

Greening energy governance through agencification in the Global South: Drivers and implications

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Abstract

This article offers the first comprehensive analysis of the emergent modes for greening electricity governance through agencification in the Global South by examining the drivers and role of renewable energy agencies (REAs) in various countries in the Middle East and North Africa region. Furthermore, the article illustrates the impact of this form of agencification on the deployment of renewables and the “democratization” of energy governance. We found that the diffusion of REAs is facilitated by the intermediation of international and transnational actors, whereas their role in national energy governance is constrained by the fossil fuels rentier political economy. As an institutional strategy for greening energy governance, agencification has the potential to foster the deployment of renewables: agencies can catalyze external funding overcoming regulatory and policy barriers. However, this strategy can reproduce top-down approaches to policymaking, hindering the “democratic” potentials of the energy transition.

Keywords: agencification, energy policy, energy transition, Global South, renewable energy.

1. Introduction

The current energy transition—that is the shift from fossil fuels toward renewables—has emerged as a key challenge for 21st century governance, policymaking and politics all over the world. The bulk of the literature on the subject, however, has mainly focused on industrialized countries in the West or on emerging economies, such as China or India, which are essential players in international climate politics. Only recently have scholars begun to reflect on the political, institutional and social implications of the energy transition for the Global South (e.g., Goldthau et al., 2020; Hochstetler, 2020). As an international and transnational phenomenon rooted in the (new) global political economy of energy (Kuzemko et al., 2019), this transition is affecting the patterns of energy governance and politics in several developing countries. While the diffusion of policy strategies and tools for renewables in the Global South has been monitored by scholars and international organizations such as the International Renewable Energy Agency (IRENA), the institutional implications of greening energy governance in these countries have been less studied. This phenomenon—which ranges from the establishment of dedicated line ministries (or units) for energy transition to specialized agencies for promoting renewables—is worth examining because it signals another important step in the transformation of state and public administration in the Global South.

Against this background, this article focuses on an important region of the Global South—the Middle East and North Africa (MENA) region¹—and on a specific type of institutional innovation: renewable energy agencies (REAs). The MENA region occupies a peculiar position as far as the impact and politics of the energy transition are concerned (e.g., Tagliapietra, 2019). Notwithstanding its vast potential in the area of renewables, especially

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solar and wind power, this region represented only 1% of global renewable capacity addition in the last decade while accounting for 6% of the global population and 4% of the global GDP (RES4MED, 2021). The poor quality of the policy and regulatory framework in the MENA countries has negatively affected their ability to attract investments (e.g., Menichetti et al., 2018; RES4MED, 2021). Moreover, numerous MENA countries are highly dependent on fossil fuels, which are a crucial component of their rentier political economies. This is a further obstacle to their energy transition (e.g., Cambini & Rubino, 2016; Jalilvand & Westphal, 2017). Overall, the MENA countries are illustrative of the key problems that hinder the energy transition in the Global South, that is, fossil fuel lock-in, rentierism and regulatory and financial barriers (Goldthau et al., 2020; IEA, 2019; Nalule, 2021). Financial difficulties, in particular, have further increased with the COVID-19 pandemic crisis, which has shrank green investments, especially in developing countries (Quitow et al., 2021).

Several studies have analyzed the dynamics and possible causes and consequences of the (limited) diffusion of renewables and related strategies and policies in the MENA countries (Atalay et al., 2016; Griffiths, 2017; Lilliestam & Patt, 2015; Poudineh et al., 2018; Somma & Rubino, 2016). However, to the best of our knowledge, there is no research considering the emergence of specialized institutions such as REAs in this region (nor in other regions of the Global South) nor investigating their impact on the diffusion of renewables and the politics of the energy transition. These institutions for greening energy governance have also been neglected in the scholarship on agencification. This strand of literature has mainly focused on the global diffusion of independent regulatory agencies (IRAs) in the electricity and other utilities sectors.² This shortcoming also applies to research on agencification in the MENA region (Cambini & Franzini, 2013, 2014; Mathieu & Jordana, 2022). In this article, we aim to close this gap by presenting the first comprehensive study focused on REAs. In particular, by combining insights from the energy transition and agencification literature, we address three sets of interrelated questions. First, we investigate the main drivers of REA diffusion in the MENA and their role in national (electricity) energy governance (Section 4). Second, we consider the impact of greening energy governance through agencification—that is by granting REAs a relevant role in national energy governance—on the deployment of renewables in the MENA countries (Section 5). Third, by looking at two countries where REAs have come to play an important role (i.e., Morocco and the United Arab Emirates, UAE), we investigate the effects of this form of green agencification on the “democratic” potentials of the energy transition (Section 6). Before addressing these questions, we discuss the relevant literature on the energy transition and agencification in the MENA (Section 2) and further specify the research hypotheses and method used in the present study (Section 3). Finally, in the conclusions (Section 7), we briefly review the findings and offer additional insights on the limits and potentials of greening electricity governance through agencification in the Global South. We found that the intermediation of international and transnational actors has been important for REA diffusion in the MENA, whereas green agencification is constrained by the rentier state political economy of fossil fuels. This result is consistent with existing research (Cambini & Rubino, 2016; Mathieu & Jordana, 2022) and explains the widespread low level of agencification in the MENA *vis a vis* other regions of the Global South. We also found that green agencification has the potential to foster the deployment of renewables, as REAs can catalyze external funding and help overcome regulatory and policy barriers. This calls for a more careful consideration of the varieties of institutional pathways that can increase policy effectiveness in the area of renewables beyond a narrow focus on market-oriented reforms and regulatory policy. However, the donor community should be aware of the risks associated with this institutional strategy. Green agencification can help the ruling elite extend control over an emerging economic sector and reproduce top-down approaches to policymaking, hindering the “democratic” potentials of the energy transition in the Global South.

2. Renewables and agencification in the MENA: A review of the literature

The literature on renewables in the MENA has focused on three interconnected areas of research: (i) the social and political implications of the energy transition for the MENA fossil fuel producers; (ii) the drivers and diffusion of policy innovations for promoting renewables; and (iii) the barriers that hinder the deployment of these new technologies in the region.³ The first strand of research has investigated the (potential) impact of the energy transition for the concentrated political economy of the MENA producers (e.g., Jalilvand & Westphal, 2017; Mahdavi & Uddin, 2021; Mills & Sim, 2021; Woertz, 2021). The shift toward renewables has the potential to

increase not only economic diversification and fiscal stability for rentier states but also demands for inclusive governance and democratic institutions. Rentierism in the MENA region emanated from the interplay between external fossil fuel rents and a “statist” model of development feeding each other, where legitimacy was secured through rent distribution (Hameed, 2020). Hence, the ruling elites in MENA producers face contrasting incentives. Thanks to renewables, they can diversify their fossil fuel-dependent economies, set up new development trajectories and increase their international influence in the emerging low-carbon world. However, by supporting the energy transition, they risk undermining the political and social foundations of their regime. The time horizon of the ruling elites has been indicated as a key factor in explaining variations among MENA producers’ renewable energy policies (Mahdavi, 2020; Mahdavi & Uddin, 2021). Many dynastic Gulf oil-rich monarchies anticipate a long and lasting rule and therefore see the inherent value of the energy transition as a means to assure their future survival. Conversely, other MENA producers, such as Libya or Algeria, do not share the same long-term view and do not see the same benefits of the energy transition. Other studies have further analyzed the specific problems that MENA producers encounter in promoting renewables, pointing to the inertia of the rentier state political economy and governmentality, and the prominent role of the traditional state actor and national oil companies in energy policymaking (e.g., Atalay et al., 2016; Griffiths, 2017; Lilliestam & Patt, 2015).

Research on the diffusion of policy innovations in the MENA has focused on the spread of strategies, tools and targets in the area of renewables (e.g., Griffiths, 2017; Menichetti et al., 2018; Poudineh et al., 2018; Tagliapietra, 2019; Vidican, 2015). These works have mapped the adoption of national strategies (or plans) for renewables and the implementation of both regulatory tools (e.g., feed-in tariffs, tendering, net metering) and nonregulatory tools (e.g., financial incentives and public investments) for promoting these new technologies, particularly in the electricity sector. As for the drivers behind the spread of these policy innovations, scholars have pointed to the role of international and transnational factors, including climate commitments, the role of international organizations and transnational networks in supporting policy learning and diffusion and the financial incentives provided by the donor community (e.g., Griffiths, 2017; Vidican, 2015). Similar to the previous strand of literature, however, these works have emphasized that MENA producers are less willing than importers to adopt strategies and tools for renewables. Furthermore, when they do adopt such strategies and tools, there is often an evident mismatch between the planned targets and their actual efforts to achieve them (e.g., Menichetti et al., 2018; Tagliapietra, 2019).

These issues have been further analyzed in research on barriers to the deployment of renewables in the MENA region (e.g., Belaïd et al., 2021; Bhutto et al., 2014; Lilliestam & Patt, 2015; Menichetti et al., 2018). These studies have focused both on technical aspects (e.g., lack of physical interconnections, inefficient energy networks) and on governance and policy elements that can hinder investments and impede the smooth introduction of new green technologies in the electricity sector. Scholars have examined the role of wider factors—such as the countries’ political stability—and sector-specific factors pertaining to the status of the regulatory and policy framework for renewables (e.g., targets, instruments, financial support, regulatory stability, market access, electricity market design, etc.). Overall, these works have stressed that political instability, regulatory instability and/or incomplete regulatory and policy frameworks, as well as powerful incumbents, scarce independence of IRAs or limited liberalization are all factors that can hinder the deployment of renewables in the MENA.

A few works in the latter two research areas have (partially) covered the establishment of REAs (e.g., Griffiths, 2017; Vidican, 2015). However, these works have not reflected on their distinctive functions, on the different roles they play in national energy governance nor on their drivers and impacts in terms of renewables deployment and political implications. A similar gap also exists in the (limited) literature on agencification in the MENA.⁴ This literature has mainly focused on the diffusion of IRAs in the MENA’s energy sector, assessing their drivers as well as their features. As for the latter aspect, scholars have illustrated the scarce independence of the MENA’s IRAs, with the exception of those countries more exposed to the external activities of the European Union (EU) (e.g., Cambini & Franzi, 2013, 2014; Cambini & Rubino, 2014; Lenzi, 2014). Euro-Mediterranean cooperation has also represented an important driver for the diffusion of IRAs and for promoting market reforms in the MENA’s energy sector (Cambini & Franzi, 2013, 2014; Cambini & Rubino, 2014). In a recent work, Mathieu and Jordana (2022) analyzed the creation of regulatory agencies in the MENA, looking at mechanisms of policy diffusion, such as coercion, competition, emulation, and learning. They highlighted the positive role played by EU–MENA countries’ interactions in facilitating diffusion through emulation and

learning. However, they also showed that (overall) agencification in this region is constrained by the legacies of the fossil fuel producers' political economy, which inhibit diffusion mechanisms. Like previous research, however, Mathieu and Jordana's (2022) work did not cover REAs.

3. Research hypothesis and method

As illustrated, the energy transition in the MENA is influenced by international and transnational dynamics. To be sure, this is not the first time that energy governance in the Global South has been influenced by such dynamics. Especially in the electricity sector since the 1990s, the liberalization-privatization agenda has been widely promoted as part of the broader neo-liberal package of the Washington Consensus. Regulatory reforms and the establishment of IRAs in this sector were key elements in the rise of the regulatory state in the Global South (e.g., Dubash & Morgan, 2013).

The energy transition is currently exercising a similar transformative effect on energy governance in the Global South. Unlike the liberalization agenda of the 1990s, however, the pressure to promote domestic reforms is less intense. The international (and donor) community is aware that the energy transition cannot follow a one-size-fits-all model, as variations in domestic contexts (political, economic, social, and geographical) require a variety of approaches and tools. The spread of policy innovations for "greening" energy governance—that is the introduction of policy strategies, policy tools, and institutions for promoting renewables—is not driven by coercion underpinned by strong political and economic conditionality. Other mechanisms of policy diffusion, such as competition, emulation and learning, are important in this field⁵ (e.g., Busch & Jörgens, 2005; Gilardi, 2012). These mechanisms are very difficult to distinguish empirically (and conceptually), and they often overlap (e.g., Kuhlmann et al., 2020; Maggetti & Gilardi, 2016). However, scholars agree that the diffusion of policy innovations—including agencies (e.g., Fernández-i-Marín & Jordana, 2015)—is facilitated by the intermediation of certain actors, such as epistemic communities, international organizations, and transnational policy networks (Gilardi, 2012; Radaelli, 2000; Stone, 2008, 2012). These actors can foster learning and persuade national policymakers to emulate others, providing also incentives in the forms of financial and technical assistance.

Hence, we expect that the activities of international organizations and transnational networks of non-state actors are important drivers for the diffusion of REAs in the MENA region as well. However, we also expect that REA diffusion is affected by some domestic conditions. The literature on policy diffusion has underlined that domestic factors and policy legacies influence diffusion processes as well as the specific design of policy innovations adopted at the national level (Busch & Jörgens, 2005; Dolowitz & Marsh, 2000; Marier, 2017). Similarly, research on agencification in the Global South has highlighted the influence of country-level political-institutional differences on the diffusion of agencies as well as on their features (e.g., Dubash & Morgan, 2013; Özel & Unan, 2021). As anticipated, research focused on the MENA has emphasized that the fossil fuel producers' political economy inhibits diffusion mechanisms, constraining the creation of regulatory agencies (Mathieu & Jordana, 2022). We expect that REA diffusion will also be more difficult in the MENA producers such as Algeria, Libya or the Gulf oil-rich monarchies, as these countries are more resistant (in general) to agencification and less inclined to adopt policy innovations in the area of renewables. However, we further articulate this expectation by hypothesizing that the fossil fuel producers' political economy influences not only the diffusion of REAs *per se*, but, more importantly, their specific design. Unlike research on IRAs that focuses on agencies' independence (e.g., Cambini & Franzini, 2013), we consider a set of functions exercised by REAs that assign them a major or minor role in national energy governance. Indeed, IRA independence is a key component of the market-oriented regulatory model for the energy sector, as it serves to signal policy credibility for attracting private investments (e.g., Gilardi, 2008). However, a similar one-size-fits-all model does not exist in the area of renewables, for which a variety of approaches and tools are accepted. Specifically, we expect that MENA producers will be more reluctant to assign important functions to REAs in national energy governance. This is because of the obstacles the energy transition encounters in the rentier states and the prominent role traditional incumbent actors, such as oil companies, play in national energy governance.

Accordingly, the first two hypotheses we tested are as follows:

Hypothesis 1. REA diffusion is (positively) influenced by international and transnational dynamics and (negatively) influenced by the (high) level of fossil fuel rents in a country.

Hypothesis 2. The role of REAs in national energy governance is (negatively) influenced by the (high) level of fossil fuel rents in a country.

To assess the first hypothesis, we examined the establishment of REAs in the MENA region and checked for the role of international organizations and transnational networks that can favor the diffusion of this policy innovation at the country level. Then, we checked whether REA diffusion is associated with the level of fossil fuel rents in a country as a proxy for producer states' political economy. Many MENA countries are geographically close to European countries and the EU, which has promoted a plethora of regional partnerships and transnational networks favoring the circulation of policy ideas across the Mediterranean. Several EU initiatives have also sought to promote regulatory reforms in the MENA energy sector (e.g., Cambini & Franz, 2014; Cambini & Rubino, 2014). Although REAs, unlike IRAs, are not part of the regulatory reforms package for the electricity sector, we expect that engagement with the EU has a positive impact on their diffusion. Indeed, the EU's energy cooperation with the MENA has also targeted the promotion of environmental (and later) climate objectives and renewables (e.g., Bardolet, 2014). For the second hypothesis, we looked at the role of REAs in national energy governance. By empirically mapping their functions, we created a simple index that differentiates between a low, medium and high role. Then, we checked whether each REA's role (higher or lower) is associated with the level (higher or lower) of fossil fuel rents in a country. Moreover, we considered alternative possible explanations, such as the dominant regulatory model for energy governance in each country.

Our second research question focused on the impact of REAs on renewables. We wanted to explore whether or not a strategy of agencification for greening energy governance—that is an institutional strategy that grants REAs important functions over renewables—can have a positive effect on the deployment of these technologies at the national level. Research on the matter is scant and ambiguous. Some studies have suggested that the creation of new institutions endowed with important functions in the area of renewables could break the inertia of the traditional actors in the fossil fuel energy system (Lee & Usman, 2018; Usman & Amegroud, 2019). These actors, such as large utilities and national oil companies, have fewer incentives to challenge the status quo and promote renewables. Other studies, however, have suggested that traditional actors are better positioned—because of their economic and political resources—to realize the investment necessary to foster renewables (Marcel, 2019). The establishment of new institutions can also result in turf battles that can delay the energy transition. This was the case in Algeria, where, in 2002, a REA was created (New Energy Algeria) but then absorbed in 2012 by the national utility Sonelgaz. To help clarify this debate, we formulated the following hypothesis:

Hypothesis 3. The more relevant the role of REAs in national energy governance, the higher the deployment of renewables in the country.

We assumed that the mere creation of a REA is not sufficient to foster the deployment of renewables. If the role of REAs in national energy governance is minimal—for instance, if they are only involved in research and demonstration projects—it is difficult to expect them to have a significant impact. However, if the role of REAs is higher, they have (potentially) more opportunities to challenge the status quo and foster the development of renewables. To investigate this proposition, we checked whether the (higher or lower) diffusion of renewables in each MENA country is associated with the (higher or lower) role that REAs play in national energy governance. To assess the role of REAs, we looked again at the index based on their functions, whereas for the diffusion of renewables, we considered a number of indicators that can provide a detailed evaluation of their deployment in each country. We focused particularly on solar and wind energy, as they are the most promising of these technologies and have more potential in the region. Conversely, we did not consider hydropower, as many of these installations in the MENA were built in the 1970s–1980s, a period outside the scope of this study.

Moreover, in discussing the impact of REAs, we took into consideration additional factors that can foster the adoption of renewables. In particular, we considered the (more or less) conducive policy and regulatory framework

for renewables using as a proxy data from the World Bank Regulatory Indicators for Sustainable Energy (RISE) project (“Renewable Energy” indicators). The advantage of the RISE project is that its data assess several aspects of each country’s policy and regulatory framework for renewables, including the legal framework, tools and targets, regulatory and financial support, market access and competition, planning, network connection and mitigation of financial risks. Unlike the literature on IRAs, we do not expect agencies’ independence to be a relevant factor for explaining the impact of REAs on the deployment of renewables. As anticipated, the focus on IRA independence in the traditional agencification literature is justified because this element is part of a wider model for (market-oriented) regulatory reforms, for which IRA independence should lead to greater effectiveness (e.g., Gilardi, 2008). In the realm of renewables, there is no standard policy model suggesting a particular design for REAs. Conversely, research has highlighted that in some cases, for developing countries, close links between a REA and the executive can be instrumental for attracting investments (Mathieu, 2022). These links can assure investors of the commitment of the ruling elite to the effective implementation of renewable energy policy. However, to further enrich our analysis, we also checked for the potential effect of key institutional differences among REAs on the development of renewables.

Finally, our third research question focused on the wider political impact of green agencification as an institutional strategy that assigns REAs an important role in national renewable energy governance. In this case as well, there is no specific literature on the subject. Several studies have investigated the possible political effects of the energy transition. However, the findings are ambiguous. Early works, which focused mainly on industrialized countries in the West, suggested that the promotion of renewables would be conducive to a “democratization” of energy governance (for a review of this debate, see Szulecki, 2018). New actors would enter the scene, challenging the prominent role of large incumbent companies. In addition, forms of bottom-up participation would challenge the traditional top-down approach to energy policymaking of the fossil fuel regime. As illustrated, similar expectations have also been proposed with regard to the MENA countries. More recent works, often focused on the Global South, have been more cautious about the possible outcomes of the energy transition (e.g., Al-Saidi, 2020; Hochstetler, 2020). This process can reaffirm, rather than challenge, existing power relations. The mere rise of renewables in the national energy mix is not sufficient to alter political asymmetries or empower new social actors. This is especially the case when renewables are not promoted in a decentralized fashion (e.g., small installations owned by small business, citizens or local communities) but through large technological systems (e.g., wind farms or concentrated solar power [CSP]) (e.g., Al-Saidi, 2020; Szulecki, 2018). These systems can easily recreate a top-down approach to energy governance.

Against this evolving background, it is difficult to predict the wider political impact of REAs at the national level. Green agencification can be a vector of innovation that contributes to a more inclusive and participatory approach or it can be a vector for reproducing (or expanding) existing power relations. To contribute to this debate, we focused on two MENA countries where REAs have come to play an important role in national energy governance: Morocco and the UAE. As we want to investigate the potential impact of green agencification, we chose two cases where this institutional strategy has been adopted (specifically, these countries have adopted a similar model of green agencification; see below). In other words, Morocco and the UAE represent “extreme” examples of the phenomenon under investigation, which are particularly suitable for developing exploratory analysis (Seawright & Gerring, 2008).⁶ Moreover, these countries differ substantially in their (energy) political economy: Morocco is a consumer country, whereas the UAE is a producer (rentier) state.⁷ In both cases, however, the creation of a REA has been instrumental in helping the ruling elite to extend control over the emerging sector of renewables hindering the democratic potential of the energy transition.⁸ To be sure, these two countries are both nondemocratic regimes.⁹ By “democratization” of energy governance, in this context, we intend the emergence of more inclusive and less top-down approaches. It is also important to stress that we do not aim at offering a comprehensive study of the evolving political and institutional landscape in these countries. Drawing on existing research and reports by international organizations we performed an analysis of these two cases that is limited to those elements that serve to address our (more focused) research question on the impact of green agencification.

4. Drivers, functions and roles of REAs in the MENA region

With the exception of Bahrain and Oman, all MENA countries have established a REA (Table A1). As expected, international and transnational factors have been important for the diffusion of REAs. The first REAs were established in the 1980s in Tunisia, Egypt, Morocco, Algeria, and Jordan as research centers focusing on

renewables and energy efficiency. This development was driven mainly by the research community, which had contacts with the other shore of the Mediterranean. In this period, similar research centers were also established in the European Mediterranean countries, including Italy (1982), France, and Spain (1986). Cooperation on environmentally related issues was well developed in the Mediterranean region, supported by a transnational epistemic community (e.g., Haas, 1990). After the 1970s oil shocks, research on renewables entered the agendas of several governments and agencies. Additional drivers for the establishment of these first MENA REAs were the technical and financial assistance provided by US and European development cooperation agencies.¹⁰ In the 1990s, only a new REA was established: the Palestinian Energy and Environment Research Center (PEC) (Table A1; Fig. 1). The PEC works under the auspices of the Palestinian Energy and Natural Resources Authority, which was created thanks to the support of the World Bank and other bilateral donors. Overall, until the end of the 1990s, REAs were established only in North African and Levant countries. In the same period, other agencies operating in the utilities and energy-related sectors were established in these countries (Table A2). This was the case particularly in Algeria, Egypt, Morocco, and Tunisia, countries that were more involved in Euro-Mediterranean cooperation (e.g., Isaac & Kares, 2017). Conversely, in the Gulf Cooperation Council (GCC) countries, similar agencies were not created until 1999 (Table A2).

The diffusion of REAs in the MENA accelerated in the 2000s in parallel with a general trend of growing agencification in the region triggered by the establishment of new agencies in the GCC countries (Fig. 1; see also Table A2). During this period, the promotion of renewables entered more firmly into the global climate agenda as well as into the agenda of the donor community. The 2002 UN paper “Guidance in Preparing a National Sustainable Development Strategy” included energy policy and renewables. Lebanon’s Center for Energy Conservation (LCEC) and Syria’s National Energy Research Center (NERC) were established thanks to the support of the Global Environment Facility and the United Nations Development Programme. Under the auspices of the Barcelona Process, promoted by the EU, these countries were also involved in the Mediterranean Association of National Agencies for Energy Management (along with Morocco, Algeria, Tunisia and Palestine). Libya did not take part in these international programs; however, it participated in the regional process that led to the 2007 Damascus Declaration, which called for the MENA countries to develop renewables. This declaration, in turn, led

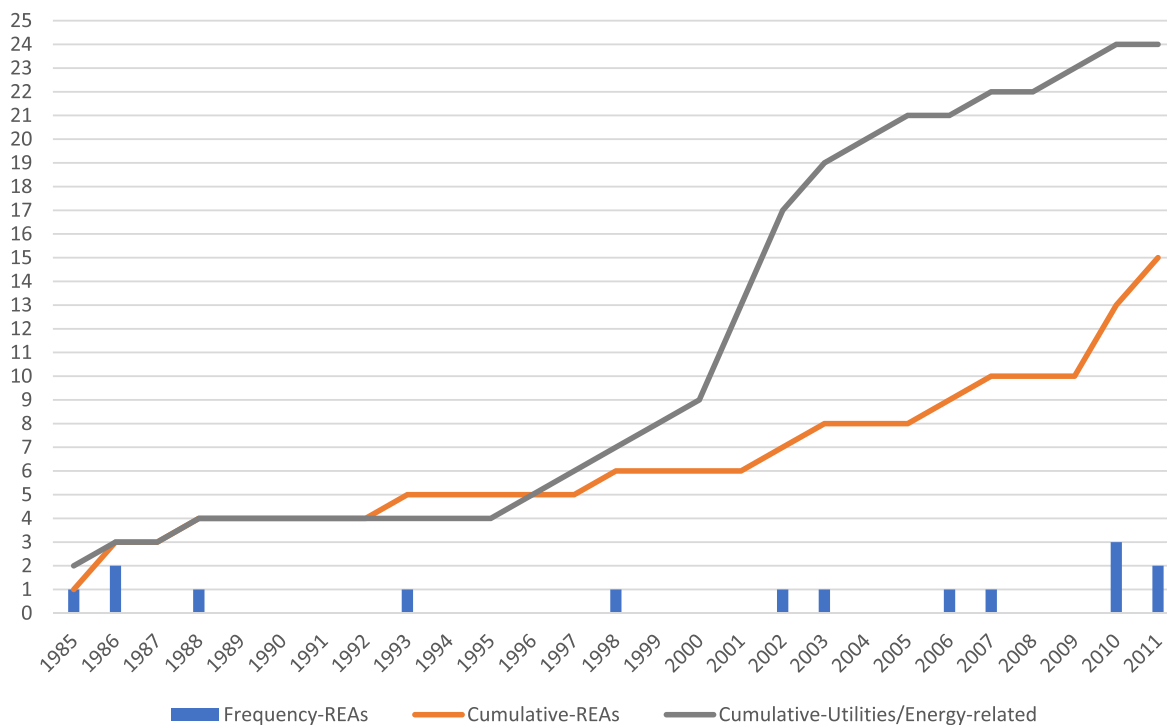


FIGURE 1 Renewable energy agencies and utilities/energy-related agencies diffusion in the Middle East and North Africa region. *Source:* Authors’ elaboration on data provided in Tables A1 and A2 (see the Supplementary data).

to the establishment of the Regional Center for Renewable Energy and Energy Efficiency for Arab countries, located in Cairo and supported by the EU, German and Danish development cooperation policy. That same year, Libya created the Libyan Renewable Energy Authority (REAOL).

In the GCC fossil fuel-rich monarchies, which were also less exposed to the efforts of the donor community and the EU's external action, the diffusion of REAs manifested later. A partial exception is the case of Kuwait. The Kuwait Institute for Scientific Research (KISR) was originally established in 1967 by Japan's Arabian Oil Company in partial fulfillment of its obligations under an oil concession agreement with Kuwait. In 1981, it became a government agency, and its competencies were expanded in the area of renewables. Its role was then advanced in the late 2000s after the country launched its "State Vision Kuwait 2035." The other GCC fossil fuel-rich monarchies also established their REAs within the context of national plans for diversification from their fossil fuel economies. The first mover was the UAE, which, in 2006, created the Abu Dhabi Future Energy Company (MASDAR), wholly owned by the Abu Dhabi government's Mubadala Investment Company.¹¹ This agency increased its role in 2010 with the launch of the "Vision 2021" plan. During this period, the UAE actively engaged the international community for the establishment of the IRENA, which was located in the newly established MASDAR City. Saudi Arabia and Qatar also created REAs along with national plans for renewables.

Overall, our first expectation (H1) was confirmed. International and transnational drivers have favored the establishment of REAs, especially in North African countries. REAs were created very early also in producers like Algeria and Egypt (Algerian and Egyptian fossil fuel rents were similar during the 1980s, totaling about 20% of their GDP) (see Table A3). Libya, another North African producer country, did not create a REA until 2007 (almost 20 years later than Algeria and Egypt). Due to the difficult relations with the Gaddafi regime (1969–2011), however, for a long period, Libya was at the margins of Euro-Mediterranean cooperation and the efforts of the donor community. For instance, Libya never joined the Barcelona Process (it only acquired observer status in 1999). It is worth noting, on the other hand, that the EU–Libya rapprochement began in 2007, the same year that the Libyan REA was established. Conversely, as illustrated in the Gulf region, the diffusion of REAs began later. The GCC countries are mainly producer states and are less exposed to the efforts of the donor community and the EU. These factors combined to retard the diffusion of REAs, which manifested in parallel with the launch of national plans on renewables. When policymakers in the GCC countries decided to establish a REA, this policy innovation was already diffused in the MENA and was perceived as a legitimate way of supporting renewables (see Fig. 1). Furthermore, other agencies were established during the same period in the GCC countries (Table A2). The two remaining MENA countries without a REA are Bahrain and Oman, which are both producer states. Moreover, in other producers, such as Saudi Arabia, Qatar, and Kuwait, the focus of REAs extends beyond renewables (e.g., the Saudi K.A.CARE also covers nuclear energy, whereas the Kuwait KISR also covers petroleum).

With regard to the role of REAs in national energy governance, these specialized institutions perform different functions, which can be grouped into three main areas of activities: (i) research and policy advising, (ii) project development, and (iii) regulatory functions. Research and policy advising concerns conducting both policy-focused and applied studies on renewable technologies. It also involves providing government expertise on renewable energy policy and contributing to draft plans and initiatives on the matter. Project development implicates more active participation in the implementation of renewable energy projects through ownership—to varying degrees—of sites and installations. Finally, regulatory functions concern the involvement of REAs in managing aspects of the national regulatory tools for renewables such as tenders, competitive auctions or feed-in tariff schemes.

The first REAs established in the 1980s in the North African and Levant countries focused on research and policy advising. However, the role of these original agencies, except in Jordan, increased over time in parallel with the development of national plans on renewables (Tagliapietra, 2015; Vidican, 2015). When Egypt started to develop renewables more actively (in the early 2000s), the Egyptian National Renewable Energy Authority (NREA) gradually became a developer of installations and sites. Finally, when Egypt relaunched its renewables energy plan—in the late 2000s—the Egyptian NREA also acquired regulatory functions managing competitive biddings, tenders and the country's feed-in tariff scheme. A similar pattern was followed by the Tunisian National Agency for the Promotion of Renewable Energy (ANME) that was gradually upgraded—first with a reform issued in 2004 and later with the Tunisian Solar Plan initiated in 2010—from a research center and advising institution

to an actor endowed with (some) regulatory functions in the area of renewables. Unlike in Egypt, however, the government in Tunisia did not grant the ANME project development functions. A subsidiary of the incumbent utility company (STEG-ER) was created for the implementation of the Tunisian Solar Plan. Morocco also upgraded its original REA; however, in 2010 it created a completely new agency to develop its solar plan, namely MASEN, a private entity funded by the state with regulatory and project development functions. This agency was further upgraded in 2016 (see Table A1).

The REA established in the 1990s in Palestine was only endowed with research and policy advising functions, as were the other REAs created in the 2000s in North Africa and the Gulf with the notable exception of MASDAR, which was endowed with project development functions (Table A1). Overall, however, only 4 out of 15 MENA countries have adopted a strategy of green agencification by granting REAs a role beyond research and policy advising (Table 1). In Egypt and Morocco, the REAs' role is higher as they have both project development and regulatory functions. In Tunisia and the UAE, this role is medium as REAs only have regulatory (ANME) and project development (MASDAR) functions, respectively. In all the other MENA countries, REAs' role is low, being limited to research and policy advising (Table 1).

We expected this variation in the role of REAs to be linked to fossil fuel rents (H2). The findings partially confirm this hypothesis. Figure 2 illustrates REAs' role (low, medium, high), fossil fuel (oil and natural gas) rents (as percentage of GDP) and MW of renewable energy (RE) installed capacity (excluding hydro) for the MENA countries. The data confirm that higher fossil fuel rents tend to discourage renewable deployment and negatively affect the REAs' role. In the GCC's fossil-fuel-rich monarchies, with the notable exception of the UAE, the REAs' role is low. Key responsibilities for renewables are in the hands of traditional state actors that have expanded their functions to cover renewables, such as energy ministries, national electricity utilities, and national oil companies (Table A1). In North African producer countries (Algeria and Libya), the REAs' role is similarly limited. As anticipated, in Algeria efforts to grant the REA a more prominent role in energy governance were reversed. On the other hand, in three out of seven countries with lower fossil fuel rents (Egypt, Morocco, and Tunisia), REAs' role in green energy governance is significant.

The case of Egypt is particularly interesting for our second expectation. Although a REA in Egypt was already established in the late 1980s—when the country was a producer state (fossil fuel rents were about the 20% of Egyptian GDP during the 1980s)—it was endowed with significant functions only in the late 2000s, when fossil fuel rents were drastically declining (see Table A3). To a lesser extent, this was also the case in Tunisia, which established its REA in 1985 but upgraded its functions only in 2010, when fossil fuel rents were declining there as well (see Table A3). The important role of the Egyptian, Moroccan, Tunisian, and UAE REAs is also reflected in

TABLE 1 Index of REAs' role and MENA countries adopting a green agencification strategy.

REA (country)	REAs role in renewable energy governance ^a	Green agencification strategy
MASEN (Morocco)	High	Yes
NREA (Egypt)	High	Yes
ANME (Tunisia)	Medium	Yes
MASDAR (UAE)	Medium	Yes
CDER (Algeria)	Low	No
PEC (Palestine)	Low	No
NERC (Jordan)	Low	No
LCEC (Lebanon)	Low	No
NERC (Syria)	Low	No
REAOL (Libya)	Low	No
KISR (Kuwait)	Low	No
K.A. CARE (Saudi Arabia)	Low	No
QEERI (Qatar)	Low	No

Abbreviations: MENA, Middle East and North Africa; REAs, renewable energy agencies. ^aLow = Research & Policy advising functions; Medium = project development OR regulatory functions; High = project development AND regulatory functions. For REAs' functions, see Table A1.

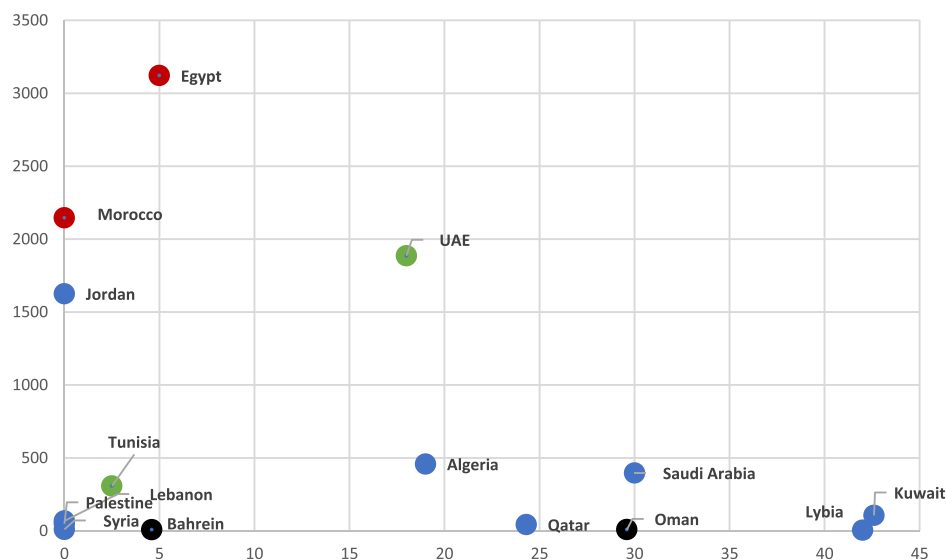


FIGURE 2 Renewable energy (RE) (non-hydro) electricity installed capacity (in MW, vertical axis), fossil fuels rents as % of GDP (horizontal axis) and renewable energy agencies' (REAs) role (colored dots) in Middle East and North Africa countries. RE installed capacity on vertical axis: 2020 data in MW by IRENA (<https://irena.org/Statistics/Statistical-Profiles>). The data on fossil fuels (natural gas and oil) rents as % of GDP are retrieved by the World Bank database, available at: <https://data.worldbank.org/indicator>. For this figure, we considered the average data of three reference years (2010, 2015, 2019). For the REAs' role: Red dot = High; Green dot = Medium; Blue dot = Low; Black dot = no REA.

their major organizational capacity: about 1,000 employees work for NREA, about 220 for MASEN, about 150 for ANME and about 500 for MASDAR Clean Energy. These numbers are much higher than those of the other REAs, which oscillate between 20 and 50 employees.¹² In Jordan, Lebanon and Palestine, traditional actors maintain competences over renewables (in Syria, the instability brought about by war has hindered the development of renewables) (Table A1).

As REAs can (also) perform regulatory functions, another possible explanation for their (lower or higher) role might be linked to the presence and position of IRAs in the domestic electricity sector. That is to say, a national regulatory model with a strong IRA could constrain the role of REAs. However, this alternative explanation is very problematic. First of all, as of 2020, only 8 out of 15 MENA countries had established an IRA (Morocco's IRA began operation in 2021) (Table A1). Only two out of seven countries without IRAs have a REA with significant functions. This proportion is similar to that of MENA countries with an IRA, as only two out of eight have a REA with significant functions (Table A1). Moreover, IRAs in the MENA generally play a very limited role in national energy governance (e.g., Cambini & Franzini, 2013). An exception is Jordan, where the IRA also has relevant competences in the area of renewables. In Tunisia and Morocco, countries without IRAs, REAs have developed some regulatory functions over renewables. However, this is also the case in Egypt, which has had an IRA since 1997. The Egyptian IRA is mainly an advisory body of the government rather than a strong regulator for the electricity sector. Nonetheless, with the exception of Jordan (again), this is the case also for the other MENA countries, including the UAE, where regulatory power is mainly in the hands of the government (Department of Energy) and the national utility.

5. Agencification and deployment of renewables in the MENA region

The other question we asked pertains to the impact of REAs on the deployment of renewables. We suggested that the mere existence of a REA alone does not necessarily imply a positive impact. However, we posited that a more relevant role for REAs in national energy governance should imply a faster deployment of renewable energy sources in the country. To check this hypothesis (H3) we again consider the variances in REAs' role according to their functions (Table 1). Then, we look at different indicators for RE deployment (excluding hydro) in terms of

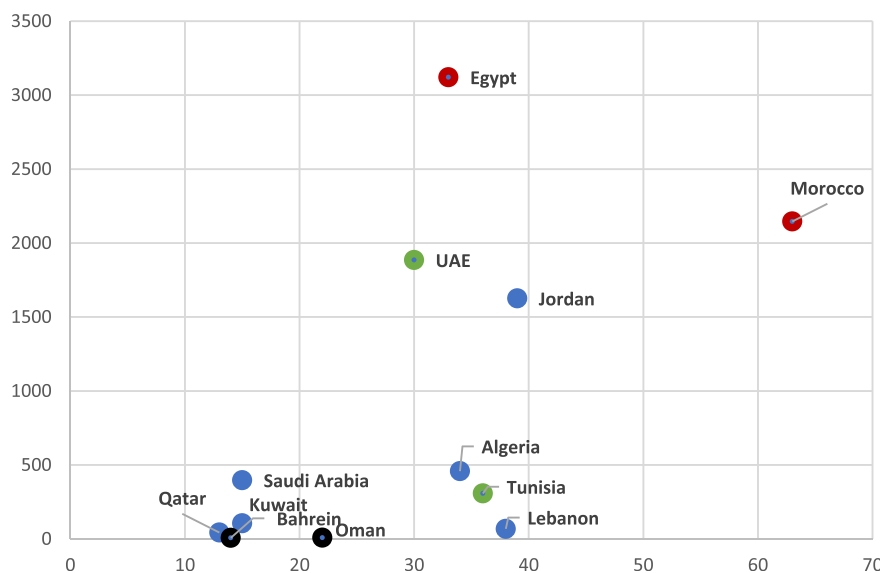


FIGURE 3 Renewable energy (RE) (non-hydro) electricity installed capacity (in MW, vertical axis), RE regulatory and policy framework (horizontal axis), and renewable energy agencies' (REAs) role (colored dots) in Middle East and North Africa countries. RE installed capacity on vertical axis: 2020 data in MW by IRENA (<https://irena.org/Statistics/Statistical-Profiles>). The Regulatory and Policy Framework (RPF) score on the horizontal axis is based on the data provided by RISE World Bank ("Renewable Energy" indicators, available at <https://rise.esmap.org/>). These data range from 0 (worst) to 100 (best). For the RPF axis in this figure, we considered the average score of three reference years (2010, 2014, 2018). For the REAs' role: Red dot = High; Green dot = Medium; Blue dot = Low; Black dot = no REA.

installed capacity in MW (Fig. 3) and percentage of renewables' installed capacity over total installed capacity (Fig. 4). We also check the regulatory and policy framework for renewables in each MENA country (Figs. 3 and 4).

Overall, the data only partially confirm our third hypothesis. The first three MENA countries in terms of renewables' installed capacity are characterized respectively by a high (Egypt and Morocco) and medium (UAE) REAs' role in energy governance (Fig. 3). Notably, in all three cases REAs engage in project development (see Table A1). Tunisia is only in the seventh position as regards renewables' installed capacity, even though its REA plays a medium role. The Tunisian REA (ANME), however, is not involved in project development, having only (limited) regulatory functions. Other countries (Jordan, Saudi Arabia, and Algeria) perform better than Tunisia despite their REAs having a low role in energy governance. The result, however, is slightly different if we consider the data in percentages. As Figure 4 illustrates, MENA countries where REAs play a more important role (high or medium) perform better for this indicator, with the notable exception of Jordan. This country has a moderately developed regulatory and policy framework, but so do Algeria and Lebanon, which perform worse in the area of renewables. Although political instability can contribute to explaining this outcome, Egypt has been characterized by lower levels of political stability than Algeria and Lebanon in the last decade.¹³ Moreover, GCC countries, which have been politically more stable than North African countries, have a lower deployment of renewables (with the exception of the UAE). In Syria, Libya and Palestine, the political context is very unstable, and all three have a very limited deployment of renewables at about 10, 5, and 40 MW of installed capacity, respectively.¹⁴

Generally, MENA countries with a more supportive regulatory and policy framework perform better than those where this framework is poor, but there are important exceptions (Figs. 3 and 4). The UAE has a poorly developed regulatory and policy framework but ranks third in the MENA for both indicators of renewable deployment. Egypt also has a poorly developed regulatory and policy framework but ranks first for renewables installed and fifth in percentages. The important role of the UAE and Egyptian REAs in national energy governance can contribute to explaining these results (see below). In Morocco, the regulatory and policy framework is advanced, and the REA has significant functions. In this country, the strong political will to develop renewables

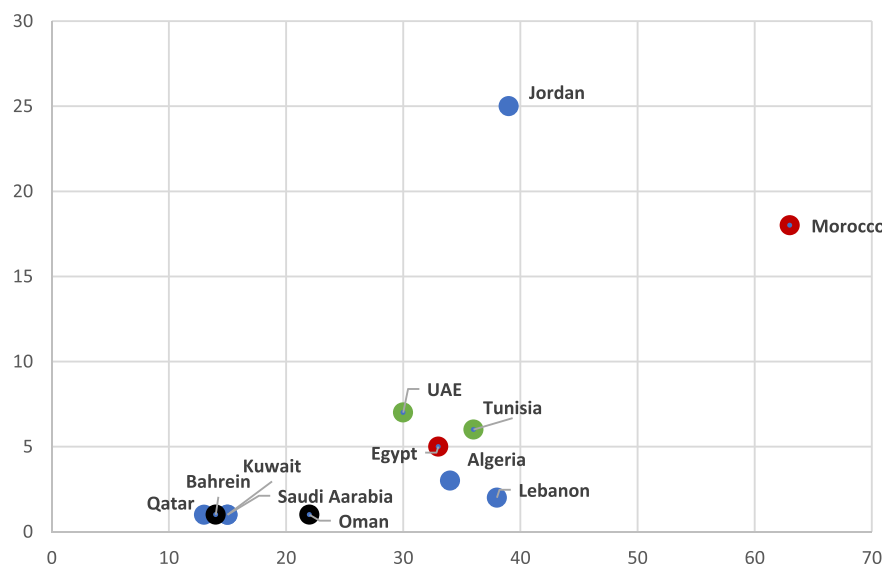


FIGURE 4 Percentage of renewable energy (RE) (non-hydro) electricity installed capacity (vertical axis), RE regulatory and policy framework (horizontal axis) and renewable energy agencies' (REAs) role (colored dots) in Middle East and North Africa countries. Percentage of RE installed capacity on vertical axis: 2020 data in MW by IRENA (<https://irena.org/Statistics/Statistical-Profiles>). The Regulatory and Policy Framework (RPF) score on the horizontal axis is based on the data provided by RISE World Bank ("Renewable Energy" indicators, available at <https://rise.esmap.org/>). These data range from 0 (worst) to 100 (best). For the RPF axis in this figure we considered the average score of three reference years (2010, 2014, 2018). For the REAs' role: Red dot = High; Green dot = Medium; Blue dot = Low; Black dot = no REA.

has translated into a (relatively) better framework and the empowering of its REA. Apart from the UAE, the GCC countries have poorly developed regulatory and policy frameworks, a low role for REAs (or no REA at all, as in Bahrain and Oman) and poor performance in the deployment of renewables. Saudi Arabia, which ranks sixth for renewable installed capacity, is a partial exception. However, renewables contribute only about 1% of the total Saudi Arabian electricity capacity, putting the country in the same group as the other oil-rich monarchies of the Gulf (Fig. 4).

Although our third hypothesis is only partially confirmed, further evidence indicates the positive relation between REAs and renewable deployment, particularly when REAs engage in project development, catalyzing investments from the donor community or international companies. As Figure 5 shows, Morocco and Egypt have been by far the largest recipients of development funds for renewable energy projects in the MENA.¹⁵

In Egypt, NREA, in co-operation with German, Spanish, Japanese, and Danish developmental agencies, has established a series of large-scale wind farms since the early 2000s (RES4MED, 2015). The following years, NREA continued to develop wind projects, catalyzing international funding from bilateral and multilateral donors (IRENA, 2018). Most of the wind power installed in the country as of 2020 had been developed by NREA (2020). NREA has also been involved in several large solar projects in Egypt which have been launched since the early 2010s in cooperation with international donors. In Morocco, similarly, the deployment of renewables accelerated after MASEN began to operate in the early 2010s (RES4MED, 2018). MASEN, like the Egyptian NREA, catalyzed funding from international (bilateral and multilateral) donors to develop large projects in the wind and solar sector which account for a large amount of the renewable capacity installed in the country.¹⁶ In the UAE, renewable deployment accelerated in the mid-2010s when MASDAR Clean Energy began to develop large CSP and solar parks, which represent almost all the renewable capacity installed in the country. However, rather than being supported by the donor community, these projects were realized by MASDAR in partnership with international companies (e.g., the French Total and EDF).¹⁷ Unlike Morocco and Egypt, the oil-rich UAE has been a net investor in other emerging economies. MASDAR has been part of this international strategy, which supports the UAE's green diplomacy.¹⁸

Finally, unlike the diversity in REAs' functions, their institutional features are not associated with any particular trend. The large majority of REAs are designed as governmental agencies placed directly under a line Minister

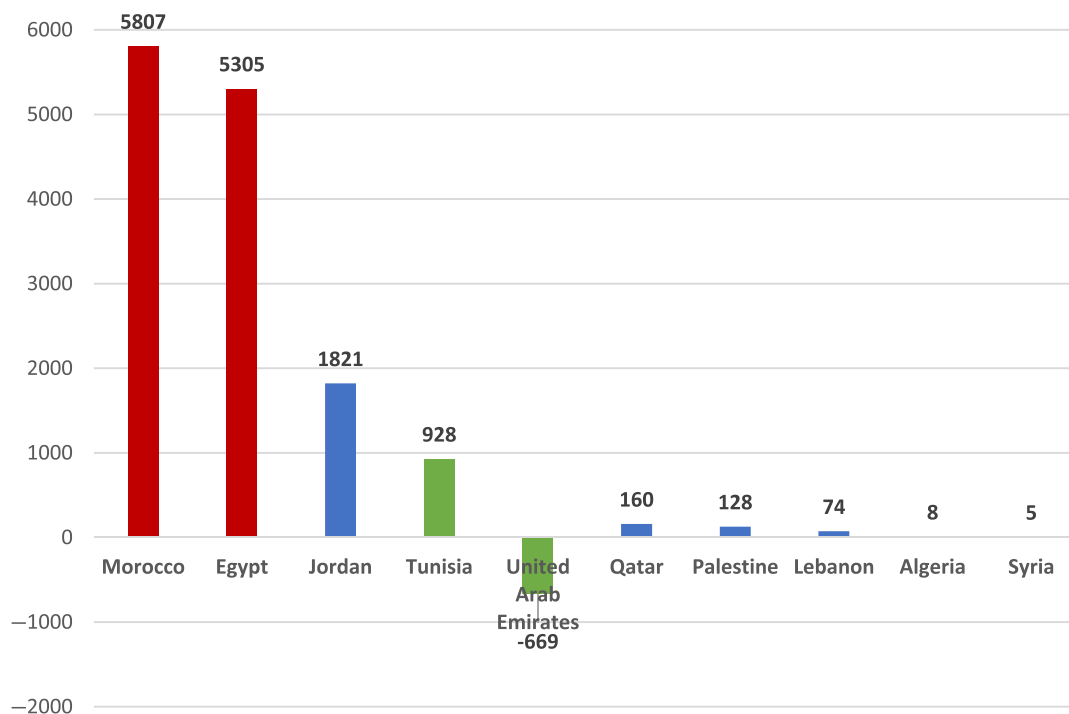


FIGURE 5 Value (in 2019 USD million) of renewable energy projects financed by bilateral and multilateral donors in the Middle East and North Africa countries (2011–2019). *Source:* Authors' elaboration based on Renewable Energy Finance 2020 (IRENA and CPI, 2020). Negative numbers indicate net outflow of investments funds. For the REAs' role: Red = High; Green = Medium; Blue = Low.

or the executive branch (10 out of 14) (see Table A1). QEERI and NERC, which are research centers, are respectively supported by the state-led Qatar Foundation and the Jordan Royal family through the Royal Scientific Society. Among REAs with more important functions, MASEN and MASDAR were established as state-backed private entities. As illustrated, MASEN has contributed to attracting several investments to Morocco, but so has NREA, which is placed under the Egyptian Ministry of Electricity and Renewable Energy. The institutional choice made by Morocco and UAE also reflects the willingness of these countries to use these agencies for developing an external action on renewables. In the case of the UAE, this strategy contributes to explaining the important role that MASDAR plays in national energy governance, which deviates from that expected in a producer state. Moreover, in both these cases this institutional choice does not increase REAs' independence; indeed, the opposite is true (see below).

6. Green agencification and “democratization”: Insights from Morocco and the UAE

The last research question we asked focused on the wider political impact of green agencification on the “democratization” potential of the energy transition. To address this question, we look at Morocco and the UAE, respectively a consumer and a producer state, which, however, have followed a similar (and more innovative) institutional strategy of green agencification as their REAs were created as state-backed private entities performing relevant functions in national energy governance. Specifically, both MASEN and MASDAR are involved in project development, which, as we saw, has been a key factor in fostering the deployment of renewables in the MENA. Below, we offer a concise illustration of the political implications of these strategies, which were implemented in a period when these monarchies remained stable during the so-called Arab uprising. The findings resonate with the recent literature that calls for a better appreciation of the effects of technological choices (large vs. small installations) on the “democratization” potential of the energy transition. They also confirm the context-dependent nature of the energy transition, which is embedded in national political and institutional configurations (e.g., Power et al., 2016).

6.1. Morocco

In the mid-2000s, Morocco was facing an increase in energy demand prompted by steady economic growth. In this context, the government decided to improve the role of renewables in its energy mix (RES4MED, 2018). Morocco also took part in several initiatives promoted by European countries and the EU to create transregional energy trade based on renewables (Cantoni & Rignall, 2019; Fritzsche et al., 2011). These initiatives encountered several political and technical problems and were abandoned. However, the Moroccan monarchy was able to maintain the momentum and link the ongoing international dynamics with its 2009 National Energy Strategy. The latter was centered on the Moroccan Solar Plan that envisaged important investments in CSP technology. MASEN was created to implement this plan. It is managed by a president and steered by a supervisory board that brings together the main ministries, the managing director of the electricity utility ONEE and the director of the Hassan II Fund, a state-led fund controlled by the royal family. The choice of CSP technology reflects the national tradition of a centralized and top-down approach to policy making (Beard, 2013; Cantoni & Rignall, 2019). A similar preference for the centralization of renewable energy governance is reflected in the progressive concentration of responsibilities and decision-making power in the hands of MASEN which, in 2016, became responsible for developing all Moroccan renewables, particularly larger installations in the solar and wind sector. Domestically, MASEN has been instrumental in helping the Moroccan ruling elite assert control over an emerging economic sector (Choukri et al., 2017; Okpanachi et al., 2022). Abroad, MASEN has begun to act as a tool for the kingdom's green diplomacy with neighboring countries (El Gharras & Menichetti, 2018) to foster further regional integration and increase its regional influence (Nicolai, 2020).

6.2. UAE

In the UAE, MASDAR Clean Energy was established as part of a larger initiative encapsulated in the MASDAR City flagship project (Crot, 2013; Cugurullo, 2013; Reiche, 2010). This project must be placed within the context of the UAE's efforts to diversify its fossil-fuel-dependent economy. Promoted by the ruling elite, however, these efforts are in line with the politics of "mega-projects" that characterize the rentier states of the Gulf (Al-Saidi, 2020; Rietmann, 2021). These mega-projects are rooted in the governmentality of the Gulf monarchies and their top-down approach to "modernization." They serve different goals: reasserting the control of the ruling elite over economic development, promoting the prestige of the rulers and attracting foreign investment. MASDAR Clean Energy has mobilized state financial resources to realize renewable projects in the UAE and abroad. In the UAE, it has developed mainly large solar (photovoltaic and CSP) and wind projects establishing partnerships with international companies and has invested heavily in importing clean technologies and enhancing multilateral partnerships on sustainable development planning (Al-Saidi et al., 2019). Abroad, MASDAR has invested in 19 countries supporting the emerging UAE green diplomacy. MASDAR is managed by a board of directors that includes traditional actors also involved in other government institutions, such as ministries and state-owned oil companies. Thanks to MASDAR, the emirate's ruling elite can extend its traditional pattern of vertical, top-down steering of economic development into the area of renewables and protect its rentier interests (Al-Sarihi & Mason, 2020; Koch, 2022; Rietmann, 2021). This strategy also has low political costs and can be described as a benefits-oriented approach toward global environmental governance (Luomi, 2015). Other approaches, such as implementing regulatory reforms or imposing higher tariffs to promote renewables in the electricity sector, would risk undermining the social contract of the UAE's rentier state, possibly opening a space for criticism of the ruling elite or requests for more political representation.

7. Conclusions

In this article, we offered the first comprehensive study on the diffusion and impact of REAs in a region of the Global South, a topic neglected by both the energy transition and agencification scholarship. In the MENA, the spread of these institutions has been favored by the intermediation of international and transnational actors. The role of the EU and the donor community has been particularly important in this process, as they have fostered policy diffusion in North African and Levant countries, in particular. Conversely, the fossil fuels rentier political economy has negatively affected green agencification. In this regard, the MENA region is confirmed as being a

hostile environment for agencification (Mathieu & Jordana, 2022). In most cases, the role of REAs has remained limited to the area of research and policy advising. Only in four MENA countries—Egypt, Morocco, Tunisia, and the UAE—have they acquired a more significant role by taking (some) regulatory functions and/or developing renewable projects. As with the deployment of renewables, the political economy of fossil fuel producers has generally hindered REAs from developing a more prominent role in national energy governance, with the notable exception of the UAE. When involved in project development, in particular, REAs have helped the deployment of renewables. REAs have acted as catalyzers of external funding from the donor community or international companies by helping overcome regulatory and policy barriers. However, as illustrated by the cases of Morocco and the UAE, green agencification has been instrumental in asserting the prominent role of the ruling elite in an emerging sector. In both a consumer (Morocco) and a producer (UAE) country, this institutional strategy for greening energy governance has hindered the “democratic” potential of the energy transition. The ability of the ruling elite to control REA’s institutional structure has helped them to reproduce traditional patterns of top-down decision-making and vertical steering of economic development. This approach has been further reinforced by the preferences for large technological systems (such as CSP) that resonate with the dominant governmentality of the Moroccan and UAE monarchies. In addition, in a rentier state like UAE, green agencification has been useful to avoiding those reforms that would have undermined the social contract supporting the regime.

Research on the institutional and political implications of energy transition in the Global South is still in its infancy. Although limited by the regional (and temporal) scope of the analysis, our findings suggest that green agencification can help developing countries overcome certain policy and regulatory barriers, catalyze investments and foster the implementation of renewable projects. These results call for a wider understanding of the different institutional paths that can increase policy effectiveness in the Global South in the area of renewables, beyond the traditional focus on market-oriented reforms and regulatory policy (on this point, see also Mathieu, 2022). The donor community, however, should be more concerned about the scarce “democratic” effects of green agencification, especially when REAs are involved in developing large-scale projects steered by the ruling elite. Further research is needed to better understand the mechanisms for accelerating the energy transition in the countries of Global South while supporting more open and participatory approaches to policy making.

Data availability statement

The data that support the findings of this study are available in the supplementary material of this article.

Endnotes

- ¹ In this article, we define MENA as including the North African Countries (Morocco, Algeria, Tunisia, Libya, and Egypt), the Levant countries (Jordan, Lebanon, Syria, and Palestine) and the Gulf Cooperation Council countries (Bahrain, Kuwait, Oman, Saudi Arabia, Qatar, and the United Arab Emirates). Israel is traditionally included in the Levant countries group. However, as the focus of the paper is on energy transition in developing countries, we did not consider Israel in our analysis.
- ² Renewable energy agencies, for instance, are not covered by leading international databases such as the one developed by Jordana, Fernández-i-Marín and Bianculli, available at: <http://xavier-fim.net/reggov-2018/ra-classification-dataviz-table.html> (see also Jordana et al., 2018). This database includes independent regulatory agencies for the electricity, gas and nuclear sector, as well as agencies for environmental protection. However, it does not cover agencification in the area of renewables.
- ³ Providing an extensive review of the literature on the political economy of the energy sector in the MENA is outside the scope of this article. Here, we illustrate only the main strands of research on the energy transition in the region that adopt a politics, policy, and governance perspective, with key examples and related findings.
- ⁴ The MENA region has been neglected by the agencification literature, which has mainly studied other regions of the Global South such as Latin America or Asia (on this point, see Mathieu & Jordana, 2022).
- ⁵ With regard to learning, policymakers update their beliefs and adopt policy innovations after learning about their positive impact in other countries. Emulation, on the other hand, suggests that policymakers adopt policy innovations not to increase the effectiveness of their policies (logic of consequences) but because of their willingness to adopt a model that is

perceived as legitimate (logic of appropriateness). The distinction between emulation and learning, however, is hardly manageable because it is extremely difficult to demonstrate whether a change in beliefs has taken place. Learning and emulation also overlap with the mechanism of competition—that is when governments adopt policy innovations to attract external funding—because policymakers can learn which innovation offers the best opportunities to succeed in a global competitive environment and because competition itself is determined by questions of image and social acceptance (Kuhlmann et al., 2020).

- ⁶ As explained by Flyvbjerg (2006, 229), extreme cases are particularly suitable for generalization: they reveal more information because they activate more actors and examine more key mechanisms of the situation.
- ⁷ Among the MENA countries in which REAs have an important role in national energy governance, Morocco and the UAE are in the first and second position respectively regarding percentage of renewables in the electricity mix (see the next section). However, among the same group of MENA countries, Morocco and the UAE are the countries with the lowest and highest level of fossil fuel rents, respectively (see Table A3).
- ⁸ The comparison follows the most different system design logic (e.g., Della Porta, 2008). We selected two very different cases (i.e., a consumer and a producer country) that have in common the same key independent variable (i.e., the same green agencification strategy) and the same outcome in terms of (limited) democratization of energy governance.
- ⁹ Freedom House classified Morocco as a “partly free country” from 2005 to 2021, whereas the UAE was classified as “not free” during the same time period.
- ¹⁰ See RCREEE (2009), Tagliapietra (2015), USAID (1981), and REA websites.
- ¹¹ The “MASDAR initiative” is composed of several units. These include those involved in research and policy advising (e.g., The MASDAR Institute of Science and Technology) and “MASDAR Clean Energy,” which owns and develops renewable projects in the UAE and abroad.
- ¹² These data on REA employees were retrieved from the website of MEDENER (<https://www.medener.org/en/>, accessed on September 27, 2022) and the websites of the agencies (accessed on October 2–5, 2022).
- ¹³ See the data for the period between 2010 and 2019, available at: <https://info.worldbank.org/governance/wgi/Home/Reports> (Political Stability and Absence of Violence/Terrorism indicators).
- ¹⁴ The RISE database does not provide data for the regulatory and policy framework of these countries.
- ¹⁵ The ranking in Figure 5, with Morocco and Egypt in, respectively, first and second position, does not change even after controlling for GDP size and population.
- ¹⁶ A detailed list of the projects developed by MASEN is available at: <https://www.masen.ma/en/projects>, accessed October 10, 2022.
- ¹⁷ A detailed list of the projects developed by MASDAR Clean Energy in the UAE is available at: <https://masdar.ae/en/Masdar-Clean-Energy/Projects>, accessed October 15, 2022.
- ¹⁸ A detailed list of the projects developed by MASDAR Clean Energy outside the UAE is available at: <https://masdar.ae/en/Masdar-Clean-Energy/Projects>, accessed October 25, 2022.

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Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Table A1. Renewable Energy Agencies (REAs) and renewable energy governance in the MENA countries.

Table A2. The establishment of regulatory agencies in the MENA countries (utilities and energy-related sectors, without REAs).

Table A3. Oil and gas rents in the MENA countries (as percentage of GDP): 1980–2019.