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The Geopolitics of The Global Energy Transition and its Implications on The Arab Gulf Region: A Review

Elmekdad Shehab¹

¹ PhD Candidate, Center for Gulf Studies, College of Arts and Sciences, Qatar University, P. O. Box 2713, Doha, Qatar. Email: es1706069@student.qu.edu.qa

Abstract

The confluence of power transitions in the international system and energy transitions in the global market presents a complex and multifaceted landscape for world developments and policies, particularly for the energy-dependent countries of the Arab Gulf states. To understand this reciprocal effect, this paper provides a review of the existing academic literature on the geopolitical implications of the global energy transition towards low-carbon renewable energy sources, both globally and in the Arab Gulf states. The paper concludes that despite the growing interest from scholars, particularly in recent years, and the multitude of investigations undertaken to examine the potential implications of climate change and renewable energy on various regions worldwide, a significant challenge has emerged in the form of inconsistencies and disagreements among these studies. This can be attributed to the over-generalization of research findings, which often neglects to define the temporal and spatial scope of influence, as well as failing to identify both the source and the affected party of the effect. These four factors are crucial in determining the nature of the geopolitical impact of the global energy transition. Therefore, we believe that there is a serious necessity to synthesize the scattered parts presented by these studies into multicoherent frameworks that clearly define these four points.

Keywords: Renewable Energy, Arab Gulf States, Geopolitics, Energy Transition, Climate Change

1. Introduction

Over the past five decades, the Arab Gulf states have witnessed significant socio-economic transformation resulting from their vast hydrocarbon resources. This has not only led to internal improvements in the standard of living, education, health, and welfare of Gulf citizens but has also elevated the Gulf region's political influence globally. Under the leadership of Saudi Arabia, Qatar, and the UAE, the region has become increasingly engaged in international affairs, such as energy governance, climate change politics, and global financial architecture.

These developments are occurring in the context of a fast-transitioning international system where power is becoming more diffuse through overlapping levels of national, regional, and global governance. At the heart of these shifts lies the rise of China, which is propelling the globe away from the post-Cold War international order, which had its institutions, norms, and laws, toward an unknown configuration of international relations. (Ikenberry, 2008) However, there is no consensus among academics on what the international system will look like over the next few decades. Will the "unipolar moment" (Krauthammer, 1990) that has persisted since the Cold War's

conclusion come to an end? where the "rise of the rest," as advocated by Farid Zakaria, challenges US hegemony? (Zakaria, 2013) or would it revert to the multipolar world that existed before World War II? or will it grow into Grevi's "inter-polarity," (Grevi, 2009) in which multipolarity and increased interdependence create a new and unprecedented redistribution of power on a global scale? Or will the world see Acharya's "multiplex world," (Acharya, 2017) where the emerging new world order comprises multiple actors whose relationships are a complex form of interdependence? And those players are not just great powers, but also regional powers, international institutions, multinational corporations, and nonstate actors. Or would it be similar to Ian Bremmer's suggested "G-zero" international system, in which no one great power or coalition of powers can shoulder the weight of global leadership? (Bremmer, 2013).

Equally important, the shift in the distribution and concentration of geopolitical power in the international system (*power transition*) is combined with (*the energy transition*) that happening in the global energy market (Yargin, 2020) from a fossil fuels-dominated energy sector to one that relies on renewable energy, as a result of increasingly strict decarbonization policies and tremendous advancements in low-carbon technology. this global shift toward low-carbon energy is throwing the world's energy system into disarray, having an effect on whole economies, and altering the political dynamics both within countries and between them. (Hafner et al, 2020).

Furthermore, the energy transition is not a new phenomenon; in the last three hundred years, modern civilization has had several energy transitions, such as from wood to coal in the eighteenth and nineteenth centuries, and then from coal to oil and natural gas in the twentieth century. These shifts were motivated by the availability, reduced cost, and enhanced convenience and utility of a new energy source. In contrast, the current global energy shift is primarily a response to the looming dangers of climate change. Today, the energy sector, which is dominated by fossil fuels, accounts for 73% of human-caused greenhouse gas emissions. To decrease the spike in the number and intensity of severe and catastrophic weather events, such as heatwaves, destructive floods, and droughts, threats to the security of food and water, forced migration, loss of life, and livelihoods, global CO₂ emissions must be halved by 2030. (UN, 2021). Therefore, the current transition efforts are being made to encourage low-carbon energy resources and technologies, Renewable energies such as solar energy, wind energy, hydropower, and others, as well as non-carbon energy carriers such as electricity and, to a lesser extent, hydrogen, and in transportation technology such as electric cars, and energy storage technologies such as batteries and thermal storage, and efforts also are being to improving energy efficiency and productivity in industry and other applications. (Bazilian and Howells 2019).

Undoubtedly, the energy transition in the global market and the power transition in the international system will leave their imprint on each other. the shift toward low-carbon energy is altering areas and locations of conflict. whereas geopolitics influences both the decisions made in the technical realm and trade patterns. Together, they will mold the energy systems and relationships of the future and the outcome will be determined in large part by how great powers position themselves in the energy transition. (Sholten, 2020).

The Arab Gulf States are at the epicenter of these global waves of energy and climate change-related geopolitical development. As producers and exporters of hydrocarbon-based products for the past eighty years, the six monarchies – Saudi Arabia, Qatar, United Arab Emirates, Bahrain, Kuwait, and Oman- have been profoundly shaped by the global economy's dependency on hydrocarbons. They are together responsible for one-fourth of world oil output, the largest source of oil exports, and one-third of globally traded gas. In addition, Due to the region's location in the hottest and driest portion of the world, the Persian Gulf states are among the most vulnerable to the consequences of climate change. including but not limited to Extreme heat waves, dust storms, and water scarcity. All of them will become more frequent and severe as climate change continues. (Al-Delaimy et al., 2020).

Consequently, whichever dynamics the geopolitics of climate and energy transition will unfold in the next decades, will have a profound effect on the Gulf states and societies. Therefore, this paper seeks to provide a comprehensive survey of the scholarly literature about comprehending the reciprocal effect of energy transition in the global market and power transition in the international system on the Arab Gulf states. To accomplish that, our primary focus in reviewing the literature will be on studies, books, and academic articles that address the future geopolitical implications of global energy transformations, since this phenomenon is driven by the climate crisis and aim to

substitute hydrocarbons for more low-carbon renewable energy sources in the energy mix. Thus, the literature on the global energy transition incorporates both themes of the study, global climate change, and renewables.

Regarding the organization of the article, this article is broken into three sections each aimed at exploring the existing literature that's relevant to the previously stated objective: the initial section delves into the literature pertaining to the implications of global energy transition in a broad sense, while the subsequent section explores the implications of the rise of global renewable technologies on the Middle East and North Africa region (MENA), whereas the third part reviews work on the global energy transition and its implications for the Gulf's energy-rich countries. The article concludes by identifying gaps in the existing literature and recommending a research agenda for future investigation in this field.

2. The Geopolitics of Global Energy Transition on The Global Scale

Energy and geopolitics have always had a close relationship. Access to energy resources was a major factor in determining war winners in the twentieth century, with oil producers banding together to form new global alliances, and price swings had spurred or discouraged superpower adventurism. Now, in the twenty-first century, vast and rapid changes in the energy sector are rewriting the relationships between the two fields. According to (Paltsev, 2016), the concept of energy geopolitics refers to "the method by which nations affect one another through energy supply and demand."

This last decade has seen a significant rise in the number of works on the geopolitics of energy system transition, taking into account the geopolitics of renewables and existing fossil fuel producers and consumers, aiming at understanding the pace of the transition and predicting the actors who will benefit or suffer as a result of such a transition (Crikemans, 2011; Johansson, 2013; Paltsev, 2016; Scholten, et al., 2016; O'Sullivan et al., 2017; Freeman, 2018; Overland et al., 2019; Scholten et al., 2020; Vakulchuk et al., 2020; Bazilian et al., 2020). But it was January 2019 which marked a turning point with the publication of *A New World-The Geopolitics of the Energy Transformation* by the International Renewable Energy Agency (IRENA). Before its release, only a few researchers had begun to examine the geopolitical effects of renewable energy. (Sholten, 2020a)

IRENA was the first international organization to investigate the geopolitics of the global energy transition (2019). Its report depicts the global impact of rising of renewable energy and the decline of fossil fuels. According to the report, the expansion of renewables will reorganize state relations (oil exporters vs. oil importers) and radically transform economies and society, the world's shift away from fossil fuels will have numerous consequences, including the stimulation of intra-state conflicts. The report contends that global power structures and arrangements, as well as the dynamics of inter-state relationships, will change, while the energy sector's rising digitalization can pose security and privacy vulnerabilities in the absence of an international rules-based configuration in which power will be decentralized and diffusive. Therefore, Countries that invest in renewable technologies, according to IRENA, will gain global influence, whereas those that rely solely on fossil fuel revenues will face serious economic and social challenges.

According to this analysis, the global energy transformation would have a devastating effect on countries that are currently significant exporters of fossil fuels, such as a number of MENA and Gulf states. especially if we put in mind the new power dynamics in the regional system, such as the potential diminution of the United States' position in the Persian Gulf, which might boost the involvement of regional powers such as Turkey, Iran, Saudi Arabia, and the United Arab Emirates and give more space for Russia's engagement which is anticipated to increase, as well as China and India's. Additionally, global factors, such as a trend away from free trade, the emergence of populist economic and social policies, and the splintering into geopolitical blocs, are anticipated to complicate the transition (Bazilian et al. 2019).

Similarly, other research done by (Goldthau et al. 2019a) offers four potential scenarios for the. For the energy transition by 2030 and its impact on global geopolitics, the first scenario (the "Big Green Deal") assumes that international policy will be coordinated because there is worldwide agreement on the need to address climate change. Fossil fuel-rich states are compensated to seamlessly transition to a sustainable economy as a result of a

wave of green globalization. There is no geopolitical conflict as a result of the agreement, which is good for both climate and security. Another possibility, dubbed (the 'Technology breakthrough') holds that a significant leap forward in technology would alter the course of human history. While the major two great powers United States and China lead the way in advancing technology, the international rivalry is also on the rise. Even in a cleantech cold war, where technology leaders have the power and others gravitate toward one of them, regional blocs and escalating antagonism are being reinforced. As demand for fossil fuels declines, producers must adjust quickly, raising tensions in some areas. In the third scenario, (the "Dirty nationalism") the power rivalries accelerate nation-first policies which favor domestic resources over imported ones, driving the growth of fossil fuels as well as renewable energy. While UN and multinational institutions are marginalized in this atmosphere because of the intra-state competition. Fourth and last, (the "Muddling on") scenario that assumed the business-as-usual pathway, in that scenario, The dominance of fossil fuels in the energy mix will not change through 2030, notwithstanding the increase of the renewables in the global energy mix. the scenario expects that the change is too slow to replace fossil fuel, but so fast to disrupt the current energy systems. which could lead to Deficiencies in government finances and cause political turmoil in oil-producing countries in the Middle East, Russia, and Africa. Nations are being compelled by energy security and climate change to adopt a wide range of options to meet their energy needs which creates new alliances and arrangements. A rising divide between the world's wealthiest, and poor is exacerbated by these alliances.

The author believed that geopolitics should be at the forefront of the energy transition debate, and that government should prioritize potential pathways over specific targets. The relevance of this research to our thesis is obvious, as scenario planning is one of the most widely used methodologies for predicting the future of energy. The most important aspect of these hypothetical scenarios, however, is the lessons that can be drawn from them. Many Western countries, for example, believe that free trade and an open market promote scientific progress. This is not always the case. As a result of high-level governance and state planning, China's production of renewable energy has increased significantly. whereas in Brazil the Biofuels' success can be attributed to a former military dictatorship's desire for self-sufficiency and a more favorable trade balance. This implies that the "one size fits all" approaches derived from western norms should be questioned.

A recent study by (Hafner and Wochner 2020) provides an additional scenario outlook on the shifting dynamics of the global climate and energy landscape and its economic and geopolitical impacts. The authors contend that there will be a change in the global energy system as a result of four fundamental causes that are currently unfolding: The first is increased energy consumption, especially in Asia's emerging markets, and the second is "top-down" climate policies enacted by governments around the world to decarbonize the global economy. Third, market-driven digitalization and "bottom-up" technology drove energy systems in the direction of greater decentralization. Finally, The energy sector is being propelled forward by technological breakthroughs such as tight oil and gas production, electrical verticals, and renewable technologies.

The study has examined how key geopolitical blocs would fare in three different energy and climate scenarios by 2050 (North America, Europe, Russia, China, and MENA). And how economic and geopolitical consequences of the global transition affect global governance. The authors believed that every geopolitical bloc would behave according to a certain strategy. For example, the major energy-consuming countries like the United States, China, Japan, and Europe are spending heavily on the development of innovative low-carbon technologies, which in a decarbonized global economy, should give them a technological and economic edge. While Russia and other oil-rich Middle Eastern economies are unable to keep up with the global energy change due to inter-socio-political restrictions.

The following are the three possible future scenarios and how they might interact with those strategies: In the first scenario (weak climate governance), the major fossil fuel exporting states (such as the Gulf States, the United States, and Russia) will maintain their position in the energy market, while European investments in low-carbon technologies may not pay off as quickly as anticipated in the short term but will facilitate Europe with greater energy independence from more fluctuating international energy prices in the medium and long term. In contrast, the second scenario (Global Efforts for Climate Action) expects that Investing in energy transition technologies will be extremely profitable for countries such as Europe, the United States, and China. While countries like Arab

Gulf Monarchies and Russia will need to diversify their economies to preserve their position as major players in the world energy market (Converting from fossil fuel exports to hydrogen exports is one of the solutions on their table) Alternatively, in the "Muddling Through" scenario, the authors assert that decarbonization, digitalization, technological innovation, and growing demand will continue to function as the key drivers of change in the energy industry. International inconsistency in climate action would impede the pace of transformation. Renewables could extend their role in the energy mix, and they could also become more cost competitive as a result of market dynamics. In the power industry, renewables may readily replace oil and coal, and to a lesser extent in the transportation and heating industries.

Notably, those latter two research were scenario-based studies, but a significant wave of current scholarly publications which delve further into the issue are not scenario-based. For example, the study by Daniel Scholten and his colleagues in 2020 claimed that the technical and geographical features of fossil fuel-based systems are fundamentally different from renewable-based systems. So, the energy transition dynamics will have repercussions on the energy relations between states and will necessitate prompt response if states are willing to make the most of opportunities and overcome obstacles. (Scholten, 2020b). The article draws attention to six distinct categories of geopolitical ramifications associated with renewable energy, each of which will become apparent at a different point in the future. Overall, the article anticipates a large disruption, but one that will also bring up new difficulties concerning energy security. In addition, even the use of renewable energy sources will eventually result in energy interactions that are less vertical and more polycentric. The use of renewable energy sources can change the context in which energy interactions take place, leading to a reconfiguration of markets, a reordering of trading partners, and a reorganization of patterns of cooperation and conflict between nations.

Another contribution that cannot be overlooked came from Daniel Yergin, who is widely regarded as one of the world's top energy experts. best known for his Pulitzer Prize–winning book, which decodes the history of the oil industry, traversing in an engaging narrative style its most important historical phases, and the people who made them (Yergin, 1991). The Prize book conclusively shows that securing and gaining access to oil supplies was a precondition for great powers, but "The New Map" aims to uncover the new world, the world in which the post-Cold War international system is transforming into a future multipolar system with unprecedented configurations. At the heart of that are international efforts towards a "clean energy system" that is environmentally friendly and contributes to reducing greenhouse gas emissions that cause climate change without compromising economic growth and prosperity. Where also the balance of economic power shifts from a US-European hegemony in which hydrocarbons (particularly coal and oil) played a large role, to a multipolar world whose economic weight is shifting towards Southeast Asia, renewable energy technologies will play a significant role.

Yergin's book can be divided into two parts, one dealing with the largest players in the global energy market in separate chapters (USA, Russia, China, and the Middle East), and another section, the last two chapters, dealing with emergent trends such as automobile technology and climate change.

Yergin concentrated on the shale oil and gas revolution in the first segment on the key actors in the energy sector. For him, shale was an unappreciated revolution in terms of what it meant for the economy, the job, the balance of payments, investment, and foreign policy. He argued that shale and gas oil is not a national game-changer for the United States, but they are a global game-changer for international markets. While this view of shale gas and oil's importance is widely held, some critics argue that it was only because of the historically low borrowing rates following the financial crisis of 2008 that the industry was able to flourish. Shale has, unfortunately, proven to be a bad investment. since the output of shale wells tends to decline After a few years of production, which necessitates the ongoing drilling of new wells to continue production. As a result, they are unable to take advantage of falling marginal costs as a result of their reliance on capital acquired on Wall Street. (Torpani, 2021) As for China, Yergin believes that the geopolitical conflict between it and the United States of America is likely to increase, especially in the South China Sea, where the lines of contact between what he sees unite two visions of the shape of the future international system, namely: Disputes over the South China Sea bring into sharp relief the conflict between competing visions of world order, more specifically, an Anglo-American transnational liberal empire that advocates unrestricted transit of commerce through international waterways, and China's insistence on the supremacy of national sovereignty. As for the chapters on other players, unfortunately, they are full of

ahistorical details. In the Middle East chapter, for example, Yergin spoke about a very wide range of topics from the division of Sykes-Picot to the British and French occupation of the region, through the invasion of Iraq and the establishment of the Islamic Republic in Iran to the Arab Spring And the discovery of natural gas and the emergence of ISIS, the chapter did not make a useful analysis for us in this thesis.

On the contrary, the second part of the book on the energy transition had important additions. Yergin doubts the possibility of humanity reaching net zero carbon by 2050, and he also doubts the existence of real alternatives to oil and gas, so he focused in his book on transportation technology in particular. Because it is the sector that uses the most oil, and the speed of oil displacement from it through "electric vehicles" controls the speed of energy transition from a system based on fossil fuels to a sustainable energy system. Yergin was also skeptical about the role of individuals in accelerating this transition, seeing government tools as the most important in the process, leading to the example of Chinese government backing for the production of solar panels, which enabled China to outperform the globe in and fast lower prices to a degree that has reached 85 percent in less than a decade.

Perhaps the best in-depth discussion of the shift in geopolitics from fossil fuels to renewable energy sources was conducted by (O'Sullivan et al.,2017). She and her colleagues looked at seven ways in which renewables might influence geopolitics. the first mechanism identified by the authors is that Critical materials supply chain cartels may emerge as the renewable energy transition accelerates. Second, they believe that in a world where renewables are the predominant source of energy, investment capital, and technology will play a greater role in international collaboration and competition. Conflicts could arise over technology transfer between developing and developed countries, as well as renewable energy infrastructure. Third, the emergence of a new resource curse. the author identified three potential ways for how the rise of renewables results in a new resource curse. first, Petrostates could suffer from a resource curse if the importance of oil and gas diminishes. Second, countries rich in rare earth elements may face a new type of resource curse, comparable to that experienced by countries with vast reserves of oil or gas. The resource curse is likely to affect countries that produce a lot of renewable energy, much like oil and gas producers. Regarding the fourth, As the amount of electricity traded across international boundaries may expand, the geopolitical complexity of bigger electric interconnections between states may exacerbate the vulnerability of energy importers, and increase the threat of cyber-attacks that those distributed energy technologies rely on. however, increased electric connections could lead to more interdependence between nations, hence reducing the likelihood the risk of conflicts. Fifth, a global fall in oil and gas consumption might have a double impact on the petrostates: on the one hand, it could push the governing elites to engage in political reform and drive economic diversification, but it could also result in political instability. Sixth, the use of renewable sources will lessen the likelihood of violent conflict and political unrest that would otherwise be caused by climate change. Africa is a good illustration of these geopolitical dynamics. Seventh, the utilization of renewable energy sources could contribute to the creation of long-term solutions to challenges of instability and conflict by promoting sustainable energy access.

In sum, the study emphasizes that the geopolitical effects of transitioning to a renewable energy system are multifaceted and may not progress straightforwardly. The outcome will depend on whether a country is an energy supplier or an energy consumer, and the impact could have both benefits and drawbacks for global players. This highlights the intricate nature of the low-carbon transition's consequences on international politics.

In addition to this, another recent study by Meghan L. O'Sullivan with Jason Bordoff in a Foreign Affairs titled "Green upheaval: The new geopolitics of energy" aimed to challenge the commonly conventional wisdom about who will benefit and who will suffer from the transition to renewable energy, as these assumptions are often inaccurate. For instance, the so-called petrostates may "enjoy feasts before they suffer famines" (Bordoff and O'Sullivan, 2021), while the poorest regions of the world will require significant energy consumption to improve their quality of life while simultaneously experiencing the most severe effects of climate change. The use of clean energy will introduce new national power opportunities while also introducing new uncertainties and risks. Therefore, policymakers must consider the risks and dangers that may arise from a complex shift to clean energy and look beyond climate change challenges. as Failure to do so could result in adverse economic and security implications and hinder the energy transition itself.

The authors challenge another commonly dominant idea, which is the potential impact of a decarbonized global economy on globalization. Although a decarbonized world may require extensive supply chains for clean energy products and components, the article suggests that three factors will work against globalization. Firstly, as the world relies more on electricity, there will be less international trade in energy. Secondly, the trend towards protectionism is already being fueled by clean energy as countries aim to establish job-generating industries within their borders. Finally, countries that take significant steps towards decarbonization may use economic tactics to compel others to follow suit, which could result in global fragmentation. The article proposes that despite a decarbonized world initially seeming more interconnected than the current fossil-fuel-dependent world, these three factors could counteract this trend.

Despite these innovative insights in the article, perhaps the part that discusses the future of petrostates in a low-carbon economy is the most intriguing aspect. The authors point out that discussions regarding the shift towards clean energy tend to overlook important factors such as the fact that even if the world reaches net-zero emissions, significant amounts of fossil fuels, including oil and natural gas, will still be in use. This means that oil and gas producers will continue to have an advantage over their natural resources for decades to come. The authors suggest that traditional suppliers will benefit from the volatility in fossil fuel prices that will inevitably arise from the energy transition. This situation would strengthen the power of petrostates by increasing their revenue and giving extra influence to OPEC. Additionally, the transition to clean energy will increase the power of some oil and gas exporters by concentrating global production in fewer hands. As the demand for oil declines, many high-cost producers may be unable to compete, while low-cost producers, such as the Gulf states, which have cheap, low-carbon oil, may see their market shares rise.

Mnberger, A., & Johansson, B. (2019) delved more into the geopolitical repercussions of the use of rare earth materials in the transition to renewable energy. they explored the geopolitical relevance of 14 metals and metalloids vital to renewable energy technologies. by concentrating on three major geopolitical factors: the geographic concentration of resources, the potential revenues of resource-rich nations, and the total size of global marketplaces. According to the findings of the study, many metals and metalloids utilized in renewable energy technologies are prone to be more geographically concentrated than oil, Silicon, tellurium and copper are the sole exceptions. In the near term, the disruptions could be caused only by hostile assaults or natural catastrophes that might influence the market supply and output of some renewable technologies. This view was reinforced by the argument that renewable energy sources are less regionally concentrated and do not face the same long-term resource shortage challenges of fossil fuels. Consequently, future energy security issues will be prompted by energy carriers rather than energy resources, as well as by a lack of functional institutions and laws (Johansson, 2013). In the medium to long term, however, most metals are unlikely to give producers political leverage and cement the bargaining capacity because importers' adaptive responses will make such behavior less effective, and because economic revenues as a percentage of total economic throughput will be relatively low for most countries studied.

In the same line, (Overland,2019) investigates four common myths regarding renewable energy's geopolitical implications to refute them. Those are the potential for geopolitical struggle over renewable energy's crucial raw materials, the prospect of new resource curses, the use of transboundary electricity cuts as an important foreign policy tool, and the idea that cyber security is a new geopolitical problem. The author counters the first myth by claiming that most rare earth elements are found in abundance in the Earth's crust. Her criticism of current discourses also focused on the fact that the most crucial components of renewable energy technologies can be recycled. She also feels that technological breakthroughs and cost reductions are highly likely in some areas because the energy transition is mostly about technology and innovation. Concerning the second myth, she affirms that exporting green energy may necessitate longer-term infrastructure maintenance, boost the number of local jobs, and generate revenue that is less volatile than that is earned from oil and gas. Notably in comparison to exported oil countries, in which foreign migrant laborers dominate the offshore oil and gas business. She did, however, admit that the energy transition would most likely result in resource revenue shortfalls for some nations, which could cause problems for some of them. However, a large-scale recurrence of the resource curse is not inevitable. The third myth maintains that widespread electricity cut-offs between states have the potential to become an important instrument of foreign policy. However, the author points out that countries that are currently

net importers will still be able to grow their own renewables capacity and will therefore be forced to make long-term decisions regarding whether to make or acquire renewable energy. The author continues by asserting that the fourth myth, which characterizes cyber security as a geopolitical issue, is sometimes overstated. She contends that as the usage of renewable energy sources increases, the system will become more decentralized, hence increasing its resilience.

To conclude, while renewable energy resources are plentiful yet more evenly scattered geographically than fossil and nuclear fuels, Overland believes that methods for capturing, storing, and transferring them will become increasingly significant in the future because of this. Thus, international energy competition may move to the control of technology and intellectual property rights rather than physical resources and transportation routes. These renewable energy markets' competitive dynamics might resemble that of mobile telephony, where China's Huawei, South Korea's Samsung, and the United States Apple compete against each other. According to the author's own words, "It is not a war, nor is it geopolitics in any strict sense, but there are winners and losers—for example, the Finns who used to work for Nokia."

3. MENA and The Geopolitics of The Global Energy Transition

When it comes to the Middle East and Gulf states, the issue of the global energy transition has become crucial in recent years, as these petrostates played a significant role in the global economy based on fossil fuels during the 20th century and benefited the most from exporting revenues to fuel their development plans and ensure their socio-political stability. Consequently, any disruption in the global energy mix is anticipated to have a significant impact, regardless of whether it is caused by the climate crises, the rise of renewables, the oil and shale gas revolution, a sudden technological breakthrough, or the strategic moves made by the great powers in the competition over energy resources.

Does this spell the end for "petrostate" nations? (Goldthau & Westphal, 2019) conducted a study that challenged the hypothesis that the global energy transformation will have a unidirectional effect on the countries that rely mainly upon oil and gas exports, limiting their benefits from their energy resources and pushing them to diversify their economies. The study demonstrates that regardless of how the global energy transition develops, certain petrostates may survive or even thrive. While the OECD countries, the most committed and fastest-moving countries in decarbonization, seek to phase out some of the most energy-intensive sectors, such as refined products and petrochemicals, their remaining requirements for such products will be met by imports, at least for some time in the future. This will pave the way for Gulf countries that have already begun upgrading the energy value chain by building refining capabilities. In other words, the global change in energy may provide some petrostates with "an additional lifeline" and perhaps promote a new oligopoly and more market concentration among the lowest crude oil providers. In addition, the study affirms that although the demand in OECD countries is likely to decrease and reach "peak demand," the demand for oil in East Asian countries is increasing, which will prolong the duration of oil in the global energy system and continue to fill the pockets of some petroleum-producing nations.

Similarly, Tagliapietra (2019) demonstrates that, despite the MENA hydrocarbon producers' persistent over-reliance on hydrocarbon rent, the global transition could be a positive input for its politics and economy, particularly after the oil price crisis of 2014 that forced the MENA-producing countries to implement some economic reforms. The article's fundamental thesis suggests the dynamics of the energy transition may provide additional justifications for MENA Energy producers to expedite economic reform and diversification. As three arguments may provide a significant motive for Middle Eastern and North African nations to adopt economic diversification policies, including policies based on a low-carbon future, to preserve a comfortable quality of living and economic development in the future. These three arguments are the risks of a volatile oil market, uncertainty about the pace of the global energy transition and, as a result, the continuation of necessary hydrocarbon rents, and the exacerbation of the urgent need to provide job opportunities for a large proportion of the population, the majority of whom are young (especially in countries such as Oman and Saudi Arabia).

On contrary, a recent article by (Mills, 2020) also investigated the consequences of the global energy shift on the Middle East and North Africa (MENA) region, which he regards as the cornerstone of global oil and gas

production. He contended that even though countries in the region are, to varying degrees, implementing economic diversification plans to reduce their reliance on one-export commodities, emergent factors such as geopolitical competition between great powers, climate change, and regional unrest would harden the challenges of the MENA energy transition. The author affirms that due to their hot, generally semi-arid or dry temperatures and dense urbanization along the coast, the Middle East and North Africa region is particularly sensitive to climate change. In addition, Fragile and repressive states in the region are experiencing increased political turmoil as well as ethnic, sectarian, and religious conflicts, and while climate change has not yet been a major contributor to any of these events or disturbances, it is likely to represent increasing pressure in the future, especially if it occurs at the same time as the economic downturn brought on by the downfall of fossil fuel rents.

The article also shows the responses of MENA nations to the energy transition could be broken down into four categories. The first is the rearrangement of their economies to account for current price reductions as well as future reductions in hydrocarbon rents that will be permanent. Secondly, they're making an effort to keep their hydrocarbon businesses secure for the future. The third is a shift that has been happening slowly but steadily toward restructuring their domestic energy sector in preparation for a future low-carbon reality. Finally, they cope with the changing geoeconomics landscape in the international system by maintaining open doors with both existing and emerging great powers.

4. The Arab Gulf and The Geopolitics of The Global Energy Transition

In this section, we will narrow our scope to the Six Arab Gulf Monarchies. In the wake of the global energy transformation, the six Gulf monarchies will be profoundly affected. since these countries are key players in the global energy system as it stands now. The region holds the highest share of the world's oil reserves. (30 percent) and the second-largest percentage of the world's gas reserves (21 percent). It stands for a third of the world's traded gas, a quarter of the world's oil output, and is the foremost exporter of oil globally (28 percent). One-third of the Gulf nations' GDP is derived from hydrocarbon exports, which also account for 80 percent of government income. (World Bank, 2019)

Overall, many previous studies have indicated that the continuous transition of the energy system to a low-carbon one will have far-reaching geopolitical implications for petrostates, such as the Arab Gulf monarchies, but few have examined the internal implications of this global energy transition on the internal rentier arrangements. So, a recent study by (Sim, 2020) rather than focusing on the external geopolitical implications of the global energy transition on the GCC, has investigated how the growing use of energy sources with lower levels of carbon emissions in the Gulf may help minimize the effects of the fossil fuel "resource curse" that is most visible in and applicable to this region. The paper's main point is that the deployment of low-carbon energy is unlikely to solve the difficulty of non-oil diversification, which manifests itself in three 'curses,' namely, revenue volatility, job losses, and a weak private sector.

When it comes to revenue instability and its effect on economic development, the low carbon-based projects will not be able to compete with hydrocarbon income. And since it saves more oil for export, switching from oil to renewables in electricity generation might increase volatility in some Gulf states. In terms of jobs and backward ties, low-carbon energy projects may contribute to the diversification of the local economy. However, as domestic use of the products and services increases, export sophistication are expected to advance slowly. In terms of the weak private sector, the energy transition appears promising since it presents an opportunity for firms to prosper in niches such as solar rooftops, but the development potential of solar rooftops as a non-hydrocarbon source of economic development is constrained by residential subsidies for electricity. Therefore, the author concludes that low-carbon projects of this sort may be able to preserve and expand present rentier arrangements. As a result of the complicated links between hydrocarbon revenues, job creation, and the state-directed economic development paradigm.

Similarly, research by Samantha Gross and Adel Abdel Ghafour has highlighted the inside impacts of the energy transfer process, titled "The shifting energy landscape and the Gulf's diversification challenge", It sought to

understand the impact of the current changes in the energy sector on the efforts of the Arab Gulf states to diversify their economies, which is their greatest challenge.

The authors believe that the Gulf countries are facing a new reality in the energy market as a result of two factors: the growing concern about climate change and the increase in oil and gas production in the United States. These two factors are pushing in the same direction, away from reliance on fossil fuels produced by Gulf Cooperation Council. Long-term, this will result in a reduction in government income and a threat to the rentier social contract predicated on the state ensuring the social welfare of its residents in exchange for a monopoly on political rights. especially if we consider the significant population increase in various Gulf Cooperation Council countries.

The authors' most significant point in the article for us is that the responses of the Gulf Cooperation Council countries to the challenge of economic diversification and their performance in addressing it are not consistent, as it is affected by the dynamics of (Reserves/Population) profiles in each country, for example. UAE, Qatar, and Kuwait have large resources but small populations, resulting in extremely high levels of resources. Therefore, to keep their country's economy flourishing, the development policy is concentrating on providing inhabitants with a vibrant and diverse economy. While Saudi Arabia's petroleum reserves and revenues are low when measured per capita, despite its enormous and diversified population. forty percent of Saudis are under the age of twenty-five, providing a serious employment dilemma for the nation. while Bahrain and Oman are projected to confront major political challenges due to resource depletion, notwithstanding the differences in their political systems. (Gross & Abdel Ghafour, 2019).

When it comes to the effects of climate change, the importance of geography cannot be overstated. The frequency and severity of extreme weather events including storms, floods, and heatwaves, as well as changes in temperature, precipitation, and weather patterns, will vary based on location. Therefore, a recent study by (Beni et al., 2021) aimed to assess the socioeconomic ability of the Gulf nations to deal with global climate change, as well as the extent to which the policies implemented by the Gulf states in this respect may contribute to the escalation of conflict in the Persian Gulf area. The study distinguishes between the socioeconomic capacity and the environmental capacity of the Persian Gulf states, concluding that, despite the implementation of socioeconomic reform policies to mitigate the effects of climate change, these policies are incompatible with the region's environmental capacity. This is owing to political differences between the region's governments, which hindered them from managing the Persian Gulf's environment as an integrated natural system. Additionally, the shift of the region's states to alternate energy resources or a knowledge-based economy is accompanied by geopolitical rivalry, political turmoil, and environmental issues. Therefore, the author affirms that if a cooperative strategy to limit the effects of climate change is not established, the situation may deteriorate. Thus, climate change may serve as a cause for future conflicts in the region.

In the same vein, (Al-Maamary et al., 2017) pointed out that even though there is a growing awareness in the Arab Gulf states of the fact that climate change represents a significant threat that has the potential to have a serious impact on all facets of life in the region, there is still much work to be done. According to the findings of the study, human activity is responsible for causing significant variations in the climate of the area. An increase in the region's average temperature and a dramatic drop in precipitation are among the impacts of the study's findings on climate change. Climate change also poses a threat to a variety of other systems and processes, including the production of distilled water, the safety of food supplies, the viability of renewable energy sources, and public health.

It should be noted that the authors acknowledged the difficulty that researchers studying the effects of climate change on the Gulf area face. Such as a lack of understanding of how to characterize and treat its impact. For instance, climate change has an indirect impact on storms, sea levels, and diseases, but these connections have not been well examined. also, there is a great deal of ambiguity about the direct consequences that rising CO₂ levels will have on plant life.

But does this imply that climate change will have a linear effect on the Gulf nations by affecting the worldwide market for oil and gas and threatening the economic rents that sustain the sociopolitical base and regime legitimacy of the Arab Gulf states? Krane deems it vital to differentiate between two kinds of risks. The political and economic one, and the physical and environmental one. when the Gulf seems to be the loser in the first, it is prone to be a

winner in the second, especially in the long run. This distinguishes the Arab Gulf states from other fossil fuel exporters in temperate locations, who may avoid physical damage in the near term or even profit from a warmer environment (Krane, 2020).

How about the economic diversification plans of the Gulf states would it help? Krane argues that the economic diversification initiatives adopted by Gulf states can serve as a buffer against the fall in hydrocarbon rents, but the necessary conditions have not yet been met. There must be more competitive economic sectors, and The Gulf states must anticipate a fall in the rent distributions upon which their social contracts are dependent. Eventually, he argued that achieving economic diversification will necessitate structural changes in social and financial policy that contradict these countries' usual rentier practices, and the signs of these changes have already begun since the 2014 oil price crisis when some countries reduced fuel subsidies and imposed taxes. (Krane, 2019). This deviated from the rentier governance model's script.

5. Conclusion

From the aforementioned review of the literature on the geopolitical effects of climate change and renewable energies, it is evident that this topic has garnered growing interest from scholars, particularly in recent years. Also, despite the significant contributions made by researchers to the subject and their desire to cover its dimensions from various angles, it is imperative to recognize that investigating the geopolitical effects of climate change and renewable energy is a nascent field, and its scholarly inquiry continues to evolve.

Moreover, despite the multitude of investigations undertaken to examine the potential implications of climate change and renewable energies on various regions worldwide, a significant challenge has emerged in the form of inconsistencies and disagreements among these studies. This can be attributed to the over-generalization of research findings, which often neglects to define both the temporal and spatial scope of influence and fails to identify both the source of the effect and the one affected by it. These four factors are critical in determining the nature of the geopolitical impact of climate change and renewable energy sources. Therefore, we believe that there is a serious necessity to collect the scattered parts presented by these studies in one image and to present a systematically coherent frameworks in which those four points are clearly defined.

To achieve this, researchers should identify and analyze the various processes and mechanisms that contribute to this impact, such as energy trade relationships, environmental governance frameworks, energy security, and technological innovation. By gaining a deeper understanding of these areas, researchers can assist policymakers and scholars in the Arab Gulf states to develop more comprehensive strategies that address the potential negative impacts of the energy transition and climate change. meanwhile, taking advantage of the impending disruptions that those changes will create, it is not unpredictable that this may result in policies that promote the use of renewable energy sources while maintaining the Gulf states' position in the oil and gas market. Ultimately, a balanced strategy that considers all factors can help countries navigate the complexities of the energy transition and mitigate its negative potential impacts.

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