffered the most. In the medium run, the GCC nations cannot rely on high oil and gas prices to save them from fiscal insolvency. Much will hinge on how they re-negotiate their social contracts with their population in the face of abundant oil and gas supplies, as well as how effective these "rentier" governments are in adopting more sustainable economic development models. The political and economic instability suffered by their poorer, conflict-ridden oil-importing neighbors in the Middle East and North Africa will make the economic and political reforms required in this process much more challenging. It's possible that America's strategic interests in the Middle East may fade as its oil imports from the region decline. However, exaggerating America's reduced reliance on Middle Eastern oil would be a mistake.

Containing terrorism, reducing the possibility of nuclear proliferation, and assisting Israel's defense requirements in a volatile region remain critical foreign policy objectives. More importantly, as the declassified version of the US national defense policy report from 2018 makes clear, the US does not want the Middle East to be dominated by any country unfriendly to the US. Much now relies on how the next US government uses its strategic advantages in the

area, including its military and diplomatic capabilities, enormous oil resources, and creative and free market economy. There is a school of thought that now that Joe Biden has won the US presidential election, a semblance of realism will prevail when the Democrats' extravagant campaign promises are exposed to the cold light of day and the true costs of policy decisions become evident. The US Senate is expected to stay Republican, putting a brake on more radical commitments to achieve "net zero" emissions in the power sector by 2035 and in the whole economy by 2050 (Lidsky & Miller, 2002).

Despite the possibility of a Republican Senate vetoing some of the more radical policies in the Biden plan for clean energy, a Biden presidency will retain broad powers through executive orders reintroducing onerous regulations that the Trump administration had discarded, as well as working through politicized administrative agencies like the Environmental Protection Agency. A Biden administration focused on renewable energy and climate change would fulfill the long-sought and shared goals of Russia, Saudi Arabia, and other OPEC oil and gas producers suffering from low oil prices by limiting US oil and gas output. But Biden isn't a perfect ally for the Middle East or Russia. A Biden administration will explore relaxing President Trump's "maximum pressure" sanctions on Iran, while unwittingly aiding Russia, Saudi Arabia, and the rest of the OPEC group by stifling US oil and gas output. Biden has indicated that if Iran "resumes compliance," he will return to the 2015 nuclear deal. The OPEC+ group would be unable to balance supply and demand if Iranian shipments of above 2.5 million dollars were to resume. The 9.7 million dollar OPEC cutback deal, as well as oil prices, would be at risk of collapsing from their already low sub-US$40 per barrel proportions.

3.1 Nord and energy security dilemma

In Germany, the compartmentalization of gas ties with Russia has long been a paradigm, backed by a market-based approach and a desire to "depoliticize" the pipeline. Since its inception in 2015, the German government has evaluated the project through economic and regulatory lenses, agreeing that Nord Stream 2 will increase gas market flexibility and liquidity. There are serious concerns about the initiative in security and foreign policy sectors, even within coalition parties. Nord Stream 2 has become embroiled in a classic energy security conundrum, with all parties pursuing their own security goals while bracing for the worst. Germany is in a precarious situation. It seemed inevitable that Russia and the United States would battle over the German gas market. More twists and turns favoured Russia's Gazprom in the final stages (Sziklai et al., 2020). As the EU gas market transitioned from an oversupplied to a tight market in the first half of 2021, supply security became increasingly problematic.

A buyers' market was expected to persist until 2025, thanks to ten years of reasonably low gas costs and the Covid-19-induced price fall in 2020. As a result of a convergence of circumstances, gas supplies are limited. The heating season in Germany and abroad was extended by cold temperatures from February to May 2021. However, LNG was diverted to Asia since its price was 80% more than in the EU, or it didn't even make it to Europe because US LNG shipments fell by two-thirds in February 2021. This resulted in the depletion of European gas storage facilities. In Asia, demand for LNG increased, and heat waves in North America increased energy demand. European gas output has been steadily declining in recent years, while Norway's supply has been reduced owing to maintenance that was put off during the outbreak (Motomura, 2017).

4.0 Indicators

Multiple indicators have been proposed for measuring the energy security threats that various nations confront, as well as how these countries' energy security circumstances have changed over time and how their energy policies affect energy security. Estimates of these variables are useful in creating energy security plans that consider a country's energy resource capacity, market circumstances, vulnerability to energy supply shocks, and technological advancement. I'll provide various energy security indicators, explain how to use them to measure energy security, and offer energy security metrics for a few nations in the following sections.

4.1 Reserves of Energy

Oil reserves are the estimated amount of energy sources that are known to exist with reasonable confidence and can be extracted at a cost that is economically acceptable using currently available technologies. Energy security is influenced by a country's energy resources and how well they are developed. Nations with abundant energy resources are, on average, more energy secure than countries with limited resources. Changes in a country's energy resources, on the other hand, can occur over time, improving or worsening the country's energy security (Kober et al., 2020). North America comes in second with the most confirmed oil reserves, followed by the Middle East. Despite the fact that these two regions have more than half of the world's confirmed oil reserves, this fact alone does not guarantee the regions' energy security. Additional aspects like oil production and consumption, as well as how they are changing over time, must be considered when assessing oil security. Several areas of the world, with the exception of Europe, have reported an increase in known oil reserves, implying an improvement in energy security.

The US example is particularly noteworthy since it has significantly increased domestic output and reduced its reliance on imported oil in recent years. This has been made feasible by the shale revolution, as well as regulatory reforms that have allowed oil to be drilled and extracted in previously forbidden regions (Dooyum et al., 2020). It may be assumed that coal availability and usage will continue to provide energy security in the near to medium term. Although there are presently concentrated attempts to limit coal consumption as part of climate change mitigation measures, coal will continue to play a key role in certain parts of the world. However, it means that in the next few years, coal will play a smaller and smaller role in energy security. This might change if major advancements in carbon capture and storage lead to increased coal consumption.

4.2 Energy utilization vs. production

Oil production and consumption can serve as a good indication of energy security because it is the most common source of energy in most of the globe. On a worldwide scale, both oil production and consumption have been steadily increasing over time, with oil production about matching oil consumption.

This suggests that the world has the capacity to be energy secure provided sufficient systems are put in place to allow the transfer of oil from oil surpluses to oil shortages (Gatto & Busato, 2020). The Middle East and the Commonwealth of Independent States (CIS) have the largest oil

surpluses, whereas Europe has the largest oil deficit. We may deduce from this broad picture based on aggregated regional statistics that Europe and Asia Pacific have the highest levels of oil insecurity, while the Middle East, Africa, and the CIS have the lowest levels of oil insecurity. Oil consumption in Asia Pacific has increased significantly in recent years as a result of the region's strong population and economic development rates. Natural gas shortages in China during the winter of 2017 are a current illustration of how natural gas demand and supply may affect energy security. China's resolve to minimize reliance on filthy coal in order to reduce urban air pollution and enhance overall environmental quality was the major reason for the scarcity. This policy move resulted in an increase in natural gas demand and a price increase for customers in China as well as other natural gas suppliers (Hughes & de Jong, 2021). Despite a global oversupply of natural gas, China's natural gas shortage and price increase were caused by infrastructural and logistical restrictions.

As a result, achieving natural gas security necessitates not just actions targeted at increasing natural gas production, but also complementing measures like expanded distribution infrastructure expenditures and increased LNG shipping capacity (von Münchow, 2020). Most economies across the world rely heavily on electricity, and its importance is projected to grow in the future as governments strive to decarbonize their power sectors. Electricity is also critical in the fight against poverty and the creation of a world that is safe, egalitarian, and ecologically sustainable. However, owing to fast rising demand and supply restrictions, several nations are currently experiencing significant problems in terms of power security.

4.3 Renewable Energy Share

Generally speaking, economies that rely on a small number of non-renewable energy sources are less energy secure than those that have a large supply of renewable energy. Renewable energy sources are appealing because their supplies are limitless and inexhaustible, ensuring that, unlike non-renewable sources, current usage does not affect future flows. They can replace nonrenewable energy and support the energy system transformation needed to sustainably fuel economic development while reducing the threat of climate change if they are properly developed. Biomass, hydropower, solar, wind, and geothermal energy are some of the common renewable energy resources that may be used to increase energy security (Komiyama et al., 2005).

Many nations are now focusing on increasing the percentage of renewable in final energy consumption, as shown by the European Union's aim of producing 20% of its power from renewable by 2020. Similarly, in the United States, power supply firms are required to produce a certain percentage of their electricity from renewable energy sources. In Germany, the Renewable Energy Act stipulates that by 2020, 35 percent of power be generated from renewable sources, with that percentage rising to 80 percent by 2050.

5.0 Impact of Covid-19 on global energy security

Energy resources are critical for every growth of the economy, and they are now regarded as a necessary commodity for humans. Due to limited natural resources and the Covid-19 pandemic, several nations are experiencing varying degrees of energy crises, ranging from mild

to severe. In times of crisis, such as the COVID-19 pandemic, reliable electricity supply has become crucial for the provision of medical services and teleworking under conditions of isolation (International Finance Corporation, 2020). Some parts of the energy sector have been hit harder than others. Demand for oil is expected to fall by 8%, with demand for aviation fuel being the hardest hit segment and demand for coal by 7% (IEA, 2020). Compared to the 2009 economic crisis, I can say that both events have seriously affected the energy investment sector due to financial difficulties and weak demand and indicated consequences in production and market functioning. This issue might result in the closure or restriction of numerous industrial units, reduced energy availability, increased unemployment, and other negative consequences for people's lives. The major cause of these challenges is the widening disparity between supply and demand for energy, as well as logistics, financial issues, and inadequate strategic planning (Mulalic & Karic, 2014).

Many activities, including travel, economic activity, building, and manufacturing, were halted during the lockdown, lowering world energy consumption. The energy sector is harmed by the decrease in energy demand and use. The COVID-19 pandemic, for example, led at least 19 energy firms in the United States to go bankrupt. For energy industry reactions, government measures have been undertaken quickly. According to the most recent statistics from July 2020, peak decrease rates of power usage in France, Germany, Italy, Spain, the United Kingdom, China, and India during the lockdown period were more than 10% lower than in the same month in 2019.Energy toxic waste are inevitable, and they are typically given a lesser priority during this critical phase of COVID-19 eradication; nevertheless, as the COVID-19 pandemic continues, environmental footprints/impacts should be examined and perhaps minimized (Yueh, 2010).

The preliminary conclusion that "the pandemic produced a highly beneficial influence on the world environment" appears overly categorical at this early stage of the pandemic and lockdown, based on little accessible data and information. Kleme et al. issued a call in April 2020 to reduce plastic waste, energy use, and environmental footprints during and after the COVID-19 pandemic. Climate change and environmental protection have moved from the margins to the foreground of international relations and geopolitics, as they are increasingly recognized as threats to economic stability and human well-being. There is widespread agreement that this global issue necessitates global action.

However, in recent years, international cooperation on climate change has deteriorated, particularly amongst the three major economic superpowers: China, the EU, and the United States. As a result, government policy has shifted toward competitive trade systems that can help advance climate action in this new setting. Lockdowns throughout the world halted transportation, particularly aircraft, lowering oil consumption by at least a quarter in the second quarter of 2020. This drop would have been far higher if strategic stores and bunkers had not been filled to near-capacity during the lockdowns. Oil prices fell to their lowest levels in almost two decades as a result of this, along with the pricing war between Russia and Saudi Arabia. They plummeted below $20/barrel in April 2020, after starting the year at $65/barrel. Annual oil demand has decreased by 8.8% by the end of 2020. These drops far outstripped those seen during the global financial crisis of 2009, when oil consumption decreased by less than 2%.As a consequence of the earliest but also shortest COVID-19 lockout, China's oil consumption recovered fast, and by June, it had returned to 90% of its pre-pandemic norm (Axon & Darton, 2021).

6.0 Trinity of energy, climate, and environment

China has a direct and major influence on climate change as the world's greatest energy consumer and emitter of GHG emissions. Coal dominates the country's energy industry, accounting for approximately two-thirds of overall energy consumption. Oil is the country's second-largest source of energy, and China, behind the United States, is the world's second-largest oil user. Until the early 1990s, the country was a net oil exporter, but in 2013 it became the world's largest net petroleum importer. It has a large proportion of hydropower, followed by a modest but growing natural gas supply, a small but quickly expanding solar and wind share, and, to a lesser extent, nuclear power. In contrast to President Donald Trump's approach, President Xi's declaration conveys the image of support for multilateralism. It was also created at a time when Joe Biden, a more progressive climate activist than Trump, appeared to be the front-runner in the US presidential race. One could question if President Xi's statement was timed to maintain China's global leadership role in a new era of more aggressive climate change action (Odgaard & Delman, 2014).

The EU has created a framework that combines climate and energy goals, and it has matched it with the UNFCCC's reporting structure. In 2009, it passed its first draught climate and energy package, which included 2020 objectives aligned with the Copenhagen Accord. Before COP21 in 2014, the 2030 framework was established. Energy efficiency objectives, renewable energy utilization, and GHG emission reductions were the centerpieces of both programmes. Climate change is at the top of the agenda for the new European Commission, which was elected in 2019. President Ursula von der Leyen recommended increasing the EU climate-mitigation objective to decrease emissions by at least 55 percent by 2030 compared to 1990 during her first State of the Union address. Given the EU's very ambitious strategy, however, there is no consensus among member states and EU institutions on the seriousness of climate change, and therefore on the parameters of the objective. The European Parliament voted in October 2020 for more aggressive action, setting a target of 60% by 2030.Although these sectors are covered under the EU–UK Trade and Cooperation Agreement, the UK now has its own climate and energy policy after leaving the EU. Importantly, the UK has left the EU's Emissions Trading System and must submit its own NDC to the UNFCCC. The UK government set its 2030 emissions target of a 68 percent decrease from 1990 levels in December 2020, which many consider to be a lofty goal.

By a wide margin, the United States has contributed more to historical global GHG emissions than any other country, accounting for 457 billion tonnes of CO2, or 29% of the total. This is due to the country's geographic area and population density, as well as its wealth and consumer spending, significant fossil-fuel resources, and economic structure. As previously said, the extraction of shale oil and gas in the United States has changed dramatically during the last decade. Between 2010 and 2019, the shale revolution increased yearly oil output from 333 million tonnes of oil equivalent to 747 million tonnes of oil equivalent, while gas production increased from 575 billion cubic metres to 920 billion cubic metres. The international community is aware of the possibly transient character of US climate policy, so the Biden administration will have to go above and beyond to demonstrate a meaningful shift in policy. The administration not only has an opportunity to signal that it will re-enter UNFCCC processes, but it also has an opportunity to set a far-reaching domestic carbon-reduction plan – one that goes beyond that of the Obama administration – that acts as a global catalyst for others to make

similarly ambitious pledges. International climate leaders, on the other hand, will be searching for domestic policies and actions that will help the US overcome its political split and provide long-term stability.

7.0 Summary

It is too early to say whether today's crisis is a stalemate in efforts to bring a safer and more sustainable energy system or a catalyst that is accelerating the pace of change. The pandemic is far more than that, many uncertainties remain and key decisions on energy policy have yet to be made. There is no doubt that the energy sector will look significantly different. The next year may see a change in attempts to address the climate issue. The magnitude of the problem necessitates a never-before-seen reaction. Real-world action necessitates collaboration, competitiveness, and consistency. The result of many high-level events in 2021 will be critical in achieving global climate change goals as well as national climate and energy goals. Even under normal circumstances, this would be a critical time, as China releases its next five-year plan, President Biden is expected to follow through on progressive campaign promises, such as re-joining the Paris Agreement and setting a 2050 net-zero target, and the EU unveils its next infrastructure investments plan.

Nevertheless, 2021 has even more significance when nations submit updated five-year commitments to the UNFCCC and negotiate at the COP26 to get global mitigation plans back on track to achieve the Paris Agreement's goals. The following 12 months are extremely crucial due to two additional considerations. First, the COVID-19 has an influence on energy supply, demand, and emissions, as well as the size of related recovery packages and the speed with which the energy transition is accelerated or slowed. Second, climate diplomacy between China, the EU, and the United States is more fluid than it has ever been, with a growing trend toward competitive climate action mechanisms such as import tariffs on carbon content of commodities (Azzuni & Breyer, 2020). The specific effects of COVID-19 on the rate of decarbonization and the energy transition are still unknown. Emissions slowed in 2020, although the initial significant drop due to lockdowns appears to be easing, and emissions are recovering to levels similar to those before the pandemic. This just emphasizes how critical it is for nations to update their NDC promises to demonstrate considerably enhanced ambition. The EU's announcement of a 55% reduction target by 2030, as well as President Xi's declaration that China's objective is to achieve carbon neutrality by 2060, will help. China, the European Union, and the United States have been the most influential parties to the UNFCCC, not only because of their past and current emissions, but also because of their geopolitical might, which has allowed them to promote or discourage greater mitigation ambition. As a result, a united front from these key parties, as well as proven examples of collaboration, will be critical to fulfilling the Paris Agreement's goals. To speed the transition to a low-carbon society, they may prioritise various measures such as using the market, subsidies, green stimulus packages, and legislation or regulation. Regardless of the incoming US administration, the trend toward less international collaboration and greater competition is certain to continue. The proposal to impose import tariffs on the carbon content of goods entering the EU is the clearest indication of this change. This will put the EU's political backing, as well as resistance from other nations, to the test, as well as the EU's capacity to overcome obstacles to CBAM implementation, particularly those related to WTO regulations. President Biden is looking at imposing comparable carbon import

tariffs in the United States. Innovative approaches that affect global commerce are notoriously difficult to execute and very politically sensitive, thus their prospects of success are likely to be slim. However, just discussing carbon import tariffs might encourage trade partners to increase their international cooperation and local climate action.

As a result, a clear distinction between collaboration and rivalry is oversimplified. Because of the postponement of COP26 due to COVID-19, nations will have more time to consider the new government in the United States before submitting their updated NDCs. Furthermore, in 2021, COP26 will be hosted jointly by Italy and the United Kingdom, the respective leaders of the G20 and G7, raising the visibility of climate efforts. GHG emission reduction policies are often long-term, needing consistency and stability. Across successive European Commissions, the EU has succeeded in achieving this, resulting in increasingly ambitious mitigation objectives and global leadership in the deployment of low-carbon technology. Similarly, China has continuously addressed environmental and climate-change concerns throughout its five-year planning cycle. However, while this has provided policy stability, tackling climate change has frequently been pushed aside by the Chinese government's other social and economic objectives. Climate change remains a political issue in the United States, with Democratic governments pushing forward climate measures only to have them stalled or reversed by Republican administrations. The efficacy of domestic measures is harmed by this stop-start approach to climate reduction and adaptation, as is the US's effectiveness in the global system. Combating the threats posed by pandemics requires awareness, planning and greater expertise, especially in the areas of diversification, decentralization and digitization of energy systems.

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