

The Socio-Economic Effects of Solar Energy in the Middle East and North Africa

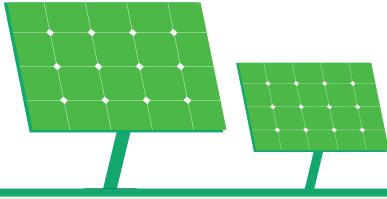
Dr. Benjamin Schuetze

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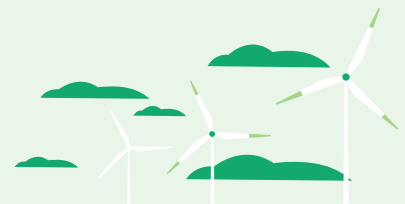
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Dr. Benjamin Schuetze



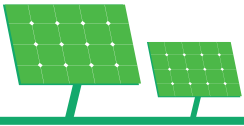
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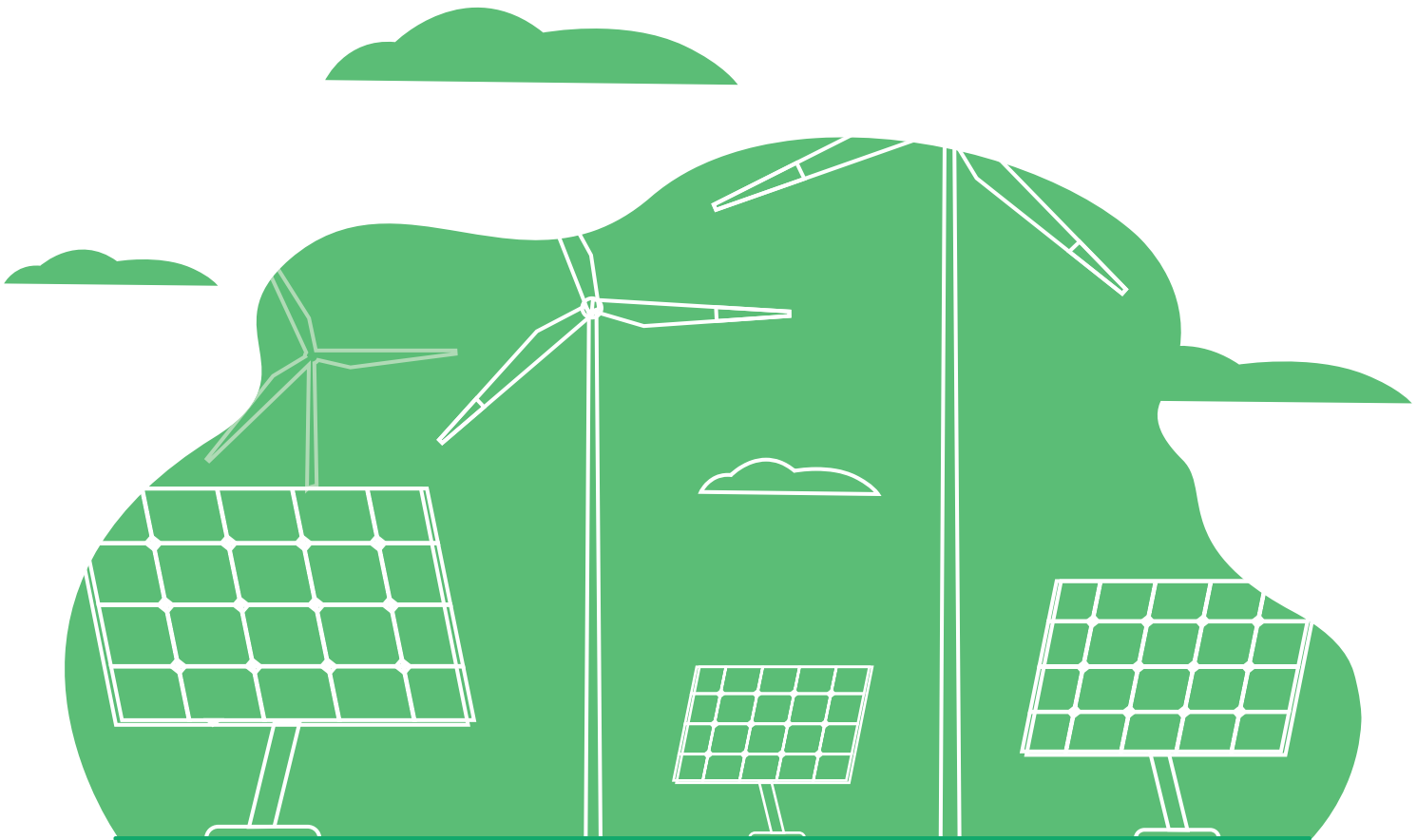


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Introduction





With countries throughout the Middle East and North Africa (MENA) pursuing ambitious targets for a transition to renewable energies, the political economy of a region predominantly analysed through the prism of fossil fuels is on the verge of radical change.¹ While renewable energies continue to account for a relatively low share in the overall energy mix of the region, the inevitability of shifting to renewables seems to have been accepted by the governing elites of the fossil-fuel rich and/or dependent countries of the MENA-region. As various strategic initiatives aimed at the reduction of the region's dependence on fossil fuels herald the gradual start of a new era, explanations of authoritarian and/or democratic power that deterministically explain its presence and/or absence on the basis of said dependence appear increasingly irrelevant.

As states in the region begin to shift from oil and gas to hydro, solar and wind energy, questions about the socio-economic effects of renewable energies on established modes of governance are of paramount importance. Are we witnessing the onset of a mere technical replacement of dominant energy sources and associated technologies, or do attempts at a renewable energy transition go hand in hand with more fundamental social, political and economic shifts? If so, what emancipatory potential do these shifts hold? Focusing on solar energy, this report seeks to provide an overview over select literature on the topic and discusses select hypotheses regarding the question of how solar energy projects connect with existing authoritarian and/or democratic practices.

First and foremost, this report insists on the deeply political nature of any (effort at) energy transition.² Attempts at shifting the sources via which a given society generates the energy it needs are bound to (re-)shape power dynamics and are hence necessarily contested. State and non-state actors from within and beyond the region, including investors, business elites, government representatives, political activists and social movements pursue different interests and strategies. It is clear then that no singular logic unfolds itself upon the region, but that instead multiple (attempts at) energy transitions are possible,³ the precise manifestations and consequences of which may strongly differ depending on socio-economic context and actors involved.

Any attempt at discussing socio-economic effects of solar energy in the MENA must build on an awareness of existing power dynamics and of the dynamic nature of governance. In order to do justice to the multiplicity of involved actors and the entangled nature of social, political and economic processes beyond the boundaries of the nation-state, this report draws on the practice turn in international relations theory. Consequently, it speaks of authoritarian and/or democratic practices instead of authoritarian vs. democratic regimes, as well as of "energized practices"⁴ that criss-cross established nation-state contexts. Doing so allows us to acknowledge rather than hide the contingency of solar energy's socio-economic effects, as well as the region's socio-ecological complexity. While the scope of this report makes it impossible to offer an in-depth analysis of multiple different contexts, the last section will provide select empirical snapshots.

Much literature on the MENA-region views the latter as a space of exception – both in an ecological sense by referring to deserts as "ruined wastelands"⁵ and/or an "unnatural nature",⁶

1 - IRENA (2020) Power sector planning in Arab countries: Incorporating variable renewables, p. 17.

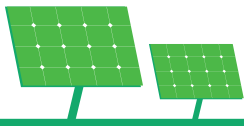
2 - See also Burke & Stephens (2018) 'Political power and renewable energy futures: A critical review', p. 80.

3 - Rignall (2016) 'Solar power, state power, and the politics of energy transition in pre-Saharan Morocco', p. 544.

4 - See Rignall (2016) 'Solar power, state power, and the politics of energy transition in pre-Saharan Morocco', p. 542 and Huber (2013) *Lifeflood: Oil, Freedom, and the Forces of Capital*, p. XI.

5 - Davis (2016) *The Arid Lands: History, Power, Knowledge*, p. 160.

6 - Hoffmann (2018) 'Beyond the resource curse and pipeline conspiracies: Energy as a social relation in the Middle East', p. 41.



and in a political sense by referring to the predominance of authoritarian regimes. However, while political power in the region is indeed highly centralized, centres of authoritarian power include not just authoritarian regimes, but also transnational corporations and 'developmental aid' agencies.⁷ Regime-centric approaches to authoritarian power ignore the transregionally entangled and territorially unbounded nature of authoritarian power.⁸ Focusing on the region's energy-politics and the ways in which actors invest solar energy with democratic and/or authoritarian meaning allows us to challenge the methodological nationalism of established studies of authoritarian power.⁹

It is crucial to pay adequate attention to the ways in which not fossil fuel in and of itself, but neoliberal ideologies, colonial continuities and enormous concentrations of economic and political power form the foundation for authoritarian rule in the region. Consequently, any exploration of the region's energy-politics needs to investigate the processes via which the exploitation of certain types of energy enables or challenges processes of capital accumulation, and reinforces or overcomes authoritarian practices that prevent dissent, technocratize politics, and repress oppositional activism.¹⁰ Such a focus allows us to reject the tiresome argument about Middle Eastern exceptionalism, and brings more nuance to our understanding of the ways in which authoritarian and/or democratic practices in the region are (re-)shaped, as different actors from within and beyond the region promote, produce and/or contest solar power.

Contemporary energy-politics in the region is marked by centralized electricity technologies and infrastructures, deeply undemocratic systems of financing that involve fund managers from the Global North and/or unaccountable and non-transparent energy giants and/or utility companies, as well as biased forms of knowledge production. Accordingly, meaningful efforts at democratizing energy-politics need to go far beyond the mere promotion and establishment of democratic procedures, which are practically void of emancipatory potential.

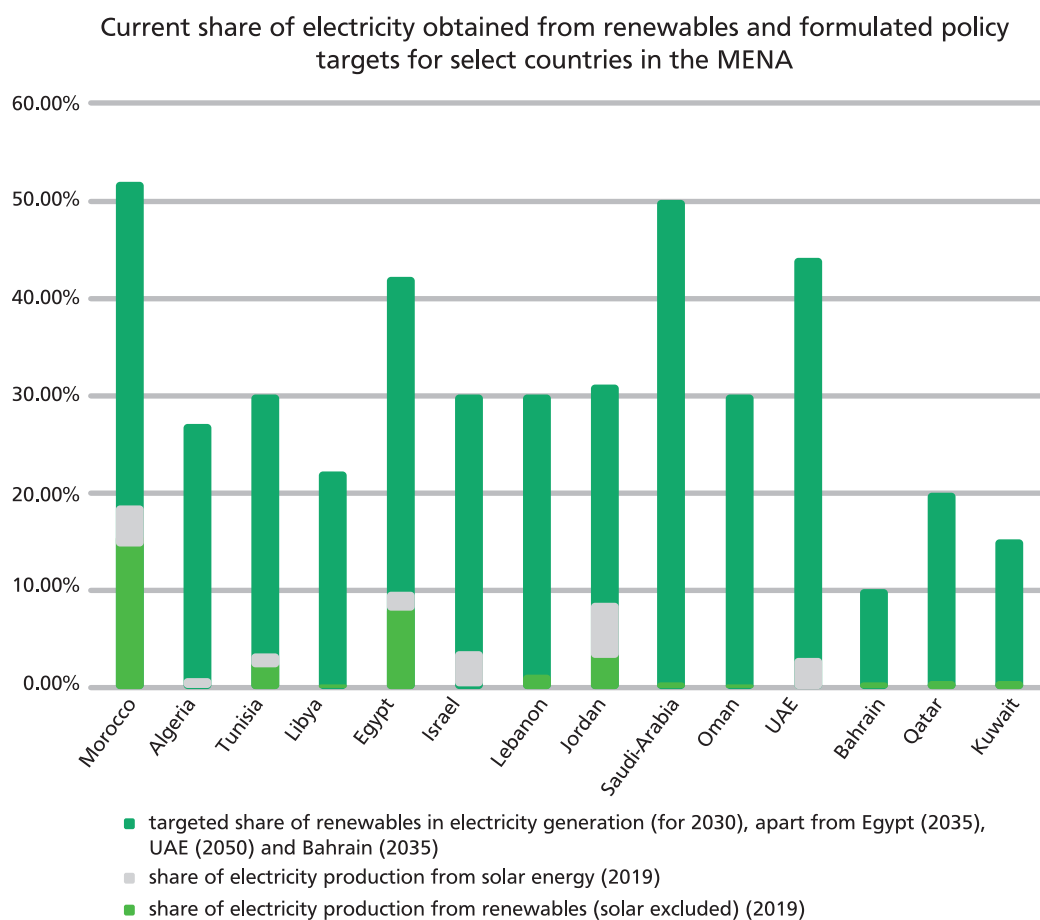
The following section discusses the main academic arguments regarding the interaction of specific energy sources and political outcomes. Building on this, the subsequent section explores the processes of production required to turn solar radiation into consumable energy. I argue that the socio-economic effects of solar energy are mediated via the materiality of specific technologies and associated infrastructures, the modes of financing offered, and the forms of knowledge produced and/or marginalized. I argue that solar energy offers a possibility for more democratic and inclusive energy futures, but no certainty, as it is also used to replicate exclusionary, centralized and authoritarian structures of power. In an effort to demonstrate the diversity of solar energy's socio-economic effects, I present select snapshots of solar energy projects throughout the region, before concluding with some final remarks. Given the scope of the topic, the report does not make any claim to be exhaustive. Instead, it suggests possible units of analysis and hypotheses, the validity of which can only be explored further via more in-depth empirical research.

7 - Jents & Schuetze (2020) 'Rethinking authoritarian power: The logistics space and authoritarian practices in and between secondary port cities of the Global South'.

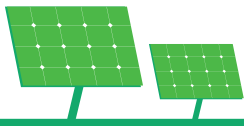
8 - Glasius (2018) 'Extraterritorial authoritarian practices: a framework'.

9 - Diamond et al. (2016) *Authoritarianism Goes Global: The Challenge to Democracy*. Linz (2000) *Totalitarian and authoritarian regimes*.

10 - Jents & Schuetze (2020) 'Rethinking authoritarian power: The logistics space and authoritarian practices in and between secondary port cities of the Global South'.



Compiled on the basis of data obtained from ourworldindata.org, different national energy strategies, IEA, RCREEE, Middle East Institute, IRENA, and other online sources. No complete set of figures could be found for Palestine, Yemen, Iraq and Syria.



Energy sources and political power

For analytical purposes, academic literature on the energy-politics nexus can be located on a continuum from energy determinism via soft determinism to an understanding of energy as social relations. The linking of specific energy systems to visions of modernity and progress has a long history, ranging from visions of electric lighting as making streets safer to walk, via hydroelectric dams as providing a solution to poverty and hunger, to nuclear reactors as taking the world into a new era of energy abundance.¹¹ While visions associated with energy technologies are mostly positive, they are also full of contradictions. Hydroelectric dams were for instance, despite the fact that their construction and operation require enormous concentrations of capital, also portrayed as a means for the improvement of democracy.¹² The fetishization of renewables as not only providing a solution to problems of climate change and challenges of structural unemployment, but also to economic dependencies and authoritarian modes of governance via a possible “democratization of energy”¹³ features the same disregard for contextual factors and the power of human agency as established determinist approaches to the study of oil – only now with reversed conclusions.

While Mumford prominently argued that societies face a clear choice between authoritarian and democratic technics,¹⁴ arguments about the political qualities associated with technological artifacts are highly divergent. Contrary to Weinberg, who viewed nuclear power as a means to transition authoritarian systems into democracies,¹⁵ Henderson described it as “inherently totalitarian”,¹⁶ due to its complexity, widespread public opposition against it, and need for both centralized authority and high capital investment. Regarding contemporary developments in the MENA-region, some of the most popular energy reductionist or determinist arguments describe war in Syria as a “Pipelineistan War,”¹⁷ or explain authoritarian power via states’ dependence on rents extracted from hydrocarbon extraction.

Informed by rentier state theory,¹⁸ conventional approaches to the study of fossil fuels interpret the income gained from oil production as constituting a ‘resource curse’ that helps sustain authoritarian elites.¹⁹ Fetishizing oil and downplaying the role of actors and processes that cut across the neat borders of the nation-state, proponents of rentier state theory explain authoritarian power in the region via states’ dependence on fossil fuel rents (for instance oil income and aid payments enabled by the latter; Hancock and Sovacool apply this argument also to water abundance and hydropower).²⁰ With a few notable exceptions,²¹ approaches based on rentier state theory exceptionalize the MENA-region and, in their focus on regime types, perpetuate a problematic methodological nationalism.²²

11 - Sovacool & Brossmann (2013) ‘Fantastic Futures and Three American Energy Transitions’.

12 - Sovacool & Brossmann (2013) ‘Fantastic Futures and Three American Energy Transitions’, p. 210.

13 - See Podimata (2010) ‘Energy from the Desert’, Desertec Industry Initiative Annual Conference 2010, at www.dii-eumena.com. See also Castree, who suggests that renewable energies may act as a wedge for more egalitarian transformations. Castree (2008) ‘The environmental wedge: neoliberalism, democracy and the prospects for a new British left’.

14 - Mumford (1964) ‘Authoritarian and Democratic Technics’.

15 - Weinberg (1990) ‘Technology and Democracy’.

16 - Henderson (1981) *The Politics of the Solar Age*, p. 350.

17 - Escobar (2012) ‘Syria’s Pipelineistan war’.

18 - Beblawi & Luciani (2015) *The Rentier State*.

19 - Ross (2001) ‘Does Oil Hinder Democracy?’

20 - Hancock & Sovacool (2018) ‘International Political Economy and Renewable Energy: Hydroelectric Power and the Resource Curse’.

21 - Lowi (2004) ‘Oil rents and political breakdown in patrimonial states: Algeria in comparative perspective’ and Vitalis (2006) *America’s Kingdom: Mythmaking on the Saudi Oil Frontier*. For an excellent critique of rentier state theory and an exploration of the forms of resistance that oil exploitation in Saudi-Arabia elicits, see Menoret (2014) *Joyriding in Riyadh: Oil, Urbanism, and Road Revolt*.

22 - Wimmer & Glick Schiller (2003) ‘Methodological Nationalism, the Social Sciences, and the Study of Migration: An Essay in Historical Epistemology’.



While the 2011 Arab uprisings initially appeared to confirm the assumptions of rentier state theory, the divergent trajectories taken since clearly demonstrate that flows of energy engineer a diverse set of political relations in different contexts – ranging from acquiescence to open opposition and intransigence. To better account for the contingent effects of different ‘energized practices’ and highly critical of the energy determinisms illustrated above, as well as of rentier state literature’s disregard for energy’s materiality, Mitchell has explored the politics of carbon energy via the opportunities for the exertion of power that emerge as it is transformed into consumable energy.²³ Paying close attention to the production networks of specific energy sources, he argues that, a century ago, democratic claims were “advanced through the flow and interruption of supplies of coal”, while “the limits of contemporary democratic politics can be traced in relation to oil.”²⁴

Mitchell argues that the socio-economic effects of different energy sources depend on the disruptive potentials associated with them, and on what he calls the engineering of different forms of vulnerability.²⁵ The extraction and transport of coal for instance was much more labour intensive than the exploitation of oil. Europe’s coal and railroad workers of the 19th and 20th century thus commanded an unprecedented power to disrupt societies’ access to energy and were better positioned to advance democratic claims. As coal was increasingly replaced by oil throughout the 20th century, a more and more consolidated petroleum industry was able to amass enormous profits, and to more easily suppress and contain democratic demands for participation, representation and socio-economic justice. Approaches that pay close attention to energy systems’ materiality and the power of technology, but locate these “with respect to other social and cultural factors”²⁶ can be called ‘soft determinism’. Similar to Mitchell – only with regard to solar power – Rignall is highly critical of analyses that ignore energy’s materiality. She emphasizes that concentrated solar power (CSP) plants for instance require water for cleaning solar collection and reflection surfaces and are hence anything but immaterial.²⁷ The widespread romanticization of renewables ignores the material effects of the processes of production that are required to turn solar, hydro and wind energy into consumable energy.

While not inherently authoritarian, oil and gas appear to be “especially compatible with concentrated political and economic power due to the ways they are made to be concentrated and their effects to demobilize populations”.²⁸ However, as outlined by Hall et al, “political reactions from below” do often not distinguish between renewable energies, extractive industries, or other forms of dispossession. Instead, the specific effects are likely to be “differentiated along lines of class, gender, generation, ethnicity and nationality”.²⁹ While the disruptive potential associated with the materiality of specific energy sources plays a key role in disabling or enabling certain forms of dispossession and exclusion, colonial legacies and complex histories of marginalization are also of central importance.³⁰ Focusing on the latter, an understanding of energy as social relations rejects the energy-determinist argument that specific energy sources can be linked to particular socio-political outcomes. Instead, it argues that energy’s socio-economic effects are always mediated via particular technologies, infrastructures, modes of financing and forms of knowledge production.

23 - Mitchell (2011) Carbon Democracy.

24 - Mitchell (2011) Carbon Democracy, p. 236 and p. 254.

25 - Mitchell (2011) Carbon Democracy, p. 146.

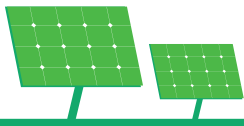
26 - Paragas & Lin (2016) ‘Organizing and reframing technological determinism’, p. 1529.

27 - Rignall (2016) ‘Solar power, state power, and the politics of energy transition in pre-Saharan Morocco’, pp. 541-542 and p. 547.

28 - Burke & Stephens (2018) ‘Political power and renewable energy futures: A critical review’, p. 82.

29 - Hall et al (2015) ‘Resistance, acquiescence or incorporation? An introduction to land grabbing and political reactions ‘from below’’, p. 468.

30 - Rignall (2016) ‘Solar power, state power, and the politics of energy transition in pre-Saharan Morocco’



In the words of Rignall, and drawing on Huber, solar power “emerges in this context as a socio-ecological relation in which the fetishism of solar energy – especially its inexhaustibility, cleanliness, and immateriality – obscures the social relations necessary for its production”.³¹ By zoning in on the production networks that mediate energy’s materiality, understandings of energy as social relations highlight the possibility of (social, political and economic) continuities despite (energy) transition. The field of energy politics is heavily contested, as Burke and Stephens remark, with transregionally connected authoritarian elites attempting “to re-organize distributed energy flows into aggregated and concentrated stocks of energy, investment instruments, technological research, ownership patterns, etc.”³² However, if renewable energies remain embedded in the same processes of capital accumulation that already defined carbon energy regimes, they will by definition fail to challenge the iniquities enabled and/or caused by the latter.³³

Even progressive narratives of a renewable energy transition at times ignore that the effects that attempts at said transition have on established socio-economic structures are highly dependent on the social goals, economic arrangements and political frameworks used to structure renewable energy projects.³⁴ In order to avoid a mere replication of exploitative dynamics of power in the name of sustainability, it is hence of key importance to pay adequate attention to the structures via which renewable energies are governed. The socio-political effects of renewables can range from a mere reproduction of existing power imbalances in the name of “saving the planet”,³⁵ the perpetuation of an ecology of capitalism premised on accumulation by dispossession,³⁶ and the commodification of nature,³⁷ to the achievement of socio-ecologically more egalitarian systems.³⁸ Attempting to capture this plurality and contingency of possible energy transitions, Burke and Stephens shift the focus away from specific energy technologies to the ways in which these enable and/or lend themselves to concentrated energy politics, “characterized as weakly democratic,” or to distributed energy politics, “characterized as strongly democratic”.³⁹

Awareness of not only the predominance of authoritarian regimes in the MENA-region, but in particular of the centralized nature via which ‘energized practices’ are governed has led to calls not just for a renewable energy transition, but for ‘energy democracy’. The notion of ‘energy democracy’ views efforts at energy transition as a means for the renewal of democratic politics, including the transformation of consumption patterns and the fair distribution, democratic control and management of energy.⁴⁰ While not pre-assuming the supposedly democratic character of renewable energies, ‘energy democracy’ advocates argue that their materiality, including their distributed nature and the relative modularity of their technologies, as well as the potential for new ownership, offer a unique window of opportunity for processes of democratisation.⁴¹ Far beyond a mere replacement of fossil fuels with renewables, the objective of ‘energy democracy’ includes the empowerment of marginalized communities, the overcoming of colonial continuities,

31 - Huber (2013) *Lifeblood: Oil, Freedom, and the Forces of Capital*, and Rignall (2016) ‘Solar power, state power, and the politics of energy transition in pre-Saharan Morocco’, p. 541.

32 - Burke & Stephens (2018) ‘Political power and renewable energy futures: A critical review’, p. 80.

33 - Rignall (2016) ‘Solar power, state power, and the politics of energy transition in pre-Saharan Morocco’, p. 554.

34 - Rignall (2016) ‘Solar power, state power, and the politics of energy transition in pre-Saharan Morocco’, p. 544.

35 - Rignall (2019) ‘Living Climate Change in the Middle East and North Africa’, p. 630.

36 - Harvey (2005) *A Brief History of Neoliberalism*.

37 - Swyngedouw (2010) ‘Apocalypse Forever? Post-political Populism and the Spectre of Climate Change’, p. 222.

38 - Castree (2008) ‘The environmental wedge: neoliberalism, democracy and the prospects for a new British left’.

39 - Burke & Stephens (2018) ‘Political power and renewable energy futures: A critical review’, p. 82.

40 - Hamouchene (2016) *The Struggle for Energy Democracy in the Maghreb*, p. 52. Angel (2016) *Strategies of Energy Democracy*, p. 10.

41 - Kunze & Becker (2015) *Wege der Energiedemokratie: Emanzipatorische Energiewenden in Europa*.



neoliberal ideologies and established patterns of consumption, and the (re-)establishment of democratic control and ownership over the energy sector following widespread corporate capture.⁴² As remarked by Burke and Stephens, “energy democracy redefines individual consumers as citizens, energy commodities and [energy] provisions as public goods, and infrastructures as public works or common resources.”⁴³

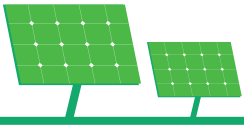
In order to better understand the contexts in which solar energy renews authoritarian practices, and those in which it can indeed facilitate democratic futures, it is necessary to explore more closely the processes via which its materiality is mediated.



'Aerial drone photo of solar power plant. Sebastian Noethlichs/Shutterstock.

42 - See also Degani, Chalfin & Cross (2020) 'Introduction: Fuelling Capture: Africa's Energy Frontiers'.

43 - Burke & Stephens (2018) 'Political power and renewable energy futures: A critical review', p. 79.



Promoting, Producing and Contesting Solar Energy in the Middle East and North Africa

Technologies

In contrast to hydrocarbons, which are available in highly concentrated form below ground, solar energy is widely available and much more amenable to modular technologies and decentralized ownership structures. While the technologies required for fossil fuel exploitation have historically been located in a few select locations out of public view, the greater visibility of solar energy arguably also involves a potential for more inclusivity and community control. Despite the material differences between hydrocarbons and solar energy, it would however be wrong to see the latter as inherently requiring and/or leading to distributed and more equitable power structures. Depending on the technology used, and whether solar power plants are connected to the utility grid (on-grid) or not (off-grid), the expansion of solar energy raises very different operational challenges, can lend itself to centralised or distributed power structures, and is likely to have very different socio-economic effects.

While dispatchable technologies can address the intermittency of solar radiation via inclusion of storage capacities (concentrated solar power (CSP) plants), the integration of large amounts of non-dispatchable systems, also called Variable Renewable Energy (VRE) (photovoltaics), requires smart grid technologies, forms of energy storage (via hydropower plants and/or hydrogen production) and/or long-distance transmission lines to more easily balance intermittent demand and supply at specific locations of the grid. Notable differences between CSP plants and photovoltaics also concern capital costs.⁴⁴ While CSP plants are always mega-projects that require the active involvement of state authorities and/or large transnational corporations (TNCs), photovoltaics can both be installed in a decentral manner, increasing the electricity independence of marginalized actors, and as megaprojects that further consolidate the energy industry. Whereas decentralized photovoltaics blur established lines of separation between consumer and producer, CSP plants maintain these and require highly centralized and specialized forms of knowledge. However, although the points of generation and end use are more closely connected in the case of decentralized photovoltaics, the production of photovoltaic modules generally also occurs in concentrated locations.⁴⁵

'Energy democracy' and community-based control appear much more likely with photovoltaics than with CSP plants. However, photovoltaics can of course also be aggregated into centralized mega-projects that perpetuate rather than challenge the assumed centrality of the market, and that provide opportunities for elite capital accumulation rather than for local communities.⁴⁶

44 - Sez nec (2018) 'Survey of Existing Renewables: Track Records in the Middle East and North Africa (MENA)', p. 5.

45 - Burke & Stephens (2018) 'Political power and renewable energy futures: A critical review', p. 86.

46 - Ryser (2019) 'The Anti-Politics Machine of Green Energy Development: The Moroccan Solar Project in Ouarzazate and Its Impact on Gendered Local Communities', p. 19.



Infrastructures

The expansion of solar energy via CSP and/or photovoltaic megaprojects requires new infrastructures. Solar energy's variability and intermittency can only be addressed by either connecting as many geographically dispersed generators as possible into a common super-grid, to thereby facilitate the easier management of intermittent demand and supply at specific locations, or by integrating forms of energy storage (hydropower, hydrogen production, batteries, etc.). While CSP plants and large-scale photovoltaics reinforce centralised power structures, the expansion of decentralized photovoltaics blurs the line of distinction between electricity production and consumption. This may facilitate distributed control of the grid and challenge the position of monopoly electric utilities.⁴⁷

Contemporary efforts at renewable energy expansion in the MENA-region are challenged by, among other points, weak grid infrastructures, low public investment into cross-border transmission lines and decades of national-level energy policies and security of supply priorities.⁴⁸ The relatively low level of interconnection and regional integration raises concerns for grid stability and has put a break on countries' ambitious renewable energy targets. In an effort to improve grid stability, to allow for the integration of more renewables, and to increase possibilities for intra- and interregional electricity trade, various countries are pursuing plans for grid improvements and cross-border interconnectors.⁴⁹

Scholars of critical infrastructure emphasize that (energy) infrastructures are no economic necessities, but political choices.⁵⁰ While storing within themselves notions of technocratic inevitability, Larkin notes that infrastructural projects also generate abstract dreams "of what it means to be modern."⁵¹ Chua and Cowen argue that infrastructures not only produce, enable and promise new connections, interconnectivities and transnational flows, but also create new forms of containment and isolation.⁵² Overland suggests that the interdependencies caused by the transformation of power production landscapes from a unidirectional system to one that blurs the distinction between production and consumption may indeed decrease the risks of geopolitical conflicts.⁵³ However, it is important to not conflate greater energy integration with socio-political integration,⁵⁴ and to pay adequate attention to the role of renewable energy projects and associated infrastructures in seemingly legitimizing authoritarian, centralized and exclusionary power structures, and in further enabling rather than disrupting capital accumulation.

47 - Burke & Stephens (2018) 'Political power and renewable energy futures: A critical review', p. 83.

48 - Poudineh & Rubino (2017) 'Business model for cross-border interconnections in the Mediterranean basin', p. 96.

49 - In 2020, agreements were signed for new interconnectors between Jordan and Iraq, as well as Jordan and Saudi-Arabia. In 2019, a memorandum of understanding was signed for a third submarine cable to boost interconnection between Spain and Morocco. Currently, the region still consists of four not yet interconnected blocks (Morocco, Algeria and Tunisia; Libya, Egypt, Jordan, Syria and Lebanon; Turkey; GCC countries).

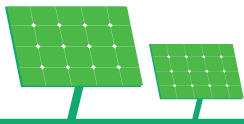
50 - Hoffmann (2018) 'Beyond the resource curse and pipeline conspiracies: Energy as a social relation in the Middle East', p. 39-40.

51 - Larkin (2013) 'The Politics and Poetics of Infrastructure', p. 333.

52 - Chua (2018) 'Containing the Ship of State: Managing Mobility in an Age of Logistics', p. 2-3. Cowen (2014) *The Deadly Life of Logistics: Mapping Violence in Global Trade*.

53 - Overland (2019) 'The geopolitics of renewable energy: Debunking four emerging myths'.

54 - Moore (2019) *Sustainable Energy Transformations, Power, and Politics: Morocco and the Mediterranean*, p. 77.



Finances

Modes of financing enable certain renewable energy futures and block others.⁵⁵ The predominance of highly centralized forms of political and economic power, partly enabled by decades of fossil fuel exploitation, reproduces undemocratic systems of financing, which again favour concentrated energy politics.⁵⁶ The politico-economic elites of the region show little interest in 'energy democracy' advocates' demands for communal ownership of renewable energy systems, or in aspirations to turn electricity from a private commodity into a public good. Emphasizing the urgency of the transition from fossil fuels to renewables plays into the hands of those, who argue that only highly concentrated forms of economic and political power can deliver the finances necessary for a rapid transition. Depending on the priority – rapid renewable energy transition or 'energy democracy' – scholars call either for strategies that further deepen existing markets and help create new ones,⁵⁷ or for "new investment models for community ownership",⁵⁸ "community resource management"⁵⁹ and an end to pro-market policies, in which state authorities and public funds act as guarantors for private profits.⁶⁰ MENA countries' continued subsidization of the consumption and production of fossil fuels presents a further topic of contention. While subsidies slow down the transition to renewables and encourage excessive energy consumption, they also constitute an essential component of a 'social contract', in which regional governments claim to ensure citizens' socio-economic well-being in return for political acquiescence.⁶¹

Given the capital intensive nature of CSP and large-scale photovoltaics projects, it comes as no surprise that a select few transnational corporations (TNCs), most notably Saudi ACWA Power and Emirati Masdar, dominate the renewable energy landscape of the region. Masdar is a subsidiary of Mubadala Investment Company and develops renewable energy projects throughout the region, as well as in Serbia, the UK and the Caribbean. ACWA is owned by a number of Saudi-based investors and public funds, and develops renewable energy projects in the region, as well as in South Africa, Bulgaria and Vietnam.⁶² For companies like ACWA and Masdar, both of which have annual operating incomes of several hundred million US Dollars, renewables are an opportunity to increase financial profits, and not to empower local communities. Public-private partnerships (PPPs) between state institutions and TNCs such as ACWA and Masdar help "to decarbonize the existing economy rather than transform it".⁶³ While this form of concentrated energy politics reduces resource-poor countries' dependence on energy imports, it creates new dependencies on TNCs and international financial institutions,⁶⁴ and assists in the 'greenwashing' of authoritarian practices.

55 - Mazzucato & Semieniuk (2018) 'Financing renewable energy: Who is financing what and why it matters', p. 9.

56 - Burke & Stephens (2018) 'Political power and renewable energy futures: A critical review', p. 79.

57 - Mazzucato & Semieniuk (2018) 'Financing renewable energy: Who is financing what and why it matters', p. 19.

58 - Burke & Stephens (2018) 'Political power and renewable energy futures: A critical review', p. 83.

59 - Sowers & Weinthal (2010) 'Climate Change Adaptation in the Middle East and North Africa', p. 9.

60 - Hamouchene (2016) *The Struggle for Energy Democracy in the Maghreb*, pp. 28-29.

61 - Fattouh & El-Katiri (2013) 'Energy subsidies in the Middle East and North Africa'. Jalilvand (2012) 'Renewable Energy for the Middle East and North Africa: Policies for a Successful Transition'. Eibl (2017) 'The Political Economy of Energy Subsidies in North Africa: The Untold Story'.

62 - Mammoser (2019) 'The 2 Energy Giants Reshaping the Middle East'.

63 - Burke & Stephens (2018) 'Political power and renewable energy futures: A critical review', p. 84.

64 - El Karmouni (2016) 'Moroccan Energy Policy: From One Dependence to Another', p. 30.



Knowledge Production

As concerns about climate change and energy transition have moved from the political margins into the global public spotlight, discussions have become increasingly dominated by forms of knowledge that replicate existing power structures behind a façade of sustainability. Concerns about how to reduce the global demand for energy and how to change consumption patterns have been marginalized by a focus on renewable energy supply.⁶⁵ Efforts at a renewable energy transition in the region mostly reproduce, rather than disrupt the capitalist practices at the heart of climate change.⁶⁶ Despite continued fossil fuel subsidies, solar energy has in many countries in the region indeed become cost-competitive. In 2020, the winning bid for a 2GW solar power plant in the UAE set a record price at US \$1.35 cents/kWh (fully depreciated coal power plants have values of around US \$3.3 cents/kWh).⁶⁷ 'Energy democracy' advocates however "challenge the idea that renewables must play by the rules of the market" to begin with, and suggest that "the speed and scale of renewable energy deployment that science tells us we need clearly require non-market and "public goods" approaches, grounded in local actions."⁶⁸ Processes of re-municipalizing electrical power generation, observable in cities around the world, constitute promising examples for the possibility to reclaim parts of the energy system and powerful alternatives to the dominant form of concentrated energy politics observable in the region. However, such examples "are a long way from disrupting the established energy order."⁶⁹

Environmental crisis narratives, Rignall reminds us, have often been used to reproduce inherited structures of power, and to obfuscate the ways in which the costs for addressing climate change are "disproportionately borne by those least responsible for environmental degradation".⁷⁰ Descriptions of the renewable energy transition as a global challenge are often based on the flawed impression of equally distributed responsibilities for, experiences of and vulnerabilities to climate change.⁷¹ In reality, these are highly differentiated, based on categories of class, gender and race.⁷² Processes of technocratization conceal the contested nature of attempts at renewable energy transition and the fact that these have become an arena on which wider social, political and economic struggles are played out. In a captivating study of Masdar City's renewable energy and clean technology infrastructures, Günel discusses the role of engineers in reproducing capitalism via seemingly technical and apolitical solutions to the conflicts and ecological contradictions of capitalism.⁷³ Via the extension of technological complexity, such 'technical adjustments' squash more fundamental questions about how to live, reproduce neo-colonial discourses about the desert as an empty space open for large-scale solar energy interventions, and side-line demands for 'energy democracy'.⁷⁴

65 - Trade Unions for Energy Democracy (2015) 'Power to the People: Toward Democratic Control of Electricity Generation', p. 2.

66 - Rignall (2019) 'Living Climate Change in the Middle East and North Africa', p. 630.

67 - Ombello (2020) '1.35 Cents/kWh: Record Abu Dhabi Solar Bid Is A Sober Reminder To Upbeat Fossil Fuel Pundits'.

68 - Trade Unions for Energy Democracy (2015) 'Power to the People: Toward Democratic Control of Electricity Generation', p. 2.

69 - Trade Unions for Energy Democracy (2015) 'Power to the People: Toward Democratic Control of Electricity Generation', p. 2.

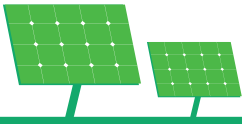
70 - Rignall (2019) 'Living Climate Change in the Middle East and North Africa', p. 629.

71 - Sowers (2019), 'Understanding Climate Vulnerability in the Middle East and North Africa', p. 622.

72 - Wahby (2019) 'Egyptian Environmentalism and Urban Grassroots Mobilisation'.

73 - See also the Desertec Industrial Initiative. Schmitt (2018) '(Why) did Desertec fail? An interim analysis of a large-scale renewable energy infrastructure project from a Social Studies of Technology perspective'.

74 - Günel (2019) Spaceship in the Desert: Energy, Climate Change, and Urban Design in Abu Dhabi.



Solar panel in Wadi Rum, Jordan. Wandel Guides/Shutterstock.

Empirical snapshots

Decentralized solar energy and the (re-)shaping of gender roles

The expansion of decentralized photovoltaics has the potential to erode established gender barriers. In line with the earlier explicated notion of distributed energy politics, decentralized photovoltaics can help challenge entrenched gender roles. First, the renewable energy industry itself is more inclusive of women (32% share of women) than the fossil fuel industry (22% share of women) that it seeks to replace.⁷⁵ Further, by stimulating job creation in rural areas marked by limited job prospects and gendered employment patterns, decentralized solar energy may offer skilled and local jobs to rural women.⁷⁶ The economic gains associated with small-scale photovoltaics may hence include an increase of the region's very low female labour force participation rate. While detailed information on the precise effects of solar energy projects on gender equality remains sparse,⁷⁷ it is fair to say that decentralized solar energy presents an opportunity for more gender equality. However, this link is highly dependent on contextual factors and far from automatic. Existing policy frameworks in Jordan for instance fail to adopt a transformative gender equality approach, as an ESCWA study found.⁷⁸

75 - IRENA (2019) Renewable Energy: A Gender Perspective, p. 10.

76 - ESCWA (2020) Regional Initiative for Promoting Small-scale Renewable Energy Applications in Rural Areas of the Arab Region (REGEND) Study on Gender Mainstreaming, Social Inclusion, Human Rights Processes and Outcomes of Access to Energy in Targeted Communities in Jordan, p. 30.

77 - IRENA (2019) Renewable Energy: A Gender Perspective, p. 9 and p. 20.

78 - ESCWA (2020) Regional Initiative for Promoting Small-scale Renewable Energy Applications in Rural Areas of the Arab Region (REGEND) Study on Gender Mainstreaming, Social Inclusion, Human Rights Processes and Outcomes of Access to Energy in Targeted Communities in Jordan, p. 51.



Greenwashing authoritarian practices

While decentralized photovoltaics hold a certain emancipatory potential, states in the MENA-region predominantly reorganize distributed energy flows into spectacular mega-projects.⁷⁹ Attempts at a renewable energy transition are thereby integrated into existing authoritarian practices, which are then reproduced in the name of sustainability. For authoritarian elites, the power of the policy field of sustainability lies in the ways in which technocratic approaches to it provide a new source of legitimation.⁸⁰ The formulation of ambitious renewable energy targets and the regular announcement of new solar megaprojects obscure continued reliance on fossil fuels, divert public attention from racialized labour exploitation and lacking forms of political participation, underline visions of being at the forefront of modernisation,⁸¹ and sustain the status quo through market-oriented technical fixes.⁸²

Masdar City in the UAE, a city project that was initially planned to have its own grid and be entirely carbon-neutral, built by Masdar, a subsidiary of Mubadala, is an excellent illustration of this dynamic. Planners “aspired to keep existing social, political, and economic relations intact [...] against the disruptive consequences of climate change and possible energy scarcity,”⁸³ as Günel notes. While allowing the UAE to portray itself as eco-friendly source of innovation – Masdar also hosts the headquarters of the International Renewable Energy Agency (IRENA), – the project benefits from the harsh working conditions for migrant workers in the country. At least initially, low-paid immigrant workers from Somalia and Bangladesh were for instance employed to clean solar panels, illustrating the fact that renewable energies and socio-economic justice do not automatically align.⁸⁴

Solar energy and colonial continuities

The idea of obtaining electricity from the desert has a long colonial genealogy.⁸⁵ As remarked by Moore, various colonial governments have envisioned utilization of concentrated solar power (CSP) since the 1800s.⁸⁶ Large-scale engineering visions such as Atlantropa and Desertec are deeply Eurocentric, as the key priority has always been European ‘energy security’.⁸⁷ While Schmitt emphasizes that the idea of Desertec “was born in the spirit of a true North-South partnership,”⁸⁸ with the idea of exporting electricity to Europe only being a long-term objective, Hamouchene describes European energy policy as “‘energy colonialism,’ especially in a context where the EU is pushing for further liberalisation in the energy sector.”⁸⁹ The reproduction of existing inequalities and colonial dependencies via concentrated renewables fundamentally challenges assumptions

79 - Burke & Stephens (2018) ‘Political power and renewable energy futures: A critical review’, p. 80. See also Koch (2018) *The Geopolitics of Spectacle: Space, Synecdoche, and the New Capitals of Asia*.

80 - Zumbrägel (2017), ‘The Quest for Green Legitimation: Reconsidering the ‘environmental enthusiasm’ of the Gulf monarchies’, p. 54.

81 - Zumbrägel (2017), ‘The Quest for Green Legitimation: Reconsidering the ‘environmental enthusiasm’ of the Gulf monarchies’, p. 57. See also Ryser (2019) ‘The Anti-Politics Machine of Green Energy Development: The Moroccan Solar Project in Ouarzazate and Its Impact on Gendered Local Communities’, p. 13.

82 - Günel (2019) *Spaceship in the Desert: Energy, Climate Change, and Urban Design in Abu Dhabi*, p. 11. Aoui, El-Amrani & Rignall (2020) ‘Global Aspirations and Local Realities of Solar Energy in Morocco’.

83 - Günel (2020) ‘Gökçe Günel, Spaceship in the Desert: Energy, Climate Change, and Urban Design in Abu Dhabi’.

84 - Matthes (2011) ‘Der geplatzte Traum der Wüstenstadt Masdar’.

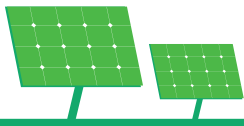
85 - Schmitt (2018) ‘(Why) did Desertec fail? An interim analysis of a large-scale renewable energy infrastructure project from a Social Studies of Technology perspective’, p. 762.

86 - Moore (2019) *Sustainable Energy Transformations, Power, and Politics: Morocco and the Mediterranean*, p. 31.

87 - Hamouchene (2016) *The Struggle for Energy Democracy in the Maghreb*, p. 52. Angel (2016) *Strategies of Energy Democracy*, p. 8.

88 - Schmitt (2018) ‘(Why) did Desertec fail? An interim analysis of a large-scale renewable energy infrastructure project from a Social Studies of Technology perspective’, p. 762.

89 - Hamouchene (2016) *The Struggle for Energy Democracy in the Maghreb*, p. 52. Angel (2016) *Strategies of Energy Democracy*, p. 8.



that renewable energy transitions are inherently progressive. It also connects closely to what Grove has called a history of “green imperialism”.⁹⁰

Megaprojects such as the Noor solar power complex in Ouarzazate, Morocco not only greenwash authoritarian practices and boost existing legitimization strategies of the Moroccan regime – similar to those discussed previously in the context of the UAE and Masdar City, – but also territorialize the state’s presence in rural hinterlands.⁹¹ Rignall notes that the Moroccan state deployed colonial legal instruments for territorial dispossession to acquire the land necessary for solar power development in Ouarzazate.⁹² The project thereby links into a history of marginalization and dependence. While, at first sight, it also helps invert some dependencies – in 2018, Morocco for instance became a net exporter of electricity to Spain – forms of resource extraction for the benefit of external elites persist, only in new form. Such (colonial) continuities and similarities with conventional extraction industries are not lost on the rural populations that host solar megaprojects. Residents’ expectations for employment opportunities in the plant have mostly not materialized, and the revenues of solar energy production in Ouarzazate flow to transnational corporations, including Saudi-Arabia’s ACWA Power.⁹³

Resisting solar energy

Solar energy projects in the region encounter different types of resistance. Entrenched authoritarian elites and the fossil fuel industry attempt to halt renewable energy transitions altogether, or to aggregate distributed solar energy flows into centralized power structures. A diverse group of labour unions, marginalized communities and activists, by contrast, opposes the ways in which renewables have become privatized, while otherwise however supporting the transition away from fossil fuels. Rocher and Verdeil note that labour unions in Tunisia have resisted renewables due to a perception of the solar energy sector as entry point for processes of privatization.⁹⁴ Along the same line, El Karmouni outlines how, in Morocco, the renewable energy strategy effectively functions as a gateway for privatisation strategies and encounters the resistance of labour unions who oppose new investments by large-scale TNCs.⁹⁵

In a context of high energy prices and the 2011 interruption of gas supplies from Egypt, Jordan has over the past years significantly expanded its generation of renewable energy and was accordingly described as one of the main emerging markets for clean energy investment worldwide.⁹⁶ However, the strong development of in particular solar energy came to a sudden halt when the suspension of all renewable energy auctions and new licences for projects over 1MW was announced in early 2019. In 2020, the government announced a target of 14% renewables in the entire energy mix by 2030, which is only a meagre 3% higher than the already achieved 11%.

90 - Grove (1995) *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1860*.

91 - Aoui, El-Amrani & Rignall (2020) ‘Global Aspirations and Local Realities of Solar Energy in Morocco’.

92 - Rignall (2016) ‘Solar power, state power, and the politics of energy transition in pre-Saharan Morocco’, p. 543.

93 - Aoui, El-Amrani & Rignall (2020) ‘Global Aspirations and Local Realities of Solar Energy in Morocco’.

94 - Rocher & Verdeil (2019) ‘Dynamics, tensions, resistance in solar energy development in Tunisia’.

95 - El Karmouni (2016) ‘Moroccan Energy Policy: From One Dependence to Another’, p. 29.

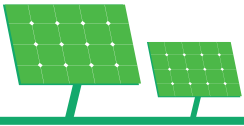
96 - Climatescope (2019) ‘Emerging Markets Outlook 2019: Energy transition in the world’s fastest growing economies’, p. 52.



A key factor behind the slowing down of Jordan's transition to renewables was a gas deal signed between the government owned electricity utility NEPCO and NBL Jordan Marketing Limited, an offshore corporation registered in the Cayman Islands and owned by three Israeli corporations and a subsidiary of US-based Nobel Energy (which was recently acquired by US energy giant Chevron). The highly restrictive contract – it escapes the Jordanian taxation regime, excludes the jurisdiction of Jordanian courts, includes various secrecy clauses, provides for uneven cancellation terms in favour of the Israeli corporations and includes the Jordanian government as guarantor despite lacking parliamentary validation of the contract – regulates the supply of natural gas from an Israeli controlled gas field in the Mediterranean for over 15 years and an amount of US\$ 10 billion.⁹⁷ The deal is highly unpopular among the Jordanian public, as it is not only widely perceived to turn the Jordanian state into a financier of Israel's occupation of Palestine – an estimated half of the expected revenues goes to the Israeli government, – but as it also directly impedes the country's transition to renewables.⁹⁸

97 - Hammouri (2020) 'Claiming 'Private' to Evade Democracy? The Leviathan Gas Deal and the Jordanian Constitutional Court'.

98 - Vidal (2020) 'Jordanians voice concerns over imports of Israeli gas'.



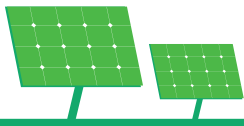
Conclusion

This report provided an overview over select literature on the energy-politics nexus. It then discussed some of the ways in which different technologies and infrastructures, modes of financing, and forms of knowledge mediate solar energy's socio-economic effects. Finally, it presented select empirical snapshots, in order to demonstrate solar energy's context-dependence. While solar energy, in particular decentralized solar energy, holds a certain emancipatory potential, projects are always embedded into pre-existing structures of power. In an attempt to conceptualize energy in terms of relationality, it was argued that solar energy's effects differ depending on categories of class, gender and race, as well as depending on the socio-economic structures within which projects are pursued. A multiplicity of different (solar) energy futures is possible, as attempts at a transition to renewables are highly contested and constitute an arena on which wider social, economic and political struggles are played out. The gradual transition from fossil fuels to solar, hydro and wind offers an unprecedented opportunity to challenge and overcome authoritarian practices and concentrated energy politics. However, transregionally entangled authoritarian elites from within and beyond the region forcefully resist the promotion and production of renewable energies altogether, or push for it in ways that merely renew authoritarian power. To resist such dynamics and shape attempts at a renewable energy transition in an as participatory, inclusive and sustainable manner as possible, it is of crucial importance to gain more insight into solar energy's context-dependent effects on entrenched authoritarian and/or democratic practices.



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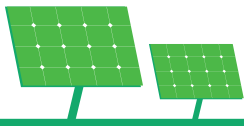
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Cover Photo: Aerial Photo of large-scale photovoltaic solar power station.
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The Regional Climate and Energy Project MENA advocates for an energy transition into renewable energy and energy efficiency. It continues to search for just transition solutions in the energy sector that ensure the protection of both the planet and people. As the MENA region is one of the areas most heavily affected by climate change, we contribute to policy advising, research, and advocacy in the areas of climate change policy, energy transition, and urban sustainability, with the support of research institutions, civil society organizations, and other partners in the region and Europe.

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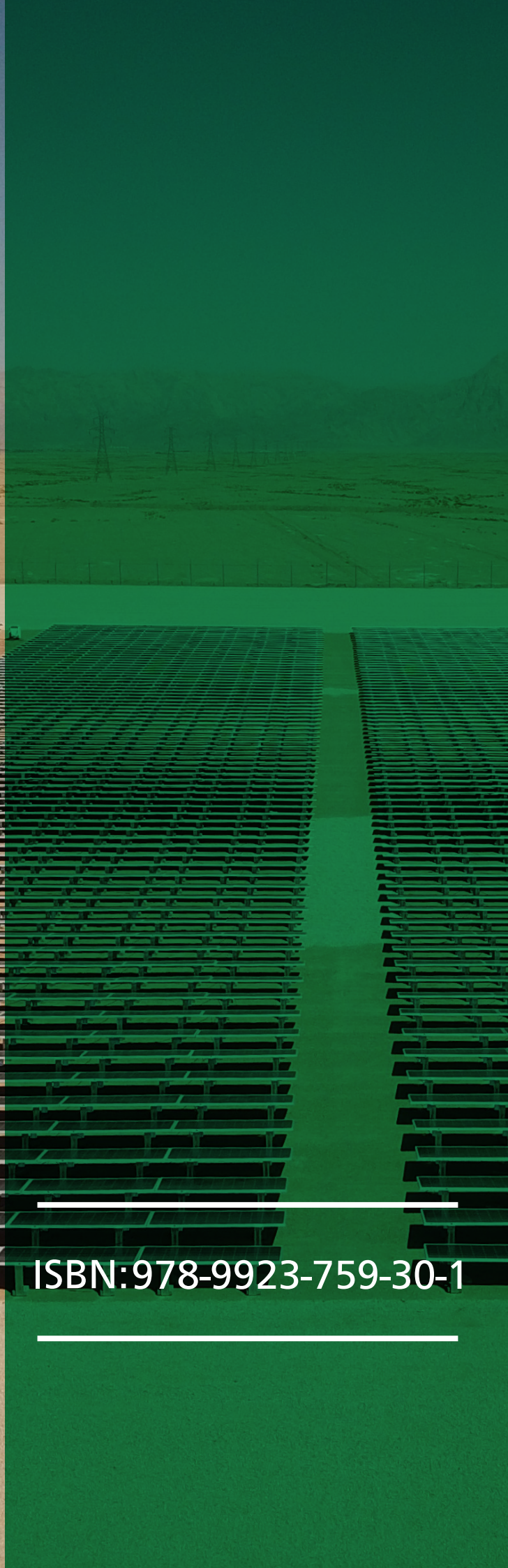
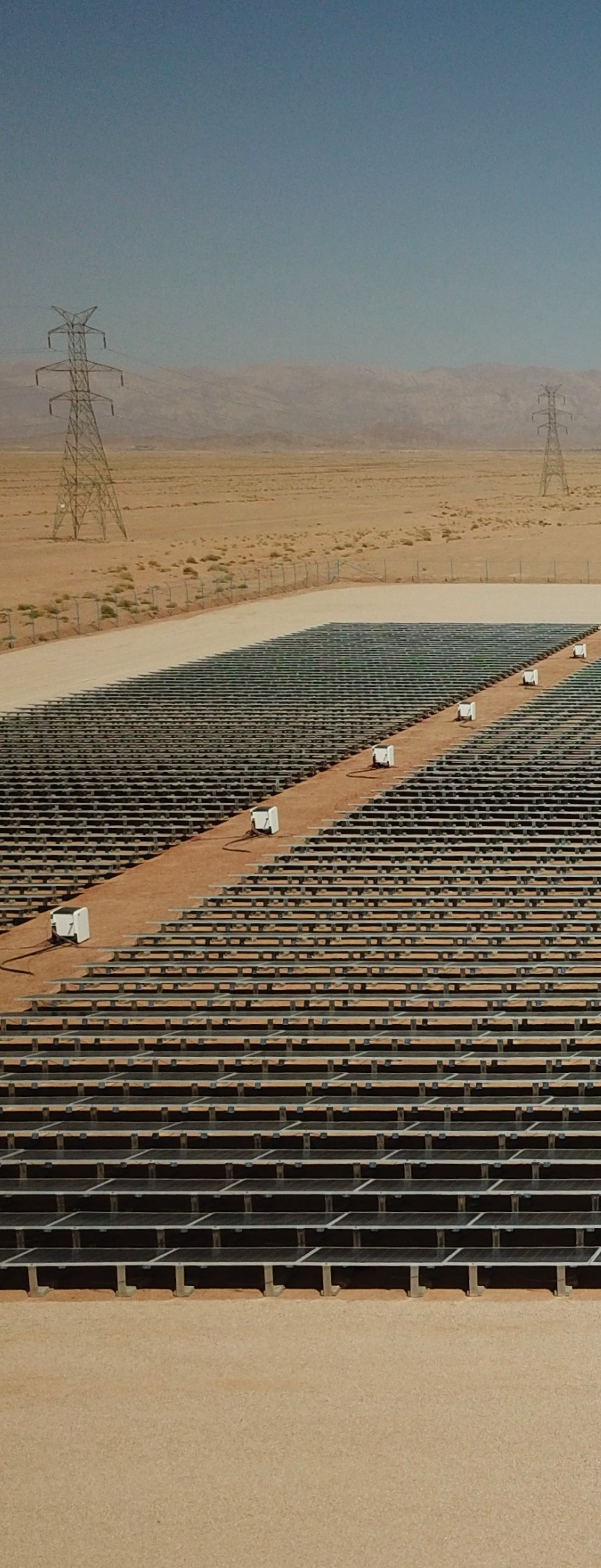
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