CHAPTER 4

The Rise of Renewables in the Gulf States: Is the ‘Rentier Effect’ Still Holding Back the Energy Transition?

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INTRODUCTION

Ten years ago, one might argue, the story of the rise of renewables in the Arab Gulf states could have gone in a rather different trajectory. Using their oil wealth and unrivaled land and solar resources, these states could have collectively chosen to make a dramatic pivot and become regional and world leaders in renewables deployment. After all, they began the twentieth century as global leaders in another energy resource, with similar investment models. Instead, under the constraints of the rentier state and perhaps in an effort to avoid actively participating in the climate emergency narrative, countries in the region are only now beginning to make inroads into the world of renewables, arguably ceding global energy leadership to countries with often fewer resources.1 States such as

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Germany, Japan, and China, as well as neighbors such as Jordan, made the early risky investments in renewables that helped drive down the cost curve, granting them a privileged position in this emerging global industry.

What explains the slow start? Where are the GCC states now in terms of renewables deployment? And for the countries that have begun making some progress, what explains the difference between them and the others? This will be the focus of this chapter.

A good place to begin understanding the outlook of some of these hydrocarbon-rich states is to look at their approaches to climate change mitigation efforts and renewables development as important tools in that battle. There is a growing literature—addressed in the next section—looking at the behavior of these states in climate change forums; with few exceptions the Gulf states played a historically obstructionist role. If shifting the power and transport sectors away from oil dependence and toward renewables became a solution, the thinking went, then states would be implicitly accepting the premise that oil was the problem. And if oil-rich states began down this road, it would signal the beginning of the end.

In recent years, further down along the cost curve, the economic case for renewables in the power sector has become too compelling to ignore. States in the region have embarked on ambitious renewables development plans, with the UAE taking the lead. In fact, a powerful argument could be made that states in the region were just waiting for a better bargain, and that the energy transformation is not a sprint, but a marathon.

Decreases in government revenues across the GCC states since the oil price decline in 2014 have also exerted stronger pressures for fiscal reforms, and a deeper understanding of the opportunity cost associated with consuming a barrel of oil locally that could otherwise be sold abroad at international market prices. The slashing of wasteful energy subsidies is now also high on the list of priorities. In addition to the obvious economic impetus to engage in price reforms, the low oil price environment has also provided a unique political opportunity to publicly justify the reduction of subsidies, allowing governments to deflect some blame, if and when prices do recover, on market forces now far beyond their reach. There is indeed an argument to be made that such reforms could never have been considered in a stronger fiscal environment. Several member states led by the UAE took advantage of these opportunities, and have lifted subsidies on power and fuel to varying degrees. This has opened
some market opportunities, allowing distributed solar energy, in particular, to reach grid parity in a number of tariff segments and markets between 2014 and 2019.

Taking a step back, this chapter will begin by conducting a review of the literature on the topic of renewables deployment in the region, and more specifically in resource-rich states. Though there has been much written journalistically about renewables in the region, more academic analysis of renewables in the rentier states of the Gulf is scarce, particularly through a comparative political lens.

Section “Literature Review” will give a historical overview of renewables deployment in the region over the past decade. This will mostly be a story of ambitious plans but a mixed record of follow through. A survey of current levels of utility-scale deployment will give important context to later discussions, along with an overview of future plans in each of the GCC states and an assessment of the credibility of these plans. The section will conclude with a similar survey of distributed renewable generation and policy across the GCC states.

Section “Renewables Development Over the Last Decade in the GCC” will then look closely at the Saudi case, both because of its size, and because it lies roughly in the middle of the 6 GCC states in terms of fiscal buffers. The early challenges facing utility-scale projects will be examined, as well as the viability of the solutions that have been put in place, and the obstacles that remain a hindrance to achieving the Kingdom’s stated goals in the future, including inter-institutional competition and historically weak private sector participation in the energy sector.

The period between 2016 and 2020 has seen the UAE make considerable tangible progress toward renewables targets both at the utility and distributed scales, setting it apart from the other states in the region. Section “What Is the Picture Like Today?” will seek to explain why, despite seemingly similar underlying political economic models, the UAE has been able to surge ahead; and what lessons this offers to the other GCC states.

**Literature Review**

A starting point of reference for this chapter is the well-established literature on the social contract in the rentier states of the Gulf. Beginning with the work of Beblawi and Luciani and looking particularly at the work of Steffen Hertog, the distributive and clientelistic nature of these states
was described, and it is on the basis of this understanding of the way these states function that this chapter seeks to make the case for why renewables deployment was delayed, and then pursued differently across the member states.

More specifically looking at climate policy in the GCC states, Depledge described in some depth the early obstructionist attitude adopted by these states in international forums. Later work by Luomi, Michaelowa and Luomi and Al-Sarihi studied the roots of this obstructionist approach, and the transition that took place in recent years toward a more cooperative one; Sim looked more specifically at the case of Abu Dhabi ‘greening’ its credentials and the start of a trend acknowledging the soft power potential of projecting an image of sustainability.

Looking directly at renewable energy policy in the GCC states, Doukas et al. were the first to study the issue in some depth in the mid-2000s, assessing the renewable resources region and the rationale for development. AlNaser et al. built on this understanding with an update on regional development, and Al-Maamari et al. continued by looking at the challenges facing adoption in the GCC states. Since 2014 El-Katiri has provided a detailed understanding of the renewable energy landscape in her publication with Husain, and more recently with colleagues in the 2019 IRENA Renewable Energy Market Analysis: The GCC Region. Yamada looked more closely at the emergence of the renewable energy agenda with the unveiling of a new wave of Saudi development plans in 2015.

Perhaps most directly related to the scope of this chapter, Alatay et al. looked at renewable energy policy variation across the GCC states, arguing that political leadership and policy transfer explained the early lead then established by the UAE; building on earlier work by Reiche which looked at early renewable energy policies in the GCC states and the opportunities and challenges facing deployment.

What appears to be missing in the literature is an analysis of the ‘rentier’ effect on renewables energy deployment in the GCC as they seemingly stand on the precipice of a large-scale energy transformation. Apart from the outlier of the UAE, there appears to now be a divergence between a number of states, offering more data points to understand the underlying causes.
Renewables Development Over the Last Decade in the GCC

Early Forays into the World of Renewables

With the exception of a number of small, remote installations developed by National Oil Companies (NOCs) and some of the region’s militaries, the earliest forays into renewables in the GCC states emerged from a host of newly established research and development institutions in the period between 2006 and 2013. Led by the ambitious plans of Masdar, the sustainable city built on the outskirts of Abu Dhabi, and two institutions established in the name of the late Saudi King Abdullah, the King Abdullah University of Science and Technology (KAUST) and the King Abdullah City for Atomic and Renewable Energy (KACARE), these institutions began conducting research on the viability and suitability of a wide range of renewables technologies to the region.\(^{15}\) Thereafter, several similar institutions began conducting research and testing in the other GCC states, notably the Kuwait Foundation for Arts and Sciences (KFAS).

The research conducted in these institutions represented the GCC states’ first forays into the world of renewables, but had little impact on the political economy conditions of the states in a way that would facilitate wider adoption. The story of KACARE, as an example, is indicative of the broader trend. Emerging from a Royal Decree in 2010, the institution was established as the focal point for renewable and atomic energy deployment in the Kingdom, announcing grandiose plans to deploy 41 GWp of solar and 16 GWp of wind before 2030.\(^{16}\) Confronted by stiff competition from other state institutions and an unclear mandate, the focus of the institution gradually turned to research and training, at least in the renewables arena. A similar picture emerged in the case of Masdar City in Abu Dhabi. A host of early companies, mostly outgrowths of local conglomerates, were established and shut down as early promises proved to be beyond their institutional reach.\(^{17}\) In Saudi Arabia in particular, this created a formidable credibility problem for state institutions, which they are still trying to overcome today. The political transition that followed the death of King Abdullah in 2015 ushered in a new period of planning and the creation of a host of new institutions, but also led to an opaque process of decay and relegation for older institutions. In particular, the Ministry of Energy’s Renewable Energy
Project Development Office (REPDO), and the PIF would come to play dominant roles in the renewable energy space. And in the nuclear energy space, the King Abdulaziz City for Science and Technology would play an increasingly important role. This phenomenon will be examined more closely in section “A Closer Look at Saudi Arabia”.

It is noteworthy that Oman’s early experiences with renewables came from a different set of institutions, as their oil and gas sector began deploying solar thermal technology—on a substantially larger scale that its neighbors—for enhanced oil recovery (EOR) as early as 2013. The 1021 MW Miraah project, developed by Petroleum Development Oman (PDO) and Glasspoint Solar in 2017, represented a different kind of early entry into the world of renewables, saving 5.6 trillion BTUs of natural gas per year to be used elsewhere in the industrial and power sectors.18

Unlike the other Gulf states, Oman took on some technology risk and chose to enter the world of renewables through a focused high value deployment, with a strong case for financial viability. Despite favorable conditions for renewables deployment in Oman, however, the Miraah project remained a rather unique case of early large-scale deployment, likely driven by the internal corporate incentives of the PDO and not broader political economy conditions in the country.

Nonetheless it would not be until the period of 2016–2019 before the GCC states, led by the UAE, began the process of integrating renewables goals into the highest level development strategies of the state, initiating legislation and endowing institutions with enough clout to create reusable platforms capable of facilitating large-scale renewables deployment.

**What Is the Picture Like Today?**

Painting a clear picture of the renewables landscape today is a key, if obvious, part of answering the questions outlined in the introduction. Table 4.1, using data compiled in a 2019 IRENA report on the region and complemented using an updated IRENA data set in 2020, details renewables deployment in the GCC states as of end 2019.19 For consistency, these figures will be used throughout the chapter to give an overview of scale and technology choices across the renewables landscape.

The period between 2014 and 2019, in which more than 75% of the current renewables capacity has been developed, has shown that states in the region have a strong technology preference for solar photovoltaic (PV) deployment, and predominantly at utility-scale. Qatar is a notable
Table 4.1  Renewable energy deployment for power generation in GCC states by end of 2019, in MW of installed capacity

|                    | Solar photovoltaic (PV) | Concentrated solar power (CSP) | Wind | Biomass and waste | Total renewable energy (RE) |
|--------------------|-------------------------|-------------------------------|------|------------------|-----------------------------|
| Bahrain            | 6                       | 0                             | 1    | 0                | 7                           |
| Kuwait             | 43                      | 50                            | 12   | 0                | 105                         |
| Oman               | 8                       | 0                             | 0    | 0                | 8                           |
| Qatar              | 5                       | 0                             | 0    | 38               | 43                          |
| Saudi Arabia       | 344                     | 50                            | 3    | 0                | 397                         |
| UAE                | 1783                    | 100                           | 1    | 1                | 1885                        |

exception, where most of the renewable energy capacity has been developed as part of a waste to energy plant at the Domestic Solid Waste Management Centre (DSWMC).

Going forward, it appears that states in the region will double down on this technology preference, with solar PV still representing more than three-quarters of short-term planned capacity additions. Countries with strong wind resources, however, notably Saudi Arabia and Oman, are also planning their first large-scale onshore wind deployments for 2020. Oman’s plans over the next two years are noteworthy, standing out from other states in the region with a strong focus on solar thermal technology. The latter represents more than 50% of planned capacity additions, though not technically in the power sector. As discussed in the previous section, Oman’s deployment of solar thermal for enhanced oil recovery (EOR) is a continuation of a trend that was set in motion as early as 2010, and was made more likely following investments made by the state in its technology partner, Glasspoint, in 2014.20 The maturity of some of the oil and gas fields in Oman has also undoubtably contributed to their early interest in solar technology for EOR, but this trend may spread to the rest of the region over the coming decade, as other heavy oil wells begin to enter maturity.

Table 4.2 uses data compiled from the 2019 IRENA GCC report and more recent data from various government sources to paint a picture of credible deployment plans in 2020–2021.21 The term credible is used here to refer to future power projects that are in the final planning stages, either the tendering process or currently under construction.
Table 4.2 Credible short- to medium-term plans, in MW, of planned capacity

|            | PV  | CSP | Wind | Biomass and waste | Total RE |
|------------|-----|-----|------|-------------------|----------|
| Bahrain    | 100 | 0   | 5    | 0                 | 105      |
| Kuwait     | 1500| 0   | 0    | 0                 | 1500     |
| Oman       | 600 | 0   | 200  | 0                 | 800      |
| Qatar      | 700 | 0   | 0    | 0                 | 700      |
| Saudi Arabia | 2670| 0   | 400  | 0                 | 3070     |
| UAE        | 3877| 700 | 0    | 190               | 4767     |

The picture stands in sharp contrast to the one painted in Table 4.1, with all states in the region now seemingly on the precipice of a substantial acceleration in renewables deployment, which is set to see a 10-fold increase in installed capacity in the next two to three years. In many of these states credible installation plans (under construction or in tender process) for the next 18 months exceed the total installed capacity thus far. Despite this, the poor track record of some of these states at meeting previous sets of targets should lead to a healthy dose of skepticism when considering new figures. There are, however, a few structural reasons why this time things may be a little different, some of which we will explore in section “What Explains the Differences”. A closer look at the plans of each of the member states at this important juncture is worthwhile.

**Bahrain**

Bahrain has made two sets of modest commitments for renewables deployment, targeting 5% of electricity production by 2025 and 10% by 2035. As seen in Table 4.2, the short-term credible plans revolve around one 100 MWp solar PV plant. With the smallest grid in the region, and less anticipated growth in energy consumption, Bahraini planners are likely wary of the grid impact of adding significant non-dispatchable power. Though it is noteworthy that the grid of the Dubai Electricity and Water Authority (DEWA) is of similar size and has managed to put forward significantly more ambitious renewables deployment and integration plans.
**Kuwait**

Kuwait has set one overarching renewables target, looking to develop enough capacity to supply 15% of consumption by 2030. All credible short-term plans are focused on the 1500 MWp solar PV plant set to be built at Al Dibdibah as part of the Shagaya Phase II development. Unlike some of its neighbors, Kuwait has not taken steps to create separate institutions charged with developing its renewable energy strategy, and the Shagaya project is owned by the Kuwait National Petroleum Company. This may be a realistic reflection of the limits of the state’s institutional capacity to establish a new entity capable of overseeing such a large capital deployment within the timeframe set of 2021. After a further sustained decline in oil prices following the Covid-19 pandemic, the Kuwaiti cabinet announced in July the cancellation of the 5 main outstanding tenders for the Shagaya Phase II project, casting doubt on the country’s ability to make progress towards meeting the overarching targets in the near-term.

**Oman**

Oman’s overarching renewables target is to supply 10% of electricity generation by 2025. An ambitious but manageable goal, as the 800 MWp of capacity categorized as part of their credible short-term plans in Table 4.2, would go a long way toward achieving this target (800 MWp would represent more than 10% of Oman’s generation capacity today, although this is offset by the renewables’ lower capacity factor). Unlike Kuwait, which also has significant wind resources, Oman is choosing to undertake a diverse development strategy; 200 MWp of wind is set to be developed in Dhofar, with the EPC contract for the first 50 MWp already awarded. The remaining 600 MWp will be developed through two large PV plants.

**Saudi Arabia**

Saudi Arabia revised its main renewables target upwards at the start of 2019, aiming to develop 27.3 GWp of renewables by 2024 (up from 9.5 GWp), and 58.7 GWp by 2030. The 27.3 GWp figure would represent almost a third of projected capacity in 2023. These are by far the most ambitious targets set in the region, and observers have received
these figures with some skepticism. As mentioned earlier in the chapter, the Kingdom had announced plans in 2013 to target 54 GWp of renewables generation capacity by 2032 through KACARE, plans which were later scrapped, and the institution tasked with their execution sidelined. The credibility of these plans has been further called into question due to uncertainty about which government entities were responsible for delivering these targets; while the initial targets and framework for renewable Independent Power Producer (IPP) projects was established through an entity within the Ministry of Energy and Mineral Resources (now known as the Ministry of Energy) called the Renewable Energy Project Development Office (REPDO) and its National Renewable Energy Program (NREP), the Public Investment Fund (PIF) was also announcing that it, along with its partner Softbank, would be developing $200 billion worth of projects in Saudi. By the second half of 2019 these two plans had been consolidated, with state institutions now in agreement that the PIF-Softbank alliance would be responsible for 70% of the renewables target, and REPDO the remaining 30%; the former would be delivering projects through negotiated deals with international partners, as opposed to the competitive tendering process deployed by the latter. In the credible plans short-term horizon outlined in Table 4.2, we have placed a total of 6 projects for which Request For Proposals (RFPs) were released in August 2019, and a further 4 projects with RFPs released in March 2020.

**Qatar**

Considering the resources available to the state, Qatar has arguably set the most modest renewables target of the group, aiming to build a 700 MWp solar PV plant at Al-Kharsaag, with the first 350 MWp to be completed in 2020. Like the Kuwaiti case, the national oil company, Qatar Petroleum, is a major sponsor of these first large-scale renewables projects. And though a longer-term target to produce 20% of its electricity using solar energy by 2030 is also part of the Qatar National Vision (QNV) 2030, a roadmap to achieve this target has not been outlined. Qatar’s abundance of natural gas resources means that it is able to produce relatively clean combustible and dispatchable power domestically at very low prices. This dynamic is an amplified version of the dynamic playing out in other rentier states, where the abundance of low-cost oil and gas resources (opportunity costs aside), has undoubtedly delayed the uptake of renewables technologies, and in an atmosphere of particular fiscal abundance in
Qatar, the opportunity cost of exporting these resources at market prices is more easily ignored by planners.

**UAE**

With the strongest track record thus far in the GCC, the UAE also has some of the most ambitious plans moving forward. The two headline targets at the federal level aim for 27% clean energy by 2021 and 44% of generation capacity by 2050. Credible short-term plans center on a series of solar PV and CSP plants planned for Dubai and Abu Dhabi. Individual emirates also have also set their own targets, with Dubai and Abu Dhabi both targeting 7% renewables capacity by 2020.

Looking at the member states’ plans as a whole it is clear that the UAE is still anticipated to retain its substantial lead, though Saudi Arabia and Kuwait are also planning on adding significant capacity, predominantly through large state-backed utility-scale projects, narrowing the large gap that exists today. The UAE’s earlier efforts to lift energy subsidies in the period between 2008 and 2014, particularly for commercial and industrial consumers, also allowed it to become the regional leader in the development of distributed solar PV. More recent subsidy reform in Saudi Arabia and Oman, however, which has led to increases in electricity costs for some heavy energy users, will also likely translate into more distributed PV projects in these markets, particularly at the commercial and industrial scale; the next section will look at the potential in these segments in greater detail.

**Distributed Renewable Energy in the GCC**

It is really at the distributed scale that one sees many of the archetypical effects of the rentier paradigm affecting the development and deployment of renewable energy. Here the distortive effects of energy subsidies on the incentives of the private sector and citizen are laid bare, and the market as it is experienced by players outside of the state—subject to its set utility prices—has insured that private investment in distributed energy resources has been limited till now. In other states that have experienced strong growth in distributed PV over the last 10 years, not only have utility prices been significantly higher, but a variety of incentives have been deployed.
As seen in Table 4.3, the general trend among the GCC states has been to set their highest generally applied electricity tariff brackets somewhere near $0.08/kWh, with the exception of the outliers of Qatar and the UAE. The figure of $0.08/kWh is approximately the average cost of electricity delivery in Saudi Arabia with deregulated fuel prices in the range of $50/barrel, as calculated in a recent KAPSARC report. The DEWA tariff of $0.12/kWh, which includes a fuel surcharge, is also calculated to be a cost reflective tariff. For the sake of this analysis, the range of $0.08–0.12/kWh will be used to describe the approximate real cost of electricity in the GCC states.

Looking at Table 4.3 in greater detail, it is clear that although some energy consumers do pay rates in the cost range highlighted above, most consumers in the region continue to pay tariffs significantly below this range. Industrial consumers in Saudi Arabia, for example, pay a tariff of $0.05/kWh in 2020. Over most of the last decade this has made the economic case for distributed generation—mostly in the form of rooftop

Table 4.3 Highest and lowest electricity tariffs for large energy consumers

| Country          | Highest tariff | Notes                                                                 | Lowest tariff | Notes                                                                 |
|------------------|----------------|------------------------------------------------------------------------|---------------|------------------------------------------------------------------------|
| Bahrain          | 0.08           | Commercial tariff                                                      | 0.08          | Same tariff for all large non-domestic energy users                    |
| Kuwait           | 0.08           | Governmental tariff, significantly higher than next highest tariff     | 0.03          | Industrial and Agricultural tariff less than half of commercial and governmental rate |
| Oman             | 0.17           | Cost reflective tariff (CRT), only applied at certain times (TOU),     | 0.03          | Agricultural tariff, Industrial tariff 0.03 in winter months          |
|                  |                | specific to specific regions                                           |               |                                                                        |
| Qatar            | 0.04           | Governmental tariff, significantly higher than next highest tariff     | 0.02          | Agricultural tariff                                                    |
| Saudi Arabia     | 0.09           | Governmental tariff, similar to tariff applied to large residential and | 0.05          | Industrial, health care, and education                                 |
|                  |                | commercial energy consumers                                            |               |                                                                        |
| UAE              | 0.12           | Specific to certain regions                                            | 0.01          | Agriculture, Abu Dhabi                                                 |
PV installations—weak. Admittedly this has now begun to change with the levelized cost of energy (LCOE) of rooftop solar at the commercial and industrial scale dropping below $0.05/kWh.\textsuperscript{29}

Despite the fact that developing distributed solar PV is already economically viable for many energy consumers in the GCC states, the size of the savings is subject to some uncertainty, being dependent on the rate of subsidy reform pursued by each state (Fig. 4.1). This means energy consumers are faced with investment decisions characterized by large potential savings over a 30-year period with relatively low risk, but a high upfront capital commitment to an unfamiliar technology, with uncertain project payback periods of around 7–10 years. For many heavy energy users in the commercial and industrial sectors, this is not a convincing investment case. Diverting significant capital away from their core businesses is unappealing, even if internal rates of return (IRR) are likely to be 10–15% or higher over the full project lifetime.

![Fig. 4.1](image)

**Fig. 4.1** Levelized cost of energy (LCOE) of a typical 2 MWp solar PV system in Saudi Arabia (CapEx discounted over system lifetime) compared to different tariff scenarios (2019) (Source SEC, DEWA, Haala Energy); Note on scenarios: BAU: commercial tariff (SAR 0.3/kWp) increases by inflation only, averaging 2% per annum; A: commercial tariff increase by 25%, and then with inflation thereafter; B: tariffs increase by 50% to (SAR 0.45/kWp (current DEWA price) with inflation thereafter; Solar LCOE: The capital cost of a solar EPC discounted over the lifetime of the system, plus the cost of maintenance and cleaning which rises with inflation. The area between the Solar LCOE line and each scenario line is indicative of the return on investment [ROI])
Here we can see the rentier state prohibitively affecting distributed renewables deployment in two distinct ways. The first and more direct effect is caused by the distributive state feeling an obligation to maintain energy subsidies as part of the social contract. This has prolonged the journey of distributed renewable generation toward economic feasibility. The Citizens’ Account, a direct cash subsidy program rolled out in Saudi Arabia in 2018 with millions of individuals signed on, is meant to mitigate the effects of the then newly imposed VAT and increases in fuel and electricity prices. Once this program is fully functional, the state will likely feel less politically inhibited in further removing subsidies, particularly on residential consumers.

The second is related to the predictability of pricing in the future. With the exception of the UAE and Bahrain, the GCC states have not given clear indications of where electricity pricing is heading, and when it is set to change. From the perspective of the region’s rulers, this maintains energy subsidies as a bargaining chip to be wielded when politically expedient. From the perspective of energy consumers considering capital investments in solar PV, for example, this makes the investment case uncertain, as depicted in Fig. 4.1. The absence of strong and credible institutions—albeit in some states more than others—capable of outliving a specific minister or ruler plays an important role in shaping how businesses and individual consumers in the GCC assess long-term investment opportunities in renewable assets.

A Closer Look at Saudi Arabia

Both due to its size, and the fact that Saudi Arabia lies roughly in the middle of the GCC in terms of fiscal buffers, this section will now take a closer look at what explains the current level of renewables deployment in the Kingdom and its future plans. The picture given in the section above of how things currently stand in the Kingdom is one of expansive ambition, but as yet unproven regulatory and policy capabilities.

Within the unveiled plans, and more broadly the rhetoric of the state in international forums, is a clear if belated acknowledgment of the soft power potential that can come from embracing the renewable energy transition, and an understanding that the Saudi market can be a launchpad for national champions. The centrality of the NREP to discussions about the Vision 2030 and the repeated references to the projects by state representatives at international forums and in the media is a testament to this shift. Despite the fact that the Kingdom’s climate negotiators still predominantly emanate from the NOC, there has been a notable
rhetorical shift. This narrative, unlike earlier and more isolated attempts in 2011–2013, has now been uniformly adopted by all the institutions of the state. The plan is to build a lot of solar, mostly at the utility scale. Just how much is to be built, and by whom, has been the subject of more debate.

The Credibility Gap

At the utility scale, Saudi Arabia’s plans include two headline figures: $200 Billion—the figure the PIF and Softbank have said they are looking to spend on developing solar, storage, and solar related manufacturing in the Kingdom—and 57.8 GWp by 2030—the amount of renewables capacity the state is planning to develop over the coming decade. Both these figures were released before the first utility-scale project in the Kingdom was completed. In fact, as mentioned in the previous section, the 57.8 GWp figure and the closer target of 27.3 GWp by 2024 are figures that have been revised up from more modest targets set in 2018. For reference, the total power generation capacity in the Kingdom in 2019 is 75 GW. The $200 billion figure also took the renewables world by surprise and was met with a fair amount of incredulity and skepticism, with observers highlighting that that figure would be sufficient to build more than twice as much capacity as is available in the Kingdom in 2019 (75 GW).32

The lofty ambitions are commendable, considering the scale of the climate crisis and the ground Saudi Arabia has to cover to make up for lost time. These plans do not exist in a vacuum, however, and come at a time when the Kingdom has struggled to bridge a credibility gap, left over from older institutions and plans that made similar claims earlier in the decade. As discussed in section “Renewables Development Over the Last Decade in the GCC” of this chapter, both KACARE and the SEC had made plans to develop utility-scale solar installations; the latter institution going as far as issuing an RFP and prequalifying companies for a specific set of projects at Rafha and Al Jouf.33

A remnant of clientelistic fiefdoms discussed by Hertog and others,34 these developments mirror the rise and fall of other institutions in the Kingdom. KACARE, for example, an institution named after a former king, clearly fell out of favor once new leadership assumed power in 2015. A similar battle for part of the renewables deployment mandate has played out more recently between the PIF and the Ministry of Energy,
Industry, and Mineral Resources (MEIM), now simply the Ministry of Energy. As outlined in leaked comments to Western financial press agencies, authorities from these very institutions described the two plans as being incongruous. Intervention by the royal court and consolidation of these two sets of plans would take place in 2019, with the PIF receiving 70% of the mandate and only 30% to be managed by MEIM through the competitive development tender process. More recent developments in the first half of 2020, suggesting a rift between the PIF and Softbank, may bring even this arrangement into question.

All this requires investors both foreign and local, to maintain a detailed and up-to-date map of the institutional arrangements in the Kingdom in order to gauge the viability of the proposed plans. What underlies investors’ and observers’ ongoing skepticism, however, is an understanding that the causes which lie beneath the early changes and reversals in plans have not been fully addressed. Institutional mandates, and the plans that lie within them, are regularly and unpredictably in flux. The fluidity of these arrangements, and perceptions that they are attached more closely to individuals managing intuitions—at various levels—rather than the intuitions themselves, has likely slowed progress.

The number of institutions involved in the process of forming and implementing policy is indicative of this:

- The Ministry of Energy (MoE), formerly part of the Ministry of Energy, Industry, and Mineral Resources (MEIM)
- The Saudi Electricity Company (SEC)
- The Electricity Cogeneration and Regulation Authority (ECRA)
- The King Abdullah City for Atomic and Renewable Energy (KACARE)
- King Abdulaziz City for Science and Technology (KACST)
- The Public Investment Fund (PIF)
- The Saudi Energy Efficiency Center (SEEC)
- Saudi Arabia’s National Energy Services Company (Tarshid)
- Saudi Aramco
- National Grid

The opaque and fluid nature of these relationships and the hierarchies between these entities continue to shape the way policy is formed, reformed, and implemented.
Saudi Arabia’s net metering initiative, the ‘Small Scale Solar PV Systems Regulations,’ has been one notable arena where this kind of inter-institutional competition has played out since 2016. This regulation, first circulated as a white paper in 2017, intended to provide a framework through which businesses and individual energy users could install solar PV on their properties, trade excess generated energy with the grid, and benefit from the credit they accumulated later on in the evenings or during other seasons of the year. The regulations also outlined specific requirements for consultants and contractors looking to qualify to work on these programs, with the distribution service provider, the SEC in this case, managing this process.

The regulation was set to go into effect in July of 2018, but as of Q4 2020 the program has still not gotten off the ground, perhaps because the incentive structures of the main stakeholders are not clearly aligned. The regulations were formulated by the electricity regulator and handed down to the SEC, a nominally profit seeking and partially privatized entity; which is now expected to ignore its economic incentives and assist its customers in replacing power they supply with power from solar PV.

**National Champions**

Another story that comes out of the Saudi case, and mirrors earlier developments in the UAE, is the emergence of new and powerful constituencies that are driving and shaping the renewables development agenda. Broadly speaking, the constituency consists of entities that are looking to use the Saudi market as a launchpad to compete globally.

The first element of this constituency is ACWA Power, a Saudi company that owns, invests in, and operates, power and water facilities globally. Following an investment in 2018, the company is also now partially owned by the PIF. Established in 2004, ACWA has been accumulating assets in the MENA region and as far afield as Vietnam and South Africa. Its renewable energy unit has taken the forefront in recent years, having won large IPP tenders in Morocco for one of the world’s largest CSP plants, and in the UAE for a similarly large PV plant. More recently, and unsurprisingly, ACWA also won Saudi Arabia’s first large-scale PV tender for 300 MWp at Sakaka. This has meant that ACWA is now singularly well placed to take advantage of the large opportunities afforded by Saudi Arabia’s renewables deployment target of 27.3 GWp by 2024, and to use the portfolio it accumulates through this process to
better qualify it to take advantage of opportunities globally. This approach is not new, and many of the largest contenders in international renewable energy tenders are state-owned or state-backed companies; EDF, Engie, Enel, Masdar, and others.

The second and more prominent element of this constituency is the PIF itself. Through its investment in ACWA Power and its more broad interest in the renewable energy space through its partnership with SoftBank, the PIF is also positioning itself to take advantage of—and simultaneously drive forward—the energy transition set to take place in the Kingdom. The pace with which this transition takes place, and the degree to which the PIF is able to leverage these opportunities to tackle others in future developing markets, is now undoubtedly a priority for the PIF. The PIF-SoftBank partnership is also set to include manufacturing and energy storage plans, ensuring that many of the opportunities made available by the energy transition strategy will be within its grasp. In a similar vein, SABIC—the state-owned petrochemical giant—recently announced the launch of a JV with the SCHMID Group to manufacture vanadium redox flow batteries in the Kingdom. All these plans also broadly fit into Vision 2030 plans to encourage local manufacturing.

And as observers will note from recent political developments, the PIF is closely linked to the current leadership of the Kingdom, with its managing director having assumed the position of Chairman of Aramco months before the 2020 IPO. This alignment of interests in the political economy of the state likely bodes well for the progress of Saudi Arabia’s renewables plans.

This arrangement mirrors a somewhat similar one that had taken shape in the UAE between 2014 and 2018, as Masdar—a company owned by Abu Dhabi’s Mubadala—began to accumulate a solar energy portfolio by winning tenders in Dubai, and using this experience to compete globally. This strategy extended in to the commercial and industrial space as well, as Mubadala invested in Enviromena, a solar project developer that has since become a regional leader.

The late rentier state, characterized by state capitalist tendencies, is now absorbing the renewable energy agenda into its orbit, with state-backed institutions positioning themselves carefully around various parts of the value chain to take advantage of the large number of projects set to take place as part of the energy transition.
What Explains the Differences

The picture painted thus far of renewables development in the GCC states shows that, despite what may be considered a ‘rentier handicap’—inhibiting large-scale early adoption of renewable energy—the last five years have seen a noticeable divergence in achievements and ambition in this space.

Rents Are not the Reason for the Divergence

As a group of states, compared to neighbors such as Jordan, it is clear that the availability of low-cost fossil fuel resources inhibited large-scale early adoption of renewable energy at the utility scale. Particularly when rents were increasing and budgets were in surplus—as was the case between 2009 and 2014 when an early adoption strategy might have been implemented—the political economies of the GCC states were not sufficiently sensitive to the opportunity costs associated with burning fossil fuels domestically for power instead of exporting them at international market prices. It is worth mentioning that the opportunity cost calculation is more complex on the ground for policy makers in states like Saudi Arabia, who have millions of barrels of excess daily oil production capacity, and are generally limited by quotas agreed by OPEC or OPEC+. Pierru and Fatih modeled the costs under different scenarios in their informative 2020 paper.

At the distributed scale, where solar PV must compete with subsidized electricity prices, it is the distributive expectations placed on the state by the rentier social contract which has led to persistently low electricity prices and the slow proliferation of the technology on rooftops across Gulf cities.

Within the group of states, however, high rents do not seem to explain either extremes of adoption. The divergence in approaches within the ‘Super Rentiers’ of Kuwait, Qatar, and the UAE makes this abundantly clear. UAE, on the one hand, has led the region in recent years in renewables development, while Qatar has been a noteworthy laggard. So what does explain the divergence?
Economic Ambition and Dynamism

As discussed in the section looking at national champions in the Saudi case, a recognition of the economic opportunities afforded by the energy transition and the bureaucratic capacity to take advantage of these opportunities seems to be a defining characteristic of the Emirati case and increasingly the Saudi case.

The pursuit of these economic opportunities by state-affiliated entities has created new and powerful clients and constituencies that help ensure targets are ambitious, and that plans materialize. The case of Masdar, and increasingly ACWA Power, using renewable project tenders in their home markets as opportunities to gain portfolio experience and credentials, and then using that experience to compete in international tenders, is an example of this dynamic. Inversely the absence of such economic actors in some of the other GCC states may go some way to explaining the more modest renewable energy targets.

Clients and Rent Seeking Pressures

The political power of constituencies that currently benefit from subsidized energy is also an important factor in determining the pace and extent of subsidy reform pursued by each state.

A salient example of this dynamic is the Kuwaiti National Assembly, which represents both populist and mercantile voices and wields the power to bring down governments. In recent years the Assembly has steadfastly rejected efforts by governments to engage in subsidy reform, even as neighbors have successfully implemented similar measures.43

In other markets, the differential between electricity tariff rates for commercial and residential consumers in Saudi Arabia for example—$0.08 and $0.05, respectively—is also indicative of the power of specific constituencies. In the Saudi case, this is evidence of the rigidity of the state’s social contract with working-class citizens paying the lowest slab of the residential tariff, and simultaneously, the malleability and weakness of the social contract with the local private sector and business elite.44 Similarly, the maintenance of low industrial electricity tariffs in Saudi Arabia of $0.05 and low diesel prices (used for off grid generation) is a product of the creation of powerful constituencies in decades past. These constituencies largely consist of industrial players that chose to engage in energy
intensive activities in the region with the understanding that the under-
lying social contract would ensure the continuation of subsidized energy. As D Reiche rightly predicted:

The energy-intensive industries would fear for their competitive advantage and act as a powerful lobby group against any policies making their business less competitive. It might be necessary to exempt this sector if first steps in the direction of an internalization of external costs are taken.45

More specifically, large state-owned entities like SABIC who have developed lucrative energy intensive business units producing and manufacturing steel and aluminum are now likely staunch defenders of subsidized energy in the Saudi industrial sector and also therefore an obstacle to the proliferation of solar PV in that sector.

Comparatively, in the UAE where the social contract has already been altered—or where important political constituencies were protected through targeted policy interventions—subsidies have been lifted to a substantial degree for many heavy energy users.46 Focusing on the changes to the Emirati social contract would be beyond the scope of this chapter, but they largely consist of providing investors with world-class infrastructure and an inviting business and legal environment while allowing other cost inputs, such as energy, to rise. This, in turn, has allowed for the proliferation of rooftop solar PV in these markets, where the LCOE of solar energy reached grid parity 3–5 years ahead of its neighbors.

**Soft Power Projection**

Abu Dhabi’s ‘energy re-branding,’ as co-editor Li-Chen Sim put it, proved to be the first iteration of this dynamic, which would take hold in other regional capitals in more recent years.47 Much in the same way that the Oil Majors engaged in a concerted effort over the past decade to ‘green’ their image, states in the region have also begun to understand the soft power benefits of being perceived as sustainable energy players.

As with other dynamics, here too the UAE took an early lead, with the establishment of Masdar in 2006, and the establishment of the UN’s International Renewable Energy Agency (IRENA) in Abu Dhabi in 2010. The story of Masdar is perhaps indicative of the fact that a number of
factors needed to align so that serious progress on renewables development could be made. For the first decade of its life, Masdar wasn’t able to garner traction as anything more than proof of concept; a demonstration of what a sustainable city could look like. Even its 10 MWp solar array, the largest of its kind in the region at the time it was built, would be followed by a lull in development as the economics of solar played catchup. It was only really in the period following 2013, when the economic case for renewables became more attractive, that Masdar’s profile began to rise again; this time with a focus on its growing renewable energy development portfolio and not the city from which it emerged. This would all seem to suggest that in this political economy, vision and leadership were insufficient on their own, and that a strong underlying economic case for renewables development was always necessary.

In a further acknowledgment of the power of this image shift, since its establishment, Masdar has also been used by the Emirati government to engage in targeted development aid, building a wide range of renewable energy projects in Africa, the South Pacific and in the developing world more generally. Dubai too has engaged in public diplomacy seeking to portray an image of sustainable and future oriented urban development; in a collaboration with National Geographic, Dubai has sought to document and publicize its energy transition.

It is more difficult to assess to what degree the concept of ‘greening’ their image has played a role in pushing forward renewables development in the other GCC states. The manner in which the renewables agenda is being carried out across these states would suggest that the primary reasons are economic, but that there is increasingly a realization that the credentials gained from this kind of development can be leveraged to project a modernized image of the state; a helpful shift considering decades of negative associations with the role the states have played in hydrocarbon extraction and the climate crisis.

**Conclusion**

After a slow start it appears that states in the region are finally on the precipice of a more serious effort to transition their energy systems toward a more renewable future.

Collectively, it is clear that the availability of cheap hydrocarbon resources and associated rents delayed the early adoption of renewable energy on a large scale; the abundance of solar and capital resources,
and the earlier proliferation of solar PV in neighboring Jordan, support this. This chapter has argued that this ‘rentier effect’ played out on two levels. At the utility scale, states in the region were able to put off large-scale renewable energy development before 2015 because the period between 2011 and 2015 (when states could have reasonably begun widespread adoption) was marked by high oil prices and relative fiscal abundance. This allowed states to ignore the opportunity costs associated with not exporting hydrocarbon resources at international prices, using them instead for domestic power production. This dynamic came to an end as oil prices declined at the end of 2014, forcing budget rationalization. The second level was at the distributed scale, where distributive expectations placed on the state by domestic constituencies prevented or slowed the removal of energy subsidies. This delayed the point at which solar PV in particular was able to compete against electricity from the grid in a number of segments and markets.

In the period following 2015, however, states in the region, led by the UAE, have begun embarking on plans to develop large-scale renewable energy, with some states setting targets that, if met, would make them global leaders in this space over the coming decade. This chapter assessed the credibility of these targets among the states in the region, arguing that the political economies and regulatory capacities of these states had not been ready in years past to engage in a serious attempt at the energy transition. Looking more closely at the case of Saudi Arabia, however, which has mirrored earlier developments in the UAE, it appears now that the political economy landscape is undergoing structural change; important constituencies of the state, often elements of the state itself, now stand to benefit from the renewable energy agenda, and are helping to shape and ensure the implementation of these plans. The late rentier state, characterized by the state capitalist model deployed in the UAE and Saudi Arabia, has now coopted the renewable energy agenda, setting the stage for a new and accelerated phase in the energy transition of the region.

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