‘Governance amidst the transition to renewable energy in the Middle East and North Africa’

Paasha Mahdavi
Noosha Uddin

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Chapter Abstract

While some states in the Middle East and North Africa have pursued renewable energy policies, others have doubled-down on conventional fossil fuels and eschewed the development of renewable energy. What explains this variation? What implications do these choices have on domestic and international politics? Drawing on theories from political science and the political economy of development, we explore the transition from conventional to renewable energy in the Middle East and North Africa (MENA) region. We consider the impact of decarbonized, diversified economies on demands for inclusive governance and democratic institutions. First, we argue that the renewable energy transition will diffuse existing and future societal pressures by increasing youth employment, hindering corruption, and reducing fiscal volatility. Compared to the concentrated political economy of petroleum-reliant states, we posit that the up and coming renewables sector provides an opportunity for states to broaden and diversify their sources of economic and international political power. Second, we build theoretical expectations that fiscal reliance on oil exports and government time horizons explain variation in renewable energy policies in the MENA. We conclude with potential scenarios for how the transition will affect fiscal and political stability.

Introduction

Despite its status and reputation as a region dominated by petro-states, the Middle East and North Africa is making strides towards the transition to renewable energy. At the forefront among the oil-exporting states is the United Arab Emirates, which has emphasized the need to reduce reliance on petroleum by adopting new energy technologies that can spur growth and employment. The UAE hosts 79% of the solar photovoltaic capacity in the Gulf and has done so largely without offering subsidies to developers and investors.[1] Its national energy strategy aims to increase the share of clean energy in the country's electricity generation capacity to 50% by 2050. Likewise, Iran, Kuwait, and Saudi Arabia have sought renewables investments as a means to free up petroleum for export, lower greenhouse gas emissions, and create new jobs and local businesses.

Yet there is broad variation in how successful and effective these investments are in displacing fossil fuels at non-trivial levels, as shown in Figure 1. For example, the share of renewable energy in national electricity generation (excluding hydroelectric power) ranges from less than 0.1% in Bahrain and Oman, to 0.2% in Iran and Saudi Arabia, to a maximum of 2.0% in the UAE. Furthermore, there exists a divide in how renewable energy plays a role in the national economy. In Saudi Arabia and Iran, renewables primarily serve to increase oil exports through efforts such as displacing domestic oil consumption and using renewable electricity for enhanced oil recovery and petroleum processing. In the UAE, renewables serve not just to free up oil for export (rather than domestic consumption), but to the long-term goal of making the UAE a regional hub capable of becoming a major exporter of renewable energy services and technical knowledge. In oil-poor Jordan and Morocco, renewable energy will provide the means to escape from energy shortages and a heavy reliance on imports for total energy consumption -- 96% in Jordan and 95% in Morocco. In war-torn Yemen, renewable energy is crucial in providing energy access; as of 2019, the country's current generation capacity can only satisfy one-third of its demand.

What explains this variation? And what do these different choices imply for domestic and international politics? In this chapter, we draw on political economy theories to explore the transition from conventional energy to renewable energy in the MENA region. We first establish the theoretical framework in the context of the resource curse hypothesis and the theory of the rentier state. We then apply this framework to provide implications for the transition from conventional to renewable energy. Here, we build an argument that the renewable energy transition will diffuse existing and future societal pressures by increasing youth employment, hindering corruption, and reducing fiscal volatility. Compared to the concentrated political economy of petroleum-reliant states, we argue that the up and coming renewables sector provides an opportunity for these states to broaden and diversify their sources of economic and international political power. We conclude with a set of potential scenarios drawn from best practices in the region to reduce dependence on fossil fuels.

[1] International Renewable Energy Agency (IRENA), (2019), *Renewable Energy Market Analysis: GCC 2019*.

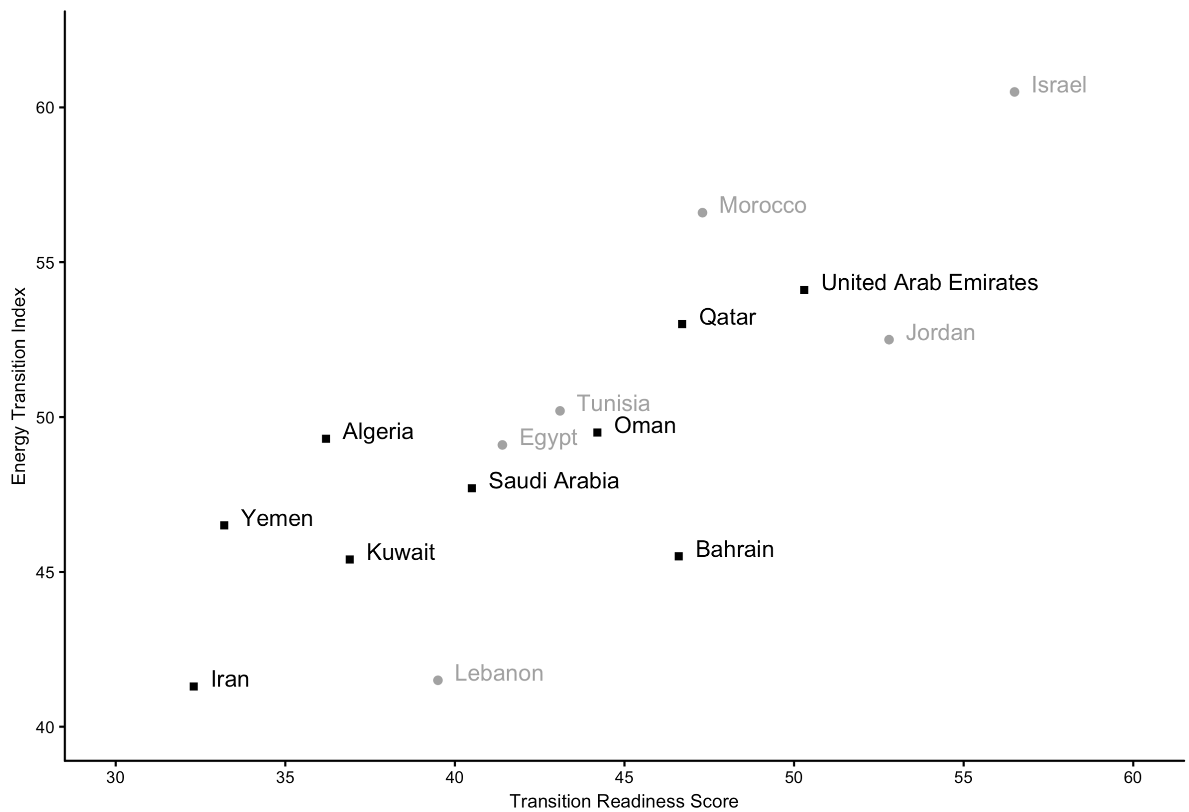

Figure 1. *Energy transition indicators in the Middle East and North Africa. Higher values correspond to greater advances and preparedness for making the transition to renewable energy. Major oil and gas exporting states are represented by black square points, non-oil-exporters are represented by gray circles. Data are missing for Iraq, Libya, and Syria. Data source: World Economic Forum.*

Political implications of conventional energy resources

Theory of the Rentier State

'No representation without taxation'. This reversal of the American Revolution's byword is the core of the idea that natural resources such as oil and gas hinder democratic governance. In contrast to taxing its citizens to finance state expenditures, a 'rentier state' - defined as a state which generates income by collecting an external rent, such as the sale of petroleum and minerals - has no need for taxing the income of its citizens. As such, rentier states are not dependent on the complicity of their citizens when making fiscal decisions. Instead, according to the rentier state theory, this type of state plays a provisory role, whereby leaders purchase support using rents to provide public goods and patronage, buying off more people with larger packages of money than their non-rentier state counterparts.

While Karl Marx, and to a lesser extent Adam Smith, is widely credited with the appellation of the 'rentier state,' two scholars of the Middle East are cited as the first to apply this moniker to a theory of political economy. The first is Hussein Mahdavy, an Iranian economist, who is best known for making the claim in 1970 that the existence of an external fiscal revenue source, such as oil sales or foreign aid, widens the gap between citizens and their government. In his words, 'a government that can expand its services without resorting to heavy taxation acquires an independence from the people seldom found in other countries'[2]. This assertion has come to be the foundation on which rentier state theory is built.

It took nearly two decades before Mahdavy's work was revisited, this time by the Egyptian economist and onetime Prime Minister Hazem Beblawi, who took up the self-prescribed onus of propagating Mahdavy's theory. In his 1987 book with Giacomo Luciani, *The Rentier State*, Beblawi explores the instrumental value of the theory by applying it to the 'prominence of the oil economies in the Arab region.'[3] Beblawi's most accredited contribution to the rentier state theory is to make the theory more than a simple classification system of the different types of economies in the world. In its most concise form, Beblawi's general hypothesis is that rentier states will suffer 'a serious blow to the ethics of work' that 'pervert[s] the economic system' and leads to an inefficient burgeoning of 'a huge bureaucracy.'[4] In addition to reducing labor productivity, resource rents hinder the development of fiscal accountability and discipline. This was best captured by Luciani's later argument of an "'allocative strategy' of rentier states. In short, Luciani posited that petroleum sales provided the oil-rich MENA countries with the means to spend lavishly on providing public sector jobs and targeted benefits to loyal elites, which increased overall support for incumbent regimes.[5] Non-rentier states, by contrast, lack the fiscal means for such allocation and instead rely on measured redistribution of revenues from taxation.

The political resource curse[6]

These theoretical propositions served as the foundation for a new paradigmatic contract between states and their citizens, and subsequently, for a larger hypothesis regarding the negative development effects of rentierism. The former, now referred to as the *rentier* social contract, is a transactional civic relationship whereby 'the state provides goods and services to society (such as subsidies on basic commodities) without imposing economic burdens, while society provides state officials with a degree of autonomy in decision-making and policy'[7].

This channel provided the basis for a theoretical extrapolation to explain why so many oil-rich states suffered from authoritarianism and generally negative governance outcomes, such as corruption,

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[2] Hussein Mahdavy, (1970), "Patterns and Problems of Economic Development in Rentier States: the Case of Iran." In M.A. Cook, ed., *Studies in Economic History of the Middle East* (London: Oxford University Press), p. 466.
[3] Hazem Beblawi and Giacomo Luciani, (1987), *The Rentier State* (London: Croom Helm), p. 50.
[4] Hazem Beblawi, (1987), "The rentier state in the Arab world," in Hazem Beblawi and Giacomo Luciani (eds.), *The Rentier State* (London: Croom Helm), p. 61 and 66.
[5] Giacomo Luciani, "Allocative vs. Production States: A Theoretical Framework," in The Arab State, ed. Luciani (Berkeley, CA: University of California Press, 1990), pp. 65-84
[6] Given the chapter's focus on the governance effects of the renewable energy transition, we deliberately limit our discussion of the resource curse to select political components. This, of course, leaves out the broader effects on corruption, civil and interstate conflict, gender and income inequality, and others. For a review of these issues, see Ross (2015) and Andrew Rosser (2006), "The political economy of the resource curse: A literature survey."
[7] Quintan Wiktorowicz, (1999), "State Power and the Regulation of Islam in Jordan," *Journal of Church and State*, 41(4): 677–696, p. 680.

bureaucratic inefficiencies, and targeted repression. The political components were first explicated by Terry Lynn Karl, who proposed that the characteristics of a country's leading export sector tend to influence the state's capacity to promote development.[8] Karl argued that a reliance on petroleum, rather than manufacturing, services, or agriculture, fostered weak institutions that constrained the state's ability to adapt to changing economic market conditions -- such as the collapse of commodity prices or the expansion of trade openness. Michael Ross expanded this argument to construct a political theory of the resource curse: resources such as petroleum provide rulers with revenues for repression, patronage, and the tools to dampen pressures for accountable government.[9] Thus, oil -- and natural resources like it -- are posited to 'hinder democracy' and instead provide avenues for the endurance of authoritarian regimes.[10]

This 'curse' in political terms therefore seeks to explain why so few states of the oil-rich Middle East and North Africa did not democratize, have such long-lasting autocrats, and suffer from bureaucratic inefficiency, corruption, human rights violations, and large-scale censorship of the press. In economic terms, oil wealth is linked to unemployment, economic stagnation, stifled innovation, and fiscal imbalances, among myriad other maladies. Jeffrey Sachs and Andrew Warner set the foundations for the broader study of the economic resource curse in showing statistical evidence that countries rich in natural resources have systematically lower levels of economic growth than non-resource-rich countries.[11] Their finding led to rigorous scholarly debate questioning the mechanisms and measures underpinning this correlation – and whether this correlation is spurious or, if not, whether it only applies to the post-1973 period once states had nationalized their oil sectors - and whether it applies to other natural resources, such as metals and minerals.[12] Of particular relevance to the MENA countries is the investigation of the productivity-damaging effects of resource wealth, whereby commodity booms hinder entrepreneurship and instead divert efforts into non-productive, rent-seeking activities.[13] This is partly explained by extreme under-investment in the education sector following resource booms, such that resource wealth effectively crowds out the conditions needed for the development of human capital.[14]

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[8] Terry Lynn Karl, (1997), *The Paradox of Plenty: Oil Booms and Petro-States* (Berkeley, CA: University of California Press).

[9] Michael Ross, (2001), "Does Oil Hinder Democracy?" *World Politics* 53(3): 325-361.

[10] Benjamin Smith, (2004). "Oil wealth and regime survival in the developing world, 1960–1999." *American Journal of Political Science* 48(2), 232-246; Michael Ross, (2012), *The Oil Curse* (Princeton University Press); Joseph Wright, Erica Frantz, and Barbara Geddes, (2015), "Oil and Autocratic Regime Survival," *British Journal of Political Science* 45 (2), 287–306.

[11] Jeffrey D. Sachs and Andrew M. Warner, (1995), Natural resource abundance and economic growth. National Bureau of Economic Research Working paper No. 5398, Cambridge, MA.

[12] See van der Ploeg (2011) for a review. On the issue of whether the curse is limited to certain time periods, see Yu-Ming Liou and Paul Musgrave, (2014), "Refining the Oil Curse: Country-Level Evidence From Exogenous Variations in Resource Income." *Comparative Political Studies* 47(11): 1584-1610.

[13] Robinson, James A., Ragnar Torvik, and Thierry Verdier. "Political foundations of the resource curse." *Journal of Development Economics* 79, no. 2 (2006): 447-468; Collier, Paul and Benedikt Goderis. 2007. "Commodity Prices, Growth and Natural Resource Curse: Reconciling a Conundrum." Centre for the Study of African Economies WP Series #274.

[14] Gylfason, Thorvaldur. "Natural resources, education, and economic development." *European economic review* 45, no. 4-6 (2001): 847-859.

Under what conditions are resources a curse versus a blessing?

Yet the 'curse' is clearly not ubiquitous: the theory could not explain the emergence of established oil-rich democracies such as the United States, Canada, Norway, and the United Kingdom, nor the wave of democratization that hit the oil-rich states of Latin America. Hence the theory shifted to a 'conditional resource curse', whereby certain pre- and post-resource-discovery conditions mediated the negative effects of petroleum on politics.[15] Thad Dunning, for instance, argues that the interaction between resource wealth and income inequality explains why oil reduced the likelihood for democratization in Angola, Algeria, and Nigeria, but not in Brazil, Colombia, Mexico, and Venezuela.[16] Dunning's argument implies that relatively low levels of income inequality in the MENA, combined with high dependence on resource wealth, made elites wary of democratization for fear of losing these rents to distributive demands. In explaining the persistence of democracy in the UK and the US, Timothy Mitchell argues that fossil fuel production -- particularly coal -- created a new political base of power in the form of unions and working-class organizations.[17] These provided the means for a classic modernization effect, whereby unions demanded more progressive and inclusive policies from their governments. Oil, by contrast, did not have the same effects given its capital intensity; the death of oil-based labor movements under Thatcher certainly attests to this vision of energy political history.

Much of the basis for earlier claims about the effects of natural resources on politics is that these resources were by and large 'exogenous'. That is, these theories assumed that political forces did not shape the production of resources, but rather that resource endowments were due to chance: some countries were lucky to have oil and therefore could reap its benefits as though they were 'manna from heaven'. This is now known to be a problematic assumption, given the political determinants of whether a country cultivates its natural resource wealth and ultimately becomes reliant on its revenues.[18] Victor Menaldo, for instance, argues that the strength of institutions prior to the discovery of extractive resources determines a country's extraction strategy.[19] Countries with weak institutions -- including those left by problematic colonial legacies -- were more likely to develop their natural resources without the ability to also foster the human capital for a developed, technically-advanced economy. By contrast, countries with strong pre-discovery institutions could invest in natural resource extraction alongside diversified economies. As such, according to Menaldo, the relationship between the high levels of oil dependence on GDP and bad governance is spurious: weak institutions are to blame for both.

Concerns beyond the 'curse'

Reliance on fossil fuels is the basis for a multitude of political and societal ills beyond its effects on accountable government and healthy labor markets. One that is particularly relevant for the MENA states

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[15] Regarding the institutional conditionality of the economic resource curse, see Halvor Mehlum, Karl Moene, and Ragnar Torvik. "Institutions and the resource curse." *The Economic Journal* 116, no. 508 (2006): 1-20

[16] Thad Dunning, (2008), *Crude Democracy* (Cambridge, UK: Cambridge University Press).

[17] Timothy Mitchell, (2011), *Carbon Democracy: Political Power in the Age of Oil* (Verso Press).

[18] Christina N. Brunnschweiler and E.H. Bulte, (2008), "Linking Natural Resources to Slow Growth and More Conflict," *Science* 320: 616-617.

[19] Victor Menaldo, (2016), *The Institutions Curse: Natural Resources, Politics, and Development* (Cambridge University Press).

is the persistence of fossil fuel consumer subsidies in the form of below-market prices for gasoline, diesel, natural gas, and other petroleum products. Globally, these subsidies are an enormous fiscal burden for the governments that support them. The World Bank and International Monetary Fund estimates for fossil fuel subsidies vary from half a trillion to two trillion dollars per year, depending on the choice of alternative definitions, assumptions, and methods.[20] In addition, consumer fuel subsidies are regressive in that the primary beneficiaries are upper-class consumers who own vehicles, although the removal of subsidies disproportionately affects the poor.[21]

Low prices for gasoline are particularly prevalent in the MENA when compared to the rest of the world. The average tax on gasoline outside the MENA across the 2003-2015 period was 58.4 US cents per liter, while among the MENA countries the average tax was *negative*, implying a subsidy of 14.8 cents per liter (Figure 2, top panel). The average is notably pulled down by the region's oil exporters, where gasoline is subsidized at 38.6 cents per liter (i.e., taxed at -38.6 cents per liter), compared to the non-oil-exporters in the MENA, where gasoline is taxed at 34.9 cents per liter (Figure 2, bottom panel).[22] Indeed, the region's oil exporters - Algeria, Bahrain, Iran, Iraq, Kuwait, Libya, Oman, Qatar, Saudi Arabia, Syria, the UAE, and Yemen - maintain some of the lowest gasoline prices in the world.[23] This group of countries are, on average, consistently below the international market price for gasoline during this period, and remain so even after several subsidy reforms in the 2015-2017 period of low oil prices.[24] Meanwhile, the region's oil importers - Egypt, Israel, Jordan, Lebanon, Morocco, and Tunisia - maintain relatively low gasoline taxes, especially when compared to European and East Asian states, though are on par with gasoline prices in North America and in emerging markets in Latin America and Sub-Saharan Africa.[25]

The negative fiscal impacts of subsidies vary for countries that are able to produce petroleum and other energy sources at below-market costs, though the net fiscal effects are nonetheless quite impactful. In Saudi Arabia, for instance, the cost of refining gasoline from local oil is far below the international market price for refined gasoline given local oil production costs in the range of $3 to $10 per barrel (compared to market prices at $55 to $75 per barrel). The 'effective subsidy' is nevertheless large if we compare local prices to the opportunity cost of selling domestic oil on the international market, despite a low marginal cost of supply that masks the true fiscal cost of the subsidy, holding production fixed.[26]

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[20] Kojima and Koplow (2015); Parry et al. 2014, Coady et al. 2015, Davis 2014, 2016.

[21] Jun Rentschler and Morgan Bazilian (2017), "Reforming fossil fuel subsidies: drivers, barriers and the state of progress," *Climate Policy* 17(7): 891-914.

[22] Calculations made based on monthly gasoline price data from Michael Ross, Chad Hazlett, and Paasha Mahdavi, (2017), "Global progress and backsliding on gasoline taxes and subsidies," *Nature Energy* 2(16201).

[23] Oil exporters are defined here as countries where fuel exports (oil and gas) are more than 50% of total merchandise exports, averaged across the 2003-2015 period. Based on fuel exports (% of merchandise exports) variable from the World Bank World Development Indicators.

[24] Note that the UAE simultaneously has the highest gasoline price in the MENA region. See Statistical Appendix of Middle East, North Africa, Afghanistan, and Pakistan REO Update, April 2019, IMF

[25] See Ross, Hazlett, and Mahdavi (2017). Note that the oil-importing MENA states also differ in governance outcomes when compared to the oil-exporting MENA states, though remain noticeably lower in institutional quality when compared to comparable states in Latin America and Asia. On this debate, see Ross (2012) and Victor Menaldo, (2012), "The Middle East and North Africa's Resilient Monarchs." *Journal of Politics* 74(3): 707-722.

[26] Paasha Mahdavi and Michael Ross (2017) "The Political Economy of Hydrocarbon Wealth and Fuel Prices." UC Berkeley: Center for Effective Global Action.

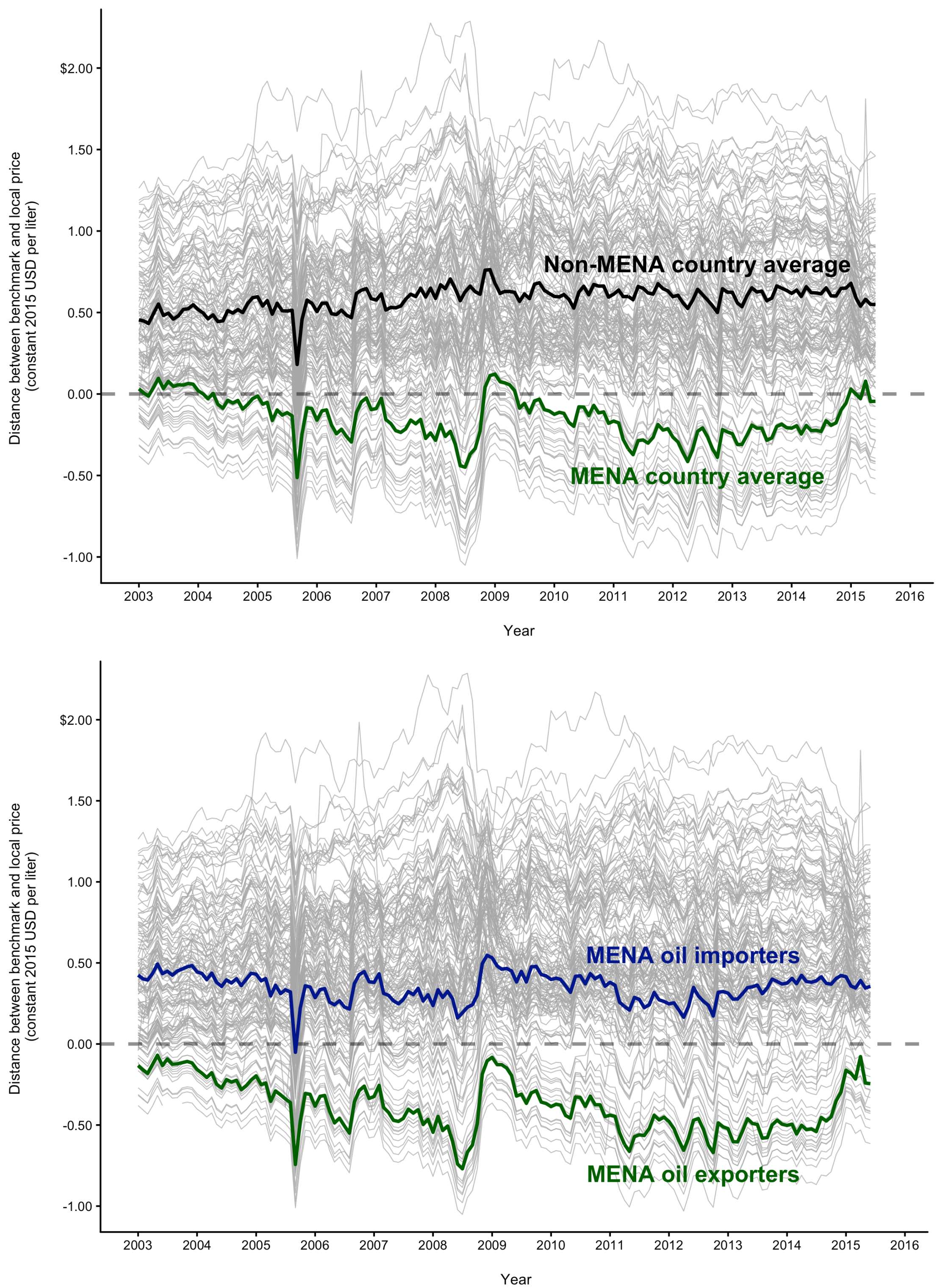

Figure 2. *Monthly trends in country-level gasoline taxes and subsidies, 2003-2015. Averages for the MENA countries and non-MENA countries highlighted in bold (top panel); averages for MENA oil exporters and MENA non-oil exporters highlighted in bold (bottom panel). See text for country groupings. Data source: Ross, Hazlett, and Mahdavi 2017.*

Implications for renewable energy

In the late 1980s, at the height of the 'oil glut', oil prices were at their lowest levels since before the Arab Oil Embargo and oil-producers around the world were suffering from severe fiscal (and existential) crises. Governments were suddenly unable to deliver on their spending commitments, facing rising pressure from elite supporters and the broader public. Outside the MENA, once mighty oil-financed regimes collapsed and ushered in more democratic governments. The sustained period of low oil prices in the 1980s and lingering into the 1990s is argued to be a key driver in regime collapses from the Soviet Union to Mexico. Indeed, this spurred broader claims derived from the political resource curse whereby as the price of oil sinks lower, the more resilient is representative government.[27]

MENA leaders by and large escaped this fate, but still suffered from worsening economic conditions, mounting fiscal deficits, and weakening legitimacy in their ability to maintain their end of the *rentier* social contract. When these leaders ultimately went to the IMF for financial rescue, the consensus 'advice' was that these countries needed to reduce dependency on fossil fuels because of the severe volatility of oil markets.[28] Leaders of the MENA petro-states saw this not as a means to reduce fiscal dependence on these commodities, but rather as a call to establish ever-larger petroleum savings accounts that accumulate wealth in boom periods to cover deficits in bust periods.[29] Of course, few states heeded this advice prior to the oil price collapse of 2014 (with the exception of Iran and the UAE, whose reforms preceded the price shock).

Now the case can be made in terms of life-and-death: advisers and multilateral agencies will argue for the transition before assets are stranded and because it will solve massive unemployment. A 'do-nothing' approach is fiscally unsustainable: international climate policy pressure and rise of low-carbon technology will eventually displace reliance on hydrocarbons, leaving all but the most low-cost extractors out of business.

The volatility-induced fiscal crises of fossil fuel dependency would pale in comparison to the fiscal cliff that awaits because of the transition. The IEA estimates that low demand for oil and gas could lead to losses on the order of 25% to 40% of petroleum revenue over the 2020-2040 period.[30] The sheer magnitude of this pitfall is staggering: according to a Citicorp report in 2015, approximately \$100 trillion worth of fossil assets could be stranded by 2050 to stay below 2-degrees-C.[31] The potential loss of one-

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[27] This is a stylized adaptation of the oft-cited "first law of petropolitics," as popularized by the journalist Thomas Freidman in 2009, wherein the "price of oil and the pace of freedom always move in opposite directions." See Freidman, (2009), "The First Law of Petropolitics," *Foreign Policy* (October).

[28] Irfan Nooruddin, (2008), "The Political Economy of National Debt Burdens, 1970--2000," *International Interactions* 34(2): 156-185; Stephen Kretzman and Irfan Nooruddin, (2011), *Drilling into debt: An investigation into the relationship between debt and oil* (Washington, DC: Oil Change International).

[29] Benjamin J. Cohen, (2009), "Sovereign wealth funds and national security: the Great Tradeoff" *International Affairs* 85(4), 713-731.

[30] IEA World Energy Outlook 2019.

[31] Citi GPS: Energy Darwinism II: Why a Low Carbon Future Doesn't Have to Cost the Earth (Citicorp Global Perspectives & Solutions, 2015).

quarter to two-fifths of government revenue is enough to send shockwaves through society and increase mass pressure for investment in decarbonized solutions.

While this may play out less dramatically in the low-carbon-intensive oil producers -- Saudi Arabia, Bahrain, Qatar, Kuwait, and the UAE -- it will be particularly problematic for high-carbon-intensive producers, namely Algeria, Iran, Sudan, Yemen, Iraq, and Oman. Algeria, for example, is estimated to have the highest carbon intensity of crude in the world, at 20.3 grams of carbon dioxide per megajoule of crude oil (gCO_2eq./MJ) compared to the global average of 10.3 gCO_2eq./MJ and to the astoundingly low 4.6 gCO_2eq./MJ of Saudi Arabia.[32] The carbon tax on an Algerian barrel of oil would be roughly four times that of a Saudi barrel of crude.[33] In an oil-constrained world, any nontrivial price on carbon would all but strand oil assets in places like Algeria and Iran from coming to market. Of course, such a tax would be secondary in terms of fiscal impact than the collapse of global oil prices in a carbon-constrained future. Even a high carbon tax of $100/tonne would only result in a roughly $9/barrel loss of revenues for a state like Algeria, which would pale in comparison to a significant decline in oil prices.[34]

From a purely fiscal-driven understanding of leadership decisions,[35] shifting to renewable energy in the medium- to long-term will maximize political survival and stability. As with the oil-glut era of the 1980s, this loss of revenues will threaten to break the *rentier* social contract if leaders are no longer able to provide goods and services. Following the logic of the resource curse theorists, acquiescence will turn into engaged protest - and the oil-producing countries will likely be unable to weather the storms they escaped during the Arab Spring. Even modest declines in petroleum revenue will result in giving up subsidies, which are known to spark protests even for marginal increases.[36]

However, this will depend largely on the time horizons of leaders and regimes in power in the oil-producing states.[37] Most of the dynastic Gulf monarchies -- the Houses of Saud, Nahyan, Khalifa, and Sabah -- perceive long and lasting rule and therefore see the inherent value of the transition to renewable energy to ensure future survival.[38] By contrast, conflict-plagued regimes in Iraq, Libya, Syria, and Yemen face shorter odds of durable survival and will not place the same political value on potential revenues in

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[32] Masnadi, Mohammad S., Hassan M. El-Houjeiri, Dominik Schunack, Yunpo Li, Jacob G. Englander, Alhassan Badahdah, Jean-Christophe Monfort et al. (2018) "Global carbon intensity of crude oil production," *Science* 361(6405): 851-853. Masnadi et al (2018) note that roughly 40% of Algeria's high carbon intensity is due to flaring alone, which, in a carbon-constrained world, would be significantly reduced.

[33] Much of the difference in estimates arises from lower natural gas flaring at Saudi wells compared to Algerian wells, where routine flaring is substantial.

[34] We thank Robin Mills for clarifying this point.

[35] Margaret Levi, (1989), *Of Rule and Revenue* (Berkeley, CA: University of California Press).

[36] Michael Ross, Chad Hazlett, and Paasha Mahdavi, (2017), "Global progress and backsliding on gasoline taxes and subsidies," *Nature Energy* 2(16201).

[37] Paasha Mahdavi, (2020), *Power Grab: Political Survival through Extractive Resource Nationalization* (Cambridge, UK: Cambridge University Press).

[38] Michael Herb, (1999), *All in the Family: Absolutism, Revolution, and Democracy in Middle Eastern Monarchies* (Albany, NY: SUNY Press). The exception would be the House of Thani in Qatar, which do not share the same confident outlook given recent rifts with long-time allies in the GCC. See Zeina Azzam and Imad K. Harb (eds.), 2019, *The GCC Crisis at One Year: Stalemate Becomes New Reality* (Washington, DC: Arab Center Washington DC, Inc.).

2050, let alone in 2030. And in between these extremes, rulers in Algeria, Egypt, and Iran all strive towards longevity but realize immediate challenges to their rule by either internal opposition parties or external forces. By this logic -- and again, from a strictly fiscal perspective -- we would expect the greatest political incentives for renewable investment and decarbonization in the Gulf monarchies and the least incentives for leaders in the conflict- and post-conflict regimes.

For the non-oil-exporting states in the MENA - particularly the non-producing states of Jordan, Lebanon, and Morocco - the transition to renewable energy has more straightforward fiscal gains. The costs of petroleum imports are substantial, especially in Egypt and Tunisia, whether directly through the market or indirectly through subsidized imports by the oil producers in exchange for international political support. Renewable energy investments can also reduce volatility in energy prices by decoupling these states from their reliance on imported oil, gas, and (to a lesser extent) coal.

What is the impact of decarbonization on governance? Will renewable energy provide the means to 'escape the resource curse'?

In contrast to the economic concentration of conventional energy systems such as oil and gas, we argue that decarbonized energy systems foster diversified economies that mobilize demands for inclusive governance and democratic institutions. This is due to four important characteristics of renewable energy as compared with non-renewable energy systems: low rents, diffuse systems, energy security, and increased employment opportunities.

The first differing characteristic is the lack of Ricardian, or differential, rents: that is, profits above and beyond classical income resulting from the gap between world market prices and local production costs plus return to capital.[39] This gap exists primarily because of the scarce nature and inelastic demand of commodities such as oil, which accounts for its excessively large rents compared to other commodities. And in the MENA in particular, the oil sector has particularly high differential rents given production costs are often below $10 per barrel compared to $55 to $75 per barrel market prices, due in part by restraining long-term production growth within the OPEC framework. While renewables based in the MENA could potentially boast lower production costs -- given its relative abundance of sunlight and wind potential -- the obvious lack of global scarcity for these 'commodities' precludes abnormally high market prices and the need for transporting electricity across long distances adds to overall costs.

This loss of rents will change the fundamental nature of the allocative rentier state.[40] Instead of serving as provider of rent-financed patronage and targeted goods and services, the state in a decarbonized energy system will instead be re-allocative. It will serve to redistribute revenues from taxation to the mass public, just as in the traditional economies of non-oil-rich states, notwithstanding variation in the degree to which

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[39] David Ricardo, (1976[1871]), *The Principles of Political Economy and Taxation* (London: J.M. Dent and Sons, 3rd edition). See also H. Hotelling, (1931), "The economics of exhaustible resources," *Journal of Political Economy* 39(2), 137–175.
[40] Luciani 1990.

this wealth is equitably redistributed.[41] This shift from extractive-based fiscal governance to governance based on taxation of the broader economy - such as income taxes, VAT, tourism, or municipality fees - is what Mick Moore refers to as the 'transition to the status of tax states'[42]. Such a system naturally fosters a negotiated relationship between citizens and government, one which involves bargaining for greater institutionalized societal influence over fiscal matters in exchange for higher and higher levels of domestic taxation and, therefore, government revenues.

A system with inherently lower rents also provides fewer incentives for malfeasance and corruption.[43] Across the renewables value chain, there are fewer opportunities for extortion as compared to the complex and opaque segments of the oil system. This begins with differences in 'upstream' value, where would-be extorters can profit from the fixity of assets such as oil reservoirs and coal mines, while bureaucrats will find less financial value in extorting prospective bidders on specific parcels of land for solar and wind development. While this will vary across states depending on the scarcity of surface areas available for renewables, recent trends in solar auctions in the Middle East suggest a remarkable high level of pricing transparency. In sum, lower rents will, somewhat paradoxically, improve overall governance in the region by improving incentives for fiscal responsibility and accountable institutions.

The second differing characteristic of note is the diffuse structure of renewable energy systems. In contrast to oil, revenue generation from renewable energy is not geographically or vertically limited to points of extraction.[44] Governments can garner tax revenues across the value chain: taxing power generators, distributors, storage facilities, and retail providers; EV manufacturers and retailers; and end-use consumers in residential, commercial, industrial, and transportation segments. Within the utilities sector specifically, value can be created (and taxed) across six segments, from planning all the way to decommissioning. Planning, installation, and grid connection all entail short-term value and highly-skilled job creation, while manufacturing, operation, and maintenance offer long-term value creation and opportunities for sustained employment.[45] This decentralized system contains both capital- and labor-intensive segments, such that a decarbonized, electrified system - much like Mitchell's (2011) vision of the coal industry in 19th-century England and the US - fosters working-class organizations that press leaders for accountable government. This is especially the case if the system is not just decarbonized but also distributed and peer-to-peer.[46]

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[41] Of course, lack of access to external rents does not preclude states from pursuing an allocative strategy. Still, decarbonization will remove a key source of revenue typically used for patronage; while these states may continue to adopt such a clientelistic strategy of governance, this will be harder to maintain in the presence of fiscal pressures and redistributive demands.

[42] Moore, Mick. "Revenues, State Formation, and the Quality of Governance in Developing Countries." International Political Science Review 25(3): 297-319.

[43] Alberto Ades and Raphael Di Tella, (1999), "Rents, Competition, and Corruption," *American Economic Review* 89(4): 982-993; Rabah Arezki and Markus Brukner, (2012), "Oil Rents, Corruption, and State Stability: Evidence from Panel Data Regressions" *European Economic Review* 55(7). See, however, Pradeep Bardhan and Dilip Mookherjee, (2000), "Corruption and Decentralization of Infrastructure Delivery in Developing Countries."

[44] This is not to say there is no value across the rest of the oil supply chain, as several states successfully generate revenues from taxing gasoline and other downstream oil services.

[45] International Renewable Energy Agency (IRENA), (2014), *The Socio-Economic Benefits of Solar and Wind Energy*.

[46] We thank Li-Chen Sim for this point.

Third, there is a gained advantage of greater energy security not only in MENA oil-exporting states but especially for the MENA oil-importing states.[47] Given the latter states' abundance of wind and sunshine in contrast to their lack of fossil fuel resources, the oil-importing MENA states have a clear incentive to develop renewable energy as a solution to threats of possible conventional energy scarcity in the future.[48] Additionally, the increasing volatility of conventional energy prices have resulted in unpredictable energy bills for these importing countries - a trend which will be amplified in a future oil-constrained world until reaching a low-price equilibrium for fossil fuels. The prospect of secure renewable resource assets is also relevant for oil-exporting states, whose conventional oil and gas assets tend to be concentrated and vulnerable to outside threats. The drone attack on Saudi oil processing facilities in September 2019, for example, exposed a key vulnerability that knocked out half of Saudi oil production for several weeks and triggered fears about the future value of the country's petroleum sector.[49]

Fourth, and perhaps the most prominent draw to the renewable energy transition, is the potential boon for widespread employment. This is particularly crucial to alleviate the 'labor resource curse' in that the MENA oil and gas producing countries have a terrible track record in terms of labor productivity when compared to non-oil producers.[50] Youth unemployment in the region stands at 30%, with the highest rates in Palestine (43%), Saudi Arabia (42%), Jordan (36%), and Tunisia (36%).[51] Even where unemployment is relatively low, such as in Qatar, the problem is 'solved' by bloating the public sector with redundant jobs.

Labor force issues are only expected to get worse over time. The region's high youth population ratios have spurred some to label youth unemployment as the Middle East's 'ticking time bomb'. The problem is most acute in Palestine, Syria, and Yemen, where young people (15-24) make up over 20% of the population.[52] The IMF estimates that roughly 27 million youths will enter the Middle East labor market by 2023, which will significantly inflate unemployment.[53]

The region also suffers from highly gendered employment challenges: only 15% of women are active in the MENA labor force, and unemployment rates are 80% higher among women compared to men (the

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[47] This follows a similar rationale for MENA states pursuing nuclear energy, though nuclearization is not without its own dependencies (for example, if fuel enrichment is completed abroad).

[48] Montassar Kahia, Mohamed Safouane Ben Aïssa, and Charfeddine Lanouar, (2017), "Renewable and non-renewable energy use-economic growth nexus: The case of MENA Net Oil Importing Countries," *Renewable and Sustainable Energy Reviews* 71: 127-140.

[49] Andrew England, Ahmed Al Omran, Najmeh Bozorgmehr, and Demetri Sevastopulo, (2019), "Why Saudi attacks changed the calculations on regional security," *The Financial Times* September 20, 2019. This is not to say that renewable energy systems are without their own vulnerabilities, particularly to long-term transmission lines and highly-concentrated power plants.

[50] Simone Tagliapietra (2019) "The impact of the global energy transition on MENA oil and gas producers" *Energy Strategy Reviews* 26(100397): 1-6.

[51] *Youth Employment in the Middle East and North Africa: Revisiting and Reframing the Challenge*, Brookings Doha Center February 2019

[52] "Youth Unemployment: The Middle East's Ticking Time Bomb" *Stratfor* 28 Feb 2018.

[53] Andrew England (2018) "Middle East jobs crisis risks fueling unrest, IMF warns" *The Financial Times* 12 July 2018.

global average gender differential is roughly 20%).[54] As with the region's other maladies, this is in part due to the gender inequities inherent in an oil-dependent economic system that crowds out manufacturing and service jobs held by women, though such imbalances are still quite prevalent in the oil-importing states as well.[55] Nonetheless, shifting to the more gender-balanced renewable energy sector would narrow the gender employment differential, which by itself could increase regional GDP by up to 7.1% by 2025.[56]

Within these sectors, there are numerous synergies in transitioning petroleum-sector workers to renewables jobs. Biofuels processing facilities share technical similarities with oil processing plants, while offshore wind platforms necessitate skilled labor for construction, assembly, and deployment that mirrors development of offshore oil and gas platforms. The key to fostering these synergies is the establishment of a competitive renewables manufacturing industry, something which MENA states have so far struggled within the context of petroleum equipment. The more that these governments can do to create incentives and favorable regulations for renewables manufacturing, the greater the opportunities for developing a balanced and sustainable industry - and not one where unemployment arises anew once installations are complete.

Globally, increased investment in decarbonized energy systems has led to sustained employment increases: the International Renewable Energy Agency (IRENA) estimates 7.3 million jobs created from renewables in 2012, increasing up to 11 million new jobs in 2018.[57] One-third of these jobs are in solar photovoltaics, primarily in China, with bioenergy and wind power combining to make up the remainder of non-hydro renewables employment. These improvements have already been realized in several states across the MENA, where even small-scale renewables investments have increased the share of non-fossil energy while simultaneously providing much-needed employment in the country. In Egypt, the first of 41 planned plants of the Benban solar complex opened in 2019 and employs 650 people; construction of the entire complex is expected to require more than 10,000 workers, and 4,000 for operations and maintenance activities. In Iran, the modest solar photovoltaic industry employs roughly 13,500 workers and the wind sector employs 7,100, despite only accounting for 0.2% of electricity generation. Scaling up installations to levels currently seen in countries such as Germany and China -- where renewables in 2015 provided 370,000 and 3.4 million jobs, respectively[58] -- would not only boost high-skill jobs but also require labor for large-scale construction. The latter are particularly critical for providing a solution to unemployment among non-educated youth.

This is directly relevant to the fossil-dependent countries, who for decades have struggled with unemployment - which, in part, is a direct consequence of their reliance on fossil industries. The oil and gas sector, for example, is a highly capital-intensive industry, one which requires very little labor. In the United States, the top global oil producer at 3.3 billion barrels per year, the oil industry only employs roughly 170,000 people. Not only that, but fossil fuel dependency actively crowds out jobs in other sectors. This is one aspect of the economic resource curse. Fossil exports cause exchange rates to work

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[54] Ibid.
[55] Michael Ross (2008) "Oil, Islam, and Women" *American Political Science Review* 102(1): 107-123.
[56] International Labor Organization (2016) *World Employment and Social Outlook: Trends for women 2017.*
[57] IRENA, (2019), *Renewable Energy and Jobs Annual Review*.
[58] Sharan Burrow, (2015), "How will climate change affect jobs?" World Economic Forum.

against exporters in non-fossil sectors such as agriculture, manufacturing, and services (i.e., the 'Dutch Disease') and governments over-invest in fossil extraction at the direct cost of investing in non-fossil segments of the economy.[59] Shifting away from fossil dependence thus provides a net benefit in terms of national employment, even if this turn is not directed towards decarbonized industries.

Summary of theoretical expectations for variation in the renewable energy transition

The theoretical approaches sketched above imply two relevant variables -- fiscal reliance on oil exports and government time horizons -- that help to explain variation in renewable energy policies in the MENA. While not a formally articulated set of theoretical expectations, these two generally map onto current country experiences with the transition to renewable energy.

At one end are the oil-importing, long-time-horizon governments that have the greatest incentives and capacity to invest in renewable energy. This would include the monarchies of Morocco and Jordan, along with the stable parliamentary republic of Israel. Similarly incentivized are the oil-exporting, long-time-horizon Gulf monarchies. But here we find some variation based on differences in the urgency with which each government sees the coming transition. The UAE, on the one hand, views the transition as inevitable, and has been a leader in renewables investments among the oil-exporters. On the other hand, the Saudi and Kuwaiti governments have been slower to pivot to renewable energy. This could stem in part from the relatively lower climate vulnerability of these states' low-carbon-intensive oil production, though it could also be the result of both states' low costs of oil extraction and hence less fiscal vulnerability as oil markets become more constrained.[60]

At the other end of the spectrum are states that have shorter political time horizons, either due to conflict or post-conflict dynamics or due to increasing domestic political turmoil. Within the net oil importers, namely Lebanon, Egypt, Turkey, and Tunisia, recent transitions and political turmoil have stymied development plans that are sufficiently forward-looking. This political instability notwithstanding, all three states still recognize the inherent value in transitioning to renewable energy in terms of labor and energy security; as such, these three are roughly in the middle in terms of existing and future commitments to renewable energy policies.[61]

The current laggards in the transition are the oil-exporters with short horizons. Governments in Syria, Yemen, Libya, and Iraq carry little political and economic incentives to make long-term adjustments to existing energy policies, given existing challenges to governance in light of ongoing conflict and post-conflict environments. Likewise, current uncertainties in the long-run political survival of regimes in

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[59] Graham A. Davis, "Learning to love the Dutch disease: Evidence from the mineral economies," *World Development* 23, no. 10 (1995): 1765-1779.

[60] It is interesting to note that Kuwait has struggled with new oil-sector developments as well, pointing to a larger potential problem of state capacity and management of the energy industry.

[61] For a more complete assessment of the impact of political instability on the energy transition in Egypt and Turkey, see Hochberg (2020) and Bayulgen (2020), respectively, in this volume.

Algeria and Iran have made renewable energy policy a low political priority.[62] This is particularly problematic for these two states given the bleak outlook of their relatively high-carbon-intensive petroleum sectors in an oil-constrained world.

Potential scenarios for how the transition will affect fiscal and political stability

Will the rise of competitive renewables from oil spark rivalry between competing SOEs? Or will this instead result in a unified, transformed SOE?

Reforms that advance the transition to non-hydrocarbon sources of energy will unsurprisingly create political adversaries for incumbent leaders. A major fear among MENA oil producers is the potential for challenges from state-owned oil companies. These fears are not without foundation: shifts to renewable energy in sub-Saharan Africa have prompted backlash from prominent SOEs who seek to thwart a broader transition to renewable energy.[63] The seeds for such backlash may already be playing out in the case of Morocco, where the state-owned utility ONEE is grappling with reforms that prioritize public-private development of renewable electricity generation. Despite serving a major coordinating role in the transition, ONEE is witnessing the disruption of its core business model: with a declining pool of customers, the utility is faced with less revenue from electricity sales and with a dwindling capacity in providing credible power purchase agreements to new investors.[64]

SOEs such as national oil companies (NOCs) and sovereign wealth funds (SWFs) have traditionally managed the government's largest revenue flows, such that many MENA producers lack a robust, independent financial sector. They also play a crucial role in the labor market: SOE and SOE-related institutions account for much of the state employment in the MENA, where state employment is already a large portion of overall employment. For example, 30% of the Saudi and Iraqi workforce and 15% of the Kuwaiti labor force is employed by SOEs and other government entities.[65] These numbers are significantly higher when looking at the share of national labor: in Kuwait, for instance, over 90% of the non-expatriate labor force is employed by the state.[66]

But if properly governed, SOEs can thrive in an renewable energy system. NOCs in particular are uniquely positioned to pivot into decarbonized investments because they are not 'boxed in' by private

[62] On current instability in Algeria, see Geoff Porter, (2019), *Political Instability in Algeria*, Council on Foreign Relations Contingency Planning Memorandum No. 35. For renewables and political uncertainty in Iran, see Mohammad Hazrati and Zeynab Malakoutikhah, (2019), "An Unclear Future for Iranian Energy Transition in Light of the Re-imposition of Sanctions," *Oil, Gas and Energy Law*, 17(1). Note that the shortened government time horizons in these cases also affect state investment in oil and gas exploration, which similarly yields long-term rather than short-term rewards.

[63] Alan David Lee and Zainab Usman, (2018), "Taking Stock of the Political Economy of Power Sector Reforms in Developing Countries," World Bank Policy Research Working Paper 8518.

[64] Zainab Usman and Tayeb Amegroud, (2019), "Lessons from Power Sector Reforms: The Case of Morocco," World Bank Policy Research Working Paper 8969.

[65] Tagliapietra 2019.

[66] OBG, (2018), *The Report: Kuwait 2019*, London, UK and Dubai, UAE: Oxford Business Group.

investors.[67] If the government makes the decision to veer investments away from fossil fuels, the SOE has the green light to do so and does not have to worry about shareholder backlash. Kuwait offers an interesting example. The 1.5 GW Al Dibdibah (Shagaya Phase II) utility-scale solar PV project is currently managed by the national oil company, KNPC, who is the only market player large enough and managerially competent enough to own and oversee the $1.2 billion investment.[68] Similarly in Oman, the giant 1 GW Mahaar solar thermal project is owned and co-operated (with GlassPoint Solar) by the Petroleum Development of Oman (PDO), the country's NOC.[69]

How can these countries reduce dependency on fossil fuels?

In light of existing and future challenges stemming from a reliance on fossil fuels, what have the oil exporters in the region been doing so far to reduce dependence? In brief, producers have been investing in renewables for electricity generation and hedging with investments in low-carbon petroleum production, petrochemicals, and carbon capture and sequestration.

Sustained global competition over the last decade have dramatically reduced generation costs for renewables when compared to conventionals. Figure 3, from IRENA, shows the strikingly low relative costs of large-scale solar electricity generation in the GCC. Figures such as these are commonplace now in the Organization for Economic Cooperation and Development (OECD), where solar or wind beats out coal and gas. But this looks specifically at the source: that is, solar is even cheaper than gas in the cheapest place to produce natural gas in the entire world. IRENA reports that in Saudi Arabia, for instance, the winning bid for the 300 MW Sakaka solar PV farm in Saudi Arabia came in at 2.34 cents per kWh, and at 2.13 cents per kWh for the 400 MW Dumat Al Jandal wind project. However, it is important to maintain perspective: renewables, excluding hydroelectric power, are still only 2% of total installed capacity in even the best case (UAE) and 0% in the worst (Sudan). Of course, the share of renewable capacity will only continue to increase as solar and wind costs only recently reached such low levels.

Aside from minimal, but growing, investments into renewable energy for electricity generation, the MENA oil exporters have also been heavily investing in petrochemicals. A bet that the oil majors have been making lately to hedge against 'light' decarbonization is increased investment into factories that convert petroleum into plastics and feedstocks, which is a sector that the BP Energy Outlook this year hails as 'the single-largest projected source of oil demand growth in the next twenty years', delivering half of global oil consumption growth to 2040.[70] Saudi Arabia's state-owned oil company Aramco, for

[67] Valerie Marcel, (2019), "National Oil Companies of the Future," *Annales des Mines - Responsabilité et environnement* 95: 133-136.
[68] IRENA, *Renewable Energy Market Analysis: GCC 2019*. See p. 53.
[69] This is a particularly natural fit since the steam from the plant will primarily be used for enhanced oil recovery (EOR), potentially displacing up to 80% of the natural gas currently used for EOR at the heavy Amal oil field. See Steven Moss, "Solar Energy Isn't Just for Electricity," *Scientific American* (19 April 2019).
[70] Nicholas Newman, "The Plastics Backlash has Some Oil Giants Worried." *Rigzone* (4 July 2019). See also Christof Ruhl, "The war on plastic will dent oil demand more than anticipated." *Financial Times* (17 February 2019).

instance, plans to invest $100 billion by 2030 to converting 2-3 million barrels a day, or 15-25% of total production, into petrochemicals.

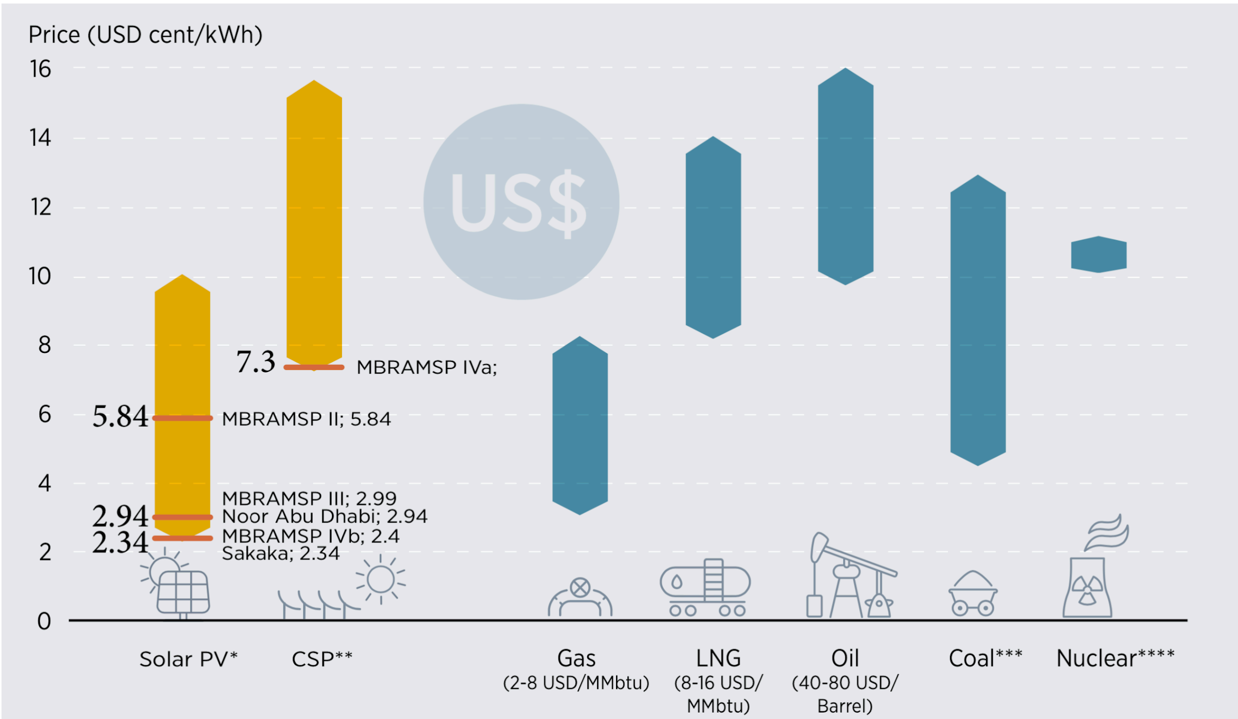

Figure 3. *Generation costs in the Gulf Cooperation Council states compared to conventional utility-scale electricity generation. Image source: IRENA 2019.*

But shifting investments from upstream oil exploration to petroleum products is a short-term fix that will not solve the long-term fiscal cliff and unemployment crises that await these countries. Former head of research development for the Abu Dhabi Investment Authority (ADIA), Christof Ruehl, made this argument clear in February 2019 that the possible 'war on plastic' will ultimately flounder long-term demand for oil. This will potentially lead to a 20% reduction in oil demand, larger than the introduction of electric cars to new markets.[71] This has spooked some firms, such as Italy's Eni, into ditching new petrochemicals investments and instead putting their money into bio-petrochemicals using vegetable oil and biomass. While no MENA oil companies have yet pivoted to bio-derived petroleum products, increasing international pressure on the plastics industry will ultimately ripple down to NOCs and their subsidiaries in the oil-exporting MENA states.

On the public-facing front, the energy-exporters in MENA could use current fossil fuel assets as collateral for international commercial financing for new renewable electricity projects. This would be particularly relevant for new projects in the Emirates, Saudi Arabia, and Qatar. It would expand financing options beyond the current use of revenues from sovereign wealth funds to invest in the decarbonized sector and re-invest fossil revenues into research and development for renewables projects. Less prominent is the

[71] Ruhl 2019. Note that this is based on forecasts of future oil use; petrochemicals currently make up only 10% of demand.

development of large-scale renewable power plants for enhanced oil recovery and petroleum processing facilities. The aforementioned Mahaar project in Oman, for example, is geared specifically toward creating steam to extract additional oil from heavy oil reservoirs in the Amal field. Saudi Arabia, on the other hand, has already developed solar photovoltaic facilities used for powering its oil processing plants.

All states in MENA have in one form or another pitched renewable energy and the decarbonized sector as solutions to build up local industries that can support jobs in ways that the oil industry cannot. This is likely to be the best political strategy to further advance the renewable energy transition particularly in the petro-states, given severe unemployment prospects for the region's youth. And with the 'Arab Spring' uprisings of 2011 still fresh in the memories of the region's leaders, the looming potential for mass youth unemployment -- and the social unrest it assuredly brings -- could be enough justification to break a century-old business model and seek a new political economy based on renewable energy.

Conclusion

The adoption of renewable energy policies in the Middle East and North Africa invites further analysis into the political and economic implications that may come as a result. These policies can help transform those states in the MENA from their traditional "rent-seeking" status to one of higher economic development and potential for democratization. Specifically, renewable energy investments have the potential to lower rents deterring corruption at the state level, increase access to energy throughout the region, and implement ample employment opportunities for growing populations. This chapter serves as an introduction to some of these implications and how institutions can promote these developmental goals for the MENA while taking part in the global pursuit divesting from fossil fuels in favor of renewable energy enterprises.