Background Paper

The Protracted Geo-economics of Energy

February 7, 2018

Harald Heubaum*, Felicia Jackson, Michael Buehler, Arshin Adib-Mogghadam, Behar Sadriu

* Lead author, hh15@soas.ac.uk

Table of Contents

I. Introduction

The Middle East and North Africa (MENA) is a region in profound political and economic upheaval. The last decade alone has seen revolutions and the toppling of governments, civil war and internal strife, the rise of non-state militant and terrorist actors, the blurring of traditional state borders, forced mass migration, humanitarian catastrophes and widening economic inequality. These have sat alongside attempts at economic diversification away from hydrocarbons, a growing middle class and rapidly rising demands for the provision of more energy, food and water, and the onset of a low-carbon energy transition in a region exposed to some of the worst impacts of global climate change yet with only little adaptive capacity. With roughly half the proven global oil and natural gas reserves, hydrocarbon rent – the ability to extract and receive revenue from the trade of oil and gas – remains a key variable for understanding MENA politics. Hydrocarbon resources are distributed unevenly across the region with Saudi Arabia, Iraq, Iran, Kuwait, the UAE and Qatar as the largest producers. Yet even those countries with a comparatively small resource base, like Syria and Yemen, have historically relied on oil rent for a significant part of their GDP and government budgets. Over time, this has created dependencies that have proved hard to shake.

Despite differences in resource endowment, the four countries covered in this analysis – Iraq, Libya, Syria and Yemen – have all been confronted with similar challenges in recent years. All four have been locked in an extended period of civil war and instability with significant damage to energy infrastructure and high degrees of energy insecurity – here understood as the unavailability of sufficient amounts of energy – experienced by large parts of their respective populations. The destruction of war followed decades of mismanagement and chronic underinvestment in infrastructure across the cases. All four have seen a further rise in corruption as compared to pre-civil war figures, with negative implications for inclusive economic development and effective energy governance at all levels. Relatedly, all four have experienced a deterioration of state institutions and a significant further erosion of public trust in the state's ability to establish order and provide essential public services, including electricity, fuel and water. With state institutions weakened, all four have also seen challenges to their territorial integrity and control over hydrocarbons and other resources, with various international and regional powers and internal non-state actors wielding influence on the ground.

The following provides an overview of the key dynamics of energy geopolitics across Iraq, Libya, Syria and Yemen, spanning an arch from the state of energy politics and infrastructure before the outbreak of the Arab revolutions and the tragedy of civil war to the projected impacts of climate change in the MENA region and the implications worsening climatic conditions hold for effective reconstruction. Each of the country cases in turn highlight the history of energy politics (t-1), followed by the situation as it presents itself today (t), incorporating energy institutions and social capital, spatial/ geographic, local and cross-border dimensions, and energy and climate security concerns. The conclusion presents a number of recommendations for the period of post-war reconstruction (t+1).

II. Iraq

Iraq is OPEC's second largest crude oil producer and holds the fifth largest oil reserves in the world. Since the first year of the Iraq war 2003-04, energy production has increased steadily (IEA, 2016a). With this growth has come continued GDP growth despite the many years of armed conflict and destruction from which the country only emerged at the end of 2017. However, with more than 90 percent of the government budget dependent on oil export revenues, Iraq's financial situation is uncertain in times of fluctuating oil prices. Paradoxically, it is oil rent, together with foreign direct investment, that will have to drive an urgently needed economic diversification away from oil. Like Libya and Yemen, Iraq is experiencing high population growth, with the number of people more than doubling since 1990. In addition, millions of Iraqis have been displaced and poverty has increased rapidly as a consequence of war (World Bank, 2018).

The rising demands for stable electricity and fuel provision can scarcely be met due to damage done to energy infrastructure going as far back as the 1990-91 Gulf War, chronic underinvestment by the government and endemic corruption. The grid currently provides around 13GW, far below the 21GW peak demand in the summer months, when air conditioning needs are highest (Reuters, 2018). Iraq imports some electricity but more cross-border grid interconnection is needed. In a warming climate, prolonged water shortages have had detrimental effects on the country's agricultural production and civilian water provision. Thus, despite the end of sectarian conflict, Iraq will need to address a number of issues for any reconstruction to be effective. This includes dealing with continuing unrest and violent protest in Basra in the country's south and conflict with Iraqi Kurdistan in the north.

History of energy politics

The first commercially viable oil field in Iraq was discovered in 1928 in Kirkuk during a period when the country was under foreign, in particular British, influence. After the arrangement of an "equal profit sharing" agreement with foreign powers in 1952, Iraqi leaders moved to increase their national sovereignty over their oil resources (Silverfarb, 1996). Under the influence of the nationalisation of the Anglo Iranian Oil Company by Muhammad Mossadegh in Iran, the Iraqi leader Abdal-Karim Qasim who overthrew the pro-British monarch Faisal II in 1958, negotiated better conditions for Iraq which led to the so called Public Law 80, whereby the Iraq National Oil Company was later established. In the 1970s, the secular Arab nationalist Ba'ath party came to power and Iraqi affairs were under increasing influence of Saddam Hussein, despite the nominal Presidency of Ahmed Hassan al-Bakr. Eventually, the Ba'ath party fully nationalised the assets of the Iraq Petroleum Company in 1972 (Schwadran, 1977).

After a period of sustained investment into the oil and gas infrastructure in the 1970s, Iraqi oil production stood at 4 million barrels a day in 1979, at the time the third highest in the world after Saudi Arabia and Iran (Jaffe, 2007). Two mega-fields have dominated Iraq's historical production: Kirkuk since the 1920s and Rumaila which began operations in the 1950s. In 1979, Saddam Hussein took absolute power in Iraq and in that year, his government issued tenders to explore Iraq's oil fields at Majnoon, West Qurna, Halfaya, and Nahr Umar (Tripp, 2000). In addition, the Iraqi government issued contracts for drilling and the expansion of the Al-Bakr terminal (now Al-Basra terminal) with the US firm Brown & Root (now KBR), and the 16-tank complex at Fao had just been completed (Mehdi, 2018).

The Iran-Iraq war between 1980-1988 and in particular the international sanctions after Operation Desert Storm in 1991, hit the Iraqi oil sector hard and led to less attention to reservoir management and infrastructure development such as pumping stations and pipelines. At the same time oil income continued to enable Saddam Hussein to hold on to his dictatorship and to suppress the majority Shia population and the Kurds of the country who repeatedly revolted against his rule. Saddam Hussein also played the oil card in order to subvert the UN oil for food programme which was meant to alleviate the humanitarian consequences of the sanctions regime instituted in 1991 (Adib-Moghaddam, 2006).

The new order brought about after the US invasion of 2003 which ended the rule of Saddam Hussein is characterised by economic, political and social challenges. Although Iraq rapidly increased its oil output, the security environment in many parts of the country and the

political infighting continued to hamper further progress (O'Sullivan, 2011). Hence, in the early 2000s, Iraq's oil production was 2.5m barrels per day (bpd), much lower than in 1979. The production further fell to approximately 1.4m bpd following the US-led invasion of Iraq in 2003. From 2003 till the end of 2007, Iraq's oil facilities and pipelines were severely damaged due to several hundred bomb attacks (Mehdi, 2018). The anarchy during this period complicated matters further as looters stole equipment and valuable documents such as logs and seismic data.

The security situation has improved in the last few years, yielding big strides in the oil sector. From 2014 to 2016, Iraq was one of the largest contributors to incremental production growth in the global oil market, having added approximately 2m bpd between 2009 and 2016 (Mehdi, 2018). But until today, Iraqis are still facing high levels of unemployment and very limited provisions of social and public services from the state. For instance, demand for electricity has more than doubled since 2003 while supply increases have been more modest, leading to a persistent gap between supply and demand. Protests over power shortages repeatedly fuelled angry protests in major Iraqi cities and led to the resignation of the Minister of Electricity in summer 2010 (Mohammed and al-Salhy, 2010). Moreover, Iraq's public sector grew significantly during the mid–late 2000s. IMF figures show that employment in the public sector tripled from one million in 2004 to three million in 2013 (IMF, 2017). However, social services in health, education, and electricity did not meet the demand of Iraqis as indicated. Despite several ministerial dismissals after recurrent efforts by the Prime Minister to contain corruption and after having spent $27 billion on the power sector, electricity generated under the relevant ministries actually fell from 4.88 GW in August 2009 to approx. 4.7 GW in 2011 (Mehdi, 2018).

Institutions and social contract

The ethnic and sectarian dilemma facing the Iraqi state has repeatedly led to civil unrest and is in many ways institutionalised in the so called '*muhassasa*' system which allocates quotas in the Iraqi state along ethnic and sectarian lines (Boduszyński, 2016). As a consequence, key governmental posts, including in the oil ministry, are distributed according to a sectarian logic. This has led to sectarian political factions controlling key state institutions which in turn has given rise to widespread corruption (Aldouri, 2017). The protest movements against the Maliki government that began in 2015 were born out of popular discontent over party

elites capturing the state, deepening sectarian divisions and failing to provide adequate public services, including energy and water, due to unparalleled corruption (Boduszyński, 2016).

The problems were further exacerbated when ISIS challenged the majority-Shia led Maliki government and entangled the country in a costly war which only ended in late 2017. The war led to an expansion of Iraq's war economy and higher budget allocations for defence and military purposes, stymieing investment in the energy/oil sector. Ultimately, the call of mass Shia mobilisation against ISIS by Ayatollah Sistani, the main Marja-e Taghlid (source of emulation, highest Shia clerical rank) of Iraq, created another problem. The so-called Hashd al-Shaabi, the umbrella organisation composed of approximately 40 militias that are mostly Shia but also include Sunni Muslims, Christians and Yazidis, has emerged as a powerful institution in and of itself. It remains to be seen how the Hashd can function as a force for stabilisation (or not) in the aftermath of the defeat of ISIS in 2017 and the elections in 2018.

Iraq's current president Saleh and prime minister Mahdi are known as reformers but there are suggestions that they, too, came to power as a result of *muhassasa* dealings (Dodge, 2018). The old guard that is seen by Iraqis as responsible for the rampant corruption and incompetence within the state thus continues to be rejected. The continuation of violent protests in Iraq's marginalized south, where trust in state institutions has hit rock bottom, is indicative of this political trend. Anger among residents of Basra, home to 80 percent of Iraq's oil wealth and the country's only deep water port, has escalated further after the new government failed to appoint any minister from the region, with calls for regional autonomy growing louder (Malik, 2018). The continuing instability has potential implications for future oil production and exports.

In Iraq there exists a notion of 'resource nationalism'. Hence, the decision to invite International Oil Companies (IOCs) into Iraq continues to be appropriated by different political parties in the country (O'Sullivan, 2011). In 2009, Iraq offered its first bid round for the development of some of its largest producing oil fields. Today, the political agenda of religious-nationalists such as the controversial cleric Moqtada al-Sadr, who is opposed to US influence in Iraq's oil sector, gains a lot of traction among the Iraqi population, not least due to the history of European colonialism which lends itself to populist politics. At the same time, the US's former nemesis has worked to counter Iranian influence, choosing to participate in the political process as an anti-corruption populist who supports diversifying the country's economy away from an overreliance on oil (Sullivan, 2018). Al-Sadr's supporters have participated in the protest movements since 2015 and his Sairoon electoral

list won the 2018 parliamentary elections, capturing 54 seats. It remains to be seen whether real progress can be made in reforming state institutions and the energy sector to deliver better services and quell public unrest (Taylor, 2018).

Spatial, local and cross-border issues

The question of federalism has pitted the central government in Baghdad against the Kurdish quest for more independence. Indeed, the disagreement over regional autonomy for the Kurds repeatedly boiled over with reference to the oil rich province of Kirkuk in the country's north. Kurds even went to the polls on 25th September 2017 and overwhelmingly voted for full independence of the Kurdish Regional Government despite regional and international opposition to the referendum, including sanctions from Iran and Turkey (Dalay, 2017). The Kurdish leadership quickly backed down after Baghdad sent tanks to the region resulting in the loss of over half of its post-2014 territory, including Kirkuk. In late 2018, however, Baghdad and Erbil struck a deal to resume oil flows of up to 100,000 bpd from the Kirkuk oil field via the KRI's pipeline to Turkey which was interpreted as an important step towards the easing of tensions between the two sides (Al Jazeera, 2018). Apart from its exports via the country's southern terminal, Iraq depends on the Kurds to transport oil north after ISIL destroyed the only other pipeline heading into Turkey.

The energy sector in Iraq developed within a context of political transition. Elections in 2005 brought about a government dominated by various Shia factions who had entered the vote under a single list, the so called United Iraqi Alliance (UIA). Some of these factions, in particular the Badr Organization and al-Hakim's Supreme Council for the Islamic Revolution in Iraq, have been allied to Iran which has emerged as the main external regional power in the country (Arango, 2017; Steinberg, 2017). But apart from political connections, economic dependencies have emerged in recent years. Iraq is Iran's second largest trade partner after China and it is dependent on Iran for much of the gas for its power sector. Iranian gas fires up to 45 percent of Iraq's current electricity generation – which is a major energy security and geopolitical concern due to continued US sanctions on Iran (Coles and Faucon, 2018). However, the US has so far provided temporary sanctions waivers for Iranian gas and electricity exports to Iraq to ensure the continued economic growth and recovery of the country. Even so, in the summer of 2018, Iran temporarily stopped providing electricity to Iraq because of unpaid bills and an increased need in Iran due to a heat wave (Mamouri, 2018).

To reduce its dependence on Iran, close continuing gaps in power provision and increase domestic energy security, Iraq has pursued a number of projects aimed at rebuilding and rehabilitating infrastructure and adding capacity across the country. In 2017, General Electric (GE) signed a contract with the Ministry of Energy to develop electric substations and provide critical equipment (Sengul, 2017). GE has a 40-year presence in Iraq and is partially responsible for up to 50 percent of all power generation in the country. Together with Standard Chartered Bank and the state-run Trade Bank of Iraq (TBI), it closed a $600-million financing agreement to fund Iraq's ambitious 'Power Up Plan' which addresses critical electricity generation and maintenance projects throughout the country and could add more than 2GW of generation capacity (Arnold, 2018). In Oct 2018, both GE and Siemens signed Principles of Cooperation to add 14 and 11 GW of new capacity, respectively (Gnana, 2018b). The original plans had Siemens build out most of the infrastructure, but GE secured its participation after pressure on Baghdad from the Trump administration.

To the west, Iraq has enjoyed long-standing economic relations with Jordan, with oil as the primary commodity. Indeed, Iraq has historically been one of Jordan's most important sources of oil, shipped by tanker to Jordan's Red Sea port at Aqaba. In early 2019, both countries agreed a trade deal involving the shipment of initially 10,000 bpd to Jordan at preferential rates in exchange for reduced tariffs on Iraqi goods imported via Jordan (Reuters, 2019). There have also been discussions on constructing an oil and gas pipeline connecting Iraq's southern oil fields in Basra to Aqaba. At the same time, however, Jordan has worked to improve its own energy security and fiscal situation and reduce imports from Iraq and elsewhere by developing its extensive indigenous shale oil reserves, awarding a 40-year exploitation contract to a Saudi company in 2018 (Gnana, 2018a).

Despite some progress in rebuilding domestic infrastructure and cross-border energy trade, outages continue to be a major problem in Iraq. Chronic electricity cuts undermine growth and development and the reliable provision of services. The failure to provide services, fuel and water has, in turn, led to violent protest in Basra (as discussed above) but it has also impacted other cities, including Baghdad, and rural areas. In the summer months, when temperatures creep up to 50˚C, the failure to meet electricity needs for cooling is particularly acutely felt, with residents of Baghdad describing their lives as "intolerable" (Ibrahim, 2018). This has led to the increased use of privately-owned oil-fuelled generators – with their owners often making huge windfall profits – as well as a growth in small-scale, rooftop solar PV. However, despite excellent solar resources, a mass rollout of solar PV is held back by higher upfront costs (despite rapidly falling prices), international firms' worries

over customer non-payment and the government's continued strong focus on hydrocarbons (Fairley, 2018).

III. Libya

Libya is a member of OPEC and the largest oil supplier in Africa with significant proven oil and gas reserves (BP, 2018). Prior to 2011 the country was growing rapidly, focused on the exploitation of hydrocarbon rent - roughly 96 percent of government revenues are derived from the oil and gas trade (RCREEE 2019). Investment in the power sector was considered important and electricity generation more than doubled between 2000 and 2010. In 2010, Libya had 6.8GW of installed capacity, with over 99 percent of the population having access to electricity and excess generation transported to Egypt. Following the civil war of 2011 and the overthrow of the Gaddafi regime, the performance of the economy remains driven by fossil fuel exports but has been dominated by local splits between different governments, warlords and local militias. This has led to a humanitarian crisis, with critical failures in healthcare, education, energy provision and clean water. While there is some interest in the aluminium, iron, steel and cement industries, this remains a small part of the economy. The country is 95 percent desert or semi-desert and access to water and the growth of agriculture have been very slow. The remaining 5 percent of the land is suitable for cultivation, yet barely 0.5 percent is farmed because of both climate restrictions and water scarcity in the region (Wright, 2012).

History of energy politics

Libya's enormous oil and gas deposits have led to political tensions throughout the country's short history. The nationalization of the Libyan oil industry in the 1970s, including bringing the oil sector under the byzantine corporate structures of the Libyan National Oil Corporation in 1970, led to inefficiencies that reduced oil production. UN and US sanctions from the mid-1980s onwards further exacerbated these problems (Otman and Karlberg, 2005). The Petroleum Law No. 25/ 1955 was the beginning of a rapid expansion of Libya's oil sector. Between 1955 and 1968, 137 concessions were awarded to 42 companies (Pearson 2003: 7). Subsequently, a broad range of foreign companies began exploiting oil on behalf of the Libyan government. After growing criticism about the "colonial" nature of the concessions

system across the developing world, the sector looked for other forms of contractual agreements between governments and oil and gas companies. Production sharing contracts (PSCs) in which the government maintains its ownership of the resource but contracts a (foreign) company to extract the resources on its behalf, became the dominant contractual agreement in Libya's oil sector in the early 1970s. The PSCs in place in Libya before the outbreak of the Arab Spring in 2011 were of a somewhat different nature than standard PSCs in the upstream oil and gas sector. However, the Libyan government received its share of oil prior to cost recovery by companies with the rights to explore and exploit oil and gas (rights holders) (Pearson, 2003). Usually, "profit oil" is only made available by lifters after "cost oil" has been sold to meet lifters' costs.

Following the Gaddafi coup d'état in 1969, the oil industry was nationalized but due to the country's sponsoring of, and direct involvement in, terrorism, relations with the international community suffered. Oil sanctions from the US had a major impact, and standstill agreements were made between US-companies and the Libyan government. In the late 1990s, the Libyan government began increasing the exploration and exploitation of natural gas, an industry sector that had existed since the 1960s but had remained underdeveloped. Now, the Libyan government wanted to push the exploitation of gas to serve the domestic energy market, freeing up oil for export (Pearson, 2003). In 2000, Gaddafi abolished the oil ministry and ordered the Libyan National Oil Company (NOC) to take over ministry's functions. The Libyan government had a 100 percent ownership of the NOC, which was responsible for licensing, contract negotiations and a broad range of policy issues in both the country's upstream and downstream oil sector (Ibid.).

In an attempt to affect a rapprochement with the West, the Libyan government began reviewing the country's petroleum law. In June 2003, Gaddafi called for the privatization of the oil sector and in the same year, UN sanctions against Libya were lifted, followed by US sanctions in 2004 (Barringer, 2003). While the lifting of sanctions was welcomed by foreign companies and the government, the re-entry of foreign-owned operations remained complex. Ever since gaining independence in 1951 and the passing of the petroleum law in 1955, Libya tried to reduce its dependence on oil through a diversification of the country's economy, though these efforts have not been very successful. While the conditions for a diversification of the energy sector towards some renewable energy were conducive in the mid-2000s (Otman and Karlberg, 2005), political events associated with the Arab revolutions and the ensuing conflict prevented an implementation of the government's ambitious plans.

Control of the country is currently split between two governments, the General National Congress (GNC) in Tripoli (which became the National Salvation Government and then the High Council of State, now the Presidency Council) and the Government of National Accord with its House of Representatives (HoR) in Tobruk, both of which remain contested. In addition to the Tobruk and Tripoli factions, there are various local militia and city-states as well as local tribes that fight over the legitimacy of office, including a Libya Dawn backed Misrata-based government. Most forms of governance in the region, usually a combination of political, social and armed actors with varying interests, operates around the exploitation, sale and export of hydrocarbons (ECFR, 2016).

While 2012 saw the end of the first phase of the civil war, with investment returning, renewed fighting in 2013-14 caused a near complete shutdown of Libya's oil industry. While the situation stabilized enough to allow for some extraction of oil and gas, local militias control many oil sites and extract rents from oil lifters (Natalucci, 2016). In 2016, Khaftar Haftar's Libyan National Army forces took control of the ports, enabling production to recover. The political fragmentation of Libya's political arena has remained extremely disruptive to the country's energy sector however.

Institutions and social capital

Political divisions and fragmentation have a history of undermining the functioning of key state institutions, attenuating both legitimacy and control. This is particularly a concern in regions where access to hydrocarbon revenues dominates the economy and the ability to fund delivery of basic goods and services. Divisions resulting from feuds between a multitude of groups over government authority have greatly undermined the (already weak) capacity of the state to deliver public services to Libyans. Revenues from hydrocarbon sales were being transferred directly to the central bank, which then used the funds to pay off militia and security services for fear of reprisals (Freeman, 2016). Failure to implement reforms, maintain infrastructure and manage distribution and export mean loss of revenue, as was seen in the standoff between the Libyan National Army and the NOC in summer 2018 (International Crisis Group, 2018). This in turn impacts state capacity to provide electricity and fuel to citizens, which itself impacts the ability for the economy to function and can result in significant failures in service provision.

The political fragmentation since 2011 has greatly undermined Libya's capacity to harness its oil resources in an effective and equitable manner. The internationally recognized

government in Tripoli does not enjoy much legitimacy in Libya. Consequently, the relationship between state institutions and Libyans is heavily strained. Competing power centers combined with limited capacity for coercion or enforcement mean that local actors/ militias have taken responsibility for the provision of local services (Lacher and Al-Idrissi, 2018). A large number of Libyans are also therefore subject to violence and intimidation by local militias.

Competing factions control different segments of the oil and gas sector, while a vibrant black market for the export of natural resources has emerged since 2011. As of 2018, the main factions were the GNA led by the Presidency Council, the HoR and Khaftar's LNA (ECFC, 2019). The GNA was formed in the aftermath of the Libyan Political Agreement (LPA) that was established under the auspices of the United Nations in December 2015 in an attempt to broker a peace between groups that had been feuding since 2011. While the international community recognizes the GNA as the legitimate government of Libya its authority is confined to the city of Tripoli and its immediate surroundings. Other parties to the conflict include the Libyan National Army (LNA), which consists of local militias, as well as the LNA's opponent, the Benghazi Defense Brigade (BDB), and its allies such as the Ansar al-Sharia and the Islamist Shura Council of Benghazi (ISCB), both of whom have ties to Al-Qaeda in the Islamic Maghreb (AQIM) (Kabouche, 2018).

Legally, the exploration and exploitation of Libya's oil resources is under the authority of the National Oil Corporation (NOC) but due to the country's political fragmentation, the exploitation of oil has become very volatile. Not only have groups opposing the government in Tripoli established their own NOC, often referred to as the "Eastern NOC" (Kabouche, 2018) and tried to sign contracts with international lifters, but aforementioned factions actively fought over control of the country's energy infrastructure at the time of writing. In addition to political instability preventing an ordered exploitation of Libya's natural resources, corruption is systemic and endemic in Libya, eroding trust in institutions and further discouraging much needed investments in the country's energy sector. While the relatively centralized government structures under Gaddafi provided a certain level of certainty for corrupt activities (if one paid, one would get an export license), the factionalism that has characterized Libyan politics since 2011 has deregulated corruption and made corrupt activities less predictable (Wijaya and Shariha, 2016). In 2018, Libya ranked 171 of 180 countries on Transparency International's Corruption Perception Index.

Differences in official and black market exchange rates, which encourages smuggling, the absence of law enforcement as well as political instability have allowed unscrupulous

players to syphon off most of Libya's oil and gas revenues, which constitute 95 percent of the country's exports. Meanwhile, around 30 percent of the population continues to live in poverty despite the country's abundance in natural resources (Armitage, 2018). Unemployment has increased considerably as a result of the fighting. Around 85 percent of Libya's labor force worked in the public sector before the war, an exceptionally high figure even for a region where the state has traditionally loomed large in local economies. Unemployment rose after 2011 across all age groups but skyrocketed among Libyan youth. In 2016, youth unemployment stood at 48 percent while 25 percent of women were without work (Fasanotti, 2016). Even if employment was available, only 15-30 percent of Libyans would be considered skilled enough to participate in a modern labor market. The re-integration of combatants into the labor force is another challenge the country is facing (Ibid.).

Spatial, local and cross-border issues

Hydrocarbon energy sources and critical energy infrastructure (ports, pipelines, power plants, roads, and grids) are geographically distributed across Libya and control over them is heavily contested, falling along political, cultural, geographic and often historically determined fault lines. For example, the divide has resulted in both attacks on the network and the physical break-up of the electricity grid. Libya's electricity grid has been separated into four isolated grids due to damage, mostly inflicted during the 2014 fighting, and ongoing intermittent attacks continue. The interruption of cross-border electricity trading, through the loss of interconnectors with Tunisia and Egypt, meant a further loss of up to 600MW of power overall (World Bank, 2017a), although GECOL has since re-established a connection with Egypt and there are plans for new power plants (ESI, 2017). While installed capacity is 9.7GW there is available capacity of just under 55 percent (Ibid.) due to maintenance challenges and the impact of fighting. In 2018 GECOL said that the cost of vandalism and attacks on the system since the civil war was over $1.6 billion (Newsbase, 2018).

In Libya, the contracts to produce, purchase, and transport crude signed with the Libyan National Oil Corporation guarantee that all payments for oil exports flow into the Tripoli-based Central Bank of Libya. Yet two-thirds of the country's oil is in the HoR controlled East, where 80 percent of its refineries and five out of its six export terminals are based. This creates a check point where political and military pressure can be placed and has resulted in many of the continuing problems in both extracting and exporting oil (Eaton,

2018). This has ranged from 600,000 bpd in March 2015 compared to a 78 percent increase in production in 2018 to 1.1m bpd (NOC, 2019). The average production during the Gaddafi period was 1.6m bpd (Kabouche, 2018). Libya has signed new contracts with Siemens to stabilise its electricity generation with a deal for 1.3GW of power (Siemens, 2017) and international reconnections are being redeveloped. The country aims to develop renewable energy and announced plans for a new CSP and PV power plants in the Misrata Free Zone (CSP Today, 2018)

Meanwhile, as of the end of 2018, 1.62 million Libyans remained affected by the country's on-going civil war. There are still around than 200,000 internally displaced people (IDPs) scattered across the country, with limited to no access to food, fuel, electricity, water, health care and public services (UNOCHA, 2018). Libya is also a destination country for migrants en-route from neighbouring and West African states whose conditions have worsened over time. The political instability and the dominant role criminal networks and armed militias have come to play in local economies due to the absence of a central government and the rule of law has turned Libya into a breeding ground for human trafficking and people's smuggling (IOM, 2018).

IV. Syria

While not blessed with the hydrocarbon wealth of other countries in the MENA region, Syria has some oil reserves and the potential for more discoveries, although the oil is sour and relatively expensive to refine. Agriculturally, Syria is poor with usable cropland making up only about 10 percent of the surface. Prolonged droughts and failing crops exacerbated internal conflict in the lead up to civil war. Before the war, Syria was a fast-growing, lower-middle-income country, although one marred by gender and economic inequalities, high levels of corruption, and one of the lowest labour force participation rates in the world (Onder et al., 2017). The war destroyed or damaged much of the existing infrastructure, especially in the hydrocarbon and power sectors – oil production dropped from 383,000 bpd in 2010 to 10,000 bpd in 2016 – as well as in agriculture, leading to a dramatic contraction of the economy (Ibid.). Since the onset of war in 2011, over half the country's population has been forcibly displaced, making it the largest such crisis anywhere since World War II and creating enormous humanitarian challenges for the provision of energy, water, food and other services.

History of energy politics

Following independence from France in 1946, Syria nationalised its oil industry in 1964 and placed it under administration by the state-run Syrian General Petroleum Company (SGPC). Oil fields begun to produce in 1968, shipping crude via pipeline to the Mediterranean port of Tartus (also the site of Russia's only oversees naval base with full sovereign rights and immunity from Syrian laws). Since the 1970s, the government's policy had been to support hydrocarbon development as an important source of revenue, though not as strongly as in Iraq or Libya, owing to far fewer reserves. Yet despite relatively small oil production – 386,000 bpd in 2010 according to the IMF (Gobat and Kostial, 2016) – this still accounted for just over 20 percent of state income.

The growth in oil exports as an important source of state revenues peaked, as elsewhere, between 1973-4 when global oil prices experienced a sharp increase. Around this time, international companies, first Romanian and then Western, were allowed to return to the country including Shell and Chevron, both of which won concessions in the 1980s (Collelo, 1987). Petroleum export value increased by 20 times during this period before slowing in the 1980s as prices stabilized. During this time, local demand reduced net earnings from oil supplies and in 1985 the government issued price increases ranging from 27 – 63 percent for various petroleum products (UNDP/ World Bank, 1986). Such reforms increased the pressure on large swaths of the population, especially in rural areas that became relatively poorer as a result, a factor which likely contributed to the current civil war (Matar and Kali, 2018). Throughout the 1990s, oil consumption rose steadily and was subsidised, along with gas, at a cost of around 13 – 15 percent of GDP according to figures from the IMF provided in 2006 (Moalla-Fetini et al., 2006). Production peaked at an all-time high of 667,000 bpd in 2002 (Meliksetian, 2018a).

Perhaps more importantly, Syria served as a vital oil transit and distribution hub, bringing with it some rent but also political clout. Indeed, before the oil crises in the 1970s, Syria was earning more from pipelines than from its domestic oil production. Of these, the Trans-Arabian Pipeline (from Saudi Arabia to Lebanon) inaugurated in the 1950s was once the most important but stopped functioning in 1990. Crossing via Homs (which also refined oil from 1959 onwards) was the more important Iraq Petroleum Company (IPC) pipeline. From the 1950s until the early 1980s the pipeline provided massive amounts of revenue to the government (Collelo, 1987). Syria stopped accepting Iraqi petroleum exports in 1982 after

reaching a deal with Iran (a move designed to harm the former's war efforts against Iran). This followed a shaky relationship and a series of renegotiated terms throughout the 1970s, as Iraq was frequently left with little leverage over Syria and forced to seek alternative export routes via Turkey (Stevens, 2003). At its height, 300,000 bpd were pumped from Iraq via Syria.

In the 1980s, a number of concessions were awarded to foreign firms for exploration of Syria's gas reserves located largely in the country's Northeast. Before the civil war, the country generally produced as much gas as it consumed – mainly for electricity production. Syria switched from oil to gas for electricity production in the 2000s before the outbreak of armed conflict. But with the civil war under way, electricity generation halved, while consumption dropped by more than half (IEA, 2016b). Prior to the war, the Assad regime had made moves to diversify the economy further – growing demand-supply gaps to underinvestment in generation capacity and transmission/distribution, coupled with rampant corruption and a growing divide between subsidised urban populations and neglected rural areas were already major problems then.

Institutions and social capital

There is significant doubt that the regime will be able to control its own affairs and ensure peace and stability once the fighting ends. As a consequence of the civil war, Syria has been "transformed from a 'shadow state' dominated by the security apparatus into a 'transactional state' dominated by regime-aligned profiteers" including internal armed groups as well as external powers both of whom have contributed to a hollowing out of state institutions (Kathib and Sinjab, 2018). As of today, the Assad regime clings on to power thanks to its control of the capital, large population centres in central and western Syria and backing from Russia and Iran, the former of which secured exclusive oil and gas production rights in the country through an energy cooperation agreement signed in early 2018 (Katona, 2018), while the latter has supplied fuel and basic goods in addition to loans and military support for the Assad regime, while pushing to construct an oil refinery near the city of Homs. The loss of control over energy resources (in the East, principally Deir al-Zour and the Kurdish controlled areas in the northeast), the regime's inability to maintain sustained power generation capacity, and the heavy reliance on external players (Iran and Russia) have further exacerbated the loss of authority and institutional capacity. Therefore, despite the conflict evolving in favour of the Assad regime in recent years, state institutions are not returning to

old strength but rather remain significantly weakened with implications for Syria's ability to reconstruct energy infrastructure in an equitable, inclusive and sustainable way.

Public trust in state institutions has been severely undermined due to abuse of power, corruption, poor governance, and a very limited provision of public services. High youth unemployment and mass migration and the disruption of formal and informal economic networks are further major problems. According to the Syrian Centre for Policy and Research (based in Damascus until 2016), 470,000 people have been killed in the war. More than half of Syria's 2010 population has been forcibly replaced (Onder et al., 2017). With the government responsible for the overwhelming majority of deaths, widespread use of torture and chemical weapons, it is unlikely to have much social capital left among ordinary citizens who are instead gripped by fear.

The breakdown of electricity, fuel and water provision and the related deterioration in living conditions has contributed to the sense of intense insecurity felt across the country. The Syrian people today are extremely energy insecure. Domestic oil production collapsed during the war, there is an on-going struggle over control of oil and gas production and transmission and the electricity infrastructure (power plants, transmission and distribution lines, and transformer stations) has been decimated. The IMF has assessed that damage to the energy sector through to December 2014 has been between US $648 million to US $791 million (Gobat and Kostial, 2016). By 2013 over 30 power stations in the country were inactive and 40 percent of its high voltage lines had been attacked according to the government (Ibid.). Natural gas, coal, hydro, biofuels and waste, and primary and secondary fuel supply sources have all dropped considerably between 2010 and 2016 and fallen to lows comparable to 1990 as IEA statistics indicate. Before the outbreak of war, Syria was largely electrified, with 95 percent of homes connected to the grid. But this changed during years of conflict, with Syrians now largely reliant on polluting and expensive diesel generators to keep the lights on. Even where the grid still reaches electricity provision is highly unreliable, with frequent power outages undermining economic and social life (Hanna and Alkhshali, 2016). The lack of fuel has led to some more innovative local solutions, including diesel fuel produced from boiling and distilling fluid from plastic bags and containers, and installing solar panels to power hospitals (Bar'el, 2017). According to the "Social Degradation in Syria" report launched in 2017 by the Syrian Centre for Policy Research (SCPR), the breakdown of trust and loss of social capital is greatest in the areas most affected by war and armed conflict, including Raqqa and Hasakah in the now SDF-controlled northeast, and smallest around the

governates of Damascus and Tartus where there has been comparatively little exposure to fighting and electricity and water have continued to be provided to a far greater extent.

Spatial, local and cross-border dynamics

Syria is geographically divided into areas controlled by the Assad regime, rebel forces, Turkish and Kurdish forces and ISIL remnants, all of which threaten the territorial integrity of the country. As noted above, most of the oil and gas in Syria is situated in the east and northeast of the country, while refining capabilities and oil export terminals are under the Assad regime's control. The refineries served more widely inhabited urban areas to the south of the country prior to the war. Partition of the country in line with US plans has expressly been argued against by the Assad regime, Turkey, Russia and Iran (Meyer, 2018). Yet while there are no significant demands to change the country's territorial status quo (apart from the US discourse), the ongoing conflict "has had deeply transformative effects on the borders of the country" (Vignal, 2017). Indeed, borderlands which once only held marginal importance, have now become critically important due to the presence of different powers, their ongoing struggle over control and the introduction of millions of Syrians due to forced migration (Ibid.). This has created new demands for the provision of basic services (including electricity) in those regions.

Early on in the war, the Assad regime cut off electricity transmission lines from Turkey, Egypt and Jordan in what was up to then an ambitious cross-border power integration project (Haydar, 2012). There are long standing grid interconnections between Iraq and Syria, and by extension Iran, that would be important to any economic recovery in a post-war scenario. Reports have demonstrated that cross-border oil trade between Syria's mainly Kurdish areas in the northeast and then on to Iraq's northern autonomous Kurdish region (both US-backed) is ongoing. The oil, having been refined in Iraq, eventually makes its way on to Turkey. This has continued throughout the war and proved a major boon for local PYD/SDF forces who are profiting off the oil rent. Other cross-border activity with Iran has been a lifeline to the Assad regime. It has benefited from Iranian oil shipments to the tune of 70,000 bpd at the beginning of the war to as much as 150,000 bpd as reported by Bloomberg in September 2018 (Gabel and Adesnik, 2018). Iran provides the oil which involves a sophisticated program in Russia designed to evade US sanctions (Meliksetian, 2018b).

Despite recent territorial gains by the government in 2018, many other challenges to regime authority remain as local and global powers find themselves progressively entrenched in the stalemate. Turkey-backed opposition groups remain dominant, especially in the north-western regions and in the governate of Idlib in particular which today has a population of 2.5 million. Following significant destruction, local municipalities in Homs, Aleppo and elsewhere have recently been able to at least partially repair their electricity grids but electricity production remains far behind pre-civil war days (Balanche, 2017). Syria's rural areas and small towns faced neglect in the years and decades preceding armed conflict, with a lack of access to public services and high unemployment seen as particular problems. The resulting migration into cities created demands for services which urban areas didn't have the capacity to meet (Ibid.). Reconstruction in rural as well as in urban areas will, however, require a weakened state to cooperate with local power brokers which threatens to complicate progress. Meanwhile, recently recaptured Daraa – the site of the original protests that sparked the civil war – has recently seen the return of popular protest and a string of hit-and-run attacks by opposition groups, showing the precariousness of Assad's hold (Haid, 2018).

V. Yemen

The modern Republic of Yemen was established only in 1990, after the northern part of Yemen merged with the southern part, then under communist rule. Despite the public appearance of a unified nation-state administering the country, socio-economic cleavages, exacerbated by a weak state apparatus constrained by alternative power centers rooted in long-established patronage networks, led to constant rifts between different interest groups. Oil rent played a critical role in President Ali Abd Allah Saleh's hold onto power from 1978 to 2012. Between 2010 and 2012, hydrocarbons constituted 63 percent of government revenues and 89 percent of the country's export revenues (EIA, 2017). Several uprisings and revolutions since 1994 culminated in a civil war which has raged since 2014 and has directly killed an estimated 13,500 to 80,000 people (Ward, 2019). The years of war have brought the country to the brink of complete collapse and created a humanitarian catastrophe of enormous proportions. All sides involved in the conflict have tried to weaponize the economy by not only meddling with fuel prices and energy supply but also through blocking supply routes for food and water.

History of energy politics

Oil production in Yemen became significant in 1988, when the country produced 173,000 bpd. Prior to unification, the northern and southern parts of Yemen had relied on the export of labour to hydrocarbon-rich states in the region, especially neighbouring Saudi Arabia. Following the Iraqi invasion of Kuwait, however, Saudi Arabia and other Gulf states expelled nearly a million Yemeni workers to punish the regime for its support of Iraq which led to a collapse in oil-based remittances flowing back to Yemen (Ohkruhlik and Conge, 1997, see also Ibrahim, 1990). However, this was counteracted by Yemen's own oil boom. While overall oil reserves are comparatively small, their exploitation still helped bring about substantial economic growth of around five percent per year between 1990 and 2010 (Perkins, 2016). But this growth failed to benefit a majority of Yemenis who, despite massive population growth, urbanization and growing demand for basic goods and services, saw their access to fuel and water decline ever further (Ibid.). The exploration of oil peaked in 2001 due to a combination of maturing fields and growing political instability. 80 percent of the country's oil reserves are concentrated in the Masila Basin in southeastern Yemen. Importantly, the Saleh regime relied heavily on oil revenues to support a patronage system built out of necessity: the government's reach didn't extend far beyond major cities and towns and rural areas were controlled by tribes. To ensure continued stability, Saleh ceded power to tribal leaders and enabled them to influence decisions and leverage their position to extract rents from the state (Phillips, 2008).

Rebel groups increasingly attacked the country's energy infrastructure after 2009, which resulted in a drastic decline in production output in the oil sector. Declining oil revenues were somewhat offset by positive developments in the gas sector. Gas has been exploited in Yemen since the 1990s. However, 98 percent of the gas was reinjected to support the lifting of oil. This changed in 2009 when Yemen established the first LNG plant and began producing gas in commercial quantities. Frequent attacks on Yemen's energy transport infrastructure have undermined these developments (EIA, 2017). Foreign lifters such as Total and Nexen, a subsidiary of China's National Offshore Oil Corporation (CNOOC), dominated the country's oil and gas sector before they evacuated from Yemen in the context of the 2014 Houthi government take-over following weeks of protest over controversial fuel price rises. By 2015, most foreign companies had either left the country or begun to close down their facilities (Said and Almasmari, 2015). Frequent attacks and acts of sabotage against the country's energy infrastructure have led to fuel shortages and power outages even though the

country has seen an increase in imported oil as a result of its domestic supply channels no longer being reliable.

The quality of Yemen's electricity grid is poor due to years of neglect, a chronic lack of investment and acts of sabotage and attacks. At the time of writing, Yemen had the lowest number of citizens with access to electricity in the region. Official figures released in 2016 stated that 52 percent of citizens had access to electricity (Al-Barashi et al., 2016) but a US-Energy Administration Information assessment put that figure at 40 percent a year later (EIA, 2017). In any case, even the population supplied with electricity has had to put up with regular power outages (Ibid.).

Institutions and social capital

State institutions in Yemen have essentially ceased to exist since the outbreak of the civil war in 2014. Government finances have come under severe strain after the Central Bank of Yemen (CBY) ceased to operate in late 2016. Bureaucrats receive their salary sporadically if at all. Public service investment including in energy infrastructure has come "to a complete stop" (World Bank, 2016). Political instability and the highly volatile security environment have brought tremendous suffering to Yemen's population. As of 2017, over 50 percent of Yemenis were food insecure and the population's already high disease burden increased further. Food and medication shortages have ensued as a result of blockages of ports by Houthi rebels and overland supply routes by the Saudi Arabian government. In the aftermath of the Houthi take-over, the country's energy sector, never a beacon for efficiency and good governance to begin with, fell into complete disarray. Several oil refineries stopped production after being seized by Houthi rebels while the country's only liquefied natural gas (LNG) plant shut down. The frequent attacks and acts of sabotage on Yemen's energy infrastructure have driven up demand for imported oil and gas in recent years (EIA, 2017).

Theoretically, the country's oil and gas sector is under the auspices of Yemen's Ministry of Oil and Minerals. The ministry issues regulations pertaining to oil and gas exploration and exploitation and enters production contracts with foreign lifters. The parliament needs to approve government contracts with foreign lifters. There is a national oil company, Yemen General Corporation for Oil, Gas, and Mineral Resources, which participates in the sector through several state-owned enterprises (SOEs) (EIA, 2017). However, the civil war since 2014 has rendered the national oil company powerless.

Corruption and rent-seeking have been systemic and endemic in Yemen for decades. During the long reign of Ali Abd Allah Saleh, vast patronage networks formed and eventually became entrenched in government institutions. Criminal activities, including fuel smuggling, were conducted at the highest level of government. For instance, Ali Mohsen al-Ahmar, the vice-president of Yemen at the time of writing, had been named by the US-government as one of the country's most notorious fuel (and arms) smugglers prior to the outbreak of the civil war in 2014 (Freedom House, 2018). Due to the collapse of Yemen's formal economy as a result of the civil war, black market activities have increased considerably. While Yemen has various anti-corruption laws and regulations in place, the state does not have the capacity (or the will) to enforce them (Nasarre, 2017; UNPAN, 2011).

In addition to corruption being systemic and endemic, accountability and transparency are low. The collapse of a national government as well as intimidation and oppression of the media have not only rendered government decision making more opaque but have assured that there is little left in terms of checks-and-balances that would contain the worst of government abuses. The media, never strong to begin with, does no longer have the capacity to expose and report on (government) abuse and embezzlement pertaining to the energy sector (Nasarre, 2017).

The provision of public services that was already rudimentary prior to the civil war has deteriorated further. There is an acute food and energy supply crisis across the territory of Yemen and the formal government has essentially lost its capacity to guarantee the import of food and energy resources which has further strained what little there was left of trust in state institutions. The import of food and energy supplies is now largely organized through private channels, which is the reason why food and energy supply are not only unreliable but also highly skewed towards people with connections to politically powerful groups (World Bank, 2017b).

As of late 2018, 22 million out of a total population of 28.25 million were in need of assistance of some sorts. In addition to 78 percent of the population being in need of help, around 10,000 people become infected with Cholera every week. An estimated 1.2 million people had Cholera by late 2018, while thousands had already died from the disease. This was largely the result of the fact that 16 million Yemeni lack access to clean drinking water and basic sanitation (Coats, 2019: 34). Furthermore, the risk of a massive famine has increased considerably throughout 2018, putting more than 14 million people at risk of starvation in 2019 (Salisbury, 2018). Furthermore, the formal labor market has collapsed. While reliable unemployment figures were unavailable at the time of writing, youth

unemployment stood at 70 percent before the war broke out (Ibid.). The World Bank estimated that the country's economy has contracted by around 40 percent since the onset of the civil war in 2014 but official statistics can no longer be obtained (World Bank, 2016).

Spatial, local and cross-border dynamics

Yemen features prominently in the most recent US-government threat assessment report, which was released in January 2019. Armed conflict between different groups supported by regional powers such as Iran, Saudia Arabia and the UAE as well as international players such as the US and UK, do not only threaten the country's population but are likely to have broader ramifications if the issue remains unaddressed. Concretely, Al-Qa'ida affiliates remain present in Yemen, while Iranian arms support for the Houthi rebel group has increased their capacity to escalate the conflict beyond the borders of Yemen. Houthi rebel groups, for instance, now have the capacity to attack ships passing through the strategically important Bab el Mandeb Strait (Coats, 2019). Blocking this strategic route which leads to the Suez Canal would potentially impact the passage of millions of barrels of oil per day, with severe repercussions for energy supply to Europe. Such a scenario would only exacerbate the serious challenges the Yemeni population is facing. The US-government report also concluded that an end to the conflict in Yemen was highly unlikely as none of the feuding parties had shown any willingness to make concessions that would pave the way for a lasting peace agreement. Consequently, "the humanitarian crisis will continue" (Ibid.). Saudi Arabia, UAE, Kuwait, the UN and others have pledged financial support to alleviate suffering in the form of providing food and supplying hospitals and other basic service providers with fuel and other energy. However, much of the aid has failed to reach the intended recipients due to corruption by all sides who hinder delivery, loot and sell food and fuel on the black market instead (Dehghan and McVeigh, 2017).

Over the past several years, local tribal leaders immediately resisted any plans of the Houthi rebels to form a broad coalition government under their auspices. Historically, oil profits from fields in southern and eastern provinces went to Sanaa-based elites. Early in the civil war, the Houthis seized some of the fields but over the course of 2015 they were displaced by forces loyal to President Hadi. Export terminals, meanwhile, are either badly damaged or under Houthi control, as is the main pipeline transporting oil from Marib province (Hatem and Wabl, 2018). Against this backdrop, "there can be scant hope of Yemeni oil and gas operations getting back to anything like normal for many months – even

if a new central government emerges in Sana'a and the country's energy sector management can get back to work" (Butt, 2015). This claim holds true in 2019: while oil production and export could be ramped up reasonably quickly and some international hydrocarbon companies such as OMV have a made a cautious return, the prevailing security situation and continuing contestation, including the ongoing battle between Houthis and the Saudi-Emirati coalition over Yemen's main port at Hodeidah, mean only limited amounts are currently brought to market.

Yemen's geographical location make solar- and wind-power viable options for broadening the country's energy mix and reduce its dependency on oil for power generation. Concretely, solar radiation in Yemen is considerably higher than in many other parts of the MENA region while the country's aridity assures a high number of sunshine hours per year (Nematollahi et al., 2016). Wind power potential is also higher than in many other parts of the region (Ibid.). While the government tried to build several wind farms prior to the outbreak of the civil war to prove the feasibility of wind farming across the country, the conflict that erupted in 2014 has brought most commercial solar and wind farm projects to a halt. The recent boom Yemen has seen with regard to solar power (Badiei, 2018) is not so much the result of a concerted government effort but a reflection of the poor quality and unreliability of the country's national energy grid, which has only been exacerbated by the civil war. Since Yemeni cannot rely on government energy supply, many have resorted to solar energy and the creation of local minigrids that generate and supply energy locally. In short, while there has been an interest by foreign investors in Yemen's alternative energy sector, including solar- and hydro-power, the abysmal security situation across the country has prevented such plans from coming to fruition (EIA, 2017).

VI. The Energy-Climate-Water-Food Risk Nexus

Climate change is beginning to turn MENA's already challenging environment into one that is increasingly unsustainable. Temperatures already reach 50˚C in the summer months, creating an unprecedented demand for cooling – a demand which is not met in the four country cases. Accessible freshwater has fallen by two thirds over the past 40 years, with the per capita availability of water 10 times less than the global average (Kamal, 2017). According to the Intergovernmental Panel on Climate Change's 5th Assessment Report (2014), further increases in temperature, an increase in the number of heat wave days, a

further significant reduction in precipitation and prolonged droughts are all set to materialize in the region under a business as usual scenario. This poses serious challenges to human health and livelihoods, food production, energy generation, infrastructure and the effective provision of a range of public services.

The interdependencies between energy, water, food and climate are critical in terms of effective reconstruction in the region. Development policy has evolved to ensure that the risk of climate change is integrated into energy, water and food development (van Aalst, 2004). In a region where there are high proportions of displaced people, humanitarian crises, significant damage to infrastructure overall and a failure to implement widely accepted and legitimate governance frameworks, the need to address the energy, water, food and climate risk nexus is critical and yet the countries reviewed herein have little adaptive capacity to do so. For example, Yemen, one of the most water-stressed countries in the world, has been experiencing a massive water and health crisis due to energy shortages as water pumping stations are running out of fuel (UNICEF, 2017). Over the medium to long-term, changes in weather patterns are threatening to further damage existing agricultural systems, while water availability can have an impact on oil and gas production, and increased transportation costs can impact export revenues (FAO, 2008; Appert and Favennec, 2005). Further afield, the increasing desertification of the Sahel region of Africa is set to lead to increased economic migration due to falling clean water and food supplies (Siddiqi and Annadon, 2011).

Vulnerable regions such as MENA face multiple stresses at the same time – climate change can act as a risk multiplier for pre-existing conflict, poverty and unequal access to resources, weak institutions, food insecurity and the incidence of disease (Jackson, 2009). Scenarios considered by the UN include limited or threatened access to energy increasing the risk of conflict, a scarcity of food and water transforming peaceful competition into violence, and floods and droughts sparking massive human migrations, polarizing societies and weakening the ability of countries to resolve conflicts peacefully (UNEP, 2012).

Therefore, not addressing sustainability, resilience and adaptive capacity in reconstruction efforts could result in a further weakening of the regional economy. The International Renewable Energy Association's Global Commission on the Geopolitics of Energy Transformation warned in 2019 that the geopolitical and socio-economic consequences of a new energy age may be as profound as those which accompanied the shift from biomass to fossil fuels two centuries ago (IRENA, 2019). As countries develop renewables and increasingly integrate their electricity grids with neighbours, new interdependencies and trade patterns will emerge. It is possible that oil and gas-related

conflict may decline, and it may be that a shift in the focus of energy, water and food provision to a local level could be beneficial in the region (Ibid.).

VII. Conclusion and Recommendations

This paper has identified a number of challenges that are preventing Iraq, Libya, Syria and Yemen from realising their potential. All four countries suffer from a lack of effective, trusted institutions, a focus on tribal and/or sectarian loyalties which has underpinned corrupt practices, a continued focus on hydrocarbon rents as a means of survival, an underinvestment in energy (especially non-hydrocarbon) infrastructure, internal strife and ongoing energy, water and food insecurity. In all four cases, civil war exacerbated problems that had already been decades in the making. To the casual eye these are crises for the four countries and their citizens. Yet, the knock-on effects on migration, human trafficking, regional and international trade and security mean that outside involvement will continue. Current approaches include support from different governments, the UN, international financial institutions as well as non-state actors. A meaningful, overarching regional security arrangement would be highly desirable to provide the stability needed for effective reconstruction to take place, yet the vastly diverging interests and persistent antagonisms between local, national and regional powers and their international backers make such an arrangement difficult to achieve. In its absence, there remains an urgent need to address core issues that have so far overwhelmed the four countries and their populations.

From an energy perspective, effective reconstruction will not be achieved through meeting only short-term objectives, although humanitarian relief and more immediate crisis response measures are critically necessary in the current environment. The economies of the four countries need to be shored up in order to address grievances, enable growth and defend against increased radicalisation for years and decades to come. Focus must be on the long-term sustainable provision of energy and water, goods and services from the bottom up. Given the constraints under which the region operates, it may be time to take a more federalist and distributed approach to governance, backed by development of a more decentralized and democratised energy, water and economic framework.

Longer term approaches that build capacity for and understanding of sustainable

practices give both urban and rural communities a stake and common purpose, enhance their energy security and resilience to external shocks, and promote inclusive economic development. The following lists a number of recommendations.

1. Support economic diversification: This includes greater efforts in transport and communication, education, agriculture and services. Critically, however, it is also the energy sector itself that needs to be diversified. Examples include using natural gas more effectively to displace oil in a number of applications – Libya and Iraq still flare large amounts of gas rather than use it for electricity generation; build out renewables to tap into the region's solar energy potential – electricity demand for cooling is highest in the early afternoon when solar PV output is greatest, making solar an ideal choice to match peak demand with supply; and switching from petrochemical refineries to biorefineries to produce fuel and power from agricultural residue and waste.

2. Support more decentralized power generation: Connected to diversification, decentralization is an important measure to increase energy system resilience by making energy supply less vulnerable to inefficient grid transmission, brownouts and blackouts that come as the result of outdated and damaged national electricity grids across all cases. In addition, it would make power supply less vulnerable to attacks and acts of sabotage, both of which are of direct concern to Iraq, Libya, Syria and Yemen. In many cases, off-grid solar PV or mini-grids made up of smaller scale solar-hybrid generation power plants offer effective ways to help meet existing needs, empower local communities, and reduce energy poverty. However, such decentralization activities require consistent, active government support.

3. Support solutions for displaced people: This will require addressing medium-term socio-economic issues at hand, from vulnerability to work and energy access. The financing of projects to maintain livelihoods and to strengthen community-based institutions could play a powerful role in reconstruction.

4. Support greater cross-border power trade: The availability of sufficient amounts of electricity at affordable prices plays an important role in the reconstruction of all four cases. However, state and quasi-state actors in none of the countries are currently able to meet the growing needs of households and businesses. Rebuilding power generation capacity, building new power plants, improving and expanding the grid while also incentivizing off-grid

measures will take some time and bringing in more energy from neighbouring countries is an important step to bridge gaps in the short to medium term. However, there are also important long-term benefits to cross-border energy cooperation such as improved reliability of supply and greater resilience to external shocks, lower costs, and the political surplus that comes as a result of economic integration between regional neighbours as experienced in the case of the EU. Examples of and experience with successful interconnection exist in Iraq, Libya and Syria though there are many more gains to be had.

5. Support greater policy capacity and learning: If a more diverse, resilient, low-carbon energy economy is to emerge from the rubble, supportive policies and measures will have to be in place at various levels of political authority. Experience with low-carbon energy technologies and measures to improve energy system resilience is low across the cases and necessary policies are often either lacking or in need of adjustment. This includes anything from financial support schemes such as feed-in tariffs and well-designed PPAs to the creation of a market for renewables through removing hydrocarbon subsidies and market liberalisation measures. Decision-makers and bureaucrats will need to be trained to design effective, reliable approaches that provide investors with certainty. This could include support for policy learning from successful cases in MENA such as Morocco, for example through workshops.

6. Improve data and skills: For sustainable finance flows to materialise and investors to put their money into projects on the ground, more information about local conditions, risks and opportunities is needed. This is especially the case in the non-hydrocarbon sectors of the (energy) economy which are underdeveloped and with little available data due to the historical focus on hydrocarbon rent. Across MENA there is a lack of evidence on the value of resilience-based measures coupled with a lack of experience and capacity among decision makers on how best to design and deliver effective interventions. The necessary knowledge and skills need to be built in conjunction with measures to support greater policy capacity and learning.

7. Support improved urban planning: Reconstruction efforts in the heavily destroyed cities and towns of the four country cases present an opportunity to introduce sustainable approaches to housing, mobility, electricity grids, sanitation and more. Effective urban planning improves the efficient use of scarce resources from energy to water and will provide

significant benefit to the overall economy. Understanding and implementing the enabling factors that allow for the development of climate resilient infrastructure will be key.

8. Establish/ support policy dialogues: National and local stakeholders will need to explore a range of policy, governance and cooperation approaches. Multi-stakeholder approaches around the world need to be assessed in order to identify what lessons can be learned and used. The region is dominated by a tangle of different conflicts, agendas and goals. Academic approaches such as the Westphalia Project may also provide some useful lessons by focusing on the importance of an agreed means of dispute resolution.

9. Establish/ support cross sector links: Effective cross-sectoral linkages must play a major role in the redevelopment and reconstruction of the region, a crucial challenge given the localisation of governance structures within countries, let alone across the region. Climate change, water and energy issues can only effectively be addressed in an integrated way. Considering the outlook for the region, existing institutional challenges make it unlikely that the current development path will be effective in the long term. Practical local solutions to challenges in addressing access to water and power will become critical if the region is to recover, and work must also be done in terms of addressing the regional need for adaptation and greater resilience.

References

Adger, Neil et al. (2018), Advances in risk assessment for climate change adaptation policy, Philosophical Transactions of the Royal Society A, 376(2121), online. Available at: https://royalsocietypublishing.org/doi/full/10.1098/rsta.2018.0106

Adib-Moghaddam, Arshin (2006), The International Politics of the Persian Gulf: A cultural genealogy, London: Routledge.

Aldouri, Saad (2017), What to Know About Iraq's Protest Movement, Chatham House, online. Available at: https://www.chathamhouse.org/expert/comment/what-know-about-iraq-s-protest-movement

Al Jazeera (2018), Iraq: Baghdad and Kurds strike deal to resume Kirkuk oil exports, November 16, online. Available at: https://www.aljazeera.com/news/2018/11/iraq-baghdad-kurds-strike-deal-resume-kirkuk-oil-exports-181116170010040.html

Appert, Olivier and Jean-Pierre Favennec (2005), Analysis of Cost Structure and Functions in Oil Transport and Refining, in: Hydrocarbons: Economics, Politics and Legislation, ENI, Italy. Available at: http://www.treccani.it/portale/opencms/handle404?exporturi=/export/sites/default/Portale/sito/altre_aree/Tecnologia_e_Scienze_applicate/enciclopedia/inglese/inglese_vol_4/085-106_x2.3x_ing.pdf&%5D

Arango, Tim (2017), Iran Dominates in Iraq After U.S. 'Handed the Country Over', The New York Times, July 15, online. Available at: https://www.nytimes.com/2017/07/15/world/middleeast/iran-iraq-iranian-power.html

Armitage, Jim (2018), Libya sinks into poverty as the oil money disappears into foreign bank accounts, The Independent, July 17, online. Available at: https://www.independent.co.uk/news/business/analysis-and-features/libya-poverty-corruption-a8451826.html

Arnold, Tom (2018), Trade Bank of Iraq, StanChart, GE close $600 million power finance deal, Reuters, December 25, online. Available at: https://uk.reuters.com/article/us-iraq-power-financing/trade-bank-of-iraq-stanchart-ge-close-600-million-power-finance-deal-idUKKCN1NU06U

Badiei, Sara (2018), A glimpse of light in Yemen: Enabling a booming solar industry through entrepreneurship and innovation, World Bank Blog, March 29, online. Available at: http://blogs.worldbank.org/arabvoices/glimpse-light-yemen-enabling-booming-solar-industry-through-entrepreneurship-and-innovation

Balanche, Fabrice (2017), Not Money Alone: The Challenges of Syrian Reconstruction, PolicyWatch 2843, The Washington Institute, online. Available at: https://www.washingtoninstitute.org/policy-analysis/view/not-money-alone-the-challenges-of-syrian-reconstruction

Bar'el, Zvi (2017), Syria's Renewable Energy Industry: Making Diesel From Plastic Bags, Haaretz, June 18, online at: https://www.haaretz.com/middle-east-news/syria/syrias-renewable-energy-industry-making-diesel-from-plastic-bags-1.5485196

Barringer, Felicity (2003), Libya Admits Culpability in Crash of Pan Am Plane, The New York Times, August 16, online. Available at: https://www.nytimes.com/2003/08/16/world/libya-admits-culpability-in-crash-of-pan-am-plane.html

Benzie, Magnus et al. (2018), Meeting the global challenge of adaptation by addressing transboundary climate risk. Briefing Paper April 2018, ODI, London, online. Available at: https://www.odi.org/publications/11096-meeting-global-challenge-adaptation-addressing-transboundary-climate-risk

Boduszyński, Mieczyslaw P. (2016), Iraq's Year of Rage, Journal of Democracy, 27(4).

BP (2015), BP Statistical Review of World Energy, online. Available at: https://www.bp.com/content/dam/bp-country/es_es/spain/documents/downloads/PDF/bp-statistical-review-of-world-energy-2015-full-report.pdf

Butt, Gerald (2015), Yemen political struggle causes problems for energy sector, Petroleum Economist: Independent Analysis for Energy Leaders, February 26, online. Available at: https://www.petroleum-economist.com/articles/politics-economics/middle-east/2015/yemen-political-struggle-causes-problems-for-energy-sector

Cevik, Serhan and Rahmati, Mohammed (2013), Searching for the Finance-Growth Nexus in Libya. IMF Working Paper, online. Available at: https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Searching-for-the-Finance-Growth-Nexus-in-Libya-40492

Charap, Joshua (2013), Libya: Selected Issues, IMF Country Report No. 13/151, Washington, D.C.: International Monetary Fund.

Coats, Daniel (2019), Worldwide threat assessment of the US Intelligence Community, Senate Select Committee on Intelligence, January 29, online. Available at: https://www.dni.gov/files/ODNI/documents/2019-ATA-SFR---SSCI.pdf

Coles, Isabel and Benoit Faucon (2017), U.S. Pushes Iraq to Wean Itself Off Iranian Energy, The Wall Street Journal, November 23, online. Available at:

https://www.wsj.com/articles/u-s-pushes-iraq-to-wean-itself-off-iranian-energy-1542969000

Collelo, Thomas (Ed) (1987), Syria: A Country Study, Washington, D.C.: Library of Congress, online. Available at: http://countrystudies.us/syria/

CSP Today (2018), Libya is latest Mena nation to plan CSP, March 21, online. Available at: https://www.solarpaces.org/libya-is-latest-mena-nation-to-plan-csp/

Dalay, Galip (2017), After the Kurdish Independence Referendum: How to Prevent a Crisis in Iraq, Foreign Affairs, October 2, online. Available at: https://www.foreignaffairs.com/articles/middle-east/2017-10-02/after-kurdish-independence-referendum

Daloub, Labib (2017), Overhead Transmission: Conflict Damage and Recontstruction, T&D World, May 1, online. Available at: https://www.tdworld.com/overhead-transmission/conflict-damage-and-reconstruction

Dehghan, Saeed K. and Karen McVeigh (2017), Yemen aid not reaching intended recipients, say activists on ground, The Guardian, April 26, online. https://www.theguardian.com/world/2017/apr/25/yemen-humanitarian-appeal-un-antonio-guterres

Dodge, Toby (2018), Is There Hope for Reform in Post-Election Iraq?, Foreign Affairs, online. Available at: https://www.foreignaffairs.com/articles/iraq/2018-10-17/there-hope-reform-post-election-iraq

Eaton, Tim (2018), Libya's War Economy Predation, Profiteering and State Weakness. London: Chatham House. Available at: https://www.chathamhouse.org/sites/default/files/publications/research/2018-04-12-libyas-war-economy-eaton-final.pdf

ECFR (2016), A quick guide to Libya's main players, European Council on Foreign Relations, online. Available at: https://www.ecfr.eu/mena/mapping_libya_conflict

EIA (2017), Yemen Country Analysis Brief, Energy Information Administration, July 6, online. Available at: https://www.eia.gov/beta/international/analysis_includes/countries_long/Yemen/yemen.pdf

El Kamouni-Janssen, Floor et al. (2018), Local security governance in Libya, Perceptions of security and protection in a fragmented country, Clingendael Conflict Research Unit, Report, online. Available at: https://www.clingendael.org/sites/default/files/2018-10/diversity_security_Libya.pdf

ESI (2017), Libya's installed power generation capacity set to improve, ESI Africa, December 17, online. Available at: https://www.esi-africa.com/libyas-installed-power-generation-capacity-set-improve/

Fairley, Peter (2018), Rooftop Solar Takes Hold in Iraq in the Aftermath of ISIS, IEEE Spectrum, May 23, online. Available at: https://spectrum.ieee.org/energy/renewables/rooftop-solar-takes-hold-in-iraq-in-the-aftermath-of-isis

FAO (2008), Climate change, water and food security, Food and Agriculture Organization. Available at: http://www.fao.org/docrep/014/i2096e/i2096e.pdf

Fasanotti, Federica Saini (2016), Making Libya's economy work again, Brookings Institute, October 7, online. Available at: https://www.brookings.edu/blog/order-from-chaos/2016/10/07/making-libyas-economy-work-again/

Freedom House (2018), Libya, Freedom in the World, online. Available at: https://freedomhouse.org/report/freedom-world/2018/libya

Freeman, Colin (2016), Libya's central bank causing civil war by paying warring militias says UK envoy, The Telegraph, February 8, online. Available at: https://www.telegraph.co.uk/news/worldnews/africaandindianocean/libya/12146453/Libyas-central-bank-causing-civil-war-by-paying-warring-militias-says-UK-envoy.html

Gabel, Andrew and David Adesnik (2018), Syria's Illicit Imports of Iranian Oil Spike in October, Foundation for Defense of Democracies, October 23, online. Available at: https://www.fdd.org/analysis/2018/10/23/syrias-illicit-imports-of-iranian-oil-spike-in-october/

Gnana, Jennifer (2018), Jordan awards oil shale concessions as it looks to energy independence, The National, February 19, online. Available at: https://www.thenational.ae/business/energy/jordan-awards-oil-shale-concessions-as-it-looks-to-energy-independence-1.705978

Gobat, Jeanne and Kristina Kostial (2016), Syria's Conflict Economy, IMF Working Paper WP/16/123, Washington, D.C.: International Monetary Fund.

Haid, Haid (2018), Daraa's resurgent resistance has lessons for the Syrian regime, Asia Times, December 24, online. Available at: http://www.atimes.com/daraas-resurgent-resistance-has-lessons-for-the-syrian-regime/

Hallet, Don and Daniel Clark Lowes (2016), Oil and Gas Fields of Libya, in: Petroleum Geology of Libya (Second Edition).

Hanna, Jason and Hamdi Alkhshali (2016), Syria reports nationwide electricity outage, CNN, March 4, online. Available at: https://edition.cnn.com/2016/03/03/middleeast/syria-war/index.html

Hatem, Mohammed and Matthias Wabl (2018), Yemen's Oil Comeback Has Far to Go as Three-Year War Rages On, Bloomberg, October 11, online. Available at: https://www.bloomberg.com/news/articles/2018-10-11/yemen-s-oil-comeback-has-far-to-go-as-three-year-war-rages-on

Haydar, Ziad (2012), Syria turns to Iran for electricity, leaves regional power grid, Al-Monitor, October 19, online. Available at: https://www.al-monitor.com/pulse/iw/business/2012/10/syria-signs-electricity-deal-with-iran-to-deal-with-power-shortage.html

Hermes (2018), Carbon Report, online. Available at: https://www.hermes-investment.com/ukw/wp-content/uploads/2018/12/hermes-corporate-carbon-report-06.12.181.pdf

Ibrahim, Arwa (2018), Electricity cuts across Iraq make life unbearable in summer heat, Al Jazeera, July 31, online. Available at: https://www.aljazeera.com/news/2018/07/electricity-cuts-iraq-life-unbearable-summer-heat-180731111220743.html

Ibrahim, Youssef M. (1990), Mideast Tensions; Saudi Curbs on Yemeni Workers Sets Off a Migration. The New York Times, October 22, online. Available at: https://www.nytimes.com/1990/10/22/world/mideast-tensions-saudi-curbs-on-yemeni-workers-sets-off-a-migration.html

IEA (2016a), Statistics: Iraq, International Energy Agency, online. Available at: https://www.iea.org/countries/Iraq/

IEA (2016b), Statistics: Syria, International Energy Agency, online. Available at: https://www.iea.org/countries/Syria/

Internal Displacement Monitoring Centre (2018), New Displacement By Conflict and Disaster in 2017, IDMC and Norwegian Refugee Council, online. Available at: http://www.internal-displacement.org/global-report/grid2018/

International Crisis Group (2018). After the Showdown in Libya's Oil Crescent. Report 189, August 9, online. Available at: https://www.crisisgroup.org/middle-east-north-africa/north-africa/libya/189-after-showdown-libyas-oil-crescent

IOM (2018), Libya 2018: Humanitarian Compendium, International Organization for Migration, online. Available at: https://humanitariancompendium.iom.int/appeals/libya-2018

IPCC (2014), Synthesis Report of the Fifth Assessment Report (AR5), Intergovernmental Panel on Climate Change, online. Available at: https://www.ipcc.ch/report/ar5/syr/

IRENA (2019), A New World: The Geopolitics of Energy Transformation. Abu Dhabi: International Renewable Energy Association.

Jackson, Felicia (2009), Conquering Carbon: Carbon Emissions, Carbon Markets and the Consumer, London: New Holland Publishers.

Jaffe, Amy M. (2007), Iraq's Oil Sector: Past, Present and Future, Rice University.

Kabouche, Leo (2018), The Energy Briefing: The never-ending battle for Libya's Oil Crescent, Global Risk Insights, August 20, online. Available at: https://globalriskinsights.com/2018/08/special-report-never-ending-battle-libyas-oil-crescent/

Kamal, Baher (2017), Middle East, Uninhabitable?, Wall Street International Magazine, March 14, online. Available at: https://wsimag.com/economy-and-politics/24280-middle-east-uninhabitable

Kathib, Lina and Sinjab, Lina (2018), Syria's Transactional State: How the Conflict Changed the Syrian State's Exercise of Power, Chatham House Research Paper, London: Chatham House.

Katona, Viktor (2018), Russia Is Taking Over Syria's Oil And Gas, OilPrice.com, online. Available at: https://oilprice.com/Energy/Energy-General/Russia-Is-Taking-Over-Syrias-Oil-And-Gas.html

Lacher, Wolfram (2016), Libya's Local Elites and the Politics of Alliance Building, Mediterranean Politics, 21(1), pp. 64-85.

Lacher, Wolfram and Alaa Al-Idrissi. (2018), Capital of Militias: Tripoli's Armed Groups Capture the Libyan State, Security Assessment in North Africa (SANA) Briefing Paper, online. Available at http://www.smallarmssurvey.org/fileadmin/docs/T-Briefing-Papers/SAS-SANA-BP-Tripoli-armed-groups.pdf

Malik, Hamdi (2018), As protests continue, residents of Iraq's Basra call for autonomy, Al-Monitor, November 12, online. Available at: https://www.al-monitor.com/pulse/originals/2018/11/iraq-basra-protests-adil-abdul-mahdi.html

Matar, Linda and Ali Kadri (Eds.) (2018), Syria: From National Independence to Proxy War, Basingstoke: Palgrave.

Mamouri, Ali (2018), Billion dollar debt, heat wave push Iran to cut electricity to Iraq, Al-Monitor, July 10, online. Available at: https://www.al-monitor.com/pulse/originals/2018/07/iran-iraq-electricity-protest.html

Massoud, Najeb (2013), A Review of Libyan's Economy, Structural Changes and Development Patterns, Business and Economics Journal, 4(2), pp. 1-10.

Matallah, Siham and Amal Mattalah (2016), Oil rents and economic growth in oil-abundant MENA countries: Governance is the trump card to escape the resource trap. Topics in Middle Eastern and African Economies, 18(2), pp. 87-116.

Megerisi, Tarek (2018), Order from Chaos: Stablising Libya the Local Way, Brussels: European Council on Foreign Relations, online. Available at: https://www.ecfr.eu/page/-/ECFR_265_Order_from_chaos_stabilising_libya_the_local_way_T_Megerisi.pdf

Mehdi, Ahmed (2018), Iraqi Oil: industry evolution and short and medium-term prospects, OIES Paper: WPM 79, Oxford Institute for Energy Studies, online. Available at: https://www.oxfordenergy.org/wpcms/wp-content/uploads/2018/10/Iraqi-Oil-industry-evolution-and-short-and-medium-term-prospects-WPM-79.pdf

Meliksetian, Vanand (2018a), What happens to Syrian oil post-civil war? Oil Price, August 11, online. Available at: https://oilprice.com/Energy/Energy-General/What-Happens-To-Syrian-Oil-Post-Civil-War.html

Meliksetian, Vanand (2018b), Stopping Syria's Oil Smuggling Scheme, Oil Price, November 27, online. Available at: https://oilprice.com/Energy/Crude-Oil/Stopping-Syrias-Oil-Smuggling-Scheme.html

Meyer, Henry et al. (2018), Putin Trio of Syria Winners Seen Accepting Partition for Now, Bloomberg, April 3, online. Available at: https://www.bloomberg.com/news/articles/2018-04-04/putin-s-troika-of-syria-winners-must-accept-partition-for-now

Millett, Peter (2016), An update on Libya with British Ambassador Peter Millett, Legatum Institute London. Available at: https://www.li.com/events/an-update-on-libya-with-british-ambassador-peter-millett

Moalla, Fetini et al. (2006), Syrian Arab Republic: Selected Issues, IMF Country Report No. 06/295, Washington, D.C.: International Monetary Fund.

Mohammed, Muhanad and Suadad al-Salhy (2010), Iraq minister resigns after clashes over electricity, Reuters, June 21, online. Available at: https://www.reuters.com/article/us-iraq-electricity-protest/iraq-minister-resigns-after-clashes-over-electricity-idUSTRE65K5LH20100621

Nasarre, Cecilia (2017), The Energy Sector in the MENA: The Fight Against High Corruption Risks, Oil, Gas & Energy Law Intelligence, 15(3), 1875-418X.

Natalucci , Matteo (2016), The Geopolitics of Natural Resources in Libya in the post-Gaddafi era, Security for Development, May 2, online. Available at: https://europa.eu/capacity4dev/securityfordevelopment/discussions/geopolitics-natural-resources-libya-post-gaddafi-era

Nematollahi, Omid et al. (2016), Energy demands and renewable energy resources in the Middle East, Renewable and Sustainable Energy Reviews, 54, pp. 1172-1181.

Newsbase (2018), Libya's GECOL Values Power Infrastructure Damage at US$ 1.5 bn, Arica Power Monitor, July 4, online. Available at: https://newsbase.com/topstories/libya%E2%80%99s-gecol-values-power-infrastructure-damage-us15bn

Ohkruhlik, Gwenn and Patrick Conge (1997), National Autonomy, Labor Migration and Political Crisis: Yemen and Saudi Arabia, Middle East Journal, 51(4), pp. 554-565.

O'Sullivan, Meghan L. (2011), Iraqi Politics and Implications for Oil and Energy, Faculty Research Working Paper Series, Belfer Center for Science and International Affairs: Harvard Kennedy School.

Onder, Harun et al. (2017), The Toll of War: The Economic and Social Consequences of the War in Syria, The World Bank Group, online. Available at: http://documents.worldbank.org/curated/en/811541499699386849/pdf/117331-WP-v2-PUBLIC-The-Toll-of-War.pdf

Otman, Waniss A. and Erling John Karlberg (2005), Libya: Petroleum Industry & the Economic Diversification, Oil, Gas and Energy Law Intelligence, 3(3), 1875-418X.

Pearson, Laurie (2003), Libya Energy Report, London: Norton Rose.

Phillips, Sarah (2008), Yemen's Democracy Experience in Regional Perspective: Patronage and Pluralized Authoritarianism, New York: Palgrave Macmillan.

RCREEE (2019), Libya, Regional Centre for Renewable Energy and Energy Efficiency, online. Available at: http://www.rcreee.org/content/libya

Reuters (2018), Siemens CEO pushes plans to boost Iraqi power infrastructure, September 23, online. Available at: https://www.reuters.com/article/us-siemens-iraq/siemens-ceo-pushes-plans-to-boost-iraqi-power-infrastructure-idUSKCN1M30HT

Reuters (2019), Iraq, Jordan agree deal over trade of oil and goods, February 2, online. Available at: https://www.reuters.com/article/iraq-jordan/iraq-jordan-agree-deal-over-trade-of-oil-and-goods-idUSL5N1ZX0A8

Ross, Michael (2013), The Oil Curse: How Petroleum Wealth Shapes the Development of Nations, Princeton: Princeton University Press.

Said, Summer and Hakim Almasmari (2015), Oil Companies Begin to Give Up on Yemen, Wall Street Journal, March 4, online. Available at: https://www.wsj.com/articles/oil-companies-begin-to-give-up-on-yemen-1425480765

Salisbury, Peter (2018), Yemen's looming famine has been a long time coming, The Washington Post, December 5, online. Available at: https://www.washingtonpost.com/news/monkey-cage/wp/2018/12/05/yemens-looming-famine-has-been-a-long-time-coming/?utm_term=.526f71dde3bf

Sengul, Ebru (2017), Iraq, GE sign $400M deal for 14 electric substations, Anadolu Agency, November 24, online. Available at: https://www.aa.com.tr/en/energyterminal/electricity/iraq-ge-sign-400m-deal-for-14-electric-substations/14673

Shwadran, Benjamin (1977), Middle East Oil: Issues and Problems. Piscataway: Transaction Publishers.

Siemens (2017), Siemens signs contracts with GECOL to boost power generation capacity in Libya by 1.3 GW, Press Release, December 11, online. Available at: https://www.siemens.com/press/en/pressrelease/?press=/en/pressrelease/2017/power-gas/pr2017120111pgen.htm

Siddiqi, Afreen and Laura Diaz Anadon (2011), The Water-Energy Nexus in Middle East and North Africa, Energy Policy, 39(6), pp. 4529-4540.

Sindico, Francesco (2017), Anniversary Special: The Inaugural Issue a Decade Later - Climate Change and Security, Carbon & Climate Law Review, 11(3), pp. 187-190.

Silverfarb, Daniel (1996), The Revision of Iraq's Oil Concession, 1949-52, Middle Eastern Studies, 32(1), pp. 69-95.

Steinberg, Guido (2017), The Badr Organization: Iran's Most Important Instrument in Iraq, SWP Comments, Berlin: German Institute for International and Security Affairs, online. Available at: https://www.swp-berlin.org/fileadmin/contents/products/comments/2017C26_sbg.pdf

Stevens, Paul (2003), Cross-Border Oil and Gas Pipelines: Problems and Prospects, Washington, D.C.: The World Bank. Available at: https://siteresources.worldbank.org/INTOGMC/Resources/crossborderoilandgaspipelines.pdf

Sullivan, Michael D. (2018), I Fought Against Muqtada al-Sadr. Now He's Iraq's Best Hope., Foreign Policy, June 18, online. Available at: https://foreignpolicy.com/2018/06/18/i-fought-against-muqtada-al-sadr-now-hes-iraqs-best-hope/

Taylor, Andrea (2018), Can Sadr Fulfill His Campaign Promise to Reform the Iraq Energy Sector?, Atlantic Council, July 11, online. Available at: https://www.atlanticcouncil.org/blogs/menasource/can-sadr-fulfill-his-campaign-promise-to-reform-the-iraq-energy-sector

Toaldo, Mattia (2016), A Quick Guide to Libya's Main Players, Brussels: European Council on Foreign Relations, online. Available at: https://www.ecfr.eu/mena/mapping_libya_conflict

Tripp, Charles (2000), A History of Iraq, Cambridge: Cambridge University Press.

UK House of Commons Foreign Affairs Committee (2016), Libya: Examination of intervention and collapse and the UK's future policy options. Available at: https://publications.parliament.uk/pa/cm201617/cmselect/cmfaff/119/119.pdf

UNDP (2018), Democratic Governance and Peacebuilding, online. Available at: http://www.ly.undp.org/content/libya/en/home/democratic-governance-and-peacebuilding.html

UNDP/World Bank (1986), Syria: Issues and Options in the Energy Sector, Report No. 5822-SYR, Joint UNDP/ World Bank Energy Sector Assessment Program, Washington, D.C., online. Available at: http://documents.worldbank.org/curated/en/765521468778485214/pdf/multi-page.pdf

UNEP (2012), Renewable Resources and Conflict, Guidance Note, United Nations Interagency Framework Team for Preventive Action, online. Available at: https://www.un.org/en/land-natural-resources-conflict/pdfs/GN_Renew.pdf

UNICEF (2017), Deepening water crisis in Yemen amid severe fuel shortages, United Nations International Children's Emergency Fund, Press Release, December 19, online. Available at: https://www.unicef.org/media/media_102344.html

UNOCHA (2018), Libya Humanitarian Needs Overview 2018, United Nations Office for the Coordination of Humanitarian Affairs, online. Available at: https://www.humanitarianresponse.info/en/operations/libya/document/libya-humanitarian-needs-overview-2018

UNPAN (2011), Engaging citizens to counter corruption for better public service delivery and achievement of the millennium development goals, United Nations Department of

Economic and Social Affairs Division for Public Administration and Development Management, Workshop report. Available at: www.unpan.org/2011WKS-Marrakesh

Van Aalst, Maarten (2004), Mainstreaming Climate Risk into Development Planning. OECD/GFCD Presentation, online. Available at: http://www.oecd.org/env/cc/33993625.pdf

Ward, Alex (2019), Yemen's humanitarian catastrophe, in one chart, Vox, January 40, online. Available at: https://www.vox.com/2019/1/30/18203857/yemen-war-deaths-injured-chart-intelligence

Wijaya, Andy Fefta and Jaber Emhemed M Shariha (2016), Comparison between Corruption in Libya during Ghaddafi's Rule and Corruption in Libya Post-Ghaddafi's, IOSR Journal of Business and Management, 18(5), pp. 19-25.

World Bank (2016), Yemen, Washington, D.C.: World Bank, online. Available at: http://pubdocs.worldbank.org/en/777611492266548883/Yemen-MEM2017-ENG.pdf

World Bank (2017a), Supporting electricity sector reform in Libya . Report 4.2: IMPROVING GECOL TECHNICAL PERFORMANCE, World Bank and PwC. Available at: http://documents.worldbank.org/curated/en/193171527061676535/pdf/08-Task-C-Improving-GECOL-Technical-Performance.pdf

World Bank Group (2017b), Yemen's economic outlook 2017, online. Available at: http://pubdocs.worldbank.org/en/592801507055198056/MEM-Oct2017-Yemen-ENG.pdf

World Bank (2018), Iraq Economic Monitor: From War to Reconstruction and Economic Recovery, Washington, D.C.: The World Bank. Available at: https://openknowledge.worldbank.org/bitstream/handle/10986/29688/125406.pdf?sequence=4&isAllowed=y