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Low-carbon energy in the Gulf: Upending the rentier state?

Li-Chen Sim

Khalifa University of Science and Technology, P O Box 127788, Abu Dhabi, United Arab Emirates

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ABSTRACT

The six Gulf monarchies are major stakeholders in the global energy system. Collectively, they account for one-quarter of global oil production, comprise the biggest source of oil exports, and are responsible for one-third of internationally traded gas. However, the ongoing transformation of this energy system towards a low-carbon one will have profound consequences for them in terms of geopolitical considerations and domestic rentier arrangements. This article focuses on the latter, which has received far less attention. Falling between the nexus of the 'rentier state' and the political economy of low-carbon energy, the article seeks to determine the extent to which the increasing deployment of low-carbon energy in the Gulf may mitigate against the effects of the hydrocarbon-fuelled 'resource curse'. These are associated with revenue volatility, jobs, and the private sector. The argument advanced here is that low-carbon energy will likely reinforce pre-existing rentier states and their development challenges. In this connection, the increasing uptake of low-carbon energy contributes to the survival of resource-rich Gulf monarchies.

1. Introduction

A seismic transformation of the global energy system is currently underway. It involves a shift away from fossil fuels, which account for 85% of our primary energy consumption, towards a low-carbon energy system. This transformation is underpinned by two key trends. The first concerns the increasing use of low-carbon sources of energy, in particular solar and wind, to generate power. By the end of 2018, for instance, 169 countries or four times the number in 2005 had adopted at least one type of renewable energy target [1]. Electricity generation from renewables has grown substantially and it now supplies more than a quarter of global power production up from 18% in 2000 [1,2]. Its share is expected to rise to 30% to over 50% by 2030 [3,4]. The second trend is stagnant oil demand growth as a result of increasing energy efficiency, uptake of electric and hybrid passenger vehicles, the rise of a 'sharing' economy, falling prices of renewable energy, the limits of China's export-led growth model, and the possible introduction of a carbon tax regime [3,5-9]. Oil will continue to play a major role oil in the global energy mix but at sustained prices far lower than $100 in a 'new normal' scenario of lower-for-longer prices [10,11]. This is because changes affecting oil demand are coupled with abundant oil supply from relative newcomers like Brazil and Guyana, as well as from stalwarts like Norway, Canada, and Iraq.

The impact on geopolitics of a transformation of the global energy system potentially includes a decline in the efficacy of conventional oil and gas sanctions, rise of renewable energy powers such as Denmark or Morocco, conflict over rare earth materials and depletable uranium used in low-carbon energy systems, and a reduction in influence of the Organization of the Petroleum Exporting Countries over hydrocarbon markets [12-16]. Within-state interactions are also expected to be challenged by the displacement of fossil fuels. In Europe, where photovoltaic solar rooftop capacity is larger than the utility-scale solar market [17], renewable energy is increasingly framed as an opportunity to reverse the post-1945 expansion in the role and scope of government. In this regard, it appears to be synonymous with 'energy democracy', 'energy justice', 'energy sovereignty', and 'energy equity' [18-20].

The upheaval in the global energy system will massively impact the six Gulf monarchies – Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE) – that are major stakeholders in the current global energy system. The region is home to the largest share of oil reserves (30%) and the second largest share of gas reserves (21%) in the world. It accounts for one-third of global traded gas, a quarter of oil production, and is the largest source of oil exports (28%). Hydrocarbon exports account for 80% of government revenues and one-third of gross domestic product (GDP) in the Gulf states [21]; they also underwrite massive economic development and social welfare programs. As a result, Qatar Airways and Emirates are among the top ten airlines in the world, Saudi Aramco is the world's most valuable public company, the UAE is among the top 20 most competitive economies in the world, and residents in the Gulf enjoy an enviably high quality of life. Nevertheless, the International Monetary Fund has warned that a decline in hydrocarbon revenues due to the afore-mentioned stagnant growth in global revenues would have profound implications for the fiscal stability of the Gulf states.
oil demand and low oil prices along with rising fiscal expenditures on public wages may deplete the region’s existing financial wealth in 15 years [22]. Political and social stability is unlikely to escape unscathed in such an outcome. Gulf states, however, are not merely content to ‘dig in’ [23] and perpetuate the role of fossil fuels in the current global energy system. They have belatedly embraced the deployment of low-carbon energy and the UAE has even emerged as a policy entrepreneur in nuclear energy governance through uncompromising non-proliferation standards [24].

Before proceeding further, a few words about the scope of the article are necessary. First, ‘low-carbon’ refers to the deployment of low-carbon energy sources such as solar, wind, and nuclear energy as part of the overall fuel mix. They emit no (during the operational phase) or low levels of carbon dioxide (on a whole life-cycle basis) compared to fossil fuels. Energy efficiency measures, a circular economy, and the use of hydrogen among others inform the path towards a low-carbon global energy system, but they are beyond the scope of this paper. Secondly, it explores only the domestic impact of low-carbon energy projects. This is because the impact on within-state patterns of interaction is an under-researched topic compared to analyses about the geopolitical implications of the transition, as noted earlier. Third, the objects of this research are the Gulf states. To the best of the author’s knowledge, this is the first scholarly publication that considers the nexus between low-carbon energy and rentier-related challenges in Gulf states. Since most of the low-carbon projects are in the construction or planning stages, this limits longitudinal and evidence-based modelling of research on low-carbon energy in the region; it does not, however, affect the analytic rigour of perspectives offered here. This article ventures beyond extant literature on the rationale, obstacles, and governance of perspectives offered here. This article ventures beyond extant literature on the rationale [25–30], obstacles [31–33], impact [34–37], and governance [38–41] of low-carbon energy in the Gulf to explore the latter’s role as an antidote to rentierism.

The rest of the paper is arranged as follows. Section 2 provides a brief overview of the ‘rentier state’ and the ‘resource curse’. It then identifies aspects of the ‘curse’—revenue volatility, jobs, and the private sector—that are most visible in and applicable to the Gulf, along with the policy responses that are traditionally used to temper these effects. Sections 3–5 take it in turn to consider the role that low-carbon energy projects may play in offsetting each of these ‘curses’ of hydrocarbon-led development in the Gulf. Section 6 concludes with an evaluation of the impact of the oil price fall on low-carbon energy projects. The key argument advanced in the paper is that the increasing deployment of low-carbon energy projects in the Gulf is unlikely to mitigate against the effects of the hydrocarbon-based resource ‘curse’ on revenue volatility, jobs, and the private sector. Instead, such projects may reinforce and strengthen existing rentier arrangements. In this connection, the increasing uptake of low-carbon energy contributes to the survival of oil-rich Gulf rentier states in the context of the ongoing transition to a low-carbon era.

2. Rentier states, the resource curse, and low-carbon energy

A rentier state derives a substantial portion of its fiscal revenue from rent earned by exporting its natural resource endowment; this externally-funded source of income therefore alleviates the need to tax its citizens. The state allocates rent to privileged groups and provides citizens with generous welfare subsidies and employment in return for political acquiescence. Rentier arrangements based on point-based resources like oil and gas tend to be associated with higher incidences of deleterious outcomes or ‘curses’, particularly if conditions such as institutional weakness are also present [42,43]. ‘Curses’ include the frequency of civil wars, declines in per capita income, lower expenditures on public education, lower levels of entrepreneurial activities, corruption, long-term economic decline, and democratic deficits [44–50].

As noted earlier, the outsized role of hydrocarbons renders Gulf monarchies archetypal rentier states. Consider, for instance, that hydrocarbons in non-Gulf oil exporters have significantly lower shares of GDP (less than one-quarter) and total exports (just over 50%) than Gulf states at one-third and 80% respectively [51]. The Gulf states, in fact, display varying degrees of rentierism and the extent of the ‘curse’ has been shaped by factors such as tribal and sectarian affiliations [52,53], ownership structure of state-owned companies [54–56], political repression [57–59], historical relationships with the merchant class [60,61], relatively small population size [62–64], and the global outlook of their leaders [65,66]. These and other refinements to the concept have strengthened, but not upended, its rigor, relevance, and influence in analyses of the Gulf [67–73].

On the one hand, hydrocarbon wealth in the Gulf has played a significant role in facilitating peace and stability, prosperity, and a high quality of life [55,74,75] although there is room to reduce discrepancy between spending and outcomes in education [45,76]. The region has hence escaped some aspects of the ‘curse’. On the other hand, rentierism in the Gulf has had less salutary effects.

One challenge concerns the volatility of oil rent and the negative impact on sustained economic growth [77,78]. Gulf states generally exhibit pro-cyclical policies as underlined by the 85–87% correlation between oil price changes and fiscal balances [79]. As a result, the Gulf has been plagued by both low and volatile growth over the longer term [62,80–82]. Diversification of goods and services has occurred but attempts to substantially increase non-oil exports to smooth out the volatility of oil rent have found limited success [83–86]. Value-added and excise taxes have been introduced as non-oil sources of fiscal revenues but they account for only 2–2.5% of GDP [21].

A second challenge of the rentier model is jobs. Hydrocarbon wealth has traditionally been used to fund jobs for citizens, more than half of whom work in the public sector in the Gulf states compared to a global average of 10–20% [82,87]. Today, state budget are under enormous strain from public sector salaries and unemployment benefits for citizens, including tertiary-educated youth, unwilling to take up private sector jobs [88,89]. Consequently, all Gulf economic plans envisage increasing the employment of citizens in the private sector and entrepreneurship as panaceas [84].

A third and related challenge is that the rentier bargain has rendered the private sector deeply dependent on state procurement, spending, and policies that sustain imports of cheap labor [67,90–92]. In addition, the tendency towards pro-cyclical fiscal policies [93] means that the private sector is hard-pressed to serve as a non-oil engine of growth and jobs. As a result, a more autonomous and self-sustaining private sector may be slow to materialize and with it, implications for even higher levels of unemployment, poverty [87,94], and social instability in a low oil price environment.

These ‘curses’ in Gulf rentier states and the limited success of attempts to address them inform the focus of the paper on the deployment of low-carbon energy. Can the export of low-carbon electricity from the Gulf be a significant and more stable source of non-oil rent to facilitate sustained economic growth? To what extent will the construction, operation, and maintenance of low-carbon energy projects generate jobs to relieve pressure on the public sector? What role is there for the private sector in low-carbon energy?

After all, the Gulf states have committed to targets for low-carbon energy in power generation capacity with shares that range from 15% to 50% [95]. With over 3 GW of grid-connected low-carbon energy capacity, the UAE is the undisputed leader within the Gulf [see Table 1]. The UAE and Saudi Arabia are expected to spend over $40 billion to build out renewable energy in the power sector, or one-sixth of their total planned and committed investments in energy between 2019 and 2023 [96]. They, along with their Gulf peers, have also organized competitive auctions for renewable energy projects [40,97,98] that have returned bid prices in line with solar and wind energy globally. For example, the current sub $0.02 per kilowatt hour global standard for photovoltaic solar has been achieved not only in recent auctions in Los Angeles, Portugal, and Brazil but also in Saudi Arabia’s 300 megawatt (MW) Sakaka project and in the 900 MW Phase
5 of Dubai’s Mohammed Bin Rashid Al Maktoum Solar Park. Beyond variable renewable energy, Abu Dhabi connected the Arab world’s first nuclear power plant to the grid in August 2020 and Saudi Arabia is considering the use of small modular reactors.

3. Low-carbon electricity export rent

Low-carbon energy may generate externally-derived rent if electricity from this source is subsequently exported. Denmark, for example, regularly exports surplus wind-generated electricity to its neighbors. Norway’s solar, wind, and hydropower exports earned $1.2 billion in 2018 and could exceed $7 billion per year by 2030 [100]. As for Morocco, it is hopeful that the Noor solar plant will eventually be able to produce excess solar power for regular export to Spain [101]. In the Gulf, Saudi Arabia has ambitions to become an exporter of solar power while the UAE envisions that any surplus solar or nuclear-powered electricity could eventually be exported to its neighbors [102–106]. In theory, the amounts of money involved in low-carbon energy projects and the fact that they respond conversely to oil price shocks imply that such investments facilitate the diversification of the rent portfolio of Gulf states.

Even if all planned low-carbon power generation capacity is built, it is doubtful that electricity exports will constitute a significant source of rent. This is because although the Gulf states are connected via the Gulf Cooperation Council Interconnection Authority, the near-identical daylight hours, peak demand patterns, and energy subsidies in the Gulf have hindered higher levels of electricity trading. Political rivalry has also stymied intra-Gulf exchanges. In 2005, for example, Qatar and Kuwait were forced to abandon a plan for Doha to deliver gas via a subsea pipeline that would transit Saudi territorial waters due to Saudi objections; the latter was wary of Qatar’s rising profile in the Gulf facilitated by its gas exports and Al Jazeera media empire [107]. The intra-Gulf spat and blockade of Qatar since 2017 will certainly not help matters. Consequently, only small volumes of trading take place among Gulf states on an emergency basis or during scheduled outages.

In any case, electricity exports will not be a priority until Gulf states achieve self-sufficiency in power generation through gas, nuclear, or renewables. At the moment, the UAE, Bahrain, and Kuwait are net importers of gas while Saudi Arabia may import LNG during the summer to offset the burning of expensive liquid fuels. Hence, the possibility that exports of low-carbon electricity will yield significant external rents is miniscule in the short-term. Consider, for instance, that France, which accounted for the highest share (12.2%) of global electricity exports, earned $4.2 billion from such exports in 2018 [108]; in comparison, Saudi Arabia earned an equivalent amount with just ten days’ worth of oil exports in 2018. The returns on investment on solar also pale in comparison to oil projects [109,110].

Realistically, therefore, the inclusion of low-carbon energy sources in the domestic energy mix will likely result in an increase in rent volatility from oil revenues. This is because generating electricity from low-carbon energy sources frees up the use of oil for this purpose. In Saudi Arabia and Kuwait, oil is the fuel source for 50% and 40% of electricity generation, respectively [111]; exporting the ‘saved’ oil would in turn generate more revenues and rent volatility. Similarly, Oman’s use of solar thermal steam injection – in place of natural gas – to pump out more oil from mature wells will reduce the amount of gas used and free up over $700 million worth of gas for export [112]. In today’s environment, where national oil and gas companies in the Gulf are under tremendous pressure to unlock the value of their hydrocarbon resources so they do not become ‘stranded assets’ in a low-carbon era, revenue volatility from oil and gas rents could be an acceptable tradeoff.

4. Low-carbon energy jobs

Low-carbon power in the Gulf is overwhelmingly generated, purchased, and transmitted to end-users through centralized utility-scale systems owned or controlled by the state [111,113,114]. Developers within a bid consortium typically include a state-backed entity, which reinforces the state’s role in the low-carbon energy sector. For example, Saudi Arabia’s $500 million 400 MW Dumat Al Jandal wind farm, the region’s largest, was awarded to a consortium comprising EDF of France (51%) and Abu Dhabi’s state-owned renewable energy developer Masdar (49%).

The use of public–private partnerships (PPP) backed by long-term power purchasing agreements [97,98] has extended the rentier state’s role in energy production from hydrocarbon to low-carbon power projects. One consequence could be the rise of low-carbon power developers that are successful at home and abroad [115,116]. These ‘national champions’ include Masdar and privately-owned Acwa Power, where shares held by the Saudi state could increase from 29% to over 40% [117]. PPPs may also be used as platforms to direct unemployed citizens into jobs – manufacturing, construction, deployment, operation, maintenance – in the low-carbon energy sector. In the solar sector alone, over 170,000 jobs across all phases could be created by 2030 in the Gulf [95] as a result of renewable energy targets in these states, the 80% decline in prices of solar modules since 2010 and hence installation costs, as well as the increased efficiency of solar panels [95,118]. The majority of these jobs would be in UAE and Saudi Arabia due to their higher levels of planned deployment. Other industrial sectors like thin film technology, glass, semi-conductors, and mining may also benefit from the surge in low-carbon energy projects [28].

Such non-public sector jobs may be a way to compensate for reductions in energy subsidies and public sector hiring freezes, while still allowing ruling elites to maintain patronage in a rentier state [88,119]. Jobs continue to be a channel for rent distribution and 82% of youth in the Gulf expect the state to find jobs for them [120]. Once grid-connected, however, low-carbon energy projects are likely to require far fewer jobs than earlier phases. Non-public sector jobs may also be a hard sell to the local population, particularly in the rentier states of the Gulf where 70% of youth prefer a government job, compared to 40% elsewhere in the Arab world [121]. On the other hand, the fact that hundreds of Emirati engineers and specialists are being trained and that over 90% of the team that loaded fuel rods into the first unit at Barakah were Emiratis certified as fuel operators set a hopeful precedent.

Local content requirements for low-carbon energy projects are also being rolled out. They are aimed at localizing parts of the supply chain to boost the modest share of non-oil manufacturing in the Gulf [62] and to increase non-oil contribution to GDP [21]. Localization is mandatory in Saudi Arabia, where a 17% minimum level of locally-sourced inputs was imposed in the 2020 solar tenders, but voluntary in the UAE where local suppliers are relatively more established [32,122,123]. Chinese companies like Hanergy, Longi, and Ningxia Zhongke have also announced intentions to jointly manufacture solar components in Saudi Arabia and Oman. However, overly ambitious localization targets may be detrimental to the pace of implementing low-carbon energy projects and promised jobs. This is due to the lack of qualified local manpower, the expense of setting up local companies in each Gulf state [32,124,125], and micro-competition among Gulf states deploying similar strategies on solar localization.

Table 1

| Country          | 2015 | 2019 |
|------------------|------|------|
| Bahrain          | 6    | 7    |
| Kuwait           | 6    | 106  |
| Oman             | 2    | 8    |
| Qatar            | 42   | 43   |
| Saudi Arabia     | 24   | 397  |
| United Arab Emirates | 137 | 1885 |
5. Low-carbon distributed energy and the private sector

Distributed energy plays a much smaller role in the Gulf compared to Europe. For example, only one-third of the photovoltaic solar rooftop capacity in Europe is at utility-scale [17]; in Germany, only 5% of the installed renewable energy capacity is owned by traditional energy utilities [126]. Investments in small-scale solar projects amount to just $40 million in the UAE, $30 million in Saudi Arabia, and $12 million in Oman, compared to the average of $908 million spent on each utility-scale project in the Gulf [28,95]. Consequently, the potential for jobs in distributed solar in the Gulf – around 23,000 [95] – pales in comparison to the utility market.

A feed-in-tariff scheme in Oman and net metering in the UAE [127] are encouraging gradual uptake of distributed rooftop solar by residential and particularly by commercial properties. Consequently, privately-owned companies like Green Energy Tomorrow, Siraj Power, Yellow Door, Total Solar Distributed Generation, and Enerwhere emerged, provided jobs which helped to relieve some pressure on bloated public sector payrolls, and broadened the base of non-oil stakeholders in the renewable energy transition in Dubai. Financing remains an issue since small and medium sized private companies account for 5–7% of bank loans in the Gulf states compared to one-quarter in developed countries [128].

Gulf states have allowed the private sector to spearhead the development of distributed solar because it is a niche area that does not undermine the established tenets of business dependency on the state. The founders of Yellow Door and Siraj Power, for example, are Gulf nationals with extensive business holdings; the same can be said of their customers Majid Al Futtaim, Al Nabooda Automobiles, DP World, and the Apparel Group. For them, it makes commercial and political sense to support the call by Dubai's leader for solar panels to be installed on every roof by 2030 [129] as part the emirate's Clean Energy Strategy 2050. Thus far, over 125 MW of distributed solar has been installed [130].

In contrast, there is little residential demand for distributed solar, except for small pockets of remote settlements in the Omani mountains. This is partly because the average decade-long pay-back period is a disincentive to the many expatriate residents on short-term work contracts in tenanted accommodation. Even though price reforms have taken place [87,131], electricity subsidies continue to render distributed solar uncompetitive. Even the highest residential tariff of $0.12 per kilowatt hour in the Gulf is cheaper than the lowest price of rooftop solar at $0.16 [132,133]. Hence, there is no risk of the associated rise of ‘energy democracy’, where citizens are empowered through distributed energy to renegotiate the terms of top-down state-society relations in a rentier state. For private companies within the distributed solar sector, the demand distortion caused by artificially low electricity prices as part of the rentier social contract has limited their vibrancy and growth.

6. Discussion and conclusion

The analysis above suggests that the deployment of low-carbon energy is unlikely to overcome the challenge of non-oil diversification manifested in three ‘curses’, namely, revenue volatility, jobs, and a lackluster private sector. These projects are unable to match the volume generated by hydrocarbon revenues and hence cannot smooth out revenue volatility as well as its impact on sustained economic growth. In fact, by substituting for oil in power generation in Kuwait and Saudi Arabia, renewable energy may increase volatility since more oil can be exported. Low-carbon energy projects can potentially contribute to diversification of the local economy in terms of jobs and backward linkages. However, the largely in-country consumption of resulting goods and services limits progress in export sophistication for the time being. Distributed solar rooftop offers a niche for private businesses to develop but the latter’s potential as a non-oil source of growth is limited by state electricity subsidies for residential consumers.

Ultimately, utility-scale solar and wind projects and nuclear power plants segue with the ‘modernizing autocracy’ narrative in the Gulf. Along with religion, science, technology, and technopolitics have been important to the making of Saudi and Gulf power [134]. Technology and technical management are perceived as instrumental in solving agricultural, environmental, and economic obstacles to development. Dams, irrigation, drainage, agriculture loans, and desalination have contemporary equivalents in carbon capture and storage, zero-carbon cities, solar parks, hyperloops, flying taxis, and space travel. In this connection, low-carbon energy projects confer onto ruling elites increased legitimacy from citizens and prestigious recognition from external stakeholders.

Looking ahead, the Gulf’s large-scale low-carbon energy projects are not likely to be significantly affected by the precipitous fall in crude oil prices – from over $65 per barrel in January 2020 to less than $20 in April with an annual average of $30–35 [135–138]. The resulting fiscal deficits in Gulf states have little impact because financing for PPPs is by private lenders [139]. The latter continue to have an appetite to lend to state-backed projects in the Gulf as underlined by their purchase of $24 billion worth of bonds issued by three Gulf states in April 2020. The fall in electricity demand in the face of coronavirus-related lockdowns and a global recession is also unlikely to curtail the deployment of low-carbon energy, although delays are expected. This is because the primary driver of low-carbon energy projects is economics: at the low levels of deployed renewable projects currently in the Gulf, marginal electricity demand is most inexpensively met by utility-scale solar energy, at least for now [140]. The other driver is the potential to reduce the use of gas and oil in power stations, thereby freeing hydrocarbons up for higher-value applications. The canceling of the start-up of expensive sour gas projects [141] aimed at increasing gas self-sufficiency in the face of falling oil revenues only increases the urgency to deploy and connect low-carbon energy projects. Consequently, the latter encounter little resistance from stakeholders of the current hydrocarbon-based energy system, some of whom are strongly advocating that hydrogen and a circular carbon economy be included in a low-carbon future. Ultimately, Gulf states that embrace low-carbon energy may thrive as late-stage rentiers given the symbiotic relationship in terms of hydrocarbon revenues, jobs, and the state-directed model of development.

Declaration of Competing Interest

The author declares that she has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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