Renewable Energy: the End of the Rentier State?

A research that contains an in-depth analysis of the effects of renewable energy on the rentier state of the Kingdom of Saudi Arabia

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Abstract

This paper presents a research conducted to expose the effects that renewable energy projects have on the rentier state of the Kingdom of Saudi Arabia. The research contains a detailed description of the Saudi Arabian rentier state and the way this state is built up. The renewable energy projects that were, are and will be set up in this state are thoroughly discussed and the way these exact projects are formed is also described. A detailed overview of the parties involved in these projects is also provided.

Furthermore, there is a successive part that also describes the way these renewable energy projects fit into the rentier state. Considering the foundation of the rentier state, certain difficulties, encountered with the implementation of the renewable energy projects, and their solutions are also discussed. Finally, the last chapter describes the future vision of the Saudi Arabian state, the effects the domestic developments might have on the wider region and expert vision on the developments.

The study concludes by stating that there are, as assumed, effects of renewable energy on the rentier state. The renewable energy projects are, however, just like the fossil fuels in the rentier state theory, almost always completely managed by the state. In some cases directly by the state, in others indirectly via state grants and investments. The economy will be further diversified due to the renewable energy projects, but this has yet to take place. Concrete plans with foreign parties have been made but not yet executed. The focus of the current renewable energy projects is to take on the ever-growing domestic demand for energy so that the fossil fuels saved by these projects can be exported in order to sustain the rentier basis of the state. Overall, the renewable energy projects do effect the rentier state of the Kingdom of Saudi Arabia, but not necessarily threaten it.

Topics: renewable energy, rentier state, the Kingdom of Saudi Arabia, GCC

Contents

Introductory

This research is performed as final assessment for the Master 'Modern Middle Eastern Studies'. Throughout this research I will use the research skills provided to me by the methodological and theoretical courses I took during this Master and conduct an in-depth research. I will seek to find and present an answer to my research question and leave the possibility for further research on this topic.

Introduction

> "June 21 marked one year of Mohammed bin Salman as crown prince of Saudi Arabia. Since assuming the role, the crown prince, fondly known as MBS, has been working for the socioeconomic transformation of the Kingdom.
> He is the architect of a wide-ranging plan for social and economic reforms known as Saudi Vision 2030, which aims to diversify the economy of the Kingdom and reduce its dependence on oil income."[1]

The above quote is taken from a news article that discussed the Saudi Vision 2030. This is a massive plan presented by the Saudi Arabian government and contains multiple, large scale projects that seek to implement reforms throughout the Saudi Arabian state. I becomes very clear that reforms are very topical in the Kingdom of Saudi Arabia. One specific type of reform, that is also part of the Saudi Vision 2030, is the development and implementation of renewable energy projects.

This trend is not just topical in the Kingdom of Saudi Arabia but is a worldwide phenomenon. Large summits, such as the COP23 but also organizations like UNESCO have an international character where environmental issues are discussed and possible solutions are presented. Something that seems to be inherently connected to these meetings is renewable energy. Renewable energy is widely seen as a good solution to many of the current environmental problems.[2] Of course this is not the only reason why renewable energy is a phenomenon that is currently the cause of many investments, the global market also seeks alternatives for the fossil fuels. Fossil fuels, such as oil, are still a huge part of the global market, not only for the industries but also on a very small scale, such as simple households. Considering the fact that

[1] Arab News. Last updated 22 June 2018. "Saudi Arabia witnesses unprecedented achievements one year after MBS became crown prince." http://www.arabnews.com/node/1325816/saudi-arabia.
[2] Noelle Eckley Selin, 'Renewable Energy,' in Encyclopaedia Brittanica, 2018.

fossil fuels, like the name already implies, are not infinite and a day will come that these fuels will no longer be available.

The research to renewable energy is thus not new, over the years the possibilities of renewable energy projects have been widely examined. There is also another part to these projects, besides the intended positive effect on the environment, namely the possible effect they may have on the economy. By renewable energy, I refer to energy sources that are replenishable. Examples of types of renewable energy are solar, wind and nuclear energy.[3] Taking into account the fact that fossil fuels play a big role in the current economy, one could only assume that the effects of new sources of energy will be widespread, especially with the future scarcening of the fossil fuels.

An interesting field of research is thus the examination of these possible effects on the current state of certain institutions, economies, or even whole states. Like the title of my thesis already shows, this is exactly what I will do in my research, namely looking into the effects that renewable energy projects in the Kingdom of Saudi Arabia have on the rentier state that currently shapes the state form of the Kingdom of Saudi Arabia. The research question I thus seek to answer is: what are the effects that renewable energy projects have on the Saudi Arabian rentier state and how does the rentier state handle these effects?

I will expect my research to show at least some effects that renewable energy projects have on the current state of the Kingdom of Saudi Arabia and, following this expectation, I intend to find ways the Saudi Arabian government handles or tends to handle these effects. My hypothesis is that the rentier state will 'suffer' from certain consequences that come with the implementation of renewable energy due to the very structure of the state, namely rentierism. I do expect the state to manage these consequences and perhaps shape the projects in such a way that they do not harm the current state structure but rather enhance it.

[3] Noelle Eckley Selin, 'Renewable Energy,' in Encyclopaedia Brittanica, 2018.

1. Theoretical framework

In this chapter I will start by explaining shortly what is meant by the term 'rentier state'. Following this, I provide a theoretical background and present the literature gap I found. I will also focus on the methodological choices I made to provide a background to the reader on how I conducted my research.

1.1 The Rentier State

"No representation without taxation?"[4]

An ever returning question surrounding the rentier state theory, is the one above formulated by Michael Herb. Critics of the theory have argued that democracy and the rentier state will never be able to coexist. But others have stated that the lack of democracy in the Middle East is not solely a result of the existence of the rentier state.[5] But what exactly is the rentier state theory? As Beblawi and Luciani state in their work 'The rentier state,' the rentier state is defined as "any state that derives a substantial part of its revenue from foreign sources and under the form of rent"[6]. This means that rentier states themselves are dependent on revenues from foreign states while the state's economy is heavily supported by the state. The taxation system is thus significantly different from other states[7] and the mentality of the state is not the regular work-reward situation. This leads to an environment in which productivity is not the main objective and has a non-diversified economy as result[8], just as Beblawi confirms "we are living in a rentier universe which has affected both the state and the citizen"[9].

Considering the fact that oil is at the basis of the rentier states in the Arab world, one might think that the surrounding, non-oil states are not affected by the rentier phenomenon. However, as Beblawi further explains, there is a so-called second-order non-oil rentier state, who benefit from the focus on oil of the other states by exploring other rent sources.[10] A discussion surrounding the rentier state theory, as stated earlier, is the one questioning whether democracy and the rentier state are compliant. There are multiple visions that are

[4] Michael Herb, "No representations without taxation? Rents, development, and democracy," *Comparative Politics* 37, no. 3 (April 2005): 297.
[5] Ibid.
[6] Haze Beblawi and Giacomo Luciani, *The rentier state* (London: Croom Helm, 1987), 11.
[7] Hossein Mahdavy, "The patterns and problems of economic development in rentier states: the case of Iran" in *Studies in the exonomic history of the Middle East,* ed. M Cook (London: Oxford University Press, 1970), 428 – 467.
[8] Haze Beblawi and Giacomo Luciani, *The rentier state* (London: Croom Helm, 1987), 14.
[9] Ibid., 62.
[10] Ibid.

widespread concerning this point of discussion and the focus is on the lack of taxation. Herb described three main views as to why rentierism negatively affects democracy; 1) the lack of need for taxation leads to exemption of accountability, 2) the state can buy off or repress possible opposition and 3) oil revenues affect the class structure in a way that changes that usually lead to democracy cannot occur.[11]

So, where multiple scholars argue that rentierism has a negative effect, others, such as Herb, state that there is not any consistent support for this view and that other factors besides oil wealth should also be taken into account.[12] An even more contradicting view, is that taxation leads to instability, rather than to representation[13], and others such as Michael Ross put emphasis on the effect of the oil state basis on democracy:

> "the oil-impedes-democracy claim is both valid and statistically robust, (…) oil does hurt democracy"[14]

One cannot miss the key element in the rentier state theory as discussed above: oil. The rentier state theory applies to countries that derive most of their national income from the export of natural resources[15], and the fact that oil is a fossil fuel, directly leads to the conclusion that one day, oil will not be available any longer. It would seem as if the rentier state theory explains the complete state structure, but there are however scholars who disagree and argue that other elements that are not necessarily parts of the rentier state theory, also play a role in the way the state functions. Hertog, for example, states the following (in relation to the Kingdom of Saudi Arabia):

> "Eventually, I realized that the Saudi story pointed up a crucial weakness of rentier theory: although the literature predicts that resource-rich states and economies will exhibit specific features—and is often right in these prognostications—the accounts of how these outcomes come about, where they exist, are usually brief and general. Much of the rentier state debate lacks empirical analysis of the causal mechanisms on any but the most general level."[16]

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[11] Michael Herb, "No representations without taxation? Rents, development, and democracy," 298.
[12] Ibid., 310 – 311.
[13] Kevin Morrison, *Nontaxation and Representation: The Fiscal Foundations of Political Stability* (Cambridge university press, 2014), 12 – 28.
[14] Michael L. Ross, "Does Oil Hinder Democracy?," *World Politics* 53 (April 2001): 356 – 357.
[15] Mohamed El Hedi Arouri et al., "Energy consumption, economic growth and CO2 emissions in the Middle East and North African countries," *Energy Policy* 45 (2012): 348.
[16] Hertog, Steffen, *Princes, Brokers, and Bureaucrats : Oil and the State in Saudi Arabia*, (Cornell University Press, 2010), 2.

So, when writing this thesis, I did keep in mind that the rentier state theory is the theory that is the most applicable when it comes to the Saud Arabian state, but, as every theory, also has its shortcomings. The theory does not contain all aspects of the state structure and this is something I will refer to later on in my research.

1.2 Literature review

Considering renewable energy in the Middle East and North African region, a lot of research has already been performed by previous scholars. A good example of such an article is "The status of renewable energy in the GCC countries", written by W.E. Alnaser and N.W. Alnaser. They focus their research on the newly implemented projects in the GCC region, the aims of the projects and their expected outcome. They claim that the Middle East, now and until at least 2035, depends on natural gas and petroleum liquid fuels to generate most of the electricity.[17] While there is little to no economic advantage for the region to make a switch to renewable energy, there are multiple countries that are setting up projects[18], such as, for example, solar and wind power projects. The GCC region is especially suitable for these two renewable energy sources[19] and is in fact the leading region investing in renewable energy in the Middle East[20].

When it comes to the research on renewable energy, there are many different views on the matter and also research in many different sectors. One of these sectors, is the way governments act in the preservation of energy, the strategies they use and the policies surrounding these actions. A good example of such a study was written down by Al-Ajlan and others. They looked specifically at the Kingdom of Saudi Arabia and reviewed the existing or possible strategies, the policy measures and implementing bodies that are needed for this process.[21] The focus of their research thus was on the specific aspect of energy conservation. They did look into the way the state of the Kingdom of Saudi Arabia is built up and argue that the current structure, the rentier state, is not compatible with privatization.[22] This means that the state will inevitably be responsible for the costs of the needed projects. Other types of research, that are very close to the conservation of energy, are studies examining efficiency-

[17] W.E. Alnaser and N.W. Alnaser, "The status of renewable energy in the GCC countries," *Renewable and Sustainable Energy Reviews* 15 (2011): 3080.
[18] Ibid., 3081 – 3082.
[19] Ibid., 3085.
[20] Ibid., 3097.
[21] S. A. Al-Ajlan, A. M. Al-Ibrahim, M. Abdulkhaleq and F. Alghamdi, "Developing sustainable energy policies for electrical energy conservation in Saudi Arabia," *Energy Policy* 34 (2006): 1556–1565.
[22] Ibid., 1562.

enhancing policies. Cherry, Kallbekken and Kroll, for example, argue that taxes, considering the public opposition to efficiency-enhancing policies, are less accepted by citizens than subsidies, but are, however, more popular than quantity regulation. They stress that the language that is used to describe the efficiency-enhancing policy plays a big role in the acceptance of the method, this is particularly the case with the tax instrument. [23]

Other scholars focussed more on the effect of climate change, such as Adger, Benjaminsen, Brown and Swarstad. They performed environmental research in relation to global and local politics and discourse and focussed on four main environmental issues that they described in-depth. A conclusion that they reached, was that in almost all the discourses, the idea that the world is on the verge of a global catastrophe and that irreversible change was risked.[24] Harold Wilhite reviews yet another side of the spectrum, namely a side that rather than concluding there is a catastrophe heading towards us, focussing on the environmental impacts of consumption and the theories and policies developed to accomplish a sustainable energy consumption.[25] He argues that the increase of the consumption has led to a rise in the use of energy in order to be able to sustain the use, but also the transportation of all these goods. This consequently created a higher use of fossil fuels and need for energy.

In the case of the assessment of the suitability of certain places for the generating of renewable energy, a lot of work has already been done. This specific side of the research spectrum analyses certain characteristics of specific areas or regions. They do this by conducting fieldwork or analysing data in order to assess the presence of these characteristics so they can decide to what extent these regions are suitable for the generation of a certain type of renewable energy. A good example of this specific type of research, is conducted by Rehman. He looked into the suitability of certain regions in the Kingdom of Saudi Arabia for the generation of wind energy. He performed this research by analysing data he gained from five different locations in the coastal area of the Kingdom of Saudi Arabia where wind energy conversion systems were set up. In the end he was even able to give certain specific advisory

[23] Todd L Cherry, Steffen Kallbekken and Stephan Krol,l "The acceptability of efficiency-enhancing environmental taxes, subsidies and regulation: An expiremental investigation," *Elsevier 'environmental science & policy'* 16 (2012): 90.
[24] W. Neil Adger, Tor A. Benjaminsen, Katrina Brown and Hanne Svarstad, "Advancing a Political Ecology of Global Environmental Discourses," *Development and Change* 32 (2001): 708 – 709.
[25] Harold Wilhite, "The problem of habits for a sustainable transformation," in "Sustainable Consumption and the Good Life: Interdisciplinary perspectives," ed. Karen Lykke Sysse and Martin Lee Mueller (New York: Routledge, 2015), 100.

comments as to where in the Kingdom of Saudi Arabia wind energy could be generated in the most successful way.[26]

This aspect of environmental research is thus not only useful for research purposes, but can also actually help with the execution of renewable energy projects. Said, El-Amin and Al-Shehri also focus on this part, but they further analyse the reason why certain earlier projects where not set up while feasibility tests were already executed. They look at solar energy and wind energy as well and assess the most suitable regions and the feasibility of possible renewable energy projects in certain locations. They end up with multiple observations and future views that can, as earlier described, help set up the execution of certain renewable projects but also produce important data for the research spectrum.[27]

This applicability for wider use than just further research objectives, also becomes clear when evaluating other types of renewable energy research. Where Zaunbrecher and others, for example, focus specifically on the issue of hydrogen storage, they also briefly mention that there has been a lack of interest in the issue of storing other renewable energy sources, such as wind and solar power. More attention has been paid to the social acceptability of the turbines and collectors, the storage, however, will also need facilities.[28] They conclude by, among others, giving the advice for further research to focus on the difference between long- and short-term storage.[29] So, what becomes evident, is that there seems to be an extinction between studies that focus on the more 'technical side' of renewable energy, and studies that focus on the 'social side,' like in this case, the social acceptability of the renewable energy storage.

Another example of research that focusses more on the 'social' side of the research spectrum, is conducted by Dorte Verner. He argues, in his article concerning climate change in the Arab World, that the effect that the upcoming climate changes will have on these countries will be significant. Where he focusses primarily on the changes itself, he does note that the government plays an essential role in the organisational process that needs to be set up in order to deal with climate change. In the case of natural resources and their upcoming extinction, this is equally important, especially in the rentier state where the government plays

[26] Shafiqur Rehman, "Prospects of wind farm development in Saudi Arabia," *Renewable Energy*, no. 320 (2005): 447 – 463.
[27] S. A. M. Said, I. M. El-Amin and A. M. Al-Shehri, "Renewable Energy Potentials in Saudi Arabia," *King Fahd University of Petroleum and Minerals* (Dhahran Saudi Arabia, 2004).
[28] Barbara S. Zaunbrecher, Thomas Bexten, Manfred Wirsum and Martina Ziefle, "What is stored, why, and how? Mental models, knowledge, and public acceptance of hydrogen storage," *Energy Procedia* 99 (2016): 109.
[29] Ibid., 117.

a significant role mainly because of the existence of natural resources. It is thus of importance to analyse the actions of the government in the state and, as Verner also amplifies, it is important to have the public data to be able to form policies and be able to react properly on the extinction of the natural resources.[30]

1.3 Literature gap

So, concluding from the above review, it becomes clear that there has been a lot of research performed in many different parts of the renewable energy sector. Where a lot of studies focussed on the more technical sides of the feasibility of the implementation of renewable energy projects, others focussed on the 'social' side of these projects, such as the acceptability of the storage of energy. It does become clear, that a merge of different research, such as the technical and social side, does not happen very often. Especially not in relation to the effect of certain political systems on renewable energy and vice versa. This is where I found the gap in the existing literature; renewable energy could potentially have great effects on a state form that is highly dependent on other forms of energy.

This is exactly the gap I will try to fill by conducting my research. The rentier state is a great example, since the fossil fuels play a significant role in the rentier state theory. Renewable energy projects in these rentier states might thus be of great influence.

1.4 Methodology

The way I will conduct the previously mentioned research, is by using, among others, the sources mentioned in my literature review. I will use these studies in order to review what kind of renewable energy projects exist in the Kingdom of Saudi Arabia and how these fit in the state, as mentioned in my introduction. I do not seek to make any generalizing conclusions, since this research only focusses on one specific rentier state and is simply too small to fully test the theoretical choices I made, which means my research will be ideographic. If there is a possible generalizable conclusion, I will point this out in my conclusion so that future research may be performed in order to prove my findings and thus maybe do lead to generalized, proved conclusions.

The following chapter will start with an overview of the shaping of the rentier state in the Kingdom of Saudi Arabia over the past century. Following this historical overview, I will

[30] Dorte Verner, "Adaptation to a Changing Climate in the Arab Countries," *MENA knowledge and learning*, no. 79 (January, 2013): 4.

mention some key elements that are part of the rentier state in the Kingdom of Saudi Arabia, such as the Arabian American Oil Company (ARAMCO) and the will to diversify the economy. Subsequent to this chapter, I will provide a numeration of the renewable energy projects through the years, the currently existing projects and the prospects for certain type of renewable energy sources. I will analyse the way these projects were and are set up and who are involved.

Following this, in chapter four, I will analyse how these projects fit in the rentier state and how, for example, policies are used to make the projects fit. In the final chapter, I will look at the effects the developments in the Kingdom of Saudi Arabia have and might possibly have in the future. I will also encompass the official position the Saudi Arabian government takes considering future development of renewable energy projects. Finally, I contacted different experts on and in the region to interview them in order to represent their view on the influence of renewable energy on the rentier state of the Kingdom of Saudi Arabia and the influence these projects have on the future of the rentier state. Unfortunately, I received little response to my emails and thus was not able to execute my planned in-depth interviews. In order to encompass an expert vision in my thesis, I decided to add the visions I encountered from scholars in the field and also use diverse media outlets and analyse the expert visons presented by them. Luckily, I studied the Arabic language during my bachelor 'Middle Eastern Studies: Arabic' at Leiden University, which resulted in the advantage that I am now able to read and understand primary sources written and spoken in Arabic. Since Arabic is the official language of Saudi Arabia, I was able to use various reports as background information for my thesis.

There are a few assumptions included in the earlier presented research question. One big assumption is the fact that I already think that renewable energy has or will have some sort of influence on the rentier state. Another assumption that follows this assumption is the fact that I not only assume that renewable energy has an impact, I also assume that the Saudi Arabian rentier state will have to deal with and possibly suffer from these effects. These assumptions might lead to a distorted view of reality, since some of the effects that are described to the influence of renewable energy projects, might actually be caused by a totally different reason.

2. The Saudi Arabian rentier state

This chapter will provide an explanation of how the rentier state in the Kingdom of Saudi Arabia came into existence. I will also look at some main features of the rentier state in this country and how the government manages the state.

2.1 The birth of the Saudi Arabian state

The founding family of the state is the royal Saud clan. Around 1900 Ibn Saud started expanding his territory by overtaking areas in Arabia that, according to him, belonged to him and his family. This was not the first time the Saud family formed a state, two earlier attempts in the 19th century had failed and only occupied a small area of Arabia. In 1906 Ibn Saud defeated his biggest rival Al Rashids in Najd and also occupied this region.[31] From this time, he continued expanding his military and in 1912 eventually realised the Ikhwan, which was basically an army to continue the expansion of his territory. Ibn Saud made sure that they all followed the Wahhabist belief and used this belief as a motivation and justification to occupy and raid other areas where Wahhabism was not followed yet.[32]

In order to finance this ongoing 'project', he had two main sources of income: the bounty from earlier defeats and the religious tax (zakat). The aridness of the region, however, caused this income to be minimal. Everything changed when the Hijaz region became part of the occupied area in 1925, since pilgrims' fees could be collected.[33] The expansion of the area seemed to be going smoothly, but there were some issues with the Ikhwan. As described above, Ibn Saud used religion as a motivation for the occupation of new areas. The Ikhwan however continued to raid areas that were already part of Ibn Saud's realm but were not Wahhabist. Ibn Saud was only able to stop the now rebellious group with the use of charisma in order to get the support of local townsmen in a violent encounter in 1929.[34]

In 1932, the third Saudi state was officially founded and immediately struggled with the economic difficulties that come with an arid region, since farming was difficult or even impossible. Besides this, the worldwide economic crisis caused the number of pilgrims, who also formed a significant amount of income, to decline. The natural resources that were

[31] Islam Yasin Qasem, "Neo-Rentier Theory: The Case of Saudi Arabia (1950-2000)" (PhD diss., Leiden University, 2010), 32.
[32] Ibid., 36.
[33] Ibid., 33.
[34] Ibid., 36.

available, however, offered huge opportunities and even though the Second World War took place, contracts were signed soon after the discovery of oil.[35]

As becomes clear from the early beginnings of the Saudi Arabian state, the state started off as one led by a single family. Ibn Saud had the control over the state and his legitimacy was based on charisma, but also definitely on religious grounds. He used the institutionalization of Islamic Wahhabism for coercion but, as Qasem states: "[m]ore than just for coercion purpose religion was equally fundamental in legitimizing Ibn Saud's authority"[36]. This is the case because Ibn Saud claimed to defend and uphold Islamic values. According to the Wahhabist belief, a leader who follows the sharia, must be supported and Ibn Saud's way of governing therefore justified the demand of obedience from his citizens. As described above, Ibn Saud used this technique earlier to unite the Ikhwan which had an unfortunate outcome, but on a national level the strategy did seem to work out.

There were four ministries that supported the reign of the Saud family, namely Foreign Affairs, Finance, Interior and Defence. These ministries were founded in order to help the young state overcome the economic difficulties of the arid region and become a financially successful state. In the first decade, the revenues of oil increased significantly but the incomes of the pilgrimage to the Hijaz region also continued to be a big part of the state revenues.[37] The Second World War did create a significant decline of the export of oil and, as discussed earlier, the pilgrims where also held back due to the financial crisis. The state asked for financial aid and both the United States and Britain and was successful; both states came forward with resources and the United States even authorized lend-lease aid.[38] Because of the aid, the young stated survived the financial crisis and with the end of the war, oil revenues rose rapidly.

The rise of the income through the export of oil, caused the state to have more budget to spend on the preservation of national security. The investment in the improvement of internal issues and in modern equipment made sure that the state was a cohesive entity that could defend itself. Besides this, the growing international importance of the Saudi oil export, led to

[35] Islam Yasin Qasem, "Neo-Rentier Theory: The Case of Saudi Arabia (1950-2000)," 34.
Paul Stevens, "Saudi Aramco: the Jewel in the Crown" in *Oil and Governance: State-Owned Enterprises and the World Energy Supply*, ed. David G. Victor, David R. Hults and Mark C. Thurber (Cambridge: Cambridge University Press, 2012), 175.
[36] Islam Yasin Qasem, "Neo-Rentier Theory: The Case of Saudi Arabia (1950-2000)," 35.
[37] Arthur N. Young, *Saudi Arabia: The Making of a Financial Giant* (New York: New York University Press, 1983), 126.
[38] Islam Yasin Qasem, "Neo-Rentier Theory: The Case of Saudi Arabia (1950-2000)," 38.

a certain international importance of the securitization of the state. The United States, again, supported the Kingdom of Saudi Arabia on this point, since they secured the preservation of the integrity and sovereignty of the state on an international level.[39]

2.2 The Saudi Arabian rentier state

ARAMCO had to increase the production of oil in order to fulfil the European post-war demand that increased rapidly after the end of the Second World War. Of course, Europe was not the only area that the Saudi state exported oil to, North Africa and Asia were also part of the importers. The European demand for Saudi Arabian oil decreased a little around the last half of the 20th century, where the demand from North Africa started to increase around the 1980s.[40] Because oil was such an important export product, the revenue it created was of high importance to the internal development of the state. This does mean that the state of the economy of the Kingdom of Saudi Arabia became highly dependent on the value of oil in the global market. Of course the state tried to diversify the economy in order to reduce its dependence on the oil revenues, but even though various projects were founded, the continuation of the high percentage of oil in the total of export income did not decline.

Besides this, government expenditure was also dependent on the income of the export of oil. Whenever the oil prices increased, so did the amount of government expenditure and, as discussed in the first chapter, a high level of government expenditure is one of the aspects of a rentier state. In the first part of this second chapter, I stated that Ibn Saud used Wahhabism as a tool to legitimize his reign. The spreading of government expenditure among the citizens without taxation, was another measure in buying off legitimacy.[41] There were a lot of new social services founded which came together with a highly centralized bureaucracy that "greatly enhanced the ability of the state to penetrate and control the various activities of the society"[42]. The state did not only mingle by setting up social institutions, it also tried to observe and partially control the private sector, who in return were provided with state funded subsidies.[43] This strategy ultimately led to a private sector that as well was indirectly, via the state, heavily dependent on oil revenues.

[39] Islam Yasin Qasem, "Neo-Rentier Theory: The Case of Saudi Arabia (1950-2000)" 39.
[40] Ibid., 41.
[41] Ibid., 71.
[42] Ibid., 90.
[43] Ibid., 91.

ARAMCO was never meant to be a national owned oil company, but partly due to the developments around the Anglo-Iranian company in Iran, ARAMCO started to invest in localizing the company. This subsequently led to more involvement within the Saudi state, since in some places, there was no infrastructure and besides this, in order to have local employees, a scholarly system was needed.[44] Where surrounding oil states in the region started to pursue the nationalization of the oil production, ARAMCO decided to plead a deal with the Saudi state in which they would gain more control over time. [45] In 1976, however, following yet again other examples in the region, the Saudi state took over full control of ARAMCO and it became part of the five-year plans that the government used to set out developments in the future. These five-year plans also focussed on diversifying the Saudi Arabian economy but never fully succeeded in reaching the set out goals. The eighth plan, launched in 2005, for example, contained twelve objective that were also included in earlier plans.[46]

In the late second half of the 20th century, a drop in oil prices caused the Saudi state to be even more aware of its dependence on the export of oil. As Gause states in his work 'Saudi Arabia over a barrel':

> "The Saudi "social contract," established in the boom years of the 1970s, requires the government to provide jobs and services to its citizens. With soaring population growth and relatively low oil revenues during the past decade, that "social contract" has been fraying at the edges."[47]

The rentier state of the Kingdom of Saudi Arabia is thus characterized by the fact that there is a longstanding willingness to diversify the economy, but this goal has not been reached due to various causes. The state revenue is highly dependent on the profit gained by the export of its natural resources, any shift in the global field concerning the market of the natural resources, poses a direct threat to the stability of the Saudi Arabian state. The fact that the internal state is run by government expenditure is an extra reason that the export of oil is of high importance to the state itself. It can be concluded that natural resources are the basis for the Saudi Arabian state and thus the insurmountable extinction of these resources subsequently will affect the way the current Saudi Arabian state is built up. The system, based on a client

[44] Paul Stevens, "Saudi Aramco: the Jewel in the Crown," 179.
[45] Also known as the General Agreement on Participation, signed in 1972. Ibid., 181.
[46] Ibid., 186.
[47] F. Gregory III Gause, "Saudia Arabia over a Barrel," *Foreign Affairs* 79, no. 3 (2000): 84.

system, consists "of a large number of bureaucrats and institutions who do not operate coherently, but act parallel to each other and work vertically rather than horizontally"[48]. The way the state is thus built up as a direct consequence of the rentier activities, is highly fragmented with different layers that do not communicate well, which complicates the implementation of new policies and reforms. As discussed in the theoretical framework, there are scholars who criticize the rentier state, such as the previously mentioned scholar Hertog, who argues:

> "In particular, theories of the "rentier state," for which the Kingdom has always served as a primary example, painted with too broad a brush. While they did provide a useful way to think about some generic problems of oil-based development, they were less useful in explaining degrees of success and failure—arguably the most interesting puzzle in a complex system like Saudi Arabia, by no means a developmental failure."[49]

Where this does mean that certain developmental issues may not be explained by this theory, the development of renewable energy is directly linkable to the main factor of the rentier state, namely oil. In the next chapter I will analyse what type of new, renewable energy projects exist in the Kingdom of Saudi Arabia and following that, how these projects fit in the current state.

[48] Katrine Wiulsrød Ratikainen, "Transitioning to renewable energy in Saudi Arabia: A multi-level perspective analysis of the Saudi renewable energy policies," (MA thesis, University of Oslo, 2017), 29.
[49] Hertog, Steffen, *Princes, Brokers, and Bureaucrats : Oil and the State in Saudi Arabia*, (Cornell University Press, 2010), 2.

3. Renewable energy in the Kingdom of Saudi Arabia

In this chapter I will analyse what kind of renewable energy projects exist in the Kingdom of Saudi Arabia today. I will also describe how these projects are managed, where the revenues go and who invests in these projects.

3.1 The need for renewable energy projects in the Kingdom of Saudi Arabia

As discussed in the previous chapter, the Saudi Arabian rentier state seeks to diversify its economy in order to be less dependent on oil revenues. Besides this, the domestic market and local energy production is also highly dependent on domestic oil production. During earlier periods, the Kingdom of Saudi Arabia was not involved in participating in renewable energy projects, since they were then mostly linked to preventing or minimalizing climate change. The Saudi Arabian opinion on climate change, was that these changes were not influenced by human actions and consequently, that oil production, consumption and export had nothing to do with the climate change.[50] This point of view changed when the urgency of their own dependence of oil might be solved by the emergence of renewable energy projects, since these made the local market less dependent on oil production and instantly diversified the economy.

The Kingdom of Saudi Arabia produces a lot of electric power and also has a high domestic consumption rate. In order to produce electric power, the natural resources are put to use and so the national dependence on these fuels does not only come from the income of export, but also the need for electric power.[51] Since the state expected an even higher rise of energy consumption, measurements to meet this continuously growing demand were needed. It was expected that the Kingdom of Saudi Arabia had to burn 27% more oil each year for domestic purposes and thus decrease the amount of oil that can be used for export.[52] The reason that the domestic demand for electric power increases so much can be explained by not only the rapid growth of the population, but also further industrialization and development plans demand more and more electric power in order to further develop. [53]

[50] Katrine Wiulsrød Ratikainen, "Transitioning to renewable energy in Saudi Arabia: A multi-level perspective analysis of the Saudi renewable energy policies," 22.
[51] W.E. Alnaser and N.W. Alnaser, "The status of renewable energy in the GCC countries," 3082.
[52] Ibid., 3084.
[53] Ibid., 3091.

3.2 Solar energy

This type of renewable energy seems to be an easy option for the Saudi Arabian state because of the climate conditions that characterize the state's region. This was thus the earliest form of renewable energy founded in the state in the beginning of the second half of the 20th century.[54] The Saudi Arabian research projects worked together with foreign states, two well-known joint programs were HYSOLAR with the Federal Republic of Germany and SOLERAS with the United States of America.[55] During the following years, more projects followed and as Tlili states:

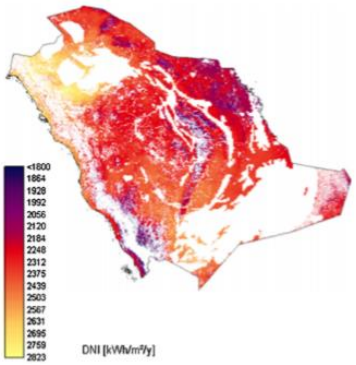

Figure 1 - The Concentrating Solar Thermal Potential in Saudi Arabia. W.E. Alnaser and N.W. Alnaser, "The status of renewable energy in the GCC countries," Renewable and Sustainable Energy Reviews 15 (2011): 3079

> "Recognizing the sun as a major natural resource with which Saudi Arabia is blessed abundantly, it is believed that solar energy is a valuable and renewable energy source that should be fully exploited for the benefit of the country."[56]

This becomes even more evident from the map displayed in figure 1. In this figure, statistics are shown that represent to what level the Kingdom of Saudi Arabia can produce energy from solar installations. Alnaser states that only 0.1% of the total area is needed in order to fulfil the demand of energy in 2050.[57] Where the start of use of solar energy was in the 1980s with foreign investors, the Kingdom of Saudi Arabia did not solely depend on foreign influence for the setup of solar energy projects. In the following section I will mention some of the solar projects that were founded over the years.

Solar energy is especially suitable for the desalination process, something that the Kingdom of Saudi Arabia continues to develop. The King Abdullah University of Science and Technology invested in research that reviews the usage of solar energy for the desalination

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[54] Arif Hepbasli and Zeyad Alsuhaibani, "A Key Review on Present Status and Future Directions of Solar Energy Studies and Applications in Saudi Arabia," *Renewable and Sustainable Energy Reviews* 15, no. 9 (2011): 5021 – 5050.

[55] Saleh H. Alawaji, "Evaluation of solar energy research and its applications in Saudi Arabia — 20 years of experience," *Renewable and Sustainable Energy Reviews* 5 (2001): 60.
The SOLERAS project was also one that later, by sponsoring from KACST via the Saudi Arabian government, led to development of other major solar programs. A. R. M. Alamoud, "Photovoltaic Activities in Saudi Arabia: Application and Research," in *Advances in Solar Energy Technology: Proceedings of the Biennal Congress of the International Solar Energy Society*, ed. F. Pfisterer and W. H. Bloss (Hamburg: Federal Republic of Germany, 1987), 306.

[56] Iskander Tlili, "Renewable energy in Saudi Arabia: current status and future potentials," *Environment, Development and Sustainability* 17 (2015): 870.

[57] W.E. Alnaser and N.W. Alnaser, "The status of renewable energy in the GCC countries," 3079.

process and how this can optimized. This led to the development of a solar concentrator that will capture the equivalent of 1500 suns.[58] This means that the use of oil, that is now necessary in order to power the desalination plants, will be lesser due to the solar alternative.

Another project where renewable energy, and thus solar energy, played a big role is in the campus of the King Abdullah University of Science and Technology. This campus received a LEED[59] certification and it actually was the first project in the Kingdom of Saudi Arabia to receive such a certification. The whole campus aims to be as environmental friendly as possible and uses solar energy for the production of hot water and energy. There is a surface of 4134m2 covered with solar thermal panels and another 16.567m2 is covered with photovoltaic arrays that produce 4 MW of energy, producing almost 6% of the total energy consumption of the campus.[60] The realization of this campus was led by the Saudi Green Building council, a council that was established by the Saudi Arabian state itself.

Besides the projects where solar energy is a part of a larger development, there were also 'just' solar power plants developed. Vision Electro Mechanical Co is one of the companies that develops, manufactures and operates solar power plants in the Kingdom of Saudi Arabia in order to generate electricity. The company is part of Construction Products Holding Company (CPC), a company that itself is part of the Saudi Bin Laden Group (SBG).[61] This group presents itself as a private sector company owned by shareholders, but does admit that most of its projects are contracted by the government and that a certain part of shares is also possessed by the state.[62] The solar power plants that are developed by Vision Electro Mechanical Co are suitable for the region's climate and are designed in a way that they maximise the potential production of solar energy by following the movement of the sun during the day. The focus of the plants is not just merely producing as much solar energy as possible, but also by doing so, preserving the natural resources, especially oil, for the future generations.[63]

In the table below, all the renewable energy projects, including solar energy developments, are listed from the beginning in the 1980s until the start of the 21st century.

[58] W.E. Alnaser and N.W. Alnaser, "The status of renewable energy in the GCC countries," 3091.
[59] Leadership in Energy Environmental Design.
[60] W.E. Alnaser and N.W. Alnaser, "The status of renewable energy in the GCC countries," 3093.
[61] Ibid., 3094.
[62] SBG, information from a SBG press release on 12-01-2018, www.sbg.com.sa.
[63] W.E. Alnaser and N.W. Alnaser, "The status of renewable energy in the GCC countries," 3094.

Projects	Location	Duration	Applications
350 kW PV system (2155 MWh)	Solar Village	1981–1987	AC/DC electricity for remote areas
350 kW PV hydrogen production plant (1.6 MWh)	Solar Village	1987–1993	Demonstration plant for solar hydrogen production
Solar cooling	Saudi universities	1981–1987	Developing of solar cooling laboratory
1 kW solar hydrogen generator (20–30 kWh)	Solar Village	1989–1993	Hydrogen production, testing and measurement (laboratory scale)
2 kW solar hydrogen (50kWh)	KAU, Jeddah	1986–1991	Testing of different electrode materials for solar hydrogen plant
3 kW PV lest system	Solar Village	1987–1990	Demonstration of climatic effects
4 kW PV system	Southern regions of Saudi Arabia	1996	AC/DC electricity for remote areas
6 kW PV system	Solar Village	1996–1998	PV grid connection
Solar sea water desalination			
PV water desalination (0.6 m^3 per hour)	Sadous Village	1994–1999	PV/RO interface
Solar-thermal desalination	Solar Village	1996–1997	Solar distillation of brackish water
PV in agriculture (4 kWp)	Muzahmia	1996	AC/DC grid connected
Long-term performance of PV (3 kW)	Solar Village	Since 1990	Performance evaluation
Fuel cell development (100–1000 W)	Solar Village	1993–2000	Hydrogen utilization
Internal combustion engine (ICE)	Solar Village	1993–1995	Hydrogen utilization
Solar radiation measurement	12 stations	1994–2000	Saudi solar atlas
Wind energy measurement	5 stations	1994–2000	Saudi solar atlas
Solar dryers	Al-Hassa,Qatif	1988–1993	Food dryers (dates, vegetables, etc.)
Two solar-thermal dishes (50 kW)	Solar Village	1986–1994	Advanced solar stirling engine
Energy management in buildings	Dammam	1988–1993	Energy conservation
Solar collectors development	Solar Village	1993–1997	Domestic, industrial, agriculture
Solar refrigeration	Solar Village	1999–2000	Desert application

Figure 2 Major previous renewable energy projects in the Kingdom of Saudi Arabia. W.E. Alnaser and N.W. Alnaser, "The status of renewable energy in the GCC countries," Renewable and Sustainable Energy Reviews *15 (2011): 3084.*

3.3 Wind energy

Just as with the production of solar energy, the production of wind energy is highly dependent on environmental aspects. The location of a wind turbine highly affects its production of energy.[64] Since the end of the second half of the 20th century, the Kingdom of Saudi Arabia has been exploring the possibilities for the production of wind energy. There was, for example, a wind energy measurement in 5 different stations during 1994 until 2000 for Saudi solar Atlas in order to determine the potential of different areas.[65] It turned out that, in the Kingdom of Saudi Arabia, especially the Northern and coastal areas are suitable for the production of wind energy, something that was later confirmed by further research.[66]

Until this day, no large scale wind energy farms were built in the Kingdom of Saudi Arabia. There might be several reasons for this, one being the simple comparison between costs and potential profits; a "further reduction in the manufacturers unit capital cost is still required to enable wind energy to compete with other conventional energy sources"[67]. There are, however, some smaller scale projects that already exist today. One of these projects is installed by the King Abdulaziz City for Science and Technology (KACST) and is a part of a study that looks into the feasibility of wind energy utilization in the Kingdom of Saudi

[64] W.E. Alnaser and N.W. Alnaser, "The status of renewable energy in the GCC countries," 3086.
[65] Ibid., 3084.
[66] N. M. Al-Abbadi, "Wind energy resource assessment for five locations in Saudi Arabia," *Renewable Energy* 30 (2005): 1490.
[67] S. A. M. Said, I. M. El-Amin and A. M. Al-Shehri, "Renewable Energy Potentials in Saudi Arabia," *King Fahd University of Petroleum and Minerals* (Dhahran Saudi Arabia, 2004).

Arabia.[68] They, just as previous studies, look to multiple 'test' sites in order to determine which location is the most suitable for the production of wind energy. Another reason that might be an explanation as to why there are no large farms built today, is that research has shown that smaller wind energy conversion systems seem to be more effective in multiple areas.[69] The small-scale and local use of wind energy would be more profitable in these areas.[70]

Even though current large scale wind farms are not founded, there are many developments taking place that explore all the possible sites that might be able to produce a lot of wind energy. A study from 2005, by Rehman, argues that "the wind park development program is economically feasible at Yanbo and Dhahran only"[71]. Very recently, the news that the first actual wind energy farm will be built came out. As was announced in the press, there are four different, foreign potential investors that want to be part of the wind energy developments in the Kingdom of Saudi Arabia and the farm is expected to be a 400-megawatt project[72].

Solar versus wind powers in the Arabian Gulf countries (W/m²) [22–25].

Country	Solar energy (Wh/m²)	Sunshine duration (h)	Solar power (W/m²)	Wind power (W/m²)	Solar/wind
Bahrain	5180	9.2	563	78	7.2
Saudi Arabia	5670	8.7	683	71	9.6
Kuwait	5990	8.9	673	140	4.8
Qatar	5260	9.3	565	85	6.6
UAE	5078	8.8	577	57	10.1
Oman	5410	9.6	564	141	4

Figure 3 Solar versus wind powers in the GCC region. W.E. Alnaser and N.W. Alnaser, "The status of renewable energy in the GCC countries," Renewable and Sustainable Energy Reviews 15 (2011): 3081.

3.4 Nuclear energy

The KACST, founded in 1977, focusses on exploring the opportunities for the Kingdom of Saudi Arabia on the field of nuclear energy. In 1988 the Atomic Energy Research Institute (AERI) was founded and started conducting research on the scientific side of the use of atomic energy for the production of electricity. So, from the end of the 1970s, the Saudi Arabian government was exploring "the feasibility of developing nuclear power plants for

[68] S. A. M. Said, I. M. El-Amin and A. M. Al-Shehri, "Renewable Energy Potentials in Saudi Arabia," *King Fahd University of Petroleum and Minerals* (Dhahran Saudi Arabia, 2004).
[69] Z. S. Ahmet and A. Ahmet, "Wind power energy potential at the northeastern region of Saudi Arabia," *Renewable Energy* 14 (1998): 439.
[70] S. A. M. Said, I. M. El-Amin and A. M. Al-Shehri, "Renewable Energy Potentials in Saudi Arabia," *King Fahd University of Petroleum and Minerals* (Dhahran Saudi Arabia, 2004).
[71] Shafiqur Rehman, "Prospects of wind farm development in Saudi Arabia," *Renewable Energy*, no. 320 (2005): 461.
[72] Reve, "Saudi Arabia receives four bids for first wind power project," *EVWind*, April 17, 2018, https://www.evwind.es/2018/04/17/saudi-arabia-receives-four-bids-for-first-wind-power-project/63144.

electricity generation"[73]. In 2007, a study was completed that looked into the potential for a regional nuclear program. The study was conducted in cooperation with the other Gulf Cooperation Countries and the International Atomic Energy Agency.[74]

In 2010, the King Abdullah City for Atomic and Renewable Energy (KACARE) was created and held responsible for "drafting a national policy on nuclear energy development, and supervising all commercial uses of nuclear power and handling of radioactive waste"[75]. It would thus seem as if the Kingdom of Saudi Arabia started off its nuclear program and plans to build a nuclear power plant and in 2011 the search for potential sites started that ended in 2013 marking three sites as suitable; Jubail, Tabuk and Jizan.[76]

Based on the research, a plan was set up that aimed to be able to provide 20% of the total demand for electricity in 20 years with nuclear power plants. These plans were soon delayed, since contracts were signed between external parties, government institutions and universities in the Kingdom of Saudi Arabia. The initial plan in 2013, was to start the building of nuclear power plants in 2016. In 2015, however, this timeline was changed and the earlier goal of 20 years was postponed until around 2040. KACARE continues to explore the possibilities with extern experts and reviews proposals, a process in which South-Korea is "considered to be the front-runner"[77]. Yet, until today, no nuclear power reactor has been built and able to be used for the production of electricity. KACST continues to further explore the options in the nuclear field with the use of the Nuclear Science Research Institute (NSRI) and states to have "signed several agreements with different developed countries and global expertise to promote the peaceful use of the nuclear energy"[78]. Together with KACARE and the International Atomic Energy Agency, KACST thus does continue to follow up on the plans to make nuclear energy plants a significant part of the national production of energy in the Kingdom of Saudi Arabia.

3.5 Parties involved

In the above description of renewable energy projects set-up in the Kingdom of Saudi Arabia throughout the years, several parties were mentioned. In the following part, I will make sure

[73] "Nuclear," Saudi Arabia, NTI website, http://www.nti.org/learn/countries/saudi-arabia/nuclear/.
[74] W.E. Alnaser and N.W. Alnaser, "The status of renewable energy in the GCC countries," 3081.
[75] Ibid., 309.
[76] "Saudi Arabia," World Nuclear Association website, http://www.world-nuclear.org/information-library/country-profiles/countries-o-s/saudi-arabia.aspx.
[77] Ibid.
[78] "NSRI," KACST website, https://www.kacst.edu.sa/eng/RD/NSRI/Pages/AboutNSRI.aspx.

that I explain who these parties exactly are en what other parties also play a role in the implementation of the projects. An organization that I mentioned often is KAUST, the King Abdullah University of Science and Technology. This University, as the name already suggests, is a University that has a foundation in which the Saudi Arabian royal family played a big role, something that also comes forward in the following quote;

> "The University shall be a beacon for peace, hope, and reconciliation and shall serve the people of the Kingdom and benefit all the peoples of the world."[79]

The University is thus ought to be of use for the Saudi state by producing knowledge and techniques that can be used by the state. Some of the research projects on the University are reviewing new approaches to solar energy conversion and for example the New Energy Oasis (NEO). This is a sight where renewable energy forms can be tested "which will enable them to select the most appropriate technologies for instantiation in the Kingdom"[80]

The King Abdulaziz City for Science and Technology (KACST), as stated before, among others helped set-up the nuclear energy sector in the Kingdom of Saudi Arabia and, again as the name suggests, was itself set-up by the royal Saudi Arabian family and mainly explores the options for the Kingdom of Saudi Arabia to develop further.[81] The renewable energy projects that they help develop are thus also intended to help the Saudi Arabian state and the organization still has a member of the royal family as their president today, the finances are also coming from the Saudi state itself.[82]

Another organization that is set up by the royal family, is the King Abdullah City for Atomic and Renewable Energy (KACARE). Founded in 2010, this organization focusses on further developing the Kingdom of Saudi Arabia so that it will be a fully sustainable state in the future. While the organization is thus not founded by the private sector, they do claim to focus on involving private actors in their activities:

> "The introduction of alternative resources now places Saudi Arabia to the fore in the development and utilization of atomic and renewable energy whilst providing numerous opportunities for national and international private sector companies to

[79] Quote from king Abdullah bin Abdulaziz Al Saud on the KAUST website.
"About," Kaust, https://www.kaust.edu.sa/en/about.
[80] "NEO Open Day showcases renewable energy technologies," News, Kaust, December 1, 2015, https://www.kaust.edu.sa/en/news/neo-open-day-showcases-renewable-energytechnologies.
[81] "About: Who We Are," KACST website, https://www.kacst.edu.sa/eng/about/Pages/WhoWeAre.aspx.
[82] A. R. M. Alamoud, "Photovoltaic Activities in Saudi Arabia: Application and Research," 306 – 307.

grow their businesses in the Kingdom, and Saudi nationals to enhance their knowledge and skills."[83]

The organization's leaders are scholars with international experience and experience in government institutions as well. It is thus a state-run entity that does have a focus on working together with the private sector in order to set-up projects concerning renewable energy.

The Saudi Electricity Company (SEC), is a company that is basically a merge of multiple, previously independent energy companies and thus has a monopoly on the energy market. It controls the transmission and distribution but also the production of energy in the Saudi state. The company is mostly owned by the Saudi state, partly direct, partly via ARAMCO. The Electricity and Cogeneration Regulatory Authority (ECRA) also plays a role in the company since they manage the performance of electricity service providers and other companies.[84] They are an organization founded by the government and thus demand certain actions from SEC. Since SEC is accountable for the production of electricity, the way they view renewable energy and use it for the general production of electricity highly influences the success of renewable energy projects.

The Saudi Industrial Development Fund (SIDF) and the National Industrial Clusters Development Program (NICDP) both contribute to developing the industrial sector in the Kingdom of Saudi Arabia. One of the clear goals of both institutions is to invest in projects that help further develop the Saudi Arabian state, something that renewable energy projects are a part of[85].

All the above mentioned organizations thus play a role in the implementation of renewable energy projects and all of them are somehow related to the government of the Kingdom of Saudi Arabia. In the following chapter I will further elaborate on the role these organizations play in the actual execution of renewable energy projects and how these projects fit in the rentier state.

[83] "About: Royal Order," KACARE website, https://www.kacare.gov.sa/en/about/Pages/royalorder.aspx.
[84] "Mission," ECRA website, http://www.ecra.gov.sa/en-us/AboutECRA/pages/Mission.aspx.
[85] SIDF and NICDP websites.
"About us," SIDF website, https://www.sidf.gov.sa/en/AboutSIDF/Pages/AboutUs.aspx.
"About," NICDP website, https://www.ic.gov.sa/en/about/.

4. Renewable energy and the rentier state of the Kingdom of Saudi Arabia

In the previous chapter, I evaluated the renewable energy projects in the Kingdom of Saudi Arabia and how they are built up. I also presented how these projects were run and who were the main actors in these projects. In this chapter I will describe how these projects fit in the rentier state, where certain difficulties may be found and what solutions could be formed in order to make them fit in the rentier state regardless.

The projects and the rentier state

As mentioned in the chapter evaluating the rentier state theory, some scholars agree on the fact that the rentier state itself is not sufficient to fully explain a state system. In the Kingdom of Saudi Arabia the governmental usage of oil incomes throughout the decades created a state form that made society dependent on oil revenues. During the years since the oil was discovered in the Kingdom of Saudi Arabia, the profit was distributed among every layer of society and created a clientelist deal, where society accepted the reign in exchange for material distribution.[86] This form of stage-managing created a huge bureaucracy and a state that is not fully autonomous from its inhabitants. Besides this, there are multiple levels in the Saudi state system that make implementation of renewable energy policies difficult.

According to Hertog, there are three major levels in the Kingdom of Saudi Arabia that affect the decision-making process, namely the macro- meso- and micro-level.[87] The macro-level controls the system, formed by royal family members, and make important decisions that are then handed over to the meso-level. This meso-level is built up by the bureaucracy; politicians. This level communicates upwards, something that slows the decision-making process down, considering the macro-level is outnumbered by the large bureaucratic system below.[88] Together with the micro-level, the meso-level mainly determines the outcome of policies.[89] The micro-level consists mainly by independent actors and is thus harder to control from above, even though this sector as well communicates mostly with the above level, rather than among the same level. Self-interest in the micro-level can influence their decision-

[86] Katrine Wiulsrød Ratikainen, "Transitioning to renewable energy in Saudi Arabia: A multi-level perspective analysis of the Saudi renewable energy policies," 29.
[87] Hertog, Steffen, *Princes, Brokers, and Bureaucrats : Oil and the State in Saudi Arabia*, (Cornell University Press, 2010), 248 – 249.
[88] Katrine Wiulsrød Ratikainen, "Transitioning to renewable energy in Saudi Arabia: A multi-level perspective analysis of the Saudi renewable energy policies," 30.
[89] Hertog, Steffen, *Princes, Brokers, and Bureaucrats : Oil and the State in Saudi Arabia*, (Cornell University Press, 2010), 11.

making process and thus influence the implementation of policies set-up by the higher levels and even form an obstruction. [90]

Because of the way the Saudi State structure is shaped, widely implementing certain policies can be proved to be difficult. Since the implementation of renewable energy affects multiple sectors, this is subsequently a difficult process. In order to develop renewable energy projects, not only the energy sector, but also the educational, labor, and economic sectors have to play a role.[91] Whether a project succeeds, is thus dependent on different factors and on the willingness of different actors in the progress. Some actors might be influenced by rent-seeking individuals that are not willing or able to do what is necessary in order to implement the renewable energy policies[92], but the enormous bureaucracy system created by the rentier state is also proving to be a factor that slows the implementation down.

Hertog is not the only scholar arguing that the high level of bureaucracy has a negative effect on the execution of renewable energy projects in the Kingdom of Saudi Arabia. Al-Ajlan and others made the same point. They did not, however, specifically look into the implementation of renewable energy projects in the Kingdom of Saudi Arabia. The focus of this specific research was on the way energy efficiency was and is managed in the state. They conclude that among others, the way the Saudi Arabian state is built up slows down "the implementation of sustainable energy conservation policies and regulations."[93] Besides this, they also argue that the market leaves no option for privatization and that this will lead to very high expenses.[94] Where their conclusion focusses on the fact that they believe that the conservation of energy is more important that the investing in new power plants, they do reach the same conclusion on the role of the state, namely that 1) the state has to be the main investor due to the lack of private actors and 2) the current way that the Saudi Arabian state is built up, slows down the decision-making process due to multiple actors.

In the previous chapter, I mentioned some of the actors involved in the implementation of renewable energy projects and how they were managed. The thing that thus came forward following the previous chapter, is that there are many different institutions involved in the managing or creating of renewable energy projects. It also became clear that many of the

[90] Katrine Wiulsrød Ratikainen, "Transitioning to renewable energy in Saudi Arabia: A multi-level perspective analysis of the Saudi renewable energy policies," 31.
[91] Ibid., 32.
[92] Ibid., 33.
[93] S. A. Al-Ajlan, A. M. Al-Ibrahim, M. Abdulkhaleq and F. Alghamdi, "Developing sustainable energy policies for electrical energy conservation in Saudi Arabia," 1565.
[94] Ibid., 1562.

projects are not actually executed or still in the early stages of development. Something that causes this lack of actually executed renewable energy projects, is in fact this variety of actors. In combination with the large bureaucratic system it is difficult to make decisions, since there is not one specific authority in charge of the decision-making process.[95]

A way to overcome this hurdle, is by, as already came forward, stimulating the private sector. This is something that has been part of Saudi Arabian government plans for a long time and also seems to be a good solution in order to help further develop the renewable energy sector. Specific research in the Saudi Arabian case has yet to take place, but research to another Middle Eastern rentier state has taken place, namely research in Iran. The scholars reached the conclusion that government expenditure was still important, but more in the specific way that the government makes investments in order to incentivise the private sector.[96] Some measures that the Iranian government took into consideration are:

1. "Performing holistic geological and geographical researches about the potential areas of exploitation and then providing an atlas for these locations […]
2. Eliminating the governmental subsidies for the electricity consumption and energy from fossil fuels in order to offer real prices from the beginning of 2011.
3. Loans and financial incentives for the investment on renewable energy production, provided by the Energy Ministry and the Environment Protection Organization.
4. Guaranteed purchase of electricity harvested form RES by the Energy Ministry from the private sector in long-term contracts, according to the Governmental Financial Regulations Act. 62.
5. Providing the required possibilities of renewable energy business and free energy market in Iran.
6. Permitting the private sector to export their extra sustainable electrical energy to the neighbor countries.
7. Incentives arising from pollution and greenhouse gases control policies […].
8. Exemption of the rent of lands used by the private sector to build power plants to produce renewable energy […].

[95] Katrine Wiulsrød Ratikainen, "Transitioning to renewable energy in Saudi Arabia: A multi-level perspective analysis of the Saudi renewable energy policies," 34.
[96] A. Alireza, N. Marja and Z. Bahnam, "The prime criteria for private sector participation in renewable energy investment in the Middle East (case study: Iran)," *Renewable and Sustainable Energy Reviews* 16 (2012): 1984.

9. Required technological supports and tax waivers for importing the relevant equipment and technology […].”[97]

At least some of the above mentioned measures could also apply to the Saudi Arabian case and thus maybe resolve the bureaucratic issue by moving the renewable energy projects to a new, private sector. In fact, one of the options was already suggested in 2001 by Alawaji, in order to promote the solar energy sector in the Kingdom of Saudi Arabia, Alawaji suggested that the availability of governmental subsidies for electricity generation via oil should be reduced. He even stated that when this would not be done, possible solar energy projects would require incentive programs.[98]

The renewable energy projects in the Kingdom of Saudi Arabia are also a thoughtful decision of the state to be able to use the techniques they are developing for their own use, for the wider market in the future. If the Kingdom of Saudi Arabia was to find a new technique or a breakthrough on the field of solar energy, considering the enormous amount of potential the state has for this particular type of renewable energy, they would have the knowledge of the technique and the people that are trained in the field. They would thus own all the then available knowledge and can use this to distribute to the wider region and international market.[99]

Like previously mentioned, there are many institutions involved in the renewable energy projects. The above made point, that renewable energy is seen as a new export product by the Saudi Arabian state, is further confirmed by for example SEC, who have the following text posted on their public website:

> “We power the Kingdom that energizes the world :
>
> - Saudi Arabia is a beacon of stability and prosperity in the region.
> - Our holy mosques inspire the Islamic world.
> - The Kingdom supplies the world with oil … and soon with power.” [100]

[97] A. Alireza, N. Marja and Z. Bahnam, “The prime criteria for private sector participation in renewable energy investment in the Middle East (case study: Iran),” 1984.
[98] H. A. Saleh, “Life after oil: Solar energy research and applications in Saudi Arabia,” *Refocus* 2 (2001): 17.
[99] S. H. A. Alawaji, “Renewable energy research and development activities in Saudi Arabia,” presented at The World Renewable Energy Congress VI, 1 – 7 July 2000.
Iskander Tlili, “Renewable energy in Saudi Arabia: current status and future potentials,” 873.
[100] “Our Vision and Mission and Values,” SEC website, https://www.se.com.sa/en-us/Pages/OurVisionAndMissionAndValues.aspx.

Following this sum-up, especially from the last sentence, one can conclude that the government of the Kingdom of Saudi Arabia must see renewable energy as their new export product. Right now, as mentioned before, the export product sustaining the current rentier state structure is oil. In the future, energy could thus be seen as its replacement. The renewable energy projects would thus fit in the rentier state since they simply produce the new form of rent, namely 'electric power'.

As previously discussed in chapter three, the Saudi Arabian state has an ever-increasing demand for electricity. This means that the production of electric power must keep up with the growing demand. The Saudi Arabian government used oil in order to fulfil this demand but also looks at renewable energy as a possible solution. This is thus also one of the ways that renewable energy is made to fit in the rentier state: by fulfilling the domestic quest for energy, gained from renewable energy projects, more oil would remain for the export product and thus the rentier state as we know it today will be able to continue longer.

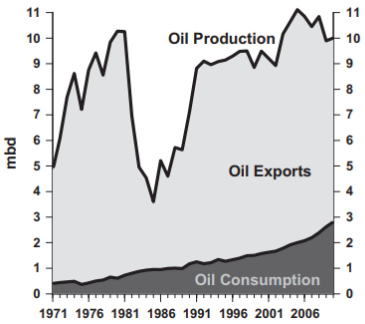

Figure 4: D. Gately, N. Al-Yousef and H. M. H. Al-Sheikh, "The rapid growth of domestic oil consumption in Saudi Arabia and the opportunity cost of oil exports foregone," Energy Policy (2012): 58.

A scholar that offered a plan to fit renewable energy projects in the Kingdom of Saudi Arabia, is Alawaji. He did this early on, in 2001, for solar energy and he comes up with three 'steps' by which solar energy can be further developed in the Kingdom of Saudi Arabia:

> "(i) Promote interaction between research centres and local industries for mass production of experimentally and seasonally tested solar-energy technologies and devices.
> (ii) A major expansion of R&D efforts, field testing, and demonstration of solar-energy projects with the purpose of increasing the awareness about utilization of renewable energy.
> (iii) Promotion of solar energy education and training programs and the creation of a local credit system, and other facilities that enable the general public to access, own and operate solar-energy technologies." [101]

[101] Saleh H. Alawaji, "Life after oil: Solar energy research and applications in Saudi Arabia." *Refocus* 2 (2001): 18

Although not many projects have actually been realized and still many plans are being written and finalized, the above provided steps could be helpful when one wants to fit renewable energy projects in the rentier state. What can be concluded from my findings, is that the rentier state does not suffer from a direct threat by renewable energy projects. They rather sometimes offer solutions that can help the Saudi Arabian government maintain the rentier character even longer. What does seems to be an issue is the actual implementation of renewable energy projects. Where there has been a lot of research throughout the years considering the possibilities of renewable energy in the Kingdom of Saudi Arabia, the current state form does not allow the plans to actually be executed in most cases. So, as discussed above, the diversification and even privatization within the current rentier state is essential for the renewable energy projects to be able to exist.

5. The effects of the developments in the Kingdom of Saudi Arabia on the future and the international market

In this chapter I will evaluate the future plans and developments in Saudi Arabia. I will also evaluate the effects that the internal developments in Saudi Arabia have on its neighbouring countries, the whole region and the international market. Finally, I will also review some of the opinions that regional experts have on the topic.

5.1 The future plans

What became very clear from the last two chapters, is that the many plans concerning renewable energy projects are rarely fully executed and the influence the government practices in these projects. So, what is really topical concerning the development of these renewable energy projects, is the future plans that exist and how they are planned to be executed and managed. I will not try to predict the outcome of these plans or the future in general, I will rather analyse the way these new projects are set up and thus if there is anything managed significantly different than with the previous projects.

When one looks at official government reports, it becomes clear what some of the motives are behind new plans and how the state intends these renewable energy projects to be implemented. In a report on the state of the environment, written by the General Authority for Meteorology and Environmental Protection (GAMEP) in 2017, new renewable energy projects are also included. This government authority has many responsibilities and one of them is the provision of information for renewable energy production.[102] Since GAMEP is an official authority, the focus lies on reporting the current state of the environment, including the aspect of renewable energy, and representing the developments that are good for the state itself. It becomes very clear that renewable energy projects are not intended to only serve the environment, but also the state itself. The projects are set out to have a positive effect on the private sector, diversify the economy and "rationalizing the use of resources"[103]. Above this, the earlier proven point, that the ever-increasing demand for electricity causes the demand for energy to rise and thus the need for fossil fuels, is confirmed once more. The fact that the state tries to narrow down the use of fossil fuels for its own domestic energy demand by creating

[102] The General Authority for Meteorology and Environmental Protection (GAMEP), "The State of the Environment (2017) Responsibilities and achievements," for the Kingdom of Saudi Arabia, 2017.
[103] Ibid., chapter 1.

renewable energy projects is stated in this report and thus not only a goal that played a part in earlier projects, but still an important motive for future plans.[104] As the report literally states:

> "King Abdullah City for Atomic and Renewable Energy has several initiatives aiming to enable renewable energy contribution to the national energy mix, […] while prolonging the life span of oil and gas resources and sustaining the Kingdom's position as a major source of oil and renewable energy in the future."[105]

The report concludes that, considering renewable energy, a lot of effort still has to be made in order to be able to widely implement renewable energy projects. They state that the private sector shapes a large part of the pollution in the Kingdom of Saudi Arabia but that they do not take a big part in the development of renewable energy projects. The report focusses on solar energy and states that considering the availability of solar power throughout the year, the promotion of this type of energy should increase significantly. They stress that the rise in production and application of solar panels could majorly lessen the burden on the state budget.[106]

In the end of this report, a specific plan for the future is being discussed, namely Vision 2030. This Vision 2030 is a large set of plans that are managed by the Saudi Arabian state. The state presents the plans as encompassing a progressive view and is widely accessible for its own citizens and the rest of the world. Vision 2030 does not only aim on renewable energy projects, but also on other aspects of the Saudi Arabian state. For example, importance of the diversification of the economy, as has been a goal for the Saudi Arabian state for longer, is also stressed.

The Vision 2030 contains a plan for a new renewable energy project, called the King Salman Renewable Energy Initiative.[107] The fact that the Kingdom of Saudi Arabia has a large potential for solar power and wind energy is also recognized by Vision 2030. The plans argue that the potential should be used more and be more developed than now in order to use its advantage at best. The prospect that the need for power is only going to increase more is once again confirmed and the plans put forward that the local market currently lacks a competitive renewable energy sector. Vision 2030, with the execution of the King Salman Renewable

[104] The General Authority for Meteorology and Environmental Protection (GAMEP), "The State of the Environment (2017) Responsibilities and achievements," chapter 2.
[105] Ibid., chapter 2.
[106] Ibid., 7.
[107] Vision 2030, report for the Kingdom of Saudi Arabia, 49.

Energy Initiative, aims to boost this sector and help it develop, not only in the actual realization of renewable energy projects, but also for example help improving the research part of the sector. The initiative focusses on the existing framework and review it in order to help adjust the current sector so that the private sector has more possibilities of getting involved by for example investing in certain projects. They state that they will encourage public-private partnerships and will take all the necessary measurements in order to make sure a competitive renewable energy sector comes into existence.[108]

Like stated before, the current energy market is dominated by the state. Something that is emphasized on in Vision 2030, is the importance of opening up this sector for other parties. The possibility of investments, as mentioned above is not just for the Saudi Arabian sector, but also specifically looks at foreign investors. There are plans that are already have caught the interest of foreign investors and with Vision 2030, the possibility of opening up the sector for these actors becomes a real option. For example, the Japan's Softbank and Saudi Arabia's Public Investment Fund have a joint project that focusses specifically on solar power. This project aims to produce 200GW of solar power and create 100.000 jobs. An investment of 200 billion dollars makes this the largest project in the world. The project should be finished by 2030 and not only produce electric power but also reduce the cost of generating this power.[109]

So, for the future vision of renewable energy projects in the Kingdom of Saudi Arabia, it seems that the initial interest in renewable energy has not diminished. The earlier executed research has not gone unnoticed and the high potential of certain types of renewable energy in specific areas is still taken into consideration. Of course, as came forward in my earlier analytical chapters, many detailed plans were set up and never implemented. Opening up the market, something that earlier was not included in the actual renewable energy plans itself but in fact needed to be done in order to make these projects succeed, is now actually included in for example Vision 2030.

5.2 The Kingdom of Saudi Arabia and the wider region

The renewable energy 'trend' is not just occurring in the Kingdom of Saudi Arabia, the wider GCC region also develops itself in the field. These countries also hold great potential for certain types of renewable energy, such as wind energy and solar power. The GCC region is

[108] Vision 2030, report for the Kingdom of Saudi Arabia, 49.
[109] Dania Saadi, "Saudi leads renewable energy with 7bn in new tenders," *The National*, June 23, 2018, https://www.thenational.ae/business/energy/saudi-leads-renewable-energy-developments-with-7bn-in-new-tenders-1.743124.

characterized by states that have large amounts of natural resources, especially fossil fuels. The motives in the region have been categorized by Munawwar and Ghedira, in their research on renewable energy development in the wider region:

Energy

- Finite resources and limited access to cheaper hydrocarbons- increased and expensive NG import
- Freely available abundant sun and wind
- Better management of the demand-supply gap by compensating for indigenous shortage of oil or gas or both
- Channelize and prioritize investment in energy- and water- efficient measures, including development of viable clean energy technology
- Align the energy infrastructure for a foreseeable future without oil and gas
- Become potential RE exporters with breakthrough technological advancement

Economy

- Limit domestic fuel consumption to recover revenues through increasing the share in export
- Divert the local demand away from highly subsidized hydrocarbon resources to extend their life and secure a more sustainable source of income for a longer period of time
- Economic diversification to lighten the burden on ageing power infrastructure
- Provide parallel energy support network to population boom and rapid urbanization characterizing most GCC nations
- Promote capacity development for a knowledge-based economy
- Through demonstrated sustainability win local popularity and international recognition

Environment

- Keep a check on carbon emissions and participation in global carbon credits program
- Facilitate climate change mitigation
- Live up to the globally felt urge for transition from carbon-based economy to sustainable economy"[110]

As can be concluded from the above list, the motives that came forward in the previous chapters, also adds up for the wider region. Where the Kingdom of Saudi Arabia clearly also

[110] Saima Munawwar and Hosni Ghedira, "A review of renewable energy and solar industry growth in the GCC region," *Energy Procedia* 57 (2014): 3194 – 3195.

invests in renewable energy projects in order to preserve the fossil fuels for their export so that the rentier state can be kept in existence longer, the wider region shares this motive; by making sure renewable energy supplies a large part of the domestic energy demand, more fossil fuels can be exported. Not only the motives seem to be shared by the wider region, also big plans for the near future seem to be common in the GCC region. Where the Kingdom of Saudi Arabia has its Vision 2030, Qatar aims to produce 2% of the total production of energy with solar power by 2020.[111] Projects as large, ambitious and expensive as the Kingdom of Saudi Arabia's Vision 2030, however, are not common. Like stated before, some projects that are being discussed in the Kingdom of Saudi Arabia are of the largest in the world.

So, the Kingdom of Saudi Arabia is not alone in its will to develop and set up renewable energy projects, they do however, are responsible for the first significant developments in the field of renewable energy in the GCC region. With the early development of renewable energy projects in the 1960s, they did set a trend and it seems that new projects that start in the GCC region, slowly spread throughout the states.[112] A specific type of solar power usage, namely for the desalination process, is something that the Kingdom of Saudi Arabia is at the forefront of. Considering the fact that they have the largest desalination industry in the region, they are the furthest in the development of the technology needed to use renewable energy for this process.[113] Since the wider GCC region also has great demand for water, the developments in the Kingdom of Saudi Arabia do influence the wider region.

The Kingdom of Saudi Arabia also makes sure to hold a prominent position in the region's renewable energy projects by developing materials and techniques that are needed to develop these projects. Like discussed before, education in the field of renewable energy receives a lot of attention and is prioritized. Besides this, in Jubail, the Kingdom of Saudi Arabia, a plant was planned to be built to produce components of solar energy panels. The large production of these components significantly influences the position of the Kingdom of Saudi Arabia in the GCC region, since the other states also have the great solar power potential that they will only be able to explore by building solar power installations.[114]

What comes forward when looking at other projects in the wider GCC region, is that many projects are widely examined but were never really executed. Just as in the case with the

[111] Saima Munawwar and Hosni Ghedira, "A review of renewable energy and solar industry growth in the GCC region," 3195.
[112] Ibid.
[113] Ibid., 3197.
[114] Ibid., 3198.

Kingdom of Saudi Arabia, a lot of studies have been performed in order to determine what region is most suitable for specific types of renewable energy and the feasibility of specific projects. There are several reasons put forward by researchers in the field that might cause this outcome. The first one is widely discussed in my research specifically focussing on the Kingdom of Saudi Arabia, namely that the rentier state based countries highly subsidize other forms of natural resources. This causes the relatively expensive renewable energy forms to not be able to compete in the energy sector.[115] Another point that not just adds up for the Kingdom of Saudi Arabia, is the lacking regulatory network. A lot of projects are widely discussed and plans are made, but in order for these projects to actually be successful or even executed, a good system is needed. As Munawwar and Ghedira state, maybe a governing body that functions region wide is necessary so that consensus can be reached and projects can be implemented throughout the region.[116] When the regulatory system is updated it will also be easier to attract investors. The Kingdom of Saudi Arabia used to fund projects directly and indirectly via the state, but now also focusses on attracting foreign investors. Finally, the amount of trained staff in the region is not sufficient for the ambitious plans and environmental conditions make the realization of the plans harder.[117] There should be more technically educated staff in order to be able to implement the renewable energy projects and also keep them in existence, but something that might be of even higher importance are the environmental conditions. The GCC region is characterized by extreme weather conditions and if the execution of renewable energy projects does not take this into consideration while implementing the projects, this could cause serious difficulties.

5.3 Expert vision on the matter

As stated earlier, I think it is really important to also evaluate the opinions and future visions of the experts in the region. In order to do so, I asked several experts on the region on their opinion. These experts are not necessarily environmental experts, but also for example regional entrepreneurs and scholars from other fields. Unfortunately, the interviews I initially intended to perform with experts in the field were not as successful as I hoped. I wrote to a lot of different persons but almost none of them responded in time to be able to have an in-depth interview. That is why I will not only focus on them, but in addition also analyse some of the

[115] Saima Munawwar and Hosni Ghedira, "A review of renewable energy and solar industry growth in the GCC region," 3199.
[116] Ibid., 3200.
[117] Ibid.

expert visions brought forward by divers media outlets and scholars that express their vision in their research.

A Dutch government official was also part of the group I contacted, he states that he does not expect renewable energy to replace oil in the rentier state of the Kingdom of Saudi Arabia. Rather, he expects it to be a start of a more diversified Saudi Arabian economy and states that renewable energy projects, together with other social economical changes, could lead to a significant change in the way the Kingdom of Saudi Arabian is built up. He does not, however, foresee the rentier state to seize to exist, but that by certain reforms already taking place today, it will be able to sustain in the future.

When analysing the media reports on renewable energy projects, some experts state that they expect the future plans of the Kingdom of Saudi Arabia to be successful. Rabia Ferroukhi, head of the International Renewable Energy Agency, even states that the "regulatory environment is well established now to conduct auctions and attract investors."[118] This contradicts the Vision 2030 opinion, since they aim on adjusting the regulatory system just so they can attract the private sector in order to invest in the renewable energy sector. Something that confirms the vision of Ferroukhi, however, is the simple fact that foreign investors are already making investments and setting up projects that are not executed yet, but have great potential to be realized.[119] This would mean that the current rentier state is already compatible with the renewable energy developments and that renewable energy projects would not affect the rentier state in a negative sense on the field of regulatory measurements. Another expert, Paddy Padmanathan, who is chief executive of ACWA Power, even states that, even though the renewable energy market in the Kingdom of Saudi Arabia is small, he foresees a large increase in the development of renewable energy projects. In order for this increase, he does not argue that the rentier state itself should change, rather that the energy authorities should become comfortable with the renewable energy projects.[120]

Not every opinion spread in the media agrees with these positive expectations, that the rentier state does not need to change in order to have the renewable energy projects being implemented. Marcel van der Steen and Paul Aarts, for example, argue that renewable energy

[118] Dania Saadi, "Saudi leads renewable energy with 7bn in new tenders," *The National*, June 23, 2018, https://www.thenational.ae/business/energy/saudi-leads-renewable-energy-developments-with-7bn-in-new-tenders-1.743124.
[119] Ibid.
[120] Stanley Reed, 'From Oil to Solar: Saudi Arabia Plots a Shift to Renewables," *New York Times*, February 2, 2018, https://www.nytimes.com/2018/02/05/business/energy-environment/saudi-arabia-solar-renewables.html.

is an unescapable phenomenon for the Kingdom of Saudi Arabia and that reforms have to be made in order to make the renewable energy projects work. They argue that the days where rentierism flourished will be over and Aarts tops this with the claim that the economy of the Kingdom of Saudi Arabia should be completely restructured.[121] Charles Kestenbaum and James Durso argue that the renewable energy plans are a change, but they are intended to keep things the way they are: "If we want things to stay the way they are, things will have to change".[122] They state that the Kingdom of Saudi Arabia only sets up these plans in order to make sure that the rentier state exists in its current setup as long as possible. This does mean that even they do not think that renewable energy projects threaten the rentier state, but rather that the Kingdom of Saudi Arabia will shape the renewable energy projects in such a way that the rentier state will not suffer from any negative consequences. Thomas Lippman even argues that plans like Vision 2030 mean the end of the rentier state as we have known as the Saudi Arabian people "are being asked to do more for themselves while the government does less, regardless of the price of oil."[123] He further elaborates on his expectations that the plans of Vision 2030 will never be fully executed and cites others who argue the same. The fact that there were many earlier plans that were never implemented, among others, leads him to this conclusion.

Besides experts that come forward in the media, scholars also express certain expectations in their work that show their view on the influence of renewable energy on the rentier state. Hertog, for example, states that the fragmentation of the Kingdom of Saudi Arabia causes the state not to be able to reform.[124] This would mean that unless the whole structure of the state would change, the reforms will simply not be able to be implemented in the state. Others, such as Munawwar and Ghedira, come forward with an analysis of the previous developments and set out the points where improvement is needed. They do not fully deem it to be impossible for the rentier state to develop renewable energy projects, they do, however, link some key aspects of the rentier state system to the difficulties of implementing renewable energy projects. One of these is the fact that the subsidising of fossil fuels should be

[121] Sheily Belhaj, "Saudi-Arabië van conservatieve moslimmacht naar wereldse Golfstaat: wat zit erachter?" *NOS,* October 30, 2017, https://nos.nl/artikel/2200546-saudi-arabie-van-conservatieve-moslimmacht-naar-wereldse-golfstaat-wat-zit-erachter.html.
[122] Charles Kestenbaum and James Durso, "Is the $4 Trillion Saudi Reform Plan Inspired By China?" January 29, 2017. https://oilprice.com/Energy/Energy-General/Is-The-4-Trillion-Saudi-Reform-Plan-Inspired-By-China.html.
[123] Thomas Lippman, "Saudi Arabia's Glass: Half Empty Or Half Full?" *Lobe Log,* December 5, 2018, https://lobelog.com/saudi-arabias-glass-half-empty-or-half-full/.
[124] Steffen Hertog, *Princes, Brokers, and Bureaucrats : Oil and the State in Saudi Arabia* (Cornell University Press, 2010), 4.

shortened.[125] Considering the fact that the rentier state uses subsidies and the export of these fossil fuels as measurement to sustain the state, it becomes evident that the rentier state as we have known should, according to them, be at least slightly adjusted in order to make renewable energy projects successful.

[125] Saima Munawwar and Hosni Ghedira, "A review of renewable energy and solar industry growth in the GCC region," 3200.

Conclusion

The question I posed in the introduction was: what are the effects that renewable energy projects have on the Saudi Arabian rentier state and how does the rentier state handle these effects? Throughout this study, I reviewed different aspects in order to provide an answer to this question. I started with a brief description of the origin of the Saudi Arabian state and how the rentier state of the Kingdom of Saudi Arabia is built up. The importance of government spending became very clear and the bureaucratic system inherent to the rentier based state was discussed.

Following this part, in chapter three, I made an overview of all the renewable energy projects in the Kingdom of Saudi Arabia. The history of renewable energy in the Kingdom of Saudi Arabia dates back to the late second half of the 20th century. During the years, new techniques were discovered and further developed. On Saudi Arabian soil, lots of studies took place in order to assess the feasibility of certain type of renewable energy projects in the Kingdom of Saudi Arabia. This eventually led to multiple advisory research results that, when looking at the amount of actual projects that were founded, were not followed up. There are, however, concrete plans for the near future and, especially in the case of nuclear energy, foreign investors that already signed certain agreements with the Saudi Arabian government.

The last part of chapter three looked into the parties involved in the renewable energy developments in the Kingdom of Saudi Arabia. There are many different parties, such as universities but also an electricity company, that influence the renewable energy projects. A general conclusion that can be drawn following this assessment, is that all parties are somehow involved with the Saudi Arabian state. Some are simply governmental bodies, others are founded or subsidised by the government and thus indirectly dependent on the state. It thus can be concluded that, just as with the fossil fuel sector in the Kingdom of Saudi Arabia, the renewable energy projects are also all, directly or indirectly, part of the Saudi Arabian state.

The next chapter described how these renewable energy projects fit in the rentier state of the Kingdom of Saudi Arabia. It turns out that the Saudi Arabian state form is based on many different, hierarchical levels that do not communicate horizontally but vertically. This causes a lot of problems considering the huge bureaucratic system that comes with it. When a renewable energy project is waiting to be approved for implementation, this can take a really long time or even not happen at all due to the immense slowdown by multiple actors. These

are not just actors within the official government itself, but also the institutions mentioned in the previous chapter, since they are usually also included and this can even slow the process down more.

One of the returning solution offered by multiple scholars, is the private sector. This sector could function aside the government system and thus function (more) independently. This solution also holds my preference and the privatization (diversification) of the economy, is something the Saudi Arabian government, as mentioned earlier, focusses on as well. As was concluded by the findings from this chapter, the rentier state of the Kingdom of Saudi Arabia does not suffer a direct threat from the renewable energy projects, they are either fit in the current state or even help preserve the rentier state even longer, resulting from the intended usage of renewable energy to fulfil the domestic demand.

The final chapter looked into the future plans of the Saudi Arabian government, the possible regional effects these developments may have and the vision of a few experts on the whole case. The Saudi Arabian state has, in line with earlier projects, set out to develop ambitious plans in the future. These plans are yet again presented by the state itself. Vision 2030 does, however, put emphasis on the importance of opening up the sector for private actors and suggests that the state should take actions in order to make sure the renewable energy sector will be able to compete with the fossil fuel won energy. Foreign investors are also recognized as being of importance for the success of renewable energy projects. There are already several projects that attract large foreign investors but what comes forward is that this is a trend that will be continued and stimulated.

The wider GCC region shows, on a larger scale, the same developments as in the Kingdom of Saudi Arabia. In some fields, the Kingdom of Saudi Arabia still is a leading actor in the region. What came forward was that some of the issues that the Kingdom of Saudi Arabia encountered with the implementation of renewable energy projects, also occurred in other states in the region. This caused, just as in the Kingdom of Saudi Arabia, many plans that were evaluated and analysed in-depth, not to be implemented. A suggestion, in order to increase the chance for the great plans in the future to be successful, is to make sure that the previously encountered issues should be taken into consideration while setting up the plans and executing them. It seems as though the Saudi Arabian state already actively executes this measurement, since Vision 2030 is not just a renewable energy project, but also encompasses certain analysations of earlier encountered problems.

Finally, I analysed expert visions on the influence and implementation of renewable energy projects in the rentier state of the Kingdom of Saudi Arabia. What can be concluded, is that different visions exist and come from different fields. Some concluded that simply because of the structure of the rentier state, it would not be able to implement renewable energy projects and maintain the state the way it is structured today. But the more pervasive view, is that renewable energy projects can go side by side with the rentier state. Of course changes need to be made in certain fields, like my earlier research proved, but these changes are feasible and mostly already included in some of the future plans.

What can be concluded from all of the above, is that there definitely are some effects that the renewable energy projects have on the rentier state of the Kingdom of Saudi Arabia. One clear example of such an effect, is the inherent diversification of the economy, labour market, and other parts of society that subsequently follows the implementation of these projects. Unfortunately, due to the previously described minimal amount of actually executed plans, these effects are not yet clearly visible. What does become clear from the analysis in the third chapter, is that the renewable energy projects seem to be the 'new oil'; they are managed in a similar way the government also manages fossil fuels. If the renewable energy sources could eventually replace the oil in the rentier state theory, is something that can be speculated about, but is not yet researchable. It would seem that renewable energy as means of export would not be as profitable as for example oil, due to the availability. The Kingdom of Saudi Arabia does of course, following the research presented in the third chapter, have a big potential for certain kinds of renewable energy, such as solar energy, that most countries do not have. Whether this advantage is as profitable as their fossil fuels, is something that needs further investigation, especially taking into account the inheritable diversification of the Saudi Arabian economy.

Another conclusion that can be drawn from this study, is that the motive behind the implementation of renewable energy projects in the Kingdom of Saudi Arabia is definitely not merely because of the enhancement of the environment. What can be clearly concluded following the last chapter, is that even the Saudi Arabian government comes forward with another motive to implement these renewable energy projects, namely to fulfil the ever-increasing domestic demand for energy so that the fossil fuel saved by these projects can be exported. This is done in order to retain the current rentier state as long as possible. Something that further confirms this remark, are the findings mentioned in chapter three, such as the fact that the Saudi Arabian government at first did not participate in renewable energy

projects. This was the case because they did not believe that human actions caused the decline of the environment and only started looking into the development of renewable energy projects when they saw the opportunity to use this energy to absorb the domestic demand for electric power.

In order to answer the question posed in the title of my thesis, it does not seem to be the case that merely the implementation of renewable energy projects means the end of the rentier state. In some aspects, there are some possible negative effects imaginable, but due to the slow course of action, the end of the rentier state will not be immediately caused by this. Following the above concluding remarks, certain reforms will take place and the rentier state theory as set up at the beginning might not be fully applicable, but this is something only future research may show.

Finally, this study focusses on the rentier state theory and thus the effects the renewable energy projects have on the rentier state of the Kingdom of Saudi Arabia. As previously mentioned in this thesis, some scholars hold the opinion that the rentier state itself is not sufficient to explain the full state form. It might thus be, that when one takes another state theory into consideration and views the effects from that position, one could come to other conclusions than this research.

What can be taken from this specific research, is how renewable energy projects in the Kingdom of Saudi Arabia are managed and how they fit into the rentier state. If one would perform further research, by for example also taking other state theories into account, a more encompassing result may be reached. Something that is interesting to further explore, is the overall tendency of development in Saudi Arabia and the effects all the reforms have on the state. A huge problem is, for example, youth unemployment. Next to renewable energy projects, a large group of unemployed youth could also pose a possible threat to the state structure and thus influence the survival of the rentier state. Considering the fact that this research is performed for a Master thesis, this was not within the possibilities of this study, but may perhaps be a good incentive for a PhD research project.

Another aspect that might lead to the possibility of generalized conclusions or at least a more detailed analysis of the effect of renewable energy projects on the rentier state, is fieldwork. Unfortunately, again due to the scale of this study, this was also not among my possibilities.

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Figure index