The political economy of the energy transition in Saudi-Arabia, Qatar and the United Arab Emirates

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1. Abstract

After the Paris Climate Agreement, oil-rich countries must also commit to making their energy mix more sustainable. The question is to what extent they are making progress here and what obstacles they will encounter. In my thesis, I look at the cases of Saudi Arabia, Qatar and the United Arab Emirates from a political economy lens on how they deal with the energy transition in their country. The research question I formulated: Why are Saudi Arabia, Qatar and the United Arab Emirates failing to meet the renewable energy expectations created after the Paris Climate Agreement in the period 2015-2019? In my thesis, I first describe the current state of the literature on the energy transition in these countries. I predict the bureaucracy, the undesirability for the political elite of these countries and the energy subsidies for fossil fuels that are pushing renewable sources away from the energy market. Then, based on the available data and literature, I will actually look at the goals set and the results achieved in the field of renewable energy. Then I will discuss the concrete political and economic obstacles that have been created for the aforementioned countries to shape the energy transition. Ultimately, I conclude that the targets set are unclear from mainly Saudi Arabia and Qatar, but that the United Arab Emirates has set a clear target and can perceive that they are also the only country that has set significant targets in the period 2015 – 2019 . There are also clear political and economic obstacles shaping the energy transition in Saudi Arabia, Qatar and the United Arab Emirates. My hypothesis that there are mainly political and economic obstacles is therefore confirmed in my conclusion. At the end I recommended further research about the development in these countries the coming period.

2. Foreword

Anything that grew took its time growing, and anything that perished took a long time to be forgotten. But everything that had once existed left its traces, and people lived on memories just as they now live on the ability to forget quickly and emphatically.

– Joseph Roth, The Radetzky March

Before you lies my thesis *The political economy of the energy transition in Saudi Arabia, Qatar and the United Arab Emirates,* which marks the end of my study period at Leiden University. It aims to provide more insight into the first turning points in the energy transition of the Gulf countries. A worldwide transition in which we have to keep an eye on groups of people who will not be able to accept this rotation on the basis of economic development, financial position and/or employment. We do not seem to fully understand the impact of the energy transition on a social, (geo)political, cultural and economic level yet. The problems of livelihood security still exist, even where they are not expected. At a time when developments seem to be moving faster and faster, the gap between 'winners' and 'losers' is widening, citizens seem to be losing their grip on 'inevitable' trends and direct connections between people are loosening, it is important to keep an eye on the commonly established facts and doubts.

I am proud that the hard work of my parents gave me the opportunity to study. In the Netherlands of 2022, social mobility is still a great asset. I am thankful to have grown up in this country. Although my parents have always given me the freedom to choose my own path, I am grateful that I learned from them the importance of community, solidarity, involvement and responsibility. In addition, I would like to thank Siem, Amber, Aedán, family and friends for the inspiration and ideas given. I would also like to thank all those valuable people with whom I have had the opportunity to have heated discussions in recent years. There is nothing more important as a political animal than to continuously sharpen your own views.

During this difficult period of limited contact, I would like to thank Mr. Henderson for his feedback provided. In addition, I am looking forward to delivering my thesis at Radboud University in 2022.

Sonny Spek

Katwijk, January 1st, 2022

3. Table of contents

4. Introduction

The earth is heating up and this has far-reaching consequences for our economy, weather conditions, quality of life on our planet and biodiversity. Climate change is a common thread throughout the history of the earth, but there is a broad scientific consensus that the current warming is accelerated by the emission of greenhouse gases and therefore humans have a hand in accelerating this process.[1] In order to plan for greenhouse gases, countries with a large stock of fossil fuels must also become more sustainable. The Intergovernmental Panel on Climate Change (IPCC) is part of the United Nations and was set up in 1988 to research climate change. There are currently 195 states affiliated and the panel is composed of researchers from all over the world to periodically write a report on the developments surrounding climate change and the consequences it has. The IPCC thus develops a scientific basis for governments to develop climate change related policies so they can make an assessment based on the various scenarios.[2] It is the consciously intention that the composition of the report is not politicized by specifically indicating what policymakers should or should not do. It can be argued that the reports written by hundreds of scientists are indicative in the scientific and political world to speak about the impact of climate change. In order to cope with these facts and to slow down climate change, it is necessary to reduce greenhouse gas emissions to a level that will not increase warming much further and cause further irreparable damage to humans, animals and nature. Therefore, 26 climate conferences have been held since 1995 to discuss the need to reduce greenhouse gases. The highlight here is still considered the Paris Climate Conference, which was held from 30 November to 12 December 2015. The agenda included a review of the climate policy of recent years and the setting of goals that should be achieved by 2050. The COP21 in Paris showed that all countries have recognized that the global temperature increase of 2 degrees Celsius compared to the pre-industrial period is undesirable and that the participating countries have agreed a new target: 'We must stay well below two degrees and aim for a temperature increase of maximum one and a half degrees'. Nearly 200 countries agreed, among other things, to do their best to limit greenhouse gas emissions as quickly as possible, to periodically review their targets in order to adjust their goals if necessary, to assist poorer countries by means of a financial gift from prosperous countries and making money available for scientific research.

[1] Emanuel, Kerry A. What We Know about Climate Change. Second ed. Boston Review Books. Cambridge, MA: MIT Press, 2012.

[2] "IPCC Factsheet: What Is the IPCC?" (Geneva, August 30, 2013).

In order to contribute to the reduction of greenhouse gases, all participating countries must make clear how they will commit themselves to this up to and including 2050.[3]

Saudi Arabia, the United Arab Emirates and Qatar have also committed themselves to the targets, recognizing that reducing greenhouse gas emissions is valuable in limiting global warming to two degrees Celsius. All three countries that have their own interests and challenges in the energy transition due to their own position within the global energy market. Countries, such as Saudi Arabia, Qatar and the United Arab Emirates, are definitely supplying a growing demand for fossil fuels. Their economies are therefore almost entirely based on the export of fossil fuels and with that, they also have a large part of their exports to lose when countries in the world switch completely to renewable energy sources. The switched countries will therefore be virtually independent in terms of energy and this will have a major economic and possibly also political impact on countries that depend on the export of fossil fuels. In addition, it is not attractive for countries with a large stock of fossil fuels to switch to renewable sources such as solar and wind energy, because this is currently more expensive for countries whose infrastructure is fully equipped for oil, coal and gas. The switch to renewable sources could therefore also affect the economy and the energy price that the population has to pay. The reluctance to actually implement the energy transition to renewable sources will therefore not be the same for every country, which is why it is interesting to take a closer look at the energy transition in Saudi Arabia, Qatar and the United Arab Emirates. In addition, these countries are relatively the larger economies in the region and that is why it is interesting to highlight them. In the years following the Paris Climate Agreement, few results have been achieved to make the energy mix in the aforementioned countries more sustainable and in my research I will examine in more detail the economic and political obstacles these countries have encountered.

The incentive for these types of countries to make their natural resources more sustainable will be different from resource-poor countries, even though they all committed themselves to the goals of the Paris Climate Agreement in 2015. It raises the question to what extent they will take this seriously or whether they will deviate from the set goals in the long run because of, for example, the economic costs or consequences for their export position. In order to be able to investigate this on the basis of reliable data, it is necessary to define the period so that sufficient information is available. The Climate Agreement was concluded in

[3] Wim Turkenburg et al., "De Klimaatdoelstelling Van Parijs," March 15, 2016.

2015 and there is still insufficient data available for 2020 and many economic and political developments were changed by the coronavirus. It is therefore plausible to study the period 2015-2019 in more detail. To research the obstacles that Saudi Arabia, Qatar and the United Arab Emirates encounter during their energy transition, I formulated the following research question:

"Why are Saudi Arabia, Qatar and the United Arab Emirates failing to meet the renewable energy expectations created after the Paris Climate Agreement in the period 2015-2019?"

I also formulated a number of associated sub-questions in which I will include Saudi Arabia, Qatar and the United Arab Emirates:

1. What are the expectations created after the Paris Climate Agreement?

2. What are the actual results achieved in the field of renewable energy and where do the countries differ?

3. What obstacles play a role in the increasing use of renewable energy?

In order to answer these questions, I will divide my research into different parts. First of all, I will prepare a literature review and show where there is a gap in the current scientific literature. In this chapter, I will indicate which theories and ideas already exist with regard to renewable energy in the aforementioned countries, so that I indicate the frameworks of my research. My conducted research is thus embedded in the existing literature. In this chapter I will also go into more detail about my hypothesis based on the available literature for the research and sub-questions posed. Second, I will explain how I will design my research methodically. In this research design I will explain what type of research I have conducted, how I have collected data, the data characteristics, the research course and the method of data analysis. Thirdly, in the next chapter I will specifically discuss the different cases and research the development of renewable energy in Saudi Arabia, Qatar and the United Arab Emirates. I want to address the first, second and third sub-questions in these separate chapters. Subsequently, in the conclusion, I will formulate a definitive answer to the research and sub-questions posed and I confirm or disprove the previously formulated hypothesis. The most important facts and results will be summarized here. I will also make the discussion part of the conclusion in which I discuss the limitations and possible implications of the research and make suggestions for further research.

5. Theoretical framework

In my literature research, I will critically examine the available literature on renewable energy in the energy transition in the Middle East and in particular Saudi Arabia, Qatar and the United Arab Emirates. I will judge it based on its relevance and quality. Also I will give a theoretical framework of the most important concepts. I will first discuss how my research fits within the current literature on political economy and climate change. It should become clear to which questions within this literature my thesis can provide new answers.

5.1 Concepts

In order to further investigate the key concepts from my research question, I will also draw up a theoretical framework based on my literature review. The related theories will be distilled from the literature so that the sub-questions can be answered on the basis of this. I will organize the literature on the basis of the following key concepts, namely the actual results in renewable energy, economic obstacles and political obstacles.

5.2 Political economy

It is important to clearly indicate how my literature is related to the chapters in which I formulate an answer to the sub-questions. The picture that emerges from the literature review is that there is limited literature available that examines the situation in Saudi Arabia, the United Arab Emirates and Qatar. Information is available on sub-topics, but a complete answer to my formulated main question is not provided. Answers are only formulated for parts of my sub-questions. It is therefore currently clear what the important literature is within this research field and what the knowledge is about the period 2015 – 2019. My aim in the remainder of my thesis is to connect this information and to provide a coherent answer to my research question. The following chapters form the arguments to arrive at an answer to my research question, which is embedded in the current theoretical discussion as I will outline it.

There are two proposals in which I could frame my research: political economy and political ecology. As we have seen in the theoretical framework, the most relevant concepts in my research question on the energy transition relate to political economy. My further research will therefore contribute within the academic field of political economy as it concerns the study of production and trade and their relations with law, custom and government; and with

the distribution of national income and wealth. Political ecology focuses on the areas of political, economic and social factors associated with environmental issues and change. However, my research question does not focus on the environmental consequences of the fact that Saudi Arabia, Qatar and the United Arab Emirates do not adhere to their sustainability goals, but the consequences thereof. The theory of political ecology is therefore less relevant to me and my research will therefore not be framed within it.

It is important that my thesis is grounded in a theoretical discussion. The book *Power shift: the global political economy of energy transitions* gives a complete picture of the different perspectives and discussions within the political economy. The energy transition from the political economy can be implemented in various ways: state-led, market-led, technology-led or citizen-led.[4] We need to understand where in the energy transition power comes from, how it is conserved and how it has changed over time.[5] An approach from the political economy requires a focus on vulnerabilities, opportunities for change, resistance and internal transformation within the economy and state. In addition, a political economy approach focuses on the questions surrounding the tension between the state and the market and power.[6] This is discussed in the literature and in my sub-question regarding the political and economic obstacles. The analysis from the political economy is often the most convincing as to why a certain change does not seem to "get off the ground". The state, corporations and other institutional actors have power over the means of production, financial situation and available technology. In some cases, the economic and political elite benefits from maintaining the status quo and therefore a strong explanation for why transitions fail or are even de-legitimized or ignored.[7] The existing power relations and power structures are therefore central to the political economy and will also be given a central place in answering the relevant sub-questions.

[4] Newell, Peter. Power Shift: the Global Political Economy of Energy Transitions, 2021. p. 37.

[5] Cox, R. (1983) 'Gramsci, Hegemony and International Relations: An Essay in Method'. Millennium: Journal of International Studies 12(2): 173–74.

[6] Newell, Peter. Power Shift : the Global Political Economy of Energy Transitions, 2021. p. 38.

[7] Levy, David L, and Peter J Newell. "Business Strategy and International Environmental Governance: Toward a Neo-Gramscian Synthesis." Global Environmental Politics 2, no. 4 (2002): 95–97. https://doi.org/10.1162/152638002320980632.

5.3 The actual results in renewable energy

The book *Spaceship in the Desert Energy, Climate Change, and Urban Design in Abu Dhabi* describes the ambitious project of the Emirate of Abu Dhabi to build a complete zero-carbon city and thereby diversify their economy.[8] As a post-oil city, Masdar City should serve as an example for the energy transition in the country, but would fail as a utopian project. The aim of the book is to show how in Abu Dhabi the goal of reducing greenhouse gas emissions and using renewable energy is being put into practice.[9] The research is useful to get a picture of the energy transition at the micro level, but it gives a limited picture of the transition at the national level. In addition, it discusses a very limited part of the energy transition, but the developments surrounding the large-scale generation of solar and wind energy, for example, are not highlighted. Because the United Arab Emirates is committed to sustainability, the international image is also improved, leading to diplomatic opportunities.[10] This is an aspect of the energy transition that I can certainly use when I look at the concrete results achieved and the obstacles in practice.

The article *Mapping states 'Paris climate pledges: Analyzing targets and groups at COP21'* analyzes the goals that countries set after the Paris Climate Conference in 2015.[11] After signing the Paris Climate Agreement, countries were asked to translate them into national goals and policies to limit the temperature rise worldwide. Each country has different options for the use of renewable energy and a different energy system, which means that it must be determined at state level how a country will become more sustainable. The authors indicate that there is a gap in the literature in which the goals set are analyzed per country and this is also in accordance with my findings when I analyze the available literature.[12] There are not a lot articles in the literature where a comparative analysis is made between different countries in the Middle East in the field of the energy transition. The intended target of Saudi Arabia, Qatar and the United Arab Emirates shows that they have not included an explicit

[8] GÜNEL, GÖKÇE. Spaceship in the Desert: Energy, Climate Change, and Urban Design in Abu Dhabi. Durham; London: Duke University Press, 2019. Accessed June 1, 2021. doi:10.2307/j.ctv1131f5h.
[9] GÜNEL, GÖKÇE. Spaceship in the Desert: Energy, Climate Change, and Urban Design in Abu Dhabi. Durham; London: Duke University Press, 2019. Accessed June 1, 2021. doi:10.2307/j.ctv1131f5h. 7-10.
[10] GÜNEL, GÖKÇE. Spaceship in the Desert: Energy, Climate Change, and Urban Design in Abu Dhabi. Durham; London: Duke University Press, 2019. Accessed June 1, 2021. doi:10.2307/j.ctv1131f5h. 153.
[11] Tobin, Paul, Schmidt, Nicole M, Tosun, Jale, and Burns, Charlotte. "Mapping States' Paris Climate Pledges: Analysing Targets and Groups at COP 21." Global Environmental Change 48 (2018): 11-21.
[12] Tobin, Paul, Schmidt, Nicole M, Tosun, Jale, and Burns, Charlotte. "Mapping States' Paris Climate Pledges: Analysing Targets and Groups at COP 21." Global Environmental Change 48 (2018): 11-12.

target to reduce CO_2 emissions.[13] It is stated that the countries indicated that they want to become more sustainable in order to diversify the economy and that they are not completely dependent on the export of fossil fuels. It is seen as a positive step that certain generally formulated goals are presented, but concrete agreements are still lacking.[14]

There are few studies that systematically list the results achieved after the Paris Climate Agreement and that pay attention to the development of concrete projects for sustainability in Saudi Arabia, Qatar and the United Arab Emirates. To a certain extent, the literature links up with theories within political ecology, where the relationships of political, economic and social factors are linked to environmental issues and changes. Political ecology analyzes how social forms and human organization interact with the environment. In the literature mentioned, we also see that attention is also paid to how the actions of states affect climate change and the environment, which means that we are within the research area of political ecology. On the basis of the literature mentioned, I propose as a partial hypothesis that Saudi Arabia, Qatar and the United Arab Emirates are also lagging behind in terms of actual results and that concrete large-scale projects are used to paint a wrong picture of the energy transition in the general, because iconic projects can be announced to make the energy mix more sustainable, but this does not automatically lead to concrete results to make the energy mix more sustainable.

5.4 The economical obstacles

If I want to understand more about the obstacles to switching to renewable energy, I will also have to understand more about the economic situation of countries that are largely dependent on fossil fuels. In the article *Low-carbon energy in the Gulf: Upending the rentier state?* addresses the challenges of the Gulf States, which hold about 30% of the total oil supply and 21% of the total gas supply.[15] The falling oil price and increasing demand for renewable energy means that the region will see its prosperity shrink within 15 years if the necessary economic reforms are not implemented, according to the International Monetary Fund.[16] The

[13] Tobin, Paul, Schmidt, Nicole M, Tosun, Jale, and Burns, Charlotte. "Mapping States' Paris Climate Pledges: Analysing Targets and Groups at COP 21." Global Environmental Change 48 (2018): 16.
[14] Cadman, Tim, Radunsky, Klaus, Simonelli, Andrea, & Maraseni, Tek. (2018). From Paris to Poland: A Postmortem of the Climate Change Negotiations. International Journal of Social Quality, 8(2), 27.
[15] Sim, Li-Chen. "Low-carbon Energy in the Gulf: Upending the Rentier State?" Energy Research & Social Science 70 (2020): 101752.
[16] Sim, Li-Chen. "Low-carbon Energy in the Gulf: Upending the Rentier State?" Energy Research & Social Science 70 (2020): 101752. 1-2.

theory of the rentier state is that a large part of the state's income is derived from the export of natural resources, thus limiting the need to levy taxes. This is not seen as a healthy economic situation, because the oil and gas market is volatile and therefore income for the state is not guaranteed. Using the indicators 'yields', 'jobs' and 'lackluster private sector', the article notes that the transition to renewable sources will not ensure stable economic growth because it will not be an actual competitor for the fossil fuels that remain in demand.[17] The article *Political power and renewable energy futures: A critical review* examines three aspects: first, the connection between renewable energy and (democratic) political power is tested, then the tensions surrounding the democratization of renewable energy systems are tested and finally the practical consequences of democratized renewable energy systems.[18] Democratizing the energy system is also a relevant factor for me because it can be a potential obstacle for countries such as Saudi Arabia, Qatar and the United Arab Emirates. Dividing energy supplies also affects political power and thus can bring about the democratization of the energy system for a new look at a dominant market ideology, unlimited growth and industrial agenda. This democratization agenda advocates for more public and community-owned renewable energy systems and opposes historical inequality, neoliberalism, agreements with large-scale companies, privatization and concentration of power and prosperity.[19] The decentralization of energy systems and political oversight is a step that may not receive much support in centrally-managed countries.[20] To get a broader picture of the economic developments around renewable energy, I will also discuss the article *Renewable and Non-renewable Energy Use - Economic Growth Nexus: The Case of MENA Net Oil Importing Countries*, which discusses the relationship between the Gross Domestic Product (GDP) and the use of renewable and non-renewable energy.[21] The International Energy Agency (IEA) and the international renewable energy agency (IRENA) have made the claim that renewable energy is an opportunity for countries to develop economically. There is little research where the link

[17] Sim, Li-Chen. "Low-carbon Energy in the Gulf: Upending the Rentier State?" Energy Research & Social Science 70 (2020): 101752. 2-3.
[18] Burke, Matthew J, and Stephens, Jennie C. "Political Power and Renewable Energy Futures: A Critical Review." Energy Research & Social Science 35 (2018): 78-93.
[19] Burke, Matthew J, and Stephens, Jennie C. "Political Power and Renewable Energy Futures: A Critical Review." Energy Research & Social Science 35 (2018): 79-80.
[20] Burke, Matthew J, and Stephens, Jennie C. "Political Power and Renewable Energy Futures: A Critical Review." Energy Research & Social Science 35 (2018): 82-83.
[21] Kahia, Montassar, Aïssa, Mohamed Safouane Ben, and Lanouar, Charfeddine. "Renewable and Non-renewable Energy Use - Economic Growth Nexus: The Case of MENA Net Oil Importing Countries." Renewable & Sustainable Energy Reviews 71 (2017): 127-40.

between renewable energy and economic growth is actually supported by the facts.[22] In conclusion, the article states after empirical research that the use of renewable and fossil energy sources are vital for economic growth. According to these studies, in order to boost investments in renewable energy, investments should be made in macroeconomic stability, property rights, transparency, good governance and infrastructure. The article is helpful to me as it continues to comment on the obstacles faced by Middle Eastern countries in the continued use and implementation of renewable energy sources.[23] It can be criticized that there is hardly any discussion of the specific circumstances of each country and how renewable energy sources influence sustainable economic development. The article *Analysis of the impact of renewable energy consumption and economic growth on carbon dioxide emissions in 12 MENA countries* is another study that focuses on the influence of renewable energy on economic growth and foreign investment.[24] Again, it is indicated as an obstacle to the investment in renewable energy that petroleum products are heavily subsidized in the Middle East, making fossil fuels inefficient and frequently used. According to the author, there is no direct link between renewable energy consumption, international trade and CO_2 emissions.[25] The authors of the empirical study recommend that governments invest in low-carbon development and opt for solar and wind energy in order to limit the use of fossil fuels.[26] A short article that discusses the obstacles to making the energy transition a success in the Middle East is *Challenges and opportunities in Middle East and North Africa*.[27] It deals very briefly with the diversification of the energy mix, the climatic conditions and the main challenges. The availability of qualified personnel is mentioned as an obstacle to quickly shaping the energy transition. Nevertheless, according to the researcher, the climatic

[22] Kahia, Montassar, Aïssa, Mohamed Safouane Ben, and Lanouar, Charfeddine. "Renewable and Non-renewable Energy Use - Economic Growth Nexus: The Case of MENA Net Oil Importing Countries." Renewable & Sustainable Energy Reviews 71 (2017): 128-29.
[23] Kahia, Montassar, Aïssa, Mohamed Safouane Ben, and Lanouar, Charfeddine. "Renewable and Non-renewable Energy Use - Economic Growth Nexus: The Case of MENA Net Oil Importing Countries." Renewable & Sustainable Energy Reviews 71 (2017): 137-38.
[24] Kahia, Montassar, Ben Jebli, Mehdi, and Belloumi, Mounir. "Analysis of the Impact of Renewable Energy Consumption and Economic Growth on Carbon Dioxide Emissions in 12 MENA Countries." Clean Technologies and Environmental Policy 21, no. 4 (2019): 871-85.
[25] Kahia, Montassar, Ben Jebli, Mehdi, and Belloumi, Mounir. "Analysis of the Impact of Renewable Energy Consumption and Economic Growth on Carbon Dioxide Emissions in 12 MENA Countries." Clean Technologies and Environmental Policy 21, no. 4 (2019): 871-74.
[26] Kahia, Montassar, Ben Jebli, Mehdi, and Belloumi, Mounir. "Analysis of the Impact of Renewable Energy Consumption and Economic Growth on Carbon Dioxide Emissions in 12 MENA Countries." Clean Technologies and Environmental Policy 21, no. 4 (2019): 882-83.
[27] Hochstrasser, Annalisa. "Challenges and Opportunities in Middle East and North Africa." Renewable Energy Focus 16, no. 5-6 (2015): 128-29.

conditions provide enough space to make extensive use of solar and wind energy. I can use this article to make a distinction if I later elaborate on the obstacles that Saudi Arabia, Qatar and the United Arab Emirates encounter.

If we analyze the available literature, we must conclude that this is not an ecological challenge, but a problem seen from an economic perspective. The concept mentioned must therefore be viewed from the perspective of the theory of the political economy, in which the relationship between society, the market and the state is examined, taking political and economic factors into account. The hypothesis that I formulate on the basis of the literature is as follows: my expectation is that the economic obstacles will be the biggest obstacle to the energy transition in Saudi Arabia, Qatar and the United Arab Emirates as many countries use fossil fuel subsidies, countries such as rentier state will find it difficult to convince their populations to start working more because the revenues from the export of fossil fuels fall and the switch to renewable energy sources will be seen as an obstacle to macroeconomic growth.

5.5 The political obstacles

The article *The Rise of Renewable Energy in the MENA Region: An Investigation into the Policies Governing Energy Resources* is ideally suited to elaborate on the policy on renewable energy.[28] The policy and legislative framework regarding renewable energy is discussed here in particular for the United Arab Emirates and Egypt. The historical research, the interviews held and available literature provide a picture of the recommendations that can be made to increase the share of renewable energy in the Middle East. In summary, the recommendations that are made mean that subsidies on fuel should be phased out and the energy market should be liberalized in order to achieve greater efficiency. The article outlines the biggest advantages and disadvantages of solar and wind energy.[29] As a national government, there are various ways to stimulate investment in renewable energy.[30] Several projects are mentioned that should bring the United Arab Emirates closer to its renewable energy targets. The state is committed to boosting investment in renewable energy by the private sector and private individuals, but this increases the pressure on its own financial

[28] Abdelrahim, F.. "The Rise of Renewable Energy in the MENA Region: An Investigation into the Policies Governing Energy Resources." (2019).
[29] Abdelrahim, F.. "The Rise of Renewable Energy in the MENA Region: An Investigation into the Policies Governing Energy Resources." (2019). 11-14.
[30] Abdelrahim, F.. "The Rise of Renewable Energy in the MENA Region: An Investigation into the Policies Governing Energy Resources." (2019). 12-15.

status. Also several problems are mentioned that are present throughout the region as an obstacle to the use of renewable energy. First of all, there is a lack of stable regulation, strategic coherence and reliable legislation and policy in various governments. It would be more efficient if the energy market is liberalized, so that private parties can freely enter and exit the market. The other financial burden on the spending of countries in the Middle East is the subsidies on electricity to keep the price down. The competitive strength of solar and wind energy is thus canceled out and ensures that the share of renewable energy cannot grow any faster. There are several recommendations that are made. The public sector should withdraw to boost energy efficiency and sustainability. Also it is argued that a more efficient bureaucratic system should be set up in which long-term goals are clear and not readily adjusted, thus driving off investors' startles.[31] This is a very important article for me because it discusses the problems in the energy transition and how they can be solved in a well-organized manner. The article *Barriers, Risks and Policies for Renewables in the Gulf States* also focuses on the policy solutions of the countries in the Gulf Cooperation Council (GCC) to increase the share of renewable energy.[32] Two major obstacles are also identified here: a bureaucracy that does not function efficiently and again the combination of the subsidy for fossil fuels and electricity and insufficient support for renewable energy. The only way in which investments in renewable energy sources can be profitable is by reducing or eliminating the aforementioned energy subsidies. Promoting transparency ensures that investments by the private sector become more attractive and the abolition of subsidies can slowly change the economic situation of the rentier states.[33] The subsidies are used to maintain order and peace and have become part of the imaginary social contract as concluded by the population with the government.[34] Another advantage that is often mentioned when it comes to the energy transition is that a lot of new jobs can be created because a lot of practical work has to be done, such as installing solar panels and installing wind turbines. Having to open up this labor market to its own population is a "threat" because in the past these jobs

[31] Abdelrahim, F.. “The Rise of Renewable Energy in the MENA Region: An Investigation into the Policies Governing Energy Resources.” (2019). 21-22.
[32] Lilliestam, Johan; Patt, Anthony. 2015. "Barriers, Risks and Policies for Renewables in the Gulf States" Energies 8, no. 8: 8263-8285. https://doi.org/10.3390/en8088263
[33] Lilliestam, Johan; Patt, Anthony. 2015. "Barriers, Risks and Policies for Renewables in the Gulf States" Energies 8, no. 8: 8266-8269. https://doi.org/10.3390/en8088263.
[34] Lilliestam, Johan; Patt, Anthony. 2015. "Barriers, Risks and Policies for Renewables in the Gulf States" Energies 8, no. 8: 8265-8266. https://doi.org/10.3390/en8088263

could be done by migrant workers and were financed by the export of fossil fuels.[35] The article is useful to further my research as it is a good summary of the available literature on the obstacles surrounding the energy transition in Saudi Arabia, Qatar and the United Arab Emirates. One aspect to be scrutinized is the fact that it may be outdated as it was published in 2015, but it is up to my research to consider whether these barriers are still current. I will definitely use the details and findings of this study when I go into more detail about the obstacles identified later.

Limited literature is available on Saudi Arabia's renewable energy targets and the extent to which they are being achieved. The written literature is mainly about the (im)possibilities of the energy system, the economic impact of economic diversification and the potential for renewable energy. The article *Oil Subsidies and Renewable Energy in Saudi Arabia: A General Equilibrium Approach* examines the macroeconomic consequences of using 9.5 GW of renewable energy for its electricity system according to the Vision 2030 plans.[36] Two main reasons are mentioned in the article why the economic impact is different in Saudi Arabia than in other countries. First of all, the country's electricity production runs largely on oil, which is not the case in many countries in the world. Second, the oil used is highly subsidized, making a switch to renewable sources even more unattractive due to the negative financial story. In conclusion, it is stated that the plans to invest relatively limited in renewable energy sources have a positive effect on economic development and consumers' welfare in the longer term.[37] The thesis *Transitioning to Renewable Energy in Saudi Arabia - A Multi-level Perspective Analysis of the Saudi Renewable Energy Policies* discusses the barriers to taking the step to renewable energy sources at all kinds of different levels, including the disadvantages of solar and wind power, Saudi Arabia's political system, economic development and opportunity, and domestic energy demand. This study focuses in great detail on the case of Saudi Arabia, but reports to a lesser extent on the results achieved in the field of sustainability. It is again important for me to know the context of Saudi Arabia and I will certainly use this in answering my sub-questions, but it does not give us enough

[35] Lilliestam, Johan; Patt, Anthony. 2015. "Barriers, Risks and Policies for Renewables in the Gulf States" Energies 8, no. 8: 8279-8281. https://doi.org/10.3390/en8088263

[36] Blazquez, Jorge, Hunt, Lester C, and Manzano, Baltasar. "Oil Subsidies and Renewable Energy in Saudi Arabia: A General Equilibrium Approach." The Energy Journal (Cambridge, Mass.) 38 (2017): 29-45.

[37] Jorge Blazquez, Lester C Hunt, and Baltasar Manzano. “Oil Subsidies and Renewable Energy in Saudi Arabia: A General Equilibrium Approach.” The Energy Journal (Cambridge, Mass.) 38, no. S1 (2017): 40.

insight into the steps that have actually been taken including 2019 in the field of renewable energy.[38]

There is also limited literature on Qatar on the steps taken in the field of renewable energy. The 2017 *article Analysis of the long-term solar potential for electricity generation in Qatar* analyzes the longer-term potential for Qatar to use solar energy.[39] It is a technically oriented article that uses satellite data to investigate the extent to which solar energy can be generated in the country. It is concluded that the south has a high potential for the placement of Concentrated Solar Power and that solar panels can be installed almost anywhere in the country. Earlier I indicated that there is little information available about the actual steps that are being taken to make the energy mix more sustainable and this article also hardly discusses this. It is therefore not relevant for me to use in my further research, but it does offer openings to use other literature used in the research.

As the last part of my literature review, I will discuss the literature available for the United Arab Emirates and the renewable targets after the Paris Agreement. The energy transition is a major challenge for countries that largely run on fossil fuels. Not only must investments be made in forms of renewable energy, but we must also say goodbye to the relatively cheap oil, gas and other fossil fuels. The article *Renewable energy technologies adopted by the UAE: Prospects and challenges* addresses this challenge for the UAE and describes the possibilities and challenges of the different renewable energy sources. In conclusion, the article states that the United Arab Emirates in the GCC region is at the forefront of the use of renewable energy sources and that various strategies are possible to make the energy mix more sustainable. It is even stated that energy demand can easily be met by 2030 and the targets set for the generation of renewable energy can be achieved.[40] However, the question remains to what extent the United Arab Emirates is prepared to actually take this step and whether they actually commit to the goals set in the Paris Climate Agreement. Substantiated predictions in the field of the energy mix and developments in sustainable energy can help us to gain a better picture of the actual efforts that the United

[38] Ratikainen, Katrine Wiulsrød. Transitioning to Renewable Energy in Saudi Arabia - A Multi-level Perspective Analysis of the Saudi Renewable Energy Policies, 2017.

[39] Martín-Pomares, Luis, Martínez, Diego, Polo, Jesús, Perez-Astudillo, Daniel, Bachour, Dunia, and Sanfilippo, Antonio. "Analysis of the Long-term Solar Potential for Electricity Generation in Qatar." Renewable & Sustainable Energy Reviews 73 (2017): 1231-246.

[40] Jamil, M, Ahmad, Farzana, and Jeon, Y.J. "Renewable Energy Technologies Adopted by the UAE: Prospects and Challenges – A Comprehensive Overview." Renewable & Sustainable Energy Reviews 55, no. C (2016): 1181-194.

Arab Emirates is making in the field of the energy transition. The article *Predictions of UAE's Renewable Energy Mix in 2030* analyzes the set target in the field of renewable energy and reducing greenhouse gases and examines to what extent this is realistic based on the state's plans for 2030.[41] Two situations are examined: first, the situation in which CO_2 emissions are not subject to additional financial burden and, secondly, the situation in which this does happen and what the results will be in both cases. In addition, an analysis is provided of future government plans to limit CO_2 emissions. An overview is given to what extent the promises of the past in the field of sustainable energy have been fulfilled and where the country stands in terms of energy development. So far, this is one of the most important and useful articles I have been able to find for my research. It is relevant to my research question and provides a clear picture of the state of affairs in The United Arab Emirates. In a way, my research focuses on some of the results of this research and makes a similarity between Saudi Arabia, Qatar and the United Arab Emirates. I will therefore use this research as an example for my own research to be carried out.

The article *The Impact of Electricity and Water Subsidies in the United Arab Emirates* discusses the current state of affairs with regard to subsidies, the barriers that exist to reform subsidies, the possibilities, solutions and concludes with a conclusion.[42] The article is relevant to me because it takes a closer look at a case that I also discuss and talks about an important barrier to the energy transition in more detail that has also been highlighted earlier in the literature. The United Arab Emirates has some of the highest levels of electricity use in the world and the subsidies have resulted in very inefficient use and overconsumption. Research shows that companies do not pass on the true costs of electricity and thus inefficiency is promoted. In order to create more awareness about the subsidies, the drawing up of a public campaign, better communication of the true costs of electricity and the promotion of energy efficiency are mentioned. In conclusion, it is stated that the rentier state maintains the social contract that the state provides affordable energy for its citizens and that this has also come to apply to the commercial and industrial sectors. This situation is not sustainable if the country wants to take the step towards more sustainable energy and the step of calculating the true electricity price will have to be taken.

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[41] Said, Zafar, Alshehhi, Abdulla A, and Mehmood, Aamir. "Predictions of UAE's Renewable Energy Mix in 2030." Renewable Energy 118 (2018): 779-89.

[42] Gallaher, M., Alam, T., & Rouchdy, N. (2017). The impact of electricity and water subsidies in the United Arab Emirates. RTI Press. RTI Press Publication No. PB-0012-1705 https://doi.org/10.3768/rtipress.2017.pb.0012.1705

In short, the literature that I have discussed extensively shows that a lot of research has been done towards the goals surrounding the energy transition, the economic situation in rentier states and the obstacles to making the transition to renewable energy sources in Saudi Arabia, Qatar and the United Arab Emirates. There is really a lack of clear up-to-date research that brings together the most recent results achieved in the field of renewable energy and the most recent barriers in the aforementioned countries. Many studies are from a few years ago, while developments in the energy sector are moving at lightning speed. In my explanatory research, I will provide an up-to-date picture of the obstacles surrounding the energy transition in Saudi Arabia, Qatar and the United Arab Emirates, based on the most recent data, developments and studies.

5.6 Hypothesis

Based on the literature, I can also formulate a hypothesis for my research question: 'Why are Saudi Arabia, Qatar and the United Arab Emirates failing to meet the renewable energy expectations created after the Paris Climate Agreement in the period 2015-2019?' The reason why I expect no significant results have yet been achieved in the field of renewable energy in the period 2015-2019 is mainly due to political and economic barriers. The technical or climatic difficulties mentioned that come with the use of new renewable energy sources hardly play a role. Politically, the focus will have to be primarily on the bureaucracy in the countries mentioned and the extent to which a long-term policy is implemented effectively. My expectation is that the goals will be changed regularly, which makes it unclear where exactly the countries work. On an economic level, then the limited progress due to the artificially low price of fossil fuels due to subsidies from Saudi Arabia, Qatar and the United Arab Emirates. In addition, a potential obstacle in the 2015-2019 period remains that many new jobs in the energy sector will have to be filled and that the slow diversification of the economy will also require more domestic labor. In order to be able to make this economic turnaround, support in society is also required, and the energy transition also ensures a certain degree of democratization, which can be raised as an obstacle. Finally, I expect that the fear of lower economic growth will also play a role as an economic argument for not making the switch to sustainable energy as a larger part of the energy mix. There will be no obvious differences between the countries mentioned and all these problems will, I expect, apply to the countries.

6. Methodology

In the methodology I substantiate the method that I have used in my research to test the hypotheses that have been drawn up and to substantiate the results. I will discuss the type of research that I will be conducting, the data collection methods, the course of the research, the data analysis and the reliability of the research. First of all, I will have to make a choice between qualitative and quantitative research. The quantitative research is often used to establish certain facts and to express the results in numbers. The qualitative research, on the other hand, has a clearer descriptive character and focuses more on the meaning of certain developments. It mainly uses words and tries to obtain in-depth information about the underlying viewpoints and motivations of the cases we are investigating. In my research, I will examine the case of Saudi Arabia, the United Arab Emirates and Qatar to find out why they are failing to reach their renewable energy targets from the Paris Climate Agreement in the period 2015-2019. This research question naturally relates to quantifiable data because in this way information can be provided with regard to whether or not the set goals have been achieved. However, in order to provide the answer to this question with sufficient context, mainly qualitative research will have to be conducted. The formulated sub-questions are also largely qualitative in nature because they relate to the policy made in the aforementioned countries. The research question therefore has a qualitative character, but it is absolutely supported by quantitative data. The aim of my research is not to test particular theories or paradigms, but to gain insight into the views and considerations of Saudi Arabia, Qatar and the United Arab Emirates. Thus, correlations or causal relationships between named variables are not sought, as would be the case with quantitative research. The research that I will be conducting is flexible and does not have a clear picture of which concepts and results will be important. Comparing the different countries has resulted in a comparative case study. In order to be able to properly compare this case study, I have conducted an extensive literature review and it is therefore clear what the state of affairs is within the research into the political and economic barriers in the energy transition. In the future it is necessary to go into more detail about the facts that have emerged from the literature review. In the previous literature review, we also found that a lot of research into making the Middle East more sustainable is used interchangeably. On the one hand, previous studies have paid attention to the prelude to sustainability, the goals set and why they are or are not achieved. To support this research, previously conducted quantitative research is used, but this does not (yet) play a major role because many countries in the Middle East are still at the start of the transition to renewable

energy. There are also practical reasons for me to limit myself to mainly qualitative research. For me, there are limitations in terms of time, money and overview to research the state of affairs with the energy transition in the aforementioned cases. I must rely on public sources and published policy documents from the relevant governments and research agencies. In order to analyze the qualitative data, I will mainly focus on possible observable regularities and the identification of certain constellations of countries. Second, I will discuss the data collection methods. There are various ways to collect data in order to formulate an answer to the formulated research question. As stated, I mainly do qualitative research and therefore I will focus my research results on a collection of specific literature related to the theme of sustainability in the Middle East. To support this, I will also use database surveys and analyze reports. Developments in the energy sector are closely monitored by various research institutions and think tanks and I will make use of that. I will use that data to be able to broadly compare the countries mentioned. Finally, I will try to ensure the validity of my research as best I can by using the correct literature that focuses on Saudi Arabia, Qatar and the United Arab Emirates.

7. The goals on renewable energy

The first sub-question I will address is: "What are the expectations created after the Paris Climate Agreement?" Two documents will be central to this question. First of all, I will discuss the Intented National Determined Contributions (INDC) that countries have drawn up after the Paris Climate Agreement. Next, I will discuss the different long-term visions that Saudi Arabia, Qatar and the United Arab Emirates have drawn up.

From the INDC of Saudi Arabia, there are several observations in the field of CO_2 reduction, development and diversification of the economy. Saudi Arabia is a country that argues it is crucial to the stability of the kingdom to its economy. In their objectives, they state that it is paramount that economic diversification must take place in order to be able to continue to exist in the longer term. Oil production and exports are the main economic activities undertaken in the country. In 2019, 63.8% of the country's exports consisted of crude petroleum to major customers such as China, India, South Korea, Japan and France.[43] As a future scenario for the period 2021-2030, it is outlined that economic diversification can take place by using the revenues from oil exports for investments in the financial sector, tourism, education, renewable energy and other energy efficient technologies. It is argued that the oil exports do not cause additional CO_2 emissions in Saudi Arabia and thus do not endanger its goal of reducing 130 million tons of CO_2 by 2030. Fossil fuel exports should therefore theoretically provide investment resources that allow Saudi Arabia to diversify its own economy and no longer rely solely on its oil exports. Five goals have been formulated on a single page around the goals for CO_2 mitigation. First of all, strengthening the Energy Efficiency Program, so that the available energy must be used more efficiently in industry, building and transport. Secondly, investing in including more renewable energy in the energy mix, mainly looking at solar energy, wind energy, geothermal energy, solar thermal and waste to energy systems. Thirdly, they want to use the technology to store CO_2 and have plans to build the largest CO_2 storage facility in the world.[44] In the energy sector, Carbon Capture and Storage (CCS) is seen as a sustainable technology to reduce the amount of CO_2 emitted, but

[43] "Saudi Arabia (SAU) Exports, Imports, and Trade Partners," OEC, accessed March 3, 2021, https://oec.world/en/profile/country/sau.

[44] Beal, Colin M, Archibald, Ian, Huntley, Mark E, Greene, Charles H, and Johnson, Zackary I. "Integrating Algae with Bioenergy Carbon Capture and Storage (ABECCS) Increases Sustainability." Earth's Future 6, no. 3 (2018): 524-42.

there is still public debate against it.[45] Fourth, it is proposed to invest extra in gas drilling and make natural gas a significant part of the national energy mix and finally to minimize the emission of that other greenhouse gas, methane. It is striking that there is relatively little explanation of how to reduce CO_2 emissions, but that there are significant plans to deal with climate change. The conclusion reiterates that sustainable economic growth must be achieved in order to achieve the 130 million tons of CO_2 reduction by 2030. The export of oil and gas is and will continue to be part of this.[46]

Qatar also drew up its INDC in 2015 to make clear what could be done to be more sustainable and to emit less CO_2. Reference is made to the underlying document of Qatar that was already adopted in 2008, namely The Qatar National Vision 2030. The pillar 'environmental development' indicates that they want to preserve Qatar's "unique climate" and that a balance must be struck between development and protecting the environment. They also indicate that economic diversification is crucial to maintain a stable economy, but adds that with the export of Liquefied Natural Gas (LNG), which is considered a clean form of energy, they contribute to the restriction of CO_2 emissions. Attention is paid to five points to diversify the economy and to limit CO_2 emissions. First of all, here, too, a more efficient use of the existing energy used is mentioned. Reference is also made here to the goals included in The Qatar National Vision 2030 and it indicated that current technology and capacity are not sufficient to be more efficient with the energy supply. It is then indicated that the second pillar of the policy is to invest in renewable energy, such as solar and wind energy. Efforts have been made to make more use of solar energy and become a regional solar energy supplier, according to the country, but this is complicated by the weather conditions and natural environment. Thirdly, a further effort in R&D is mentioned to make better use of renewable sources in the future and to develop new ways to deal with climate change. The penultimate focus is placed on education, which in time should generate new scientists to be able to study climate change and further roll out green technologies in the private sector, but this is not made concrete. Finally, tourism is mentioned as a sector that has to diversify the economy in the long term. It is literally stated that the strategy is to reduce dependence of exports on natural energy sources and to promote sustainable tourism strategies. In this way, the economy is also better protected against fluctuations in the energy market and it works with

[45] Terwel, Bart W, and Daamen, Dancker D.L. "Initial Public Reactions to Carbon Capture and Storage (CCS): Differentiating General and Local Views." Climate Policy 12, no. 3 (2012): 288-300.
[46] "The Intended Nationally Determined Contribution of the Kingdom of Saudi Arabia under the UNFCCC." KSA, November 1, 2015.

sustainable economic growth. In conclusion, it is striking that no concrete target is mentioned with regard to limiting CO_2 emissions by 2030. We also see that in the literature on the INDC of Qatar little concrete can be achieved due to the lack of a concrete target. It is therefore argued that due to the uncertainty associated with measures to combat climate change, further policy must be assessed against the economic consequences and the quality of life of the Qataris.[47]

The United Arab Emirates INDC is the most comprehensive and concrete of the countries discussed earlier. The goal is to have 24% clean energy in the total energy mix, so without the use of coal or oil. Here too, as a country that is largely dependent on oil exports, the diversification of the economy is referred to as a strategy. To achieve this, a Vision 2021 and "Green Growth Strategy" have been drawn up, outlining how economic growth and social development can be safeguarded in sustainable initiatives. It is indicated that the UAE is the first country in the region to set a concrete target for renewable energy and that this is feasible due to the reduced costs for solar energy. In 2014, 0.2% of the total energy mix consisted of clean energy, but this should grow to 24% by 2021. To achieve this, additional investments will have to be made in renewable sources and nuclear energy. In addition to the goals set, a number of means are also mentioned to use the available energy more efficiently. First of all, there is a call for a tariff reform, which promotes efficient use of energy and low-carbon development. In addition, efficiency standards must be imposed for the building sector because a significant part of the electricity and water supply is consumed there. Finally, it is written about reducing or slowing down the demand for energy, decentralizing air conditioning to increase efficiency, and setting higher sustainability standards for appliances that are sold and otherwise need to be withdrawn from the market. In conclusion, it can be stated that the United Arab Emirates has already created a number of vision documents on which the sustainability policy is built. The concrete planning seems to be further and more transparent than that of Saudi Arabia and Qatar. We can further elaborate on this in the further research and elaborate on the goals set for renewable energy and how they intend to achieve this with renewable energy sources.[48]

The Vision 2030, published in 2016, was previously cited and I will discuss that in more detail now. The 85-page document is "Saudi Arabian vision for the future" outlining

[47] "Intended Nationally Determined Contributions (INDCs) Report." State of Qatar, November 19, 2015.
[48] "Intended Nationally Determined Contribution of the United Arab Emirates ." The United Arab Emirates, October 22, 2015.

"ambitions, but feasible blueprint for the long term." The plan sketches a picture of how 'ambitions and dreams' can be realized in 2030 by means of various programs. The main goals that have been formulated refer to economic diversification, but do not address the development and roll-out of renewable forms of energy. In the chapter Investment for the long-term, it is stated that there is a natural potential for solar and wind energy, but the competitive renewable energy sources are missing from the energy mix. A concrete target is mentioned here for the first time for 2030, namely 9.5 gigawatts of renewable energy by 2030 as part of the total energy mix. In order to shape the step towards renewable energy and localizing the "energy value chain", a King Salman Renewable Energy Initiative will be started in which the legal and regulatory framework for investing in renewable energy sources is established. In addition, the energy market in Saudi Arabia will be liberalized to give renewable sources a chance against the heavily subsidized fossil energy sources.[49]

Qatar published a National Vision 2030 in 2008 and it is striking that in the available literature there is hardly any critical consideration of anything published here. The Qatar National Vision 2030 aims to have a vision and strategy on how Qatar can remain a prosperous country centered on social justice and a developed economy. The introduction already mentions the economical and conscious use of the limited raw materials that are available. One of the objectives stated is that a balance must be sought between economic growth and a sensible environmental policy. It is interesting to see that relatively early, in 2008, attention was already paid to sustainability and preserving prosperity for future generations. The word 'renewable' appears only three times in the 40-page document, but it is clear that the diversification of the Qatari economy is an important goal for 2030. Again, in this vision of the future, the reduced use of oil is not only linked to the goals to combat climate change, but also to safeguard the economic prosperity of future generations. The document does not yet set concrete goals for making the energy mix more sustainable. The policy document is important to me as a literature because it gives me an idea of how long Qatar has been working on the concept of "sustainability" and which starting points they use towards the period 2015-2019 for the use of renewable energy. The "weakness" about this literature is again that it is a policy document and unfortunately the scientific literature in this area is lagging behind.[50]

[49] "Overview." Vision 2030. Accessed March 6, 2021. https://www.vision2030.gov.sa/en.
[50] "Qatar National Vision 2030," Government Communications Office, August 1, 2019, https://www.gco.gov.qa/en/about-qatar/national-vision2030/.

Finally, the United Arab Emirates has also published a long-term vision. In the National Agenda 2021 of 2010 it is - again - written about the diversification of the economy, the development of education and the preservation of one's own identity. It is also stated that the country must use renewable energy, such as nuclear energy, by 2021, but no concrete target is set for this. Additional publications later show that the United Arab Emirates wants to generate 27 percent of its energy needs from renewable energy sources and reduce greenhouse gas emissions per capita.[51] In my literature review, I cite the article *Mapping states 'Paris climate pledges: Analyzing targets and groups at COP21* as relevant literature for the chapter on the actual results on renewable energy and I now want to link to it.[52] This article stated that there is a gap in the literature regarding Saudi Arabia, Qatar and the United Arab Emirates where their goals are formulated and discussed. In my current research, I am supplementing this by showing the recently set goals for these countries in the 2015 – 2019 period. This chapter builds on the gap in the literature as formulated earlier and analyzes the goal in the energy transition per country. It can be concluded that the goals in Saudi Arabia and the United Arab Emirates have been concretized after the Paris climate agreement, but are still unclear for Qatar.

[51] "National Agenda 2021," National Agenda 2021, accessed March 7, 2021, https://www.vision2021.ae/en/national-agenda-2021.

[52] Tobin, P., Schmidt, N. M., Tosun, J., & Burns, C. (2018). Mapping states' Paris climate pledges: Analysing targets and groups at COP 21. Global Environmental Change, 48, 11–21. https://doi.org/10.1016/j.gloenvcha.2017.11.002

8. The results on renewable energy

The *Saudi National Renewable Energy Program* (NREP) is a further elaboration by the Ministry of Energy of the principles mentioned in the Saudi Vision 2030 in the field of energy efficiency and renewable energy. The NREP aims to maximize the potential of renewable energy and to develop a specific road map on how the set goals can be achieved. How can local energy sources be diversified? How can economic development be stimulated? How can there be reliable long-term economic growth at the same time? These are questions that this program tries to answer.[53] The King Salman Renewable Energy Initiative was also previously launched, but those targets now seem to be outdated by the higher targets in the field of renewable energy generation that have been set.[54] However, it is striking that this program is not based on extensive documentation. There seems to be only a brief summary that will be worked on in the coming years. The question of where wind and solar energy, among other things, will be generated on a large scale is discussed in more detail. The intention is that by 2030, 35 wind farms will be realized and spread across the country to stimulate regional development. How the placement of wind farms should stimulate regional development remains unclear for the time being. It also outlines how the tender for the various wind and solar parks will proceed and which parks will be sold in 2019 and 2020. The projects sold in 2019 should be good for 3.1 GW of sustainable energy, which is important for the higher targets that have been set for 2030. In that year, around 58.7 GW of sustainable energy must be generated in the Kingdom and that is a big step compared to the 0.12 MWh that was generated in 2019. On January 20, 2020, the French company Total announced that they had entered into an agreement to develop a large scale solar plant of 800 MWh. The project, called Al Kharsaah, will be the first large-scale solar power plant and will provide the country with sustainable, affordable and clean energy to industry, services and individuals. It will be able to supply about 10% of the electricity demand at peak times. What is interesting about this development is that Total has been present in Qatar for gas and oil supplies since 1936. The company that previously focused on fossil fuels is now also participating in making the

[53] "Ministry of Energy Invites Bids for Round Three of the National Renewable Energy Program," National Renewable Energy Program eProcurement Portal, accessed March 12, 2021, https://www.powersaudiarabia.com.sa/web/index.html.

[54] Digital Real Media, "Saudi Arabia Launches 9.5GW Initiative," Global Wind Energy Council, May 3, 2016, https://gwec.net/saudi-arabia-launches-9-5gw-initiative/#:~:text=Under%20the%20planned%20King%20Salman,partnerships%20and%20promote%20local%20manufacture.

energy mix in Qatar more sustainable. Unfortunately, at the time of writing, the development has not yet been completed and cannot be taken into account in the described renewable energy development in Qatar.[55] Qatar has also included in its long-term plans that there must be sustainability. They have therefore previously committed themselves to the Paris Climate Agreement, as we have seen. The Qatar National Vision 2030 also mentions this and that is why we will now look at what steps have been taken in the period 2015-2019. Renewable energy here also includes solar energy, wind energy, biomass, geothermal, hydropower, waste and wave and tidal sources. First of all, we will look at the use of renewable energy as part of the total energy mix. We see that in the 2015-2018 period, the vast majority of natural gas and oil will be used to meet the energy demand. The use of renewable energy is completely irrelevant during this period. According to the available renewable energy, the consumed renewable energy is fairly constant in the period 2015-2019 and amounts to about 0.3 TWh. So there does not seem to be an increase in renewable energy after the conclusion of the Paris Climate Agreement and the earlier targets included in the Qatar National Vision 2030. If we consider this per capita, we even see that there has been a gradual decrease from 2011 onwards, extending to the most recent figures for 2019. As a comparison, we can take the Netherlands, China and Israel where there is a clear increase in the period 2015-2019. These countries have respectively about 4MWh, 3.5 MWh and 0.8 MWh per capita in 2019, while Qatar is stuck at 0.1 MWh. We must conclude from this that the energy transition in Qatar is practically non-existent and hardly any renewable energy sources are part of the energy mix. The target of having 2% renewable energy in the total energy mix by 2020 will not be met, given that it was only 0.05% in 2019.

Finally, I will take a closer look at the renewable energy developments in the United Arab Emirates and they show a distinctly different picture. Earlier we discussed in the theoretical framework the project of Masdar City. Construction of the first phase of Masdar City started in 2008 and was completed two years later. However, due to the high costs, the remaining construction was postponed and the full plan will not yet be realized in 2021. Nearly a decade after construction started, The Guardian describes how the managers have abandoned the goal of a zero-carbon city and that the project to usher in the diversification of the economy has more or less failed due to the lack of companies who want to use the

[55] "Total to Develop Qatar's First Large-Scale (800 MWp) Solar Plant," TotalEnergies.com, accessed March 15, 2021, https://www.total.com/media/news/press-releases/total-develop-qatars-first-large-scale-800-mwp-solar-plant.

available spaces. So far only 5% of the originally designated area has been built on due to a lack of interest from investors and businesses.[56] It's another example of a project in the Middle East in the field of sustainability and renewable energy sources that is widely announced and has a clear goal, but is ultimately not completed in practice or ambitions have to be scaled down. What are the developments in the field of renewable energy in the total energy mix? The demand for energy increased slightly in the period 2015-2019 from 1246 TWh to 1342 TWh in 2019. Even if this is offset against the demand for energy per capita, we see that there is a slight increase. The total energy mix of the United Arab Emirates in 2018 consisted of 59% natural gas, 40% petroleum and the remainder is supplemented by hydroelectricity and renewable energy sources such as solar and wind energy.[57] Looking at renewable energy sources, something interesting is happening. In the period 2015-2019, there was a big increase in the use of renewable energy. In 2015, renewable energy per capita was only 0.1 MWh, but in 2019 this had increased tenfold to 1 MWh.[58] It could indicate the first steps in the energy transition to renewable energy sources. Even if it is compared per capita with the Netherlands, China and Israel, you see that the United Arab Emirates has surpassed Israel, but is still relatively far behind China (3MWh) and the Netherlands (4MWh).[59] Nevertheless, we see that renewable energy sources are still a small part of the energy mix in 2019, at around 0.8%. This is considerably less than the use of fossil energy sources, but a clear step since 2015 when renewable energy sources made up about 0.1% of the energy mix. The renewable energy that the United Arab Emirates uses is almost entirely solar energy.[60] If we make a comparison between Saudi Arabia, Qatar and the United Arab Emirates, we can draw some interesting conclusions. First of all, we see that CO_2 emissions per capita have remained roughly the same in the period 2015-2018 in the United Arab Emirates because it continues to fluctuate around 20 metrics ton CO_2 / per capita. Saudi Arabia's CO_2 / per capita

[56] "Masdar's Zero-Carbon Dream Could Become World's First Green Ghost Town," The Guardian (Guardian News and Media, February 16, 2016), https://www.theguardian.com/environment/2016/feb/16/masdars-zero-carbon-dream-could-become-worlds-first-green-ghost-town.
[57] "U.S. Energy Information Administration - EIA - Independent Statistics and Analysis," International - U.S. Energy Information Administration (EIA), accessed April 5, 2021, https://www.eia.gov/international/analysis/country/ARE.
[58] "Per Capita Energy Consumption from Renewables," Our World in Data, accessed April 5, 2021, https://ourworldindata.org/grapher/per-capita-renewables?tab=chart&time=2014..latest&country=~ARE.
[59] "Per Capita Energy Consumption from Renewables," Our World in Data, accessed April 5, 2021, https://ourworldindata.org/grapher/per-capita-renewables?tab=chart&time=2014..latest&country=ARE~ISR~NLD~CHN~USA~Africa.
[60] "Per Capita Energy Consumption from Solar," Our World in Data, accessed April 5, 2021, https://ourworldindata.org/grapher/per-capita-solar?tab=chart&time=2005..latest&country=~ARE.

emissions peaked in 2015 at 16.8 CO_2 / per capita for the first time since 1990. Finally, we have Qatar, which reached an all-time high in the 1970s by emitting almost 174 metrics tons of CO_2 per capita. A few decades later, it would still be relatively high in the period 2015-2019, but still considerably lower. In that period, the CO_2 emissions per capita will be around 39.2 and that would drop slightly to 38.8 metrics tons in 2019. We can clearly state that of the three countries, Qatar emits the most CO_2 and there is no change yet.[61] In order to consider what countries are doing to reduce their emissions, an important variable to look at is the share of renewable energy per capita. We see here that only Saudi Arabia and the United Arab Emirates have taken (small) steps here in the period 2015-2019 by increasing their share of renewable energy tenfold during that period. The use of nuclear energy is sometimes mentioned as a target, but it will not be used by any country in the period 2015-2019. This is of course not surprising, as the climatic conditions of the countries are extremely suitable for the generation of solar energy.[62]

[61] "Qatar CO2 Emissions per Capita, 1970-2020," Knoema, accessed April 5, 2021, https://knoema.com/atlas/Qatar/CO2-emissions-per-capita.

[62] "Per Capita Energy Consumption from Solar," Our World in Data, accessed April 5, 2021, https://ourworldindata.org/grapher/per-capita-solar?tab=chart&time=2005..latest&country=ARE~SAU~QAT.

9. The political obstacles

In the chapter on the political obstacles, I will build on the literature discussed earlier and make general observations applicable to the political conditions in Saudi Arabia, Qatar and the United Arab Emirates. The article *Barriers, Risks and Policies for Renewables in the Gulf States* discussed in the theoretical framework provides a clear overview of the political obstacles to renewable energy in the Gulf States.[63] The theoretical framework in general mainly focused on bureaucracy and its role in the energy transition. There is also a lack of a clear support policy for renewable energy sources, including both grid access rules and financial support schemes, and there is limited knowledge among governments to make the energy transition a success.[64] The inefficient state bureaucracy to facilitate large-scale economic and political upheavals is actively discouraged by the rentier state theory. The rentier state theory states that the proceeds of the sale of fossil fuels enable the state to finance groups and institutions in society in exchange for (political) stability. In order to make people also dependent on the state, they are included in the bureaucratic system without having to work efficiently and effectively.[65] They are therefore discouraged from participating in a systemic change in which the rentier state transforms into a state with a diversified economy. The distribution of resources among the ruling bureaucracy is therefore used in exchange for the acceptance of the ruling political elite. The fact that there is a large bureaucracy in these countries leads to a so-called 'rentier class', which benefit from the export of fossil fuels.[66] In the Saudi Vision 2030, general formulations also pay attention to the role of bureaucracy and advocate government restructuring, privatization and a national transformation.[67] However, there are also criticisms of these generally formulated political reforms, namely that these goals are drawn up and implemented top-down by Western consultancies in particular. There does not appear to be a coherent plan to implement reforms, for example in the field of renewable energy, partly because Saudi Arabia is a highly centralized country, making it unclear to local authorities what powers they have to stimulate renewable energy projects. In

[63] Lilliestam, Johan; Patt, Anthony. 2015. "Barriers, Risks and Policies for Renewables in the Gulf States" Energies 8, no. 8: 8263-8285. https://doi.org/10.3390/en8088263

[64] Lilliestam, Johan; Patt, Anthony. 2015. "Barriers, Risks and Policies for Renewables in the Gulf States" Energies 8, no. 8: 8269-8270. https://doi.org/10.3390/en8088263

[65] Steffen Hertog, Princes, Brokers, and Bureaucrats - Oil and the State in Saudi Arabia (Ithaca and London: Cornell University Press, 2011), 2.

[66] Beblawi, Hazem. "The Rentier State in the Arab World." Arab Studies Quarterly 9, no. 4 (1987): 392-93. Accessed June 2, 2021. http://www.jstor.org/stable/41857943.

[67] "Overview." Vision 2030. Accessed June 3, 2021. https://www.vision2030.gov.sa/en.

the specific situation of Saudi Arabia, it is also argued that implementation in the longer term is also difficult to achieve because unrealistic deadlines are set, there is insufficient knowledge in the ministries and there are too few academically trained bureaucrats who can implement a long-term policy set up. In 2019, the Wall Street Journal even reported that there would be passive resistance from public servants to the announced reforms, including diversification and making the economy more sustainable.[68]

Qatar declared war on its own bureaucratic system in 2005.[69] However, 15 years later, Qatar's political system is still being argued to have an extensive and complex bureaucracy that is generally inefficient. Relatives of the Emir would also be given the most important posts in the state system, creating an influential bureaucratic caste. There is also little independent control, which means that corruption can increase unnoticed.[70] However, Qatar has recently taken relatively many steps to combat corruption by also cutting back on the bureaucratic apparatus due to cuts that had to be made.[71] As we have seen in the theoretical framework, collaboration with the private sector is necessary in order to boost sustainability. Research shows that the quality of government in Qatar hinders the growth of companies and the entire private sector. In 2014, the IMF stated that about 85% of Qatari workers are part of the state bureaucracy and this leads to an inefficient working method. The World Bank stated that the five most problematic reasons for investing in Qatar are restrictive labor regulations, inadequately educated labor force, inefficient government bureaucracy, inflation and poor work ethic in labor force. Here too we see that in 2015, the World Bank considers the bureaucracy to be very problematic for the private sector to invest in renewable energy projects, for example.[72] Despite this, the government has actually increased pressure on the private sector to hire workers of Qatari nationality, which will deter rather than attract investment. We should also note that Qatar, and Saudi Arabia, for that matter, has a low score on the indicators 'voice and accountability', 'legal rights', 'resolving insolvency' and 'enforcing contracts'. It will all be political obstacles that contribute to the fact that the investment

[68] Hadi Fathallah, “Failure of Regional Governance in Saudi Arabia,” Carnegie Endowment for International Peace, July 26, 2018, https://carnegieendowment.org/sada/76928.
[69] Correspondent Barbara Bibbo', “Qatar Declares War on Bureaucracy,” Qatar – Gulf News (Gulf News, July 25, 2019), https://gulfnews.com/world/gulf/qatar/qatar-declares-war-on-bureaucracy-1.279870.
[70] “Governance & Politics of Qatar,” Fanack.com, July 20, 2020, https://fanack.com/qatar/politics-of-qatar/#bureaucracy.
[71] “BTI 2020 Qatar Country Report,” BTI Blog, accessed June 10, 2021, https://www.bti-project.org/en/reports/country-report-QAT-2020.html.
[72] Biygautane, Mhamed, Hodge, Graeme, and Gerber, Paula. "The Prospect of Infrastructure Public-Private Partnerships in Kuwait, Saudi Arabia, and Qatar: Transforming Challenges into Opportunities." Thunderbird International Business Review 60, no. 3 (2018): 336.

climate for the private sector in Qatar and Saudi Arabia does not fully flourish and thus also limits investment in renewable energy sources. The fear among local and international companies and/or investors is that there can be sudden changes in legislation and regulations, which means that there are greater risks to the investments that are made.[73] There are two main reasons why it is difficult in practice to dismantle an extensive and inefficient bureaucratic system. First of all, low-ranking bureaucrats are often protected by their own contacts from the ruling political elite. In addition, reforms are blocked by the natural flow of decisions made in countries with autocratic regimes, such as Saudi Arabia and Qatar. There is no decentralization and every detailed decision to make the system more efficient and effective has to be approved by the top of the political regime.[74] In a sense, there is a paradox in which it is precisely centralized governance that leads to inefficient and ineffective decisions.[75] Earlier we discussed the Qatar National Vision 2030 from the perspective of the climate and energy issue. The introduction mentions the five most important principles: modernization and preservation of traditions, the needs of this generation and the needs of future generations, managed growth and uncontrolled expansion, the size and the quality of the expatriate labor force and the selected path of development and economic growth, social development and environmental management. It is striking that the four pillars of the National Vision, namely human development, social development, economic development and environmental development, lack the development of the state.[76] It is also remarkable that hardly a single word is mentioned about the constitution, bureaucracy or the way in which the state functions at all. Almost all that is said about a functioning society is: 'Establish a secure and stable society operating on the principles of justice, equality and the rule of law'. It is further stated that: ‘Qatar has already made a good headway in developing a political and organizational climate that supports the business sector. But further steps to enhance competitiveness and attract investment will be needed in a dynamic and increasingly

[73] Biygautane, Mhamed, Hodge, Graeme, and Gerber, Paula. "The Prospect of Infrastructure Public-Private Partnerships in Kuwait, Saudi Arabia, and Qatar: Transforming Challenges into Opportunities." Thunderbird International Business Review 60, no. 3 (2018): 339-40.

[74] Steffen Hertog. Princes, Brokers, and Bureaucrats. 1st ed. Cornell University Press, 2010. 32.

[75] LESTRA, Martin, The more it’s centralized, the more it’s divided : a historical-institutionalist reading of Qatar’s foreign aid landscape, Oxford Middle East review, 2017, Vol. 1, No. 1, p. 78.
Retrieved from Cadmus, European University Institute Research Repository, at:
http://hdl.handle.net/1814/49344

[76] “Qatar National Vision 2030,” Government Communications Office, August 1, 2019, https://www.gco.gov.qa/en/about-qatar/national-vision2030/.

borderless international economy'.[77] However, it is questionable whether this is correct, because as we have noted before, there are precisely political circumstances in which investment as a company is not encouraged and in some cases will even be made unattractive by the changing policy of the state. However, Qatar does not offer solutions for these political problems as we have outlined them earlier and the real problems are in a sense even denied. It is stated that there are good developments to improve the political climate for foreign investment. No further concrete solutions are mentioned here to improve the political and organizational climate. Brief attention is paid to the problematic situation that arises on the labor market because it is stated that an excessive number of labor migrants can be at the expense of national identity. It has already become clear that, due to the lack of sufficiently qualified personnel, it is difficult to get off the ground investing in and realizing renewable energy sources. The National Vision does not seem to provide an answer to this either, but rather deepens the problem because labor migration of skilled personnel is not actively encouraged.[78]

The previously discussed literature on the political obstacles in the United Arab Emirates helps to get a picture of the state of affairs regarding renewable energy in the country. It has also already emerged how the country deals with the subsidies on fossil fuels.[79] However, it is also possible to examine whether there are more political obstacles that have not been discussed before. In the United Arab Emirates we have seen that in recent years work has been done on renewable energy and in the period 2015-2019 the share of renewable energy per capita has increased tenfold. The political participation of the population in the United Arab Emirates is limited by the authoritarian system, as is also present in Qatar and Saudi Arabia. Despite this, the diversification of the economy in the United Arab Emirates has taken off and relatively more use is made of renewable energy. The political system is designed in such a way that if gas or oil discoveries are made, they belong to the emirate where they were found. Previous research has therefore indicated that these differences between the various emirates have led to more economic diversification because not every emirate could rely on fossil fuels. In the United Arab Emirates, the authoritarian style of

[77] "Qatar National Vision 2030," Government Communications Office, August 1, 2019, https://www.gco.gov.qa/en/about-qatar/national-vision2030/. 27-29.
[78] "Qatar National Vision 2030," Government Communications Office, August 1, 2019, https://www.gco.gov.qa/en/about-qatar/national-vision2030/. 10-11.
[79] Gallaher, M., Alam, T., & Rouchdy, N. (2017). The impact of electricity and water subsidies in the United Arab Emirates. RTI Press. RTI Press Publication No. PB-0012-1705 https://doi.org/10.3768/rtipress.2017.pb.0012.1705

governance would ensure that private sector investments can be more effective and efficient.[80] From a political point of view, there are different arguments for putting the energy transition into practice, namely the will to diversify the economy, sustainable and reliable economic growth, limiting environmental risks and being able to limit the use of scarce water. There have already been a number of large-scale sustainability projects to shape the transition to renewable energy sources, but in order to make the major shift in the energy mix of the United Arab Emirates, 'green technologies' must be used across the country on a smaller scale. In order for this to be successful, the following must be done: 'Adopting renewable energy policies that will encourage the participation of the stakeholders beyond the state; gaining societal support by changing renter mentality; addressing inefficient bureaucracy; securing access to innovative technologies and critical materials; dealing with intermittent nature of renewable energy sources; and mitigating the geopolitical impact of the transition'. Recommendations are also made for the United Arab Emirates regarding inefficient bureaucracy and better involvement of the private sector to invest in the energy sector. At the moment, the policies that have been taken are mainly aimed at increasing the power of the state and the ruling elite.[81] It could be possible that public private partnerships (PPPs) will play an increasingly larger role in renewable energy projects. In the 2015-2019 period, the United Arab Emirates law stipulated that in large parts of the country, foreign investors can own up to 49% of a local company. These legal restrictions also have a restraining effect on the willingness of investors to invest in renewable energy sources.[82] Bureaucracy has been discussed before and there seem to be different views on this. A study published in 2017 asks whether the federal government of the United Arab Emirates has succeeded in transforming the federal bureaucracy into a new public management system. I will not dwell on this too long, but it is important to note that there are differences here between the United Arab Emirates and Saudi Arabia and Qatar. A major problem here is that the state is a major employer and privatization, outsourcing and private-public partnerships are driving unemployment up. Along the paths of economic development and free market, a new and modern bureaucracy has indeed been developed in which there is a clear connection with the

[80] Herb, Michael. “A NATION OF BUREAUCRATS: POLITICAL PARTICIPATION AND ECONOMIC DIVERSIFICATION IN KUWAIT AND THE UNITED ARAB EMIRATES.” International Journal of Middle East Studies 41, no. 3 (2009): 380–81. doi:10.1017/S0020743809091119.

[81] Aminjonov, Farkhod. "Policy Innovations and Rationale for Sustainable Energy Transition in the UAE." Social Science Quarterly 101, no. 7 (2020): 2404-405.

[82] Staff Writer, “Renewables: The Full Potential of the UAE Economy,” ZAWYA MENA Edition (ZAWYA, August 12, 2019), https://www.zawya.com/mena/en/story/Renewables_The_full_potential_of_the_UAE_economy-SNG_151420411/.

old tribal system. Today there is room in government circles for new objectives such as 'total quality management, governance, zero-based budgeting, competitiveness and privatization, and e-government'. Challenges remain in the areas of massive privatization, public-private partnerships, outsourcing and the frequent hiring of people of their own nationality, but overall clear steps have been taken to make the government bureaucracy function more efficiently.[83]

Another point that has come up several times is the reliability of countries to stick to the targets that have been set. In order to be able to make policy, it is necessary that a certain objective is set on the horizon and that this is also adhered to in the agreements made. Not only is this important for the state itself because it allows it to work consistently towards a certain goal, but also for the private sector and foreign investors who expect a certain security from a country. It is therefore interesting to take a closer look at the renewable energy targets for the period 2015-2019. Saudi Arabia announced in 2016 that the 2030 target is 9.5 GW of wind and solar power, which is being shaped by the *King Salman Renewable Energy Initiative*.[84] In 2013, the target of 9 GW was also revealed for the year 2032, but questions were immediately raised about whether this could be sufficiently financed.[85] In addition, we found that relatively little has happened to achieve this target in the period 2015-2019, but despite this, in 2016, after the signing of the Paris Climate Agreement, the target for 2023 was increased to 9.5 GW. In 2019, the target for 2030 was raised again to approximately 60 GW of renewable energy, including 43 GW of solar energy and 16 GW of wind energy.[86] In 2021, Energy Minister Prince Abdulaziz bin Salman even announced that 50% of energy should be carbon neutral by 2030.[87] We have seen before that the share of renewable energy in the energy mix does not even come close to this.

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[83] MANSOUR, A.M. (2017) Have the United Arab Emirates federal government succeeded to transform its federal bureaucracy into a new public management system? International Public Management Review, 18 (1), pp. 130-133.

[84] Digital Real Media, "Saudi Arabia Launches 9.5GW Initiative," Global Wind Energy Council, May 3, 2016, https://gwec.net/saudi-arabia-launches-9-5gw-initiative/.

[85] John McKenna, "Analysis - Financing Saudi Arabia's Wind Energy Plan," Windpower Monthly (Windpower Monthly, February 6, 2015), https://www.windpowermonthly.com/article/1173394/analysis-financing-saudi-arabias-wind-energy-plan.

[86] Rania El Gamal and Stanley Carvalho, "Saudi Arabia Sees Domestic Energy Use Falling, Plans Renewables Push," Reuters (Thomson Reuters, January 15, 2019), https://www.reuters.com/article/us-saudi-energy-reforms-idUSKCN1P918N.

[87] Leigh Collins (l_collins), "'We Will Be Pioneering': Saudi Arabia Reveals 50% Renewables Goal by 2030, but Is That Realistic?," Recharge, January 29, 2021, https://www.rechargenews.com/energy-transition/we-will-be-pioneering-saudi-arabia-reveals-50-renewables-goal-by-2030-but-is-that-realistic-/2-1-954094.

Qatar stated in its Vision 2030, published in 2008, that the target for 2020 should be 2% renewable energy as part of the total energy mix. After that, 20% renewable energy should be generated by 2030, but this was revised in 2013 by the Minister of Energy and Industry Abdullah bin Hamad Al Attiyah who stated that Qatar should generate 20% renewable energy in 2024 and 1.8 GW must have installed green energy sources by 2020.[88] In the country where the sun shines a lot and with a favorable location, there is sufficient potential for solar and wind energy as we have also concluded before, but we have also seen that the renewable energy projects are not yet actually have been realized.[89] The targets following the Paris Climate Agreement were set for the generation of 4.9 GW of renewable energy by 2030.[90] In the period 2015-2019, we see that after the Paris Climate Agreement there has been no change in the long-term target and as a result, the target for 2030 has been constant, which is to use 20% renewable energy sources for the electricity supply. However, we have already had to conclude that Qatar is not yet close to that target. A country that did start using its renewable energy sources in the period 2015-2019 is the United Arab Emirates. In 2009 and 2013, the first renewable energy targets in the Middle East were established in the United Arab Emirates. The emirates of Dubai and Abu Dhabi set targets for themselves in this area with 5% and 7% renewable energy respectively by 2030. In 2015, this was adjusted to 15% renewable energy for the entire United Arab Emirates and even 7% renewable energy as part of the energy mix in 2020.[91] The emirate of Dubai has already raised its targets for 2030 to 25% renewable energy by 2015.[92] In 2017, with the publication of the Energy Strategy 2050, it was announced that the United Arab Emirates aims to generate at least 50% renewable energy as part of the energy mix by 2050.[93] The Emirate of Abu Dhabi wants to achieve that goal as early as 2030, but the future will show whether this has been considered

[88] "Qatar's Dependency on Solar Energy to Exceed 20% by 2030," The Peninsula Qatar, March 31, 2019, https://www.thepeninsulaqatar.com/article/31/03/2019/Qatar%E2%80%99s-dependency-on-solar-energy-to-exceed-20-by-2030?

[89] "Qatar's Solar Energy Ambitions," Marhaba, November 10, 2016, https://www.marhaba.qa/qatars-solar-energy-ambitions/.

[90] Juergen Braunstein, "Green Ambitions, Brown Realities: Making Sense of Renewable Investment Strategies in the Gulf," Belfer Center for Science and International Affairs, March 2020, https://www.belfercenter.org/publication/green-ambitions-brown-realities-making-sense-renewable-investment-strategies-gulf.

[91] Jan Georgopoulos, "Dubai Triples Renewable Energy Target to 15% by 2030," Pager Power, April 20, 2015, https://www.pagerpower.com/news/dubai-triples-renewable-energy-target-2015/.

[92] "Mohammed Launches Dh50bn Dubai Clean Energy Strategy," Emirates24/7, November 29, 2015, https://www.emirates247.com/news/emirates/mohammed-launches-dh50bn-dubai-clean-energy-strategy-2015-11-29-1.612173.

[93] "United Arab Emirates - Renewable Energy," International Trade Administration | Trade.gov, September 12, 2020, https://www.trade.gov/country-commercial-guides/united-arab-emirates-renewable-energy

sufficiently realistic.[94] The striking thing about actually all these countries is that they lack a clear and defined future perspective. Long-term goals are being set and even increased, but there is no coherent story to get there. The questions why certain goals are set and how one wants to achieve them often seems to be missing. Only in the United Arab Emirates does there seem to be a clearer longer-term plan with the Energy Strategy 2050, but in Saudi Arabia and Qatar this is lacking. If goals are set, it may be expected that an explanation is given as to why they are considered realistic and how they envisage getting there. However, this justification seems to be lacking at Qatar and Saudi Arabia, which means that transparency is also limited for the outside world and researchers as to whether and why Qatar and Saudi Arabia are lagging behind on their stated goals. When it comes to the consistency of the goals that have been set, we have to note that Qatar and the United Arab Emirates are fairly constant in the period 2015-2019, but that Saudi Arabia is still regularly tightening goals for which it is unclear exactly what that means. If all three countries formulate their goals more clearly, they must provide insight into what specific goals are based on. If this does not happen and targets are promising in the future, but at the same time little concrete is happening, this undermines the credibility of their renewable energy policy. As the figures show from the 2015-2019 period, this mainly concerns Saudi Arabia and Qatar.

[94] Andrea d. Steffen, "Abu Dhabi Commits To 50% Renewable Energy By 2030, UAE By 2050," Intelligent Living, October 7, 2020, https://www.intelligentliving.co/abu-dhabi-50-renewable-energy-2030-uae-2050/.

10. The economic obstacles

In this chapter I will discuss the economic obstacles to the energy transition in Saudi Arabia, Qatar and the United Arab Emirates. I will then focus in particular on the role of fossil fuels in the export economy, fossil fuel subsidies and the role they play in limiting the growth of renewable energy sources, the expenditure made to enable renewable energy sources and the consequences of sustainability for the labor market. The articles *Renewable and Non-renewable Energy Use - Economic Growth Nexus: The Case of MENA Net Oil Importing Countries*[95] and *Challenges and Opportunities in Middle East and North Africa*[96], as discussed in the literature review, have outlined where the economic obstacles to the energy transition in countries in the Middle East and I will consider these obstacles in more detail in this chapter, building on the economic obstacles outlined in the literature. In fact, the region is discussed in general terms, but no specific countries are discussed, which I will do in this chapter.

In order to understand the role of fossil fuels in the economies of Saudi Arabia, Qatar and the United Arab Emirates, one must look at exports as part of the total economy. If we look at the figures from Saudi Arabia, in 2019 exports will consist of 63.8% crude petroleum and 9.6% refined petroleum. The export economy, consisting of a total of 228 billion dollars, is therefore largely dependent on the export of fossil fuels. An energy transition in which fewer greenhouse gases must be emitted also involves limiting the production processes related to oil extraction and the export of fossil fuels. In practice, it would therefore mean that a large part of Saudi Arabia's exports would disappear, so that the energy transition could be seen as a very unattractive option. It is in line with expectations that Saudi Arabia has worked on diversifying the economy since 2015 after the Paris Climate Agreement, but in 2015 the export economy consisted of 60.7% crude petroleum and 9.64% refined petroleum and consisted of the total export economy from 218 billion dollars. In 2019, as mentioned, this consisted of a total of 228 billion dollars and consisted of 63.8% crude petroleum and 9.57% refined petroleum. Fossil fuels have therefore not become a smaller part of the economy in the

[95] Kahia, Montassar, Aïssa, Mohamed Safouane Ben, and Lanouar, Charfeddine. "Renewable and Non-renewable Energy Use - Economic Growth Nexus: The Case of MENA Net Oil Importing Countries." Renewable & Sustainable Energy Reviews 71 (2017): 127-40.

[96] Hochstrasser, Annalisa. "Challenges and Opportunities in Middle East and North Africa." Renewable Energy Focus 16, no. 5-6 (2015): 128-29.

period 2015-2019, but have increased as a share.[97] Qatar's total exports in 2019 will be $78 billion, and the vast majority will be fossil fuels. In 2019 total exports consisted of 57.5% petroleum gas and 20% crude petroleum. In addition, refined petroleum also makes up a significant part of the export in 2019 with 10.7%. The other largest export sectors 'chemicals', 'metals' and 'plastics and rubbers' represent a significantly smaller share of total exports in 2019. In 2015, total exports amounted to 82.1 billion and fossil fuels also made up a significant part of this from: petroleum gas with 58.3%, crude petroleum with 19% and refined petroleum with 7.2%. Here, too, we must note that there has been no major decline in the share of fossil fuels as part of the total export economy. The incentive to become more sustainable will also be low in Qatar, given the fact that the country remains so dependent in its export of fossil fuels. These processes also release greenhouse gases and counteracting this would also severely limit its export position. However, we do not see a clear reduction in the share of fossil fuels in exports in the period 2015-2019, but there is even a relative increase.[98] Finally, we discuss the export position of the United Arab Emirates. Total exports amounted to nearly $250 billion in 2019, making it the largest export value of the three countries discussed. The striking thing is that the exports of the United Arab Emirates are a lot more diverse than those of Saudi Arabia and Qatar. In 2019, exports consisted of 23.1% crude petroleum, 13% refined petroleum and 2.4% petroleum gas. The other export sector such as 'precious metals' also accounted for almost 19% of exports in 2019, and other sectors such as 'machines', 'transportation' and 'metals' also make up a relatively large part of the export. In 2015, the total value of exports was 177 billion dollars and the exports were also a lot more diverse. In this year, exports consisted of 26.4% crude petroleum, 10.5% and 5% petroleum gas. However, the fossil fuel sector as a total part of the economy fell from 42.5% to 38.8% in the period 2015-2019. This is not a huge decrease, but we do see a trend in which the United Arab Emirates is becoming less dependent on fossil fuels for its export position. By way of illustration, in 2008, 65.2% of exports still consisted of fossil fuels, so the diversification of the economy has indeed taken shape.[99] All in all, we see that Saudi Arabia and Qatar have hardly achieved any results in limiting their largest emitting export sectors, but that the United Arab Emirates is indeed achieving results in this area and can therefore also more easily shape

[97] "Saudi Arabia (SAU) Exports, Imports, and Trade Partners," OEC, accessed June 6, 2021, https://oec.world/en/profile/country/sau.
[98] "Qatar (QAT) Exports, Imports, and Trade Partners," OEC, accessed June 6, 2021, https://oec.world/en/profile/country/qat.
[99] "United Arab Emirates (ARE) Exports, Imports, and Trade Partners," OEC, accessed June 6, 2021, https://oec.world/en/profile/country/are.

the energy transition to renewable sources in the period 2015-2019. The economic barrier that Saudi Arabia and Qatar face in making themselves less dependent on fossil fuels do not appear to be overcome in the period mentioned. The United Arab Emirates is doing more work in this area and achieving more results.

The second aspect of the economic barriers that have emerged in the theoretical framework is the subsidization of fossil fuels in Saudi Arabia, Qatar and the United Arab Emirates. To enable the development of renewable energy, there must be competition in energy prices. There must be a level playing field in the energy market in order to offer the various providers an opportunity and also allow them to compete with each other. Fossil fuel subsidies have always been characteristic of the rentier state in which cheap energy was shared with the population and seen as part of 'the social contract' between government and citizens.[100] This observation also builds on the previously discussed literature from *Low-carbon energy in the Gulf: Upending the renter state?* on the rentier state, which stated that subsidies on electricity can limit the growth of renewable energy.[101] Research has examined the link between greenhouse gas emissions and fuel subsidies and shows that between 1980 and 2010 36% of global greenhouse gas emissions were driven by fossil fuel subsidies.[102] Despite this, the underlying cause for reforming fossil fuel subsidies is often economic and environmental or climate considerations play a limited role. The subsidies limit private sector innovation, efficiency and investment, increase financial pressure on governments, limit spending on health and education and encourage corruption.[103] In 2013, the IMF published a report examining 22 case studies of countries that had attempted to reform their fossil fuel subsidies, but only 12 countries succeeded without significant harm to society economically or socially.[104] There are a number of clear barriers that make it difficult for countries to reform subsidies. First of all, the desire to reform it is especially present among governments when the free market pushes up the price of fossil fuels as it increases state spending, but at

[100] Aminjonov, Farkhod. "Policy Innovations and Rationale for Sustainable Energy Transition in the UAE." Social Science Quarterly 101, no. 7 (2020): 2403.
[101] Sim, Li-Chen. "Low-carbon Energy in the Gulf: Upending the Rentier State?" Energy Research & Social Science 70 (2020): 101752. 1-2.
[102] Radoslaw (Radek) Stefanski, 2014. "Dirty Little Secrets: Inferring Fossil-Fuel Subsidies from Patterns in Emission Intensities," OxCarre Working Papers 134, Oxford Centre for the Analysis of Resource Rich Economies, University of Oxford.
[103] Rentschler, Jun, and Bazilian, Morgan. "Reforming Fossil Fuel Subsidies: Drivers, Barriers and the State of Progress." Climate Policy 17, no. 7 (2017): 892.
[104] Rentschler, Jun, and Bazilian, Morgan. "Reforming Fossil Fuel Subsidies: Drivers, Barriers and the State of Progress." Climate Policy 17, no. 7 (2017): 899-900.

the same time it widens the difference between the real and subsidized price making it unattractive for households. To make these reforms acceptable to lower incomes, they must be introduced when they are least needed by the state. In practice, it often happens that states reform subsidies when the fiscal burden becomes too great, causing great resistance among the population. Second, fossil fuel subsidies are a way of continuing to shape centralized state power and are particularly prevalent in countries with weak institutions or bureaucracy. So there is also a diminished state power when the control on fossil fuels is slowly released. Earlier we also noted in our theoretical framework that democratization through the energy transition and the decentralization of energy networks is a possibility that authoritarian states want to oppose. In addition, there are other reasons to mention, namely not wanting to impoverish the underclass in society, employment that is lost in certain parts of the energy sector, it can lead to lower incomes switching to less safe forms of energy use, influential stakeholders who are well organized to hold back reforms and the macroeconomic consequences that could lead to a reduction in output in certain sectors.[105] If we elaborate on the democratization of the energy system, we see that this is an important factor for rentier states such as Saudi Arabia, Qatar and the United Arab Emirates. This is a welcome addition to the literature discussed earlier.[106] The hypothesis that this is a factor of importance for the countries mentioned can also be confirmed on the basis of this literature.

We have seen that there are many obstacles for states to reform fossil fuel subsidies, but that this is necessary to give renewable energy sources a fair competitive position in the energy market. In 2013, Saudi Arabia was the second largest subsidy provider for electricity, oil and gas after Iran.[107] The country also had the lowest fossil fuel prices in the world after Venezuela.[108] That it is a sensitive subject became apparent in 2020 when Saudi Arabia organized the G20 and campaigned to have the term 'fossil fuel subsidies' removed from policy briefs and to use 'fossil fuel incentives' instead.[109] In 2018, the state spent more on

[105] Rentschler, Jun, and Bazilian, Morgan. "Reforming Fossil Fuel Subsidies: Drivers, Barriers and the State of Progress." Climate Policy 17, no. 7 (2017): 902-903.
[106] Burke, Matthew J, and Stephens, Jennie C. "Political Power and Renewable Energy Futures: A Critical Review." Energy Research & Social Science 35 (2018): 78-93.
[107] Mundaca, Gabriela. "How Much Can CO2 Emissions Be Reduced If Fossil Fuel Subsidies Are Removed?" Energy Economics 64 (2017): 91.
[108] Admincitizen, "Saudi Arabia Subsidies," Climate Scorecard, February 11, 2018, https://www.climatescorecard.org/2018/01/saudi-arabia-subsidies/.
[109] Chloé Farand, "Saudi Arabia Censors Fossil Fuel Subsidy Discussion as G20 Host," Climate Home News (Climate Home, July 14, 2020), https://www.climatechangenews.com/2020/07/14/saudi-arabia-censors-fossil-fuel-subsidy-discussion-g20-host/.

fossil fuel subsidies than on education and health care combined.[110] The question is whether and, if so, how Saudi Arabia has shaped fossil fuel subsidies. Research shows that in 2018 about 6% of Saudi Arabia's GDP was spent on fossil fuel subsidies.[111] If we put this in a comparative perspective over the years, we have to conclude that in 2012, Saudi Arabia spent just over 72 billion dollars on fossil fuel subsidies, but that in 2018 this had fallen to almost 45 billion dollars. Despite this, in 2018 it was $1333 per citizen, compared to $258 and $32 in Russia and China.[112] So there must have been reforms in the area of fossil fuel subsidies. When income from oil fell sharply in 2015, the first reduction of subsidies was initiated. This was followed up in 2018 by raising the energy price for households in the country. Crude oil cost an average of $4.24 per barrel in 2015, but $6.35 per barrel in 2020. This trend is also visible in diesel, natural gas and ethane. Citizens were partially compensated by a new fiscal program by the state, but are getting back significantly less than with the generous subsidies on fossil fuels. So there has been a marked decrease in the subsidies provided by the Saudi state, but since 2015 there has been no further reform and expenditure has actually increased slightly and has been constant for several years. It is therefore early to see how far Saudi Arabia will now implement further reforms to create a more level playing field in the energy market, because in 2018 Saudi Arabia still spent the most on fossil fuel subsidies of the G20 countries.[113] Research also shows that an increase in renewable energy sources and a decrease in fossil fuel subsidies can improve prosperity.[114] At the same time, other research shows that under the scenario of phasing out all fossil fuel subsidies, the Saudi economy would face higher energy prices, especially the mining and quarrying sector. In another scenario in which subsidies are also cut, but 50% is invested in education, health care and social work, there is a positive effect for the Saudi economy, except for the sectors that use a lot of energy.[115] Qatar spent about $6.1 billion on fossil fuel subsidies in 2010, which translates to about $2,983

[110] Admincitizen, “Saudi Arabia Subsidies,” Climate Scorecard, February 11, 2018, https://www.climatescorecard.org/2018/01/saudi-arabia-subsidies/.
[111] Jim Krane, Walid Matar, and Francisco J. Monaldi, “FOSSIL FUEL SUBSIDY REFORM SINCE THE PITTSBURGH G20: A LOST DECADE?,” October 2020. 3-4.
[112] Jim Krane, Walid Matar, and Francisco J. Monaldi, “FOSSIL FUEL SUBSIDY REFORM SINCE THE PITTSBURGH G20: A LOST DECADE?,” October 2020. 9-10.
[113] Jim Krane, Walid Matar, and Francisco Monaldi, “FOSSIL FUEL SUBSIDY REFORM SINCE THE PITTSBURGH G20: A LOST DECADE?,” October 2020. 13-14.
[114] Blazquez, Jorge, C Hunt, Lester, and Manzano, Baltasar. "Oil Subsidies and Renewable Energy in Saudi Arabia: A General Equilibrium Approach." The Energy Journal (Cambridge, Mass.) 38, no. S1 (2017): 41-42.
[115] Sarrakh, Redouane, Renukappa, Suresh, Suresh, Subashini, and Mushatat, Sabah. "Impact of Subsidy Reform on the Kingdom of Saudi Arabia's Economy and Carbon Emissions." Energy Strategy Reviews 28 (2020): 7-8.

subsidy per capita.[116] As we can see, this was still a lot higher than in Saudi Arabia in 2018, but in 2010 Saudi Arabia also spent similar amounts per capita on subsidies. Qatar has also implemented several reforms in recent years. In 2015, the electricity and water rates for expats were increased and the following year the price of gasoline was also increased by 30%. In 2016, more market-driven prices would also be steered, and that was also reflected in the prices for diesel and gasoline. In 2015, the price for a gallon of diesel was $1.04, but a year later that would be $1.46. The price of gasoline also rose from $1.04 in 2015 to $1.42 in 2016. The local population still receives free electricity and water from the government, which does not encourage efficiency. The country also differs significantly from Saudi Arabia where this is not the case.[117] In 2018, the IMF stated that the oil price shock of 2014 forced Qatar to make new choices and is successfully limiting subsidies on fossil fuels. Tariffs on water and electricity have risen and domestic fuel prices are now following international prices.[118] In 2019, the IMF stated that further phasing out subsidies in Qatar would contribute to economic effectiveness and generate additional savings.[119] According to the indicators of the *Green Fiscal Policy Network*, according to the most recent data from the IMF, only 0.5% of GDP would be spent on fossil fuel subsidies.[120] That is a big difference with Saudi Arabia, where expenditure on subsidies is still around 4% of GDP.[121] Finally, we discuss the United Arab Emirates, where we have already seen that the export is a lot more diverse than Saudi Arabia and Qatar and the results in the field of renewable energy were already visible. There have also been reforms in the area of fossil fuel subsidies in the United Arab Emirates. In January 2015, the Minister of Energy Suhal Al Mazroui announced that the end of subsidies would be a matter of time and on August 1 of that year, the price of gasoline and diesel was left to the

[116] Chris Charles, Tom Moerenhout, and Richard Bridle, "The Context of Fossil-Fuel Subsidies in the GCC Region and Their Impact on Renewable Energy Development," May 2014.
[117] Jim Krane and Francisco J. Monaldi, "OIL PRICES, POLITICAL INSTABILITY, AND ENERGY SUBSIDY REFORM IN MENA OIL EXPORTERS," May 2017. 3-4.
[118] "Qatar: Staff Concluding Statement for the 2018 Article IV Mission." IMF, March 5, 2018. https://www.imf.org/en/News/Articles/2018/03/05/ms030518-qatar-staff-concluding-statement-for-the-2018-article-iv-mission.
[119] "IMF Executive Board Concludes 2019 Article IV Consultation with Qatar," IMF, June 3, 2019, https://www.imf.org/en/News/Articles/2019/06/03/pr19192-qatar-imf-executive-board-concludes-2019-article-iv-consultation-with-qatar.
[120] "Qatar," Green Fiscal Policy Network, February 26, 2021, https://greenfiscalpolicy.org/qatar/.
[121] "Saudi Arabia," Green Fiscal Policy Network, February 26, 2021, https://greenfiscalpolicy.org/saudi-arabia-2/.

free market.[122] It became the first country in the region to completely abolish subsidies.[123] In 2010, the United Arab Emirates spent nearly $20 billion in fossil fuel subsidies.[124] In 2013, it was estimated that the country used about 5% of GDP to finance the subsidies.[125] However, despite the minister's statements, more than 7 billion would still be spent in 2016 on subsidies for fossil fuels.[126] The *Green Fiscal Policy Network* also concludes on the basis of the IMF's reports that the United Arab Emirates still spends about 1.8% of its GDP on subsidies for fossil fuels. So, although there has been a significant reduction until the early 1990s, there is no question of a complete abolition of subsidies.[127] In 2019, the vast majority of subsidies would be spent on residents consuming gas and only a very small percentage on oil and electricity.[128] In conclusion, it can be said that Saudi Arabia, Qatar and the United Arab Emirates have all been working on limiting subsidies on fossil fuels since 2010. Saudi Arabia has made the biggest reforms in absolute numbers, but has continued to spend a significant amount on fossil fuel subsidies since 2015. There have been reforms, but of the three countries, subsidies are still the most present. Qatar has also implemented reforms and significantly reduced subsidies, but the local population continues to receive free water and electricity, which still does not fully encourage effective use. However, the IMF is satisfied with the developments in the country and has stated this several times. Finally, we see that the developments in the United Arab Emirates are most favorable for a level playing field in the energy market for renewable energy sources. The country has implemented the most far-reaching reforms and in 2019 spent almost exclusively on subsidizing gas. They have almost completely fulfilled their 2015 promise that it would stop subsidies on fossil fuels.

Another way to show how much attention countries are paying to renewable energy is by looking at the spending pattern. However, very little is known about how much Saudi

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[122] Andrew McCarthy, "United Arab Emirates Reforms Fossil Fuel Subsidies: GSI," United Arab Emirates Reforms Fossil Fuel Subsidies | GSI, accessed June 8, 2021, https://www.iisd.org/gsi/subsidy-watch-blog/united-arab-emirates-reforms-fossil-fuel-subsidies.

[123] https://www.bloomberg.com/news/articles/2015-07-22/u-a-e-to-link-gasoline-price-to-global-markets-effect-aug-1

[124] Chris Charles, Tom Moerenhout, and Richard Bridle, "The Context of Fossil-Fuel Subsidies in the GCC Region and Their Impact on Renewable Energy Development," May 2014. 3-4.

[125] Anthony McAuley, "UAE Embraces New Era of Subsidy Reform," The National (The National, January 3, 2016), https://www.thenationalnews.com/business/uae-embraces-new-era-of-subsidy-reform-1.223032.

[126] Al-Saidi, Mohammad. "Instruments of Energy Subsidy Reforms in Arab Countries — The Case of the Gulf Cooperation Council (GCC) Countries." Energy Reports 6 (2020): 71.

[127] "United Arab Emirates (UAE)," Green Fiscal Policy Network, February 26, 2021, https://greenfiscalpolicy.org/united-arab-emirates-uae/.

[128] IEA, Value of fossil-fuel subsidies by fuel in the top 25 countries, 2019, IEA, Paris https://www.iea.org/data-and-statistics/charts/value-of-fossil-fuel-subsidies-by-fuel-in-the-top-25-countries-2019

Arabia, Qatar and the United Arab Emirates spent on renewables over the 2015-2019 period. We have already noted that it is sometimes unclear how certain plans have been worked out, but it is also not entirely clear what the state has spent on. There is a very general indication in Saudi Arabia in which sectors will be spending more, but this is not explained specifically for renewable energy sources.[129] It is questionable how structurally the country actually spends to stimulate renewable energy sources, but there is no clarity about this for the period 2015-2019. The same applies in Qatar, where it is explained how much is being spent on 'Municipal and Environmental Sector Projects', but this is not specified further.[130] In the United Arab Emirates, spending is a lot more transparent, especially how much was spent on The Ministry of Climate Change and Environment in 2016-2020.[131] However, it does not clarify the specific investments in renewable sources because the expenditure of this ministry can be very broad. Unfortunately, we cannot use the indicator of 'a country's expenditure' for the development of renewable energy sources and I will not consider it further. It is interesting to note that the spending of the United Arab Emirates has been made much more transparent and that the country has a separate ministry for climate change. The country therefore seems to be a lot further than Saudi Arabia and Qatar, where expenditure on renewable energy sources may also be deliberately presented with little transparency.

A final indicator also arises from the theoretical framework in which the literature has discussed the social contract of the rentier state. Holding on to the sale of fossil fuels would ensure that the state can take on more tasks and fewer citizens have to participate actively in the labor market. If the switch to renewable energy sources and reduction of greenhouse gases were made, the 'social contract' with the citizens would also be broken. It is therefore important to look at the indicator 'labor force participation force'. The labor force participation rate is a measure of an economy's active workforce. The formula for the number is the sum of all workers who are employed or actively seeking employment divided by the total noninstitutionalized, civilian working-age population. Since 2015, we have seen that labor force participation in Saudi Arabia has fallen slightly, from approximately 56% in 2015 to

[129] "Saudi Arabia National Portal.," الميزانية السنوية في المملكة العربية السعودية, accessed June 8, 2021, https://www.my.gov.sa/wps/portal/snp/aboutksa/governmentBudget.
[130] "Qatar State Budget 2021." Qatar State Budget 2021. Ministry of Finance . Accessed June 8, 2021. https://www.mof.gov.qa/en/Pages/StateBudget2021.aspx.
[131] "Government Expenditure - The Official Portal of the UAE Government," Government expenditure - The Official Portal of the UAE Government, accessed June 9, 2021, https://u.ae/en/information-and-services/finance-and-investment/government-expenditure.

55% in 2019.[132] If we compare this with Qatar, we see that labor force participation has also fallen from almost 88% in 2015 to 87% in 2019.[133] In the United Arab Emirates, labor force participation decreased from 83% in 2015 to 82% in 2019.[134] Saudi Arabia, Qatar and the United Arab Emirates therefore have decreased labor force participation, but we do see Qatar and the United Arab Emirates score a lot higher than Saudi Arabia with this indicator. The number of people who work or want to work is therefore a lot lower in Saudi Arabia than in Qatar and the United Arab Emirates.

[132] "Saudi Arabia Labor Force Participation Rate1999-2020 Data: 2021-2023 Forecast," Saudi Arabia Labor Force Participation Rate | 1999-2020 Data | 2021-2023 Forecast, accessed June 9, 2021, https://tradingeconomics.com/saudi-arabia/labor-force-participation-rate.
[133] "Qatar Labor Force Participation - Data, Chart," TheGlobalEconomy.com, accessed June 9, 2021, https://www.theglobaleconomy.com/Qatar/labor_force_participation/.
[134] "United Arab Emirates Labor Force Participation - Data, Chart," TheGlobalEconomy.com, accessed June 9, 2021, https://www.theglobaleconomy.com/United-Arab-Emirates/Labor_force_participation/.

11. Conclusion

Saudi Arabia, the United Arab Emirates and Qatar have committed themselves to the targets, recognizing that reducing greenhouse gas emissions is valuable in limiting global warming to 2 degrees Celsius. All three countries that have their own interests and challenges in the energy transition due to their own position within the global energy market. Countries, such as Saudi Arabia, Qatar and the United Arab Emirates, are definitely supplying a growing demand for fossil fuels. Their economies are therefore almost entirely based on the export of fossil fuels and with that they also have a large part of their exports to lose when countries in the world switch completely to renewable energy sources. In my research I therefore examined the energy transition of the countries mentioned. The formulated research question is: "Why are Saudi Arabia, Qatar and the United Arab Emirates failing to meet the renewable energy expectations created after the Paris Climate Agreement in the period 2015-2019?" In addition, I formulated three sub-questions:

1. What are the expectations created after the Paris Climate Agreement?

2. What are the actual results achieved in the field of renewable energy and where do the countries differ?

3. What obstacles play a role in the increasing use of renewable energy?

To frame my research, I decided to focus on the political economy of the energy transition in Saudi Arabia, Qatar and the United Arab Emirates. The analysis from the political economy is often the most convincing as to why a certain change does not seem to get "off the ground". The state, corporations and other institutional actors have power over the means of production, financial situation and available technology. In some cases, the economic and political elite benefits from maintaining the status quo and therefore a strong explanation for why transitions fail or are even de-legitimized or ignored.

Based on the theoretical framework about the political economy of the energy transition in the aforementioned countries, I have drawn up a hypothesis. The available literature mainly focused on the political and economic aspects of the energy transition in Saudi Arabia, Qatar and the United Arab Emirates, while for example technical, climatic and/or cultural barriers may also play a role. As a hypothesis, I have therefore stated that no significant results have yet been achieved in the field of renewable energy in the period 2015-

2019 due to mainly political and economic barriers. The technical or climatic difficulties mentioned that come with the use of new renewable energy sources hardly play a role. Politically, the focus will have to be primarily on the bureaucracy in the countries mentioned and the extent to which a long-term policy is implemented effectively. My expectation was that the goals will be changed regularly, which makes it unclear where exactly the countries work. On an economic level, the limited progress due to the artificially low price of fossil fuels due to subsidies from Saudi Arabia, Qatar and the United Arab Emirates. In addition, a potential obstacle in the 2015-2019 period remains that many new jobs in the energy sector will have to be filled and that the slow diversification of the economy will also require more domestic labor. In order to be able to make this economic turnaround, support in society is also required, and the energy transition also ensures a certain degree of democratization, which can be raised as an obstacle. Finally, I expected that the fear of lower economic growth will also play a role as an economic argument for not making the switch to sustainable energy as a larger part of the energy mix. There will be no obvious differences between the countries mentioned and all these problems will, I expect, apply to the countries.

First, we see that from the available literature Saudi Arabia and Qatar have set abstract goals for which it is not clearly substantiated as to how they are going to try to achieve them and why these goals would be realistic. The United Arab Emirates, on the other hand, has set more concrete goals after the Paris Climate Agreement and more extensively substantiated how they want to achieve this. Secondly, I researched the actual results achieved. We see here that only Saudi Arabia and the United Arab Emirates have taken (small) steps here in the period 2015-2019 by increasing their share of renewable energy tenfold during that period. If we look at the use of renewable energy per capita in Qatar, this has remained almost the same in the period 2015-2019 and even decreased slightly. We can clearly see that all three countries largely use solar energy as a renewable energy source.

Then we have to find an explanation for the fact that the stated goals for the mentioned countries are out of reach. First of all, the political barriers. The theoretical framework in general mainly focused on bureaucracy and its role in the energy transition. There is also a lack of a clear support policy for renewable energy sources, including both grid access rules and financial support schemes, and there is limited knowledge among governments to make the energy transition a success. The inefficient state bureaucracy to facilitate large-scale economic and political upheavals is actively discouraged by the rentier state theory. The distribution of resources among the ruling bureaucracy is therefore used in exchange for the

acceptance of the ruling political elite. The fact that there is a large bureaucracy in these countries leads to a so-called 'rentier class', which benefit from the export of fossil fuels. There does not appear to be a coherent plan to implement reforms, for example in the field of renewable energy, partly because these are highly centralized countries, making it unclear to local authorities what powers they have to stimulate renewable energy projects. Qatar declared war on its own bureaucratic system in 2005. However, 15 years later, Qatar's political system is still being argued to have an extensive and complex bureaucracy that is generally inefficient. Qatar has recently taken relatively many steps to combat corruption by also cutting back on the bureaucratic apparatus due to cuts that had to be made. The World Bank stated that the five most problematic reasons for investing in Qatar are restrictive labor regulations, inadequately educated labor force, inefficient government bureaucracy, inflation and poor work ethic in the labor force. We should also note that Qatar, and Saudi Arabia, for that matter, has a low score on the indicators 'voice and accountability', 'legal rights', 'resolving insolvency' and 'enforcing contracts'. It will all be political obstacles that contribute to the fact that the investment climate for the private sector in Qatar and Saudi Arabia does not fully flourish and thus also limits investment in renewable energy sources. There is no decentralization and every detailed decision to make the system more efficient and effective has to be approved by the top of the political regime. There is a paradox in which it is precisely centralized governance that leads to inefficient and ineffective decisions. Qatar does not offer solutions for these political problems as we have outlined them earlier and the real problems are in a sense even denied. It is stated that there are good developments to improve the political climate for foreign investment. No further concrete solutions are mentioned here to improve the political and organizational climate. Recommendations are also made for the United Arab Emirates regarding inefficient bureaucracy and better involvement of the private sector to invest in the energy sector. At the moment, the policies that have been taken are mainly aimed at increasing the power of the state and the ruling elite. It could be possible that public private partnerships (PPPs) will play an increasingly larger role in renewable energy projects. In the 2015-2019 period, the United Arab Emirates law stipulated that in large parts of the country, foreign investors can own up to 49% of a local company. These legal restrictions also have a restraining effect on the willingness of investors to invest in renewable energy sources. Challenges remain in the areas of massive privatization, public-private partnerships, outsourcing and the frequent hiring of people of their own nationality, but overall clear steps have been taken to make the government bureaucracy function more efficiently. Another point that has come up several times is the reliability of countries to stick

to the targets that have been set. In order to be able to make policy, it is necessary that a certain objective is set on the horizon and that this is also adhered to in the agreements made. The striking thing about actually all these countries is that they lack a clear and defined future perspective. Long-term goals are being set and even increased, but there is no coherent story to get there. The questions why certain goals are set and how one wants to achieve them often seems to be missing. Only in the United Arab Emirates does there seem to be a clearer longer-term plan with the Energy Strategy 2050, but in Saudi Arabia and Qatar this is lacking.

I will now discuss the economic barriers as they emerge from the research. We see that Saudi Arabia and Qatar have hardly achieved any results in limiting their largest emitting export sectors, but that the United Arab Emirates is indeed achieving results in this area and can therefore also more easily shape the energy transition to renewable sources in the period 2015-2019. The economic barrier that Saudi Arabia and Qatar face in making themselves less dependent on fossil fuels do not appear to be overcome in the period mentioned. The United Arab Emirates is doing more work in this area and achieving more results. The second aspect of the economic barriers that have emerged in the theoretical framework is the subsidization of fossil fuels in Saudi Arabia, Qatar and the United Arab Emirates. To enable the development of renewable energy, there must be competition in energy prices. There must be a level playing field in the energy market in order to offer the various providers an opportunity and also allow them to compete with each other. Fossil fuel subsidies have always been characteristic of the rentier state in which cheap energy was shared with the population and seen as part of 'the social contract' between government and citizens. Fossil fuel subsidies are a way of continuing to shape centralized state power and are particularly prevalent in countries with weak institutions or bureaucracy. So there is also a diminished state power when the control on fossil fuels is slowly released. In addition, there are other reasons to mention, namely not wanting to impoverish the underclass in society, employment that is lost in certain parts of the energy sector, it can lead to lower incomes switching to less safe forms of energy use, influential stakeholders who are well organized to hold back reforms and the macroeconomic consequences that could lead to a reduction in output in certain sectors. Research shows that in 2018 about 6% of Saudi Arabia's GDP was spent on fossil fuel subsidies. If we put this in a comparative perspective over the years, we have to conclude that in 2012, Saudi Arabia spent just over 72 billion dollars on fossil fuel subsidies, but that in 2018 this had fallen to almost 45 billion dollars. Qatar and the United Arab Emirates has also implemented several reforms in recent years.

Very little is known about how much Saudi Arabia, Qatar and the United Arab Emirates spent on renewables over the 2015-2019 period. It is questionable how structurally the country actually spends to stimulate renewable energy sources, but there is no clarity about this for the period 2015-2019. Unfortunately, we cannot use the indicator of 'a country's expenditure' for the development of renewable energy sources. It is interesting to note that the spending of the United Arab Emirates has been made much more transparent and that the country has a separate ministry for climate change. The country therefore seems to be a lot further than Saudi Arabia and Qatar, where expenditure on renewable energy sources may also be deliberately presented with little transparency. A final indicator also arises from the theoretical framework in which the literature has discussed the social contract of the rentier state. Holding on to the sale of fossil fuels would ensure that the state can take on more tasks and fewer citizens have to participate actively in the labor market.

The democratization effects of the energy transition is an important aspect of the energy transition. It centers on the notion that existing power structures benefit from being dominant over structures with less power in order to maintain the status quo and secure economic position. The political and economic barriers I mentioned above show that the transformations on a political, social and economic life are hindered by the interests of the political and social elite. First of all, the inefficient state bureaucracy, which have an interest in maintaining the rentier state in order to maintain social stability. The distribution of resources among the ruling bureaucracy is therefore used in exchange for the acceptance of the ruling political elite. The fact that there is a large bureaucracy in these countries leads to a so-called 'rentier class', which benefit from the export of fossil fuels. We see the role of bureaucracy playing a major role, especially in Qatar and Saudi Arabia. This discourages the private sector from making long-term investments in renewable energy. The aforementioned subsidies for fossil fuels are also intended to preserve economic, social and political stability and thus maintain the current hegemony because fewer people participate in the labor market.

In conclusion, I state that my research clearly shows that the energy transition to renewable sources in Saudi Arabia, Qatar and the United Arab Emirates is mainly limited by the presence of various economic and political barriers as I outlined in the conclusion. The hegemony of the elites plays a central role in this on the part of the state to maintain social, economic and political stability. The hypothesis I have formulated is therefore confirmed, but further analysis shows that there are many different political and economic barriers. There are several options for meaningful follow-up research. It is recommended that follow-up research

be conducted into the developments in the field of renewable energy for the coming years and to what extent the targets will be achieved. The plans that have now been drawn up will actually be implemented in the coming years. In my research I have found that Saudi Arabia and the United Arab Emirates are taking a big step in the field of renewable energy sources in 2019, but it is worth further research to see whether this continues in the period 2020-2022 and whether there is an acceleration has come up. In addition, it is also worth a follow-up study to look at the stated goals of Saudi Arabia, Qatar and the United Arab Emirates. We've previously found that the goals seem to be changing rapidly, but it would merit further research to see what these changes are based on and what exactly underlies them. In this way, there can be more clarity about the extent to which sustainability has actually been given a place by means of realistic goals for the aforementioned Gulf States.

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