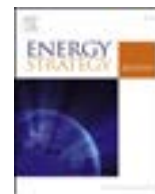


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Energy diplomacy in a time of energy transition

Steven Griffiths^{a,b,*}

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

^b Payne Institute for Earth Resources, Colorado School of Mines, Golden, CO, USA



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ABSTRACT

The global energy system is undergoing a transition away from a nearly complete dependence on fossil fuels toward a greater reliance on clean and renewable energy sources. Because this low-carbon energy transition will fundamentally alter the relationship between energy producers and consumers, its geopolitical ramifications are now a key concern of global energy leaders. Among the foreign policy tools that can be leveraged to support a country in managing the geopolitical consequences of an energy transition, diplomacy is one of the most important. This paper provides an analysis of how bilateral energy diplomacy can support the interests of Gulf Cooperation Council (GCC) countries during a low-carbon energy transition. The strategic objectives of bilateral energy diplomacy for GCC countries are assessed and then considered more specifically via a case study of the United Arab Emirates (UAE). The UAE case study yields foreign policy conclusions and recommendations that are intended to serve as strategic guidance for all hydrocarbon-exporting countries. The results demonstrate the strategic importance of fostering bilateral energy diplomacy with countries that can provide security of domestic energy supply, markets for the long-term monetization of hydrocarbon resources and support for economic diversification. These strategic relations have energy at the core but should extend to joint investment and science and technology collaboration in order to have maximum value.

1. Introduction

The global energy mix has been dominated by fossil fuels for decades with relatively little change [1,2]. The share of fossil fuels in total final energy consumption fell from about 85% in the early 1970s but has stagnated at about 80% since that time [3]. However, this situation is beginning to change due largely to the rapidly falling costs of renewable energy technologies and growing awareness of the negative environmental impacts of carbon dioxide emissions from fossil fuel combustion. Consistent with the various definitions of “energy transition” [4], changes in our energy and economic system throughout the remainder of this century will be characterized by a shift from reliance almost entirely on fossil to a much greater reliance on renewable energy [5]. This rise of renewable energy will be accompanied by increased electrification and digitalization across all energy sectors as well as decentralization of energy supply [6–8].

This multifaceted, low-carbon energy transition will fundamentally alter the geopolitics of energy in a number of ways, including a changing of power relations among and between energy producers and consumers [9–12]. Hydrocarbon-exporting countries face potentially negative economic and political impacts from reduced energy exports

while energy importing countries can benefit from greater energy self-reliance and, in some cases, the export of clean energy technologies.

As such challenges and opportunities evolve, management of international relations via diplomacy will become an increasingly important instrument of foreign policy as countries strive for strategic positioning in the future energy landscape. While various forms of multilateral diplomacy are important in concurrently aligning the energy transition interests of multiple stakeholders, bilateral diplomacy is the most direct means of pursuing national interests.

The Gulf Cooperation Council (GCC)¹ countries rely significantly on oil export revenues to meet their budgetary needs [13] and therefore face a potentially challenging future should a low-carbon energy transition result in a significant reduction in global demand for oil. To counter this challenge, GCC countries need to forge strong bilateral relationships that will yield security of energy demand as well as new economic opportunities that arise from a low-carbon energy transition. The United Arab Emirates (UAE) is a GCC country that has been developing strategic bilateral relationships regionally and globally in an effort to effectively position for such an energy transition.

This paper considers energy diplomacy as it relates to the geopolitics of a low-carbon energy transition. The UAE's bilateral energy

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

E-mail address: steven.griffiths@ku.ac.ae.

¹ Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates.

diplomacy directions serve as a case study for the development of foreign policy recommendations that support the UAE's ongoing efforts and provide guidance for other hydrocarbon-exporting countries facing an uncertain future energy landscape.

2. Methodology

The research method employed for this work is the case study method. This method enables the exploration of complex issues and is considered a robust approach when an in-depth investigation is needed to examine a particular topic [14–16]. The energy diplomacy of hydrocarbon-exporting countries during a low-carbon energy transition is one such complex topic for which the case study method is useful.

The UAE is selected as the case study for this paper because it is a major hydrocarbon-exporting country that has an articulated, strategic emphasis on diplomacy in its foreign affairs [17]. Evidence that these efforts have been effective is provided by the country's establishment of diplomatic relations with 189 countries and formalization of these relations through the establishment of 82 embassies abroad and the hosting of 110 foreign embassies and 15 regional and international organizations in the country [18]. Furthering these diplomatic efforts, in 2017 the UAE launched its Soft Power Strategy, which aims to increase the UAE's global reputation abroad by highlighting to the world its identity, heritage, culture and global contributions [19]. The pillars of this strategy are diplomacy in its many forms, including humanitarian, scientific and academic, cultural and economic.

3. Background

3.1. Energy transition and its geopolitical impacts

Predicting the ultimate extent of a low-carbon energy system transition and the pace at which it will occur is a somewhat complex matter that depends on multiple socio-political factors [20]. Nonetheless, current trends point toward a significant increase of renewable energy in the power sector by the middle of this century coupled with major advances in transportation electrification. As evidence of the trend, renewable energy, excluding large hydro, was responsible for 61% of new power generation capacity worldwide in 2017 [21] and the annual growth in electric passenger car sales has remained at nearly 60% every year from 2015 through 2018 [22]. Given such developments, Bloomberg New Energy Finance (BNEF) [23] projects that by 2050 renewable energy will account for approximately 64% of global electricity generation while electricity generation itself will increase by nearly 57% to 38,685 TWh (Table 1). In even more ambitious projections, IRENA has stated that if the climate objectives of the 2015 Paris Agreement [24] are to be met, by 2050 85% of global power generation must come from renewable energy with solar and wind energy having the predominant share [25].

In the transportation sector, BNEF projects that by 2040 55% of all new car sales and 33% of all light duty vehicles on the road could be electric [26], resulting in the displacement of about 7.3 million barrels per day (mbpd) of transportation fuel and an additional 2,000 TWh of electricity demand. Because of this trend in vehicle electrification coupled with shared mobility and improved vehicle efficiency [27], oil demand for petrochemical production will begin to outpace oil demand for transportation. According to the IEA, petrochemicals are expected to account for more than one-third of the growth in new oil demand between now and 2030, and nearly half of the growth in new oil demand to 2050 [28].

Although current trends have led to a growing consensus that an “energy transition” is underway, social and political dynamics will be a key determinant of the extent to which clean energy technologies are adopted [4,20,29]. Among the many published global energy outlooks [30], those published by the Institute of Energy Economics, Japan (IEEJ) [31] and Equinor [3] are two that provide insight into how such

a low-carbon energy transition may unfold differently based on uncertain social, economic and political dynamics that may unfold globally in the coming years. As shown in Table 1, rapid and significant proliferation of clean energy requires a world in which strong global energy governance² that prioritizes sustainability emerges. Weak global energy governance, on the other hand, is more likely to retard the deployment of clean energy technologies, particularly when accompanied by international political strife. Hence, geopolitics is at the core of energy transition.

Just as geopolitics are foundational to the energy transition, the widespread diffusion of clean energy into the global energy system will significantly impact geopolitics [9]. The geopolitical impacts of renewable energy derive from the following intrinsic features of renewable energy:

- Global abundance with many countries having access to multiple renewable resources that include sun, wind, hydro, biomass, geothermal or ocean
- Intermittency of the fastest growing forms of renewable energy, solar and wind
- Opportunity for distribution of generation rather than reliance on centralized generation
- Dependence on technologies that are made from minerals and rare-earth metals³ that are geographically concentrated in selected parts of the world

Based on these characteristics, power relations between energy producers and consumers will be altered as energy markets become increasingly defined by the combination of resource abundance, energy self-reliance and interconnectivity of electrical grids rather than the historical combination of energy resource scarcity and geographical concentration that requires transport of energy over long distances to reach end markets [12]. Furthermore, the increased importance of electricity as an energy carrier will make digitalization a key component of a low-carbon energy transition [8] and further empower those countries that are the most advanced in digital capabilities. Given such expected geopolitical impacts of a low-carbon energy transition, countries must be prepared to adapt their foreign relations for the protection of their national interests.

3.2. Energy diplomacy

Although there is no exact definition for energy diplomacy, it pertains to government-related foreign activities that aim to ensure a country's energy security while also promoting business opportunities related to the energy sector [32,33]. Among the set of foreign policy tools that can be leveraged to support a country's energy interests during a global energy transition, diplomacy is one of the most important [34] and can be either bilateral or multilateral in scope. A large-scale transformation of the energy system to one predominantly based on clean energy will certainly require aligning the interests of multiple parties through multilateral diplomacy. Global energy governance is perhaps the most important form of multilateral diplomacy for a large-scale energy system transformation as it seeks to ensure on a global scale security of energy supply and demand, economic development, international security, environmental sustainability and domestic good

² As further elaborated in the section on energy diplomacy, strong global energy governance refers to international governance that is effective in achieving an energy system designed and managed to achieve the collective best interests of the global community.

³ The term “rare earths” refers to 17 elements often found in the same ore deposits, including cerium, dysprosium, erbium, europium, gadolinium, holmium, lanthanum, lutetium, neodymium, praseodymium, promethium, samarium, scandium, terbium, thulium, ytterbium and yttrium.

Table 1
Summary of selected global energy transition scenarios.

Study	Scenario	Summary	Electricity Demand (TWhr)		Total Final Energy From Electricity (%)		Electricity Generation From Renewables (%)		Electricity Generation From Solar PV and Wind (%)	
			2017	2050	2017	2050	2017	2050	2017	2050
BNEF	NA	Overview: Market-agnostic projection, concerned only with achieving a lowest system-cost solution, and does not take a view on price formation and the market design required to deliver it in an increasingly zero-marginal-cost environment International Setting: Market-oriented international interactions with modest global energy governance Policy Direction: NDCs from the 21st Conference of the Parties in Paris in 2015 Technology Evolution: continuation of recent trends at the pace observed in recent years with no breakthroughs expected International Setting: Strong global energy governance toward a shared vision of the energy future Policy Direction: Strong policy interventions globally with the intent of achieving energy sector GHG emissions consistent with limiting global warming below 2° relative to pre-industrial levels Technology Evolution: substantial evolution of low carbon technologies due to strong policies with carbon capture, energy storage playing a key role along with major deployment of zero emissions passenger vehicles	24,656	38,685	19%	NA	26%	64%	7%	48%
Equinor	Reform	International Setting: Market-oriented international interactions with modest global energy governance	24,656	36,053	19%	26%	26%	50%	7%	30%
Equinor	Renewal	International Setting: Strong global energy governance toward a shared vision of the energy future Policy Direction: Strong policy interventions globally with the intent of achieving energy sector GHG emissions consistent with limiting global warming below 2° relative to pre-industrial levels Technology Evolution: substantial evolution of low carbon technologies due to strong policies with carbon capture, energy storage playing a key role along with major deployment of zero emissions passenger vehicles	24,656	34,890	19%	33%	26%	75%	7%	49%
Equinor	Rivalry	International Setting: Weak global energy governance framed by geopolitical tension Policy Direction: Weak environmental regulation with concern shifted to short-term interests Technology Evolution: emphasis on exploitation on indigenous resources at lowest cost as opposed to deployment of low carbon technologies	24,656	34,890	19%	25%	26%	42%	7%	20%
IEEJ	Reference	Overview: Energy, environment and related policies follow current trends with no significant deviations expected.	24,656	38,658	19%	24%	26%	29%	7%	12%
IEEJ	Advanced Technologies	Overview: The use of energy conservation and low-carbon technologies is maximized in all countries to ensure stable energy supply while meeting aggressive climate change objectives.	24,656	35,030	19%	25%	26%	44%	7%	22%
IEEJ	Peak Oil Demand	Overview: Strong policies are enacted for the rapid development and deployment of zero emission vehicles, particularly for passenger transportation.	24,656	43,450	19%	30%	26%	26%	7%	10%

governance [35]. Global energy governance is particularly challenging, however, because energy governance most often lies within national borders. This bounded notion of energy governance creates a “paradox of sovereignty” whereby countries fail to act collectively despite the fact that globalization of energy markets increasingly diminishes their control over their individual energy interests [35]. Although global energy governance is being pursued by a variety of intergovernmental organizations, clubs, forums, networks, partnerships, multilateral institutions and United Nations entities [36,37], the potential for strong governance remains unrealized due to fragmentation of the actors involved and their genuinely different interests. Therefore, while it is imperative that countries engage in the pursuit of global energy governance via the prominent organizations such as the International Energy Agency (IEA), the International Renewable Energy Agency (IRENA) and the Organization of Petroleum Exporting Countries (OPEC), other means of diplomacy will be more effective in the directed pursuit of national interests.

Bilateral diplomacy, which involves direct diplomatic engagement between two countries, is both efficient and flexible because with fewer parties involved, coordination costs are lower and interests are easier to align. As outlined in the Vienna Convention on Diplomatic Relations [38], diplomacy between nations involves the protection of the interests of one country within the borders of another through information gathering, the promotion of friendly relations and negotiation. Given this scope, bilateral diplomacy can be particularly effective when encompassing the pursuit of common interests between countries as well as addressing differences and commonalities related to culture, politics and economy.

The depth of bilateral diplomatic relations that one country establishes with another can be positioned as special, normal or peripheral [39]. While normal engagement between countries involves regular engagement via embassies, consulates and other diplomatic channels, special relations typically involve a broader number of actors, employ diverse modes of engagement and serve a distinct strategic purpose. Such special bilateral relations typically arise between countries with strong political, security or economic links. Geopolitical challenges that will arise during an energy transition make the establishment of special bilateral diplomatic relations increasingly important.

Once bilateral diplomatic relations are established, the effectiveness of these relations in supporting a country's energy interests depends on the power or influence that a country is able to establish with its counterparts. “Soft power” is a very important concept in this regard because soft power is defined as the means by which one country gets other country to do what it wants via perceived legitimacy, attractiveness of ideology and culture, and societal norms [40,41]. In essence, soft power is about affecting behavior without commanding it. Although countries with sufficient resources may succeed in an energy transition by exercising “hard power” tactics of coercion and/or payment [42], most countries lack the physical and/or financial resources to implement a hard power approach to achieving their foreign energy policy objectives. Pascual [43] has outlined how hard power tactics can work in energy markets via his Rules of Six framework and applied this framework to a selected set of countries and regions. His analysis shows that such tactics are not likely to be successful during an energy transition for all but a small number of countries the possess substantial natural, military and/or economic resources, such as China [10]. Even China, however, has been aggressively pursuing the establishment of soft power to achieve its energy interests [44,45]. Hence, the importance of trust and collaborative partnership in energy relations makes bilateral diplomacy, which is a key tool of soft power, essential for international relations during an energy transition.

4. GCC bilateral energy diplomacy

4.1. Strategic objectives

As with all forms of foreign policy, foreign energy policy is designed to protect and support national interests. National energy interests are concerned with energy related societal goals, including universal access to reliable and affordable energy that supports economic development. Energy security, including energy availability, is perhaps the defining feature of national energy policy, although other essential elements are energy affordability, energy efficiency, environmental preservation, energy sector regulation and energy sector governance [46,47].

For GCC countries, energy security and economic efficiency in the power sector are key energy policy concerns [48,49]. Hence, renewable energy [49], electricity trade [48,50], natural gas supply [51] and nuclear energy [52] would be expected to play an important role in the foreign energy policies and bilateral energy diplomacy efforts of GCC countries.

Although GCC countries have historically had access to cheap and abundant supplies of natural gas and oil to meet their domestic energy demands, this situation has begun to change in recent years. While oil remains abundant in the GCC with the region accounting for about 30% of proven crude oil reserves and 28% of oil exports globally [53], all GCC countries with the exception of Qatar have experienced a shortfall of domestic natural gas production to meet growing domestic demands [51,54]. This shortfall in regional natural gas supply has triggered countries throughout the GCC to explore their options for increasing natural gas supply as well as reducing natural gas demand [48]. Although Qatar has abundant natural gas resources, Qatar's political differences with Saudi Arabia, Bahrain and the UAE [55,56] have made it impossible for it to be a key natural gas supplier across the GCC. Rather, bilateral energy relations between GCC countries is currently limited to pipeline natural gas exports from Qatar to both the UAE and Oman via the Dolphin pipeline and liquefied natural gas (LNG) shipments to Kuwait [48,51]. Given this situation, GCC countries, are pursuing the development of their own indigenous natural gas resources [51] as well as the deployment of clean energy, including both nuclear and renewables, to achieve domestic energy security at the lowest possible cost.

Although the procurement and domestic deployment of renewable energy is unlikely to have any significant implications for the bilateral diplomatic relations of GCC countries, development of challenging sour and shale natural gas resources [51] as well as the deployment and operation of nuclear energy requires significant foreign engagement for access to specialized skills and technologies. The UAE's access to South Korean nuclear technology and training [52], for example, is based on a bilateral agreement signed in 2009 between the UAE and South Korea. Both Russia and China have significant interest in using their nuclear technology capabilities to establish foreign influence [57] and so are positioning strongly for Saudi Arabia's proposed nuclear program [58].

Despite the importance of domestic energy security and economic efficiency, the more pressing foreign energy policy concern for GCC countries that arises specifically from a low-carbon energy transition is monetization of hydrocarbon resources. With the exception of Qatar, which is a major global exporter of LNG, GCC countries are primarily concerned with securing markets for their crude oil exports and hydrocarbon products.

As shown in Fig. 1, global demand for crude oil is expected to remain significant in the coming decades but the extent of demand is highly uncertain. If demand for oil falls significantly as some scenarios suggest, the price of oil is expected to fall as well. This means that even if GCC countries remain major oil exporters because they are low cost producers and succeed with current efforts to contain domestic energy demand growth [48,53,59], resulting government revenues could be very negatively affected. For example, in IEEJ's Peak Oil Demand scenario (Table 1), a large-scale shift to electric vehicles reduces global oil demand to 88.7 mbpd by 2050, which is a 33 mbpd reduction relative

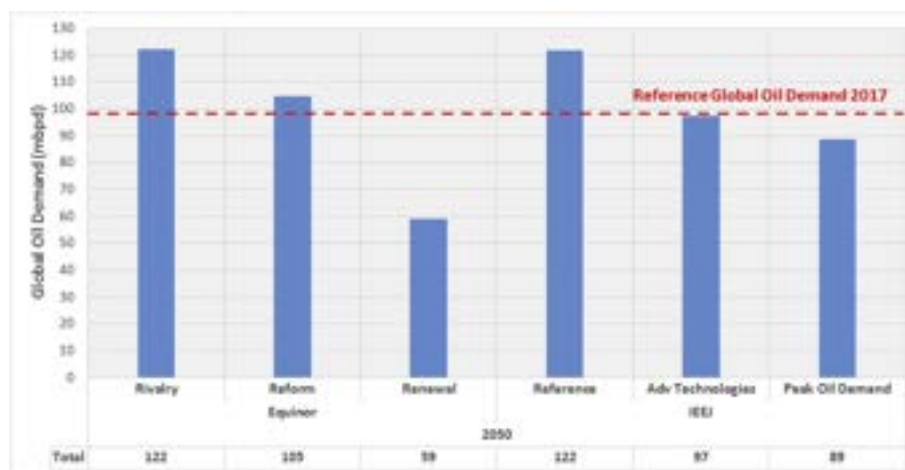


Fig. 1. Projected global oil demand (Equinor and IEEJ scenarios).

to their Reference scenario (Fig. 1). The projected impact on Middle Eastern countries in this scenario is \$1.6 trillion in foregone oil export revenues in 2050, which would be equivalent to 13% of nominal GDP for these countries and based primarily on reduced oil prices rather than reduced demand for Middle Eastern oil. Rowland and Mjelde [60] have also shown that Middle Eastern countries, and particularly those in the GCC, are likely to have robust demand for their oil exports in the coming decades but face significant uncertainty in their oil export revenues. Their study shows that a 2.5%–10% reduction in world oil demand would reduce the oil export revenues of GCC countries by anywhere from 5% to 40% depending on the particular country and the extent of global oil demand reduction.

Substantially reduced oil export revenues would have a major impact on GCC countries under their current economic structures. Across the GCC countries, fiscal revenues are more than 50% derived from hydrocarbon exports and any significant diversification in GDP is largely based on investments and expenditures made using hydrocarbon export revenues [13]. It is therefore critical for GCC countries to diversify their economies to reduce this dependence. Diversification efforts will include a greatly increased focus on petrochemicals for monetization of oil and gas resources as well as the development of new economic sectors that are not directly tied to hydrocarbons.

Given the context of GCC countries in a low-carbon energy transition, their priority efforts in energy diplomacy should support long-term monetization of hydrocarbon resources and development of diversified economic sectors. For both priorities, relations with Asia are particularly important [61,62]. Growing energy interdependence between GCC and Asian economies has supported a pivot in GCC trade relations towards Asia in recent years [63] with China, Japan, India and South Korea serving as vital Asian partners given current levels of energy imports from the GCC (Fig. 2). China is perhaps the most important Asian country for strategic consideration given the potential positive impacts of its Belt and Road Initiative on Middle Eastern countries [64]. However, diversified relationships across Asia remain important for GCC countries to create a greater balance of relational power with China.

A strategic framework for development of special bilateral diplomatic relations between GCC and Asian countries positions energy at the core, infrastructure and investment as a next level of engagement and finally joint development of advanced technologies as an ultimate ambition (Fig. 3). This framework, which is consistent with China's articulated approach to engaging Arab countries [65], builds on current bilateral energy relations to further support GCC countries in their economic diversification efforts.

4.2. UAE case study

Based on hydrocarbon trade data, the UAE's core energy relationships are currently with China, India, Japan, South Korea, Singapore and Thailand (Fig. 2). Each of these countries factors strongly into the UAE's foreign policy not only as a market for oil exports, but also for broader energy and economic relations.

Referring to the classification of bilateral diplomatic relations as special, normal and peripheral, each of the UAE's key Asian energy trade partners has a special relationship with the UAE (Table 2). However, the special partnerships with Northeast Asian countries and India have each been upgraded since the start of 2017 to a "strategic" level. Furthermore, the major bilateral diplomatic meetings that launched these enhanced relations have resulted in expanded energy partnerships. This strengthening of bilateral relations between the UAE and its Asian partners during an early phase of global energy transition is logical. Falling oil demand reduced oil prices would push high cost producers out of the market, making oil importing countries more reliant on low cost producers in the Middle East [31,60,66]. For this reason, Asian economies that will continue to be significant energy importers should seek long-term partnerships for energy supply with stable countries that are expected to be long-term energy exporters. The UAE is well positioned to fill this role given its stable political environment and ongoing economic diversification aimed at building strong economic foundations [67].

Having established special diplomatic relations with key Asian countries, the UAE's core energy relations with these countries have progressed well with the Abu Dhabi National Oil Company (ADNOC) awarding recent onshore and offshore oil concessions to national oil companies from China, Japan, South Korea and India [68,69] (Fig. 4). Further, the launch of ADNOC's first ever exploration licensing round is likely to attract additional Asian investment in the UAE's oil and gas sector [68], particularly China.

Through the China National Petroleum Company (CNPC), China has already become a major player in ADNOC's oil and gas sector. Not only has CNPC been awarded stakes in ADNOC's onshore and offshore concessions, ADNOC awarded in July 2018 a USD 1.6 billion contract to CNPC subsidiary BGP for onshore and offshore 3D seismic surveying, which will be completed by 2024 [70,71]. This relationship development follows the 40% stake awarded to CNPC in 2014 in the Al-Yasat joint venture with ADNOC. CNPC is also positioned to engage in the development of Abu Dhabi's abundant sour gas fields as the UAE works to increase its natural gas production.

China Petroleum Engineering and Construction (CPECC) has also represented China in the UAE via its work in constructing the 1.5mn b/d Habshan-Fujairah pipeline, which allows UAE crude oil to be loaded

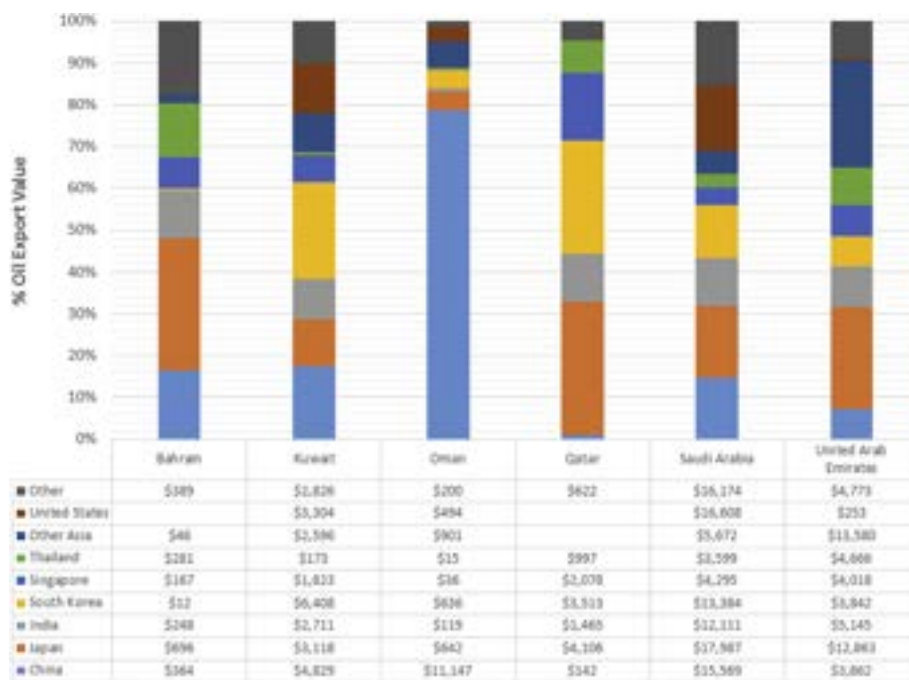


Fig. 2. GCC Oil Export Revenues by Export Market (2016, all table values in millions) (Data Source: resourcetrade.earth [98]).

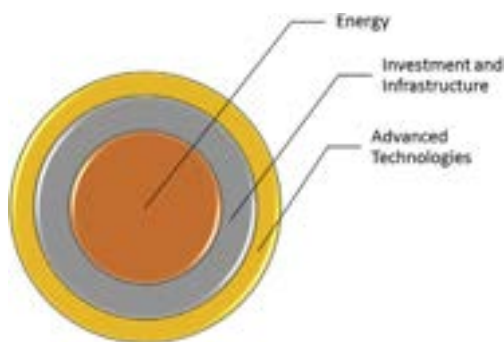


Fig. 3. Strategic framework for the special bilateral relations of GCC countries.

on ships that don't need to pass through the Strait of Hormuz. This bypass option is important because the Strait of Hormuz is a major chokepoint for global oil trade that could have major global economic implications if completely or partly closed due to Middle East conflict [72].

Notably, the depth of the UAE's relations with China extend beyond those established by ADNOC. Mubadala Investment Company, Abu Dhabi's global multi-sector investment company whose board Chairman is His Highness Sheikh Mohamed bin Zayed Al Nahyan, established the UAE-China Joint Investment Fund as a partnership between Mubadala, China Development Bank Capital and China's State Administration of Foreign Exchange [73]. The fund will invest in assets in the UAE and China and demonstrates the second layer of strategic engagement between GCC and Asian economies, which is joint investment and infrastructure development (Fig. 3).

The UAE has also strengthened energy relations with Japan, which is currently the country's largest oil export market (Fig. 2). Japan has secured stakes in Abu Dhabi's onshore oil concession as well as multiple offshore concessions and exploration rights for onshore exploration in Abu Dhabi [74]. Through the concessions, Japan will remain an oil partner with the UAE at least until 2058 (Fig. 4). Similar to its engagement with China, the UAE is building strong investment links with Japan as part of the comprehensive strategic partnership between Japan and the UAE [75].

While the UAE has clearly developed strategic alignment with Asia for its upstream development plans and broader investments, the UAE's ambition for its hydrocarbon sector is to aggressively move into petrochemicals since this is the fastest growing source of global oil demand [76,77] and is therefore important to the long-term monetization of the country's abundant oil and gas resources. ADNOC is investing USD 45 billion by 2025 to develop Abu Dhabi into what it hopes will be the world's largest integrated refining and petrochemicals complex and also taking equity in overseas downstream⁴ projects to secure end markets for its products [28,78]. Overseas opportunities are a key aspect of UAE energy diplomacy as the UAE wants to partner with countries in the development of their refining and petrochemicals capacity rather than having these countries develop their own capacity. ADNOC's strategic commitment to overseas engagement is demonstrated by the 25% equity stake the company has taken in India's proposed Ratnagiri refining and petrochemicals complex [79]. This is ADNOC's first overseas downstream investment and follows the establishment of the comprehensive bilateral strategic partnership with India in 2017 (Table 2). ADNOC has also engaged with CNPC for Chinese investment in UAE petrochemical and refining plants and joint UAE-China investment in downstream assets in China [80].

In addition to ADNOC, Mubadala is supporting the UAE in its push for downstream activity via investments abroad. The CEO of Mubadala Petroleum and Petrochemicals has stated that petrochemicals are “an enabler for the new industrial revolution” and Mubadala's recent investments abroad reflect this sentiment [81]. In early 2018, Total and Mubadala's Novealis Holdings, which consists of Mubadala subsidiaries Borealis (64% Mubadala owned) and Nova Chemicals (100% Mubadala owned and based in Canada), formed a USD 1.7 billion joint venture to produce petrochemicals on a 50:50 basis at Port Arthur, Texas in the United States. Further, Mubadala and ADNOC are joint owners of the UAE's key petrochemical producer, Bourage (60% ADNOC ownership and 40% Borealis ownership, with Mubadala owning 64% of Borealis directly and 24.9% of Austria's OMV, which owns 36% of Borealis). Bourage currently has three polyolefin plants in Abu Dhabi with a

⁴ In this paper, downstream refers primarily to refining and petrochemicals production.

Table 2
Key UAE bilateral relationships with Asian countries.

Country	Region	UAE Foreign Embassy	Type of Bilateral Relationship	Key Diplomatic Events since 2016		
				Date	Event	Energy Aspects
China	Northeast Asia	Beijing, established in 1987	Special (Comprehensive Strategic Partnership)	July 21st, 2018	<ul style="list-style-type: none"> ● Visit of Chinese President Xi Jinping to the UAE ● Agreement to elevate the strategic partnership between the UAE and China established in 2012 into a “comprehensive strategic partnership” 	<ul style="list-style-type: none"> ● Partnership between ADNOC and CNPC for strategic oil and gas sector projects ● Advanced energy cooperation agreement between the UAE Ministry of Energy and Industry, and China’s National Energy Commission ● Partnership and investment agreement in the world’s largest solar energy project in Dubai ● Reaffirmed determination to further expand joint projects in the energy sector with inclusion of clean and renewable energy, upstream and downstream oil and gas and platform technologies and capabilities such as cyber security, robotics, internet-of-things, big data analysis, artificial intelligence, and nanotechnology
Japan	Northeast Asia	Tokyo, established in 1973	Special (Comprehensive Strategic Partnership)	April 30th, 2018	<ul style="list-style-type: none"> ● Visit of Prime Minister Shinzo Abe to the UAE ● Agreement to deepen and strengthen the existing strategic partnership between the UAE and Japan through a “comprehensive strategic partnership” 	<ul style="list-style-type: none"> ● Celebration marking the completion of the construction of the first nuclear reactor as part of the Barakah Nuclear Energy Plant project (UAE and Korea strategic partnership is significantly based on the use of Korean technology in the UAE’s nuclear program)
South Korea	Northeast Asia	Seoul, established in 1987	Special (Special Strategic Partnership)	March 25th, 2018	<ul style="list-style-type: none"> ● Visit of President Moon Jae-in to the UAE ● Agreement to upgrade the strategic partnership between the UAE and Japan established in 2009 into a “special strategic partnership” 	<ul style="list-style-type: none"> ● Agreements in science and renewable energy ● Discussion on ways to enhance bilateral relations and strengthen cooperation in trade, investment, tourism and food security
Singapore	Southeast Asia	Singapore, established in 1985	Special	May 11th, 2018	<ul style="list-style-type: none"> ● Visit of His Highness Sheikh Abdullah bin Zayed, Minister of Foreign Affairs and International Cooperation, to Singapore 	<ul style="list-style-type: none"> ● Discussion on Thailand’s readiness to support UAE in food security and the UAE’s readiness to support Thailand in energy security
Thailand	Southeast Asia	Bangkok, established in 1998	Special	May 13th, 2016	<ul style="list-style-type: none"> ● Visit of His Highness Sheikh Abdullah bin Zayed, Minister of Foreign Affairs and International Cooperation, to Thailand for the first UAE-Thai joint committee meeting 	<ul style="list-style-type: none"> ● Agreement on strategic crude oil storage in India signed between ADNOC and Indian Strategic Petroleum Reserves Ltd (ISPR)
India	South Asia	New Delhi, established in 1972	Special (Strategic Partnership)	January 26th, 2017	<ul style="list-style-type: none"> ● Visit of His Highness Sheikh Mohamed Bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, to India ● Agreement to implement comprehensive bilateral strategic partnership 	

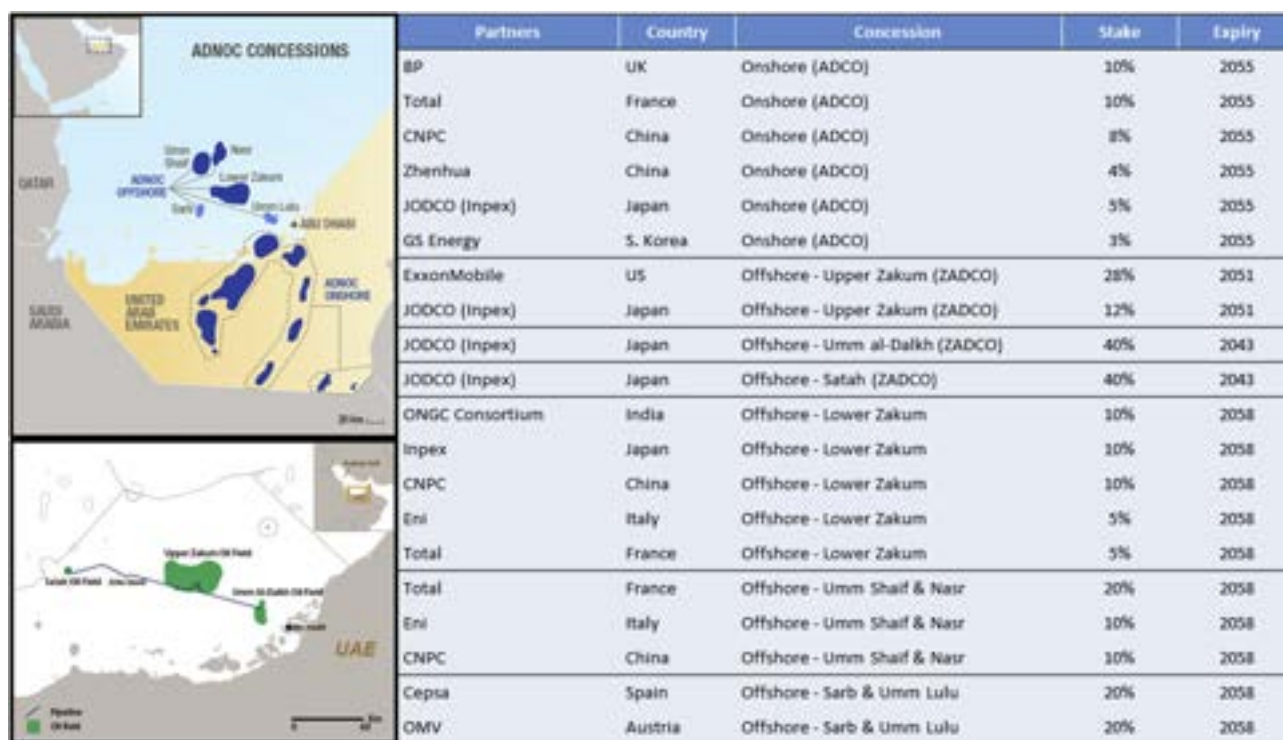


Fig. 4. ADNOC onshore and offshore concession partners.

combined capacity of 4.3 million tons per year. This capacity is expected to significantly expand as part of ADNOC's downstream investment strategy.

Although Asia is clearly a key target for the UAE's bilateral energy diplomacy, it should not be overlooked that regional and European countries will play an important role in the country's energy future. The UAE's strong diplomatic relations with the United Kingdom [82], France [83] and Italy [84] are reflected in the significant engagement of BP, Total and Eni in Abu Dhabi's onshore and offshore oil development (Fig. 4). Eni has taken a particularly strong interest in the UAE securing not only offshore oil development concessions, but also major stakes in Abu Dhabi's ultra-sour gas development, oil and gas exploration, refining and petrochemical production activities [85,86].

The UAE's strategic bilateral partnership with Russia, which includes energy and regional security as foundational elements, was established in June 2018 to promote common interests in oil, gas and nuclear energy [87] and builds on the 2013 establishment of Mubadala's USD 2 billion Russian Direct Investment Fund (RDIF). The UAE's bilateral partnership with Russia is important because the UAE and Russia have a common interest in prolonging the economic viability of hydrocarbon energy and Russia is an ally for the UAE in establishing geopolitical stability in the Gulf, particularly given Russia's influence with Iran [88]. The UAE may also consider developing closer ties with Russia for downstream investment since both Russia and the UAE have interest in monetizing their hydrocarbon resources overseas. Similar to the UAE, Russia has a strong interest in Asia [89] and so cooperation rather than competition may be the best approach. Cooperation with Russia is in fact the approach being taken by Saudi Arabia [90].

Common interests in Gulf geopolitical stability and hydrocarbon energy also underpin the UAE's recently strengthened strategic partnership with Saudi Arabia. The UAE and Saudi Arabia have formed a Joint Cooperation Council (JCC) to cover "all military, political, economic, trade and cultural fields" [55] between the countries. The JCC is the implementing body of the UAE-Saudi "Strategy of Resolve" [91] and establishes a new mode of bilateral cooperation following fragmentation of the GCC resulting from political differences between Qatar

and the trio of the UAE, Saudi Arabia and Bahrain [56]. The UAE and Saudi Arabia have already begun to align interests to secure Asian downstream markets. Their joint investment in the Ratnagiri refining and petrochemicals complex in India is an example of the type of relationships that can be elaborated [79].

While it is clear that the UAE's special bilateral energy relationships are well structured, activities for the joint development of advanced technological capabilities as depicted in Fig. 3 can be expanded. The area of advanced technology with the greatest potential impact on the UAE's ambition to become a diversified, knowledge-based economy is artificial intelligence (AI). AI could contribute as much as USD 96 billion to the UAE's Gross Domestic Product (GDP) by 2030 [92] and as much as USD 182 billion to the UAE's Gross Value Add (GVA) by 2035 [93]. Such broad benefits will be achieved through machine learning and other AI techniques that support the UAE in advancing automation, augmentation of human capabilities and stimulation of the country's fundamental innovation potential. Furthermore, AI is central to energy sector digitalization [8] and can support the UAE in integrating renewable energy technologies into the country's power sector, creating an intelligent transportation system and reducing the cost of UAE oil production to improve the long-term profitability of the country's oil exports.

Because AI is expected to have such major economic impacts for the UAE, exploiting strong bilateral ties with countries that are extremely advanced in AI is an important and recommended energy transition strategy for the country. Like the UAE, China, Japan, South Korea, Singapore and India have each launched AI strategies since 2017 [94] that provide foundations for international AI collaboration. So far, however, only India and China have formally engaged the UAE for bilateral cooperation on AI [95,96]. The UAE therefore needs to expand and deepen its international engagements in AI and China is particularly important given the country's ambitious scheme to become a world leader in AI technology by 2030 [97] and its strong interest in engaging with the UAE [99].

5. Conclusions and policy recommendations

The transition to a global energy system based predominantly on clean and renewable energy would have significant social, political and economic implications. Multilateral diplomacy will play a key role in determining the ultimate scale and extent of this transition and its impact on groups of countries and organizations that share common interests. Bilateral energy diplomacy, on the other hand, can support the long-term energy security and economic well-being of individual nations through the fostering of foreign relationships concerning energy supply and demand. Similar to other GCC countries, the key energy diplomacy concern for the UAE that arises from a low-carbon energy transition is development of business opportunities for monetizing the country's hydrocarbon resources and ensuring economic diversification that lessens dependence on oil export revenues. Based on these considerations and the analysis provided in this paper, bilateral energy diplomacy is a priority and the following foreign policy recommendations are made with reference to the insights derived from this UAE case study:

- **Develop special bilateral relationships with countries that can provide strategic benefit during a low-carbon energy transition.** The UAE has already established special strategic bilateral relationships with a number of countries that are important partners for energy and economic reasons. Additional special relationships may be formed with countries that have strong capabilities in key growth areas such as petrochemicals.
- **Engage key national stakeholders beyond the ministry of foreign affairs for the fostering of special bilateral relationships.** Special bilateral relationships require regular consultations between partner countries and the UAE's political leadership. These consultations will of course include the UAE Ministry of Foreign Affairs and International Cooperation but should extend to other UAE ministries dealing with energy, industry, environment and technology. Organizations such as ADNOC and Mubadala also play an important diplomatic role in bilateral energy diplomacy.
- **Develop and leverage soft power in bilateral energy relationships.** The UAE has effectively exercised soft power via multiple bilateral investment relationships established by Mubadala as well as other UAE government organizations. The establishment of UAE-China week is a further effort toward soft power that can be replicated in other key bilateral relations.
- **Pursue bilateral collaborations to advance national science and technology capabilities.** Digitalization, and particularly AI, is one of the most critical areas of advanced technology development across all industries. The UAE's strong bilateral ties with countries at the forefront of AI, particularly China, make AI collaboration an important opportunity that will have direct benefit for the country's energy sector.
- **Engage in multilateral diplomacy to compliment bilateral efforts.** Multilateral diplomacy will continue to be important for the UAE to secure a voice in global energy governance. This means that the UAE's current strong engagements with IRENA, OPEC and other multilateral organizations that shaping the global energy dialogue are essential.

While these recommendations are derived from analysis of the UAE context, they are intended to be broadly applicable to the bilateral energy diplomacy of hydrocarbon-exporting countries.

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References

- [1] B. Fattouh, R. Poudineh, R. West, *The Rise of Renewables and Energy Transition: what Adaptation Strategy for Oil Companies and Oil-Exporting Countries?* Oxford Institute for Energy Studies, 2018.
- [2] REN21, *Global Status Report, REN21 Secretariat, Paris, 2018*, p. 2018.
- [3] Equinor, *Energy Perspectives*, (2018), p. 2018.
- [4] B.K. Sovacool, How long will it take? Conceptualizing the temporal dynamics of energy transitions, *Energy Res. Soc. Sci.* 13 (2016) 202–215.
- [5] J. Wiseman, The great energy transition of the 21st century: the 2050 Zero-Carbon World Oration, *Energy Res. Soc. Sci.* 35 (2018) 227–232.
- [6] World Economic Forum, *Electric Vehicles for Smarter Cities: the Future of Energy and Mobility*, (2018) Switzerland.
- [7] World Economic Forum, *The Future of Electricity: New Technologies Transforming the Grid Edge*, (2017) Switzerland.
- [8] IEA, *Digitalization & Energy*, OECD/IEA, International Energy Agency, Paris, 2017.
- [9] D. Scholten, R. Bosman, The geopolitics of renewables; exploring the political implications of renewable energy systems, *Technol. Forecast. Soc. Chang.* 103 (2016) 273–283.
- [10] N. Semkin, S. Lyyra, O. Sipilä, *Global Energy Sector Transitions Will Have an Impact on Geopolitics*, Pöyry Management Consulting Oy, 2017.
- [11] *The Economist*, *Clean Power Is Shaking up the Global Geopolitics of Energy*, (2018).
- [12] M. O'Sullivan, I. Overland, D. Sandalow, *The Geopolitics of Renewable Energy*, Columbia University Center on Global Energy Policy, Belfer Center for Science and International Affairs, 2017.
- [13] IMF, *Economic diversification in oil-exporting Arab countries*, Annual Meeting of Arab Ministers of Finance, International Monetary Fund (IMF), 2016.
- [14] G. Bill, *Case Study Research Methods*, Continuum, London and New York, 2000.
- [15] R.K. Yin, *Applied Social Research Methods Series Case Study Research: Design and Methods*, (1984).
- [16] Z. Zainal, Case study as a research method, *J. Kemanusiaan* 5 (2007).
- [17] R. Woodward, *The UAE – Soft Superpower in the Making?* TRENDS Research & Advisory, 2018.
- [18] The United Arab Emirates Ministry of Foreign Affairs and International Cooperation, *UAE Foreign Policy*, (2018).
- [19] The United Arab Emirates Government, *The UAE Soft Power Strategy*, The United Arab Emirates Government, 2018.
- [20] C. Roberts, F.W. Geels, M. Lockwood, P. Newell, H. Schmitz, B. Turnheim, A. Jordan, *The politics of accelerating low-carbon transitions: towards a new research agenda*, *Energy Res. Soc. Sci.* 44 (2018) 304–311.
- [21] Frankfurt School - UNEP Collaborating Centre, BNEF, *Global Trends in Renewable Energy Investment 2018*, Frankfurt School of Finance & Management, Frankfurt, 2016.
- [22] IEA, *Global, EV Outlook 2018*, OECD/IEA (International Energy Agency), Paris, 2018.
- [23] BNEF, *New Energy Outlook 2018*, Bloomberg New Energy Finance (BNEF), 2018.
- [24] Y. Dagnet, D. Waskow, C. Elliott, E. Northrop, J. Thwaites, K. Mogelgaard, M. Krnjaic, K. Levin, H. Mcgray, *Staying on Track from Paris: Advancing the Key Elements of the Paris Agreement*, World Resources Institute, 2016.
- [25] IRENA, *Global Energy Transformation, A Roadmap to 2050*, International Renewable Energy Agency (IRENA), Abu Dhabi, 2018.
- [26] BNEF, *Long-Term Electric Vehicle Outlook 2018*, Bloomberg New Energy Finance (BNEF), 2018.
- [27] BP, *BP Energy Outlook, BP, 2018*, p. 2018.
- [28] IEA, *The Future of Petrochemicals*, OECD/IEA (International Energy Agency), 2018.
- [29] F.W. Geels, B.K. Sovacool, T. Schwanen, S. Sorrell, *The socio-technical dynamics of low-carbon transitions*, *Joule* 1 (2017) 463–479.
- [30] IEF, *Energy Outlooks*, International Energy Forum (IEF), 2018.
- [31] IEEJ, *IEEJ Outlook, Prospects and Challenges until 2050*, The Institute of Energy Economics Japan (IEEJ), Tokyo, Japan, 2018, p. 2017.
- [32] K.H. Yu, *From Energy Diplomacy to Global Governance? A Case Study on China's Energy Security in the 21st Century*, European and International Studies, King's College London, United Kingdom, 2015, p. 270.
- [33] H. Zhao, *Energy Diplomacy: from "Bilateral Diplomacy" to "Global Energy Governance"*, the Economics and Politics of China's Energy Security Transition, Academic Press, 2019, pp. 121–149.
- [34] A. Amin, *The Age of Renewable Energy Diplomacy*, EDA Reflection, Emirates Diplomacy Academy (EDA), 2017.
- [35] T. Van de Graaf, J. Colgan, *Global energy governance: a review and research agenda*, *Palgrave Commun.* 2 (2016).
- [36] A. Florini, B.K. Sovacool, *Who governs energy? The challenges facing global energy governance*, *Energy Policy* 37 (2009) 5239–5248.
- [37] M. Luomi, *Global Governance of the Energy-Climate Nexus: towards National Engagement Strategies*, EDA Working Paper, Emirates Diplomacy Academy (EDA), 2016.
- [38] *Vienna Convention on Diplomatic Relations*, Vienna, (1961), p. 95.
- [39] K.S. Rana, *Bilateral Diplomacy*, *DiploHandbooks*, 2002.
- [40] J.S. Nye, *Soft Power*, Foreign Policy, Slate Group, LLC, 1990, pp. 153–171.
- [41] J. Nye, *The Benefits of Soft Power*, Harvard Business School Working Knowledge, 2004.
- [42] J.S. Nye, *Get smart: combining hard and soft power*, *Foreign Aff.* 88 (2009) 160–163.
- [43] C. Pascual, *The New Geopolitics of Energy*, Columbia Center on Global Energy Policy, 2015.
- [44] B.H. Arif, *The role of soft power in China's foreign policy in the 21th century*, *Int. J.*

- Soc. Sci. Edu. Stud. 3 (2017) 94–101.
- [45] E. Albert, China's Big Bet on Soft Power, Foreign Affairs, Council on Foreign Relations, 2018.
- [46] O. Gippner, D. Torney, Shifting policy priorities in EU-China energy relations: implications for Chinese energy investments in Europe, *Energy Policy* 101 (2017) 649–658.
- [47] B.K. Sovacool, I. Mukherjee, Conceptualizing and measuring energy security: a synthesized approach, *Energy* 36 (2011) 5343–5355.
- [48] S. Griffiths, A review and assessment of energy policy in the Middle East and North Africa region, *Energy Policy* 102 (2017) 249–269.
- [49] S. Griffiths, Renewable energy policy trends and recommendations for GCC countries, *Energy Transit.* 1 (2017).
- [50] KAPSARC, Electricity Market Integration in the GCC and MENA: Imperatives and Challenges, The King Abdullah Petroleum Studies and Research Center (KAPSARC), Riyadh, Saudi Arabia, 2018.
- [51] D. Munro, Enhancing Gas Security: an Economic Imperative for the Gulf Arab States, Arab Gulf States Institute in Washington, 2018.
- [52] APICORP, MENA nuclear plans stalled as challenges begin to surface, *APICORP Energy Res.* 3 (2018).
- [53] IRENA, Renewable Energy Market Analysis: GCC 2019, International Renewable Energy Agency (IRENA), Abu Dhabi, 2019.
- [54] APICORP, Renewables in the Arab world: maintaining momentum, *APICORP Energy Res.* 3 (2018).
- [55] MEES, Division in the Gulf: is there any way back for GCC unity in 2018? *Middle East Econ. Surv. (MEES)* 60 (2018) 13.
- [56] D. Dudley, Is Time Running Out for the Gulf Cooperation Council? *Forbes*, 2018.
- [57] M. Freeman, How Russia, China Use Nuclear Reactors to Win Global Influence, *Defense One*, 2018.
- [58] MEES, Saudi pushes on with nuclear plans despite US concern, *Middle East Econ. Surv. (MEES)* 61 (2018) 8.
- [59] T. Boersma, S. Griffiths, Reforming Energy Subsidies: Initial Lessons from the United Arab Emirates, The Brookings Institution and The Masdar Institute of Science and Technology, 2016.
- [60] C.S. Rowland, J.W. Mjelde, Politics and petroleum: unintended implications of global oil demand reduction policies, *Energy Res. Soc. Sci.* 11 (2016) 209–224.
- [61] EDA, Global Trends in Oil and Energy: Implications for the GCC and Foreign Policy Responses, EDA Insight, Emirates Diplomacy Academy (EDA), 2017.
- [62] N. Janardhan, Gulf's Pivot to Asia: Contextualizing 'Look East' Policy, EDA Working Paper, Emirates Diplomacy Academy (EDA), 2018.
- [63] M. Javid, F. Sharif, K. Alkhatlan, Oil price volatility and interdependency of GCC economies and North East Asian economies, *Energy Strategy Rev.* 21 (2018) 172–179.
- [64] J. Liangxiang, N. Janardhan, Belt and Road Initiative: Opportunities and Obstacles for the Gulf, EDA Insight, Emirates Diplomacy Academy (EDA), 2018.
- [65] S. Tiezzi, Revealed: China's Blueprint for Building Middle East Relations, *The Diplomat*, 2016.
- [66] J. Arbib, T. Seba, Rethinking Transportation 2020-2030, *RethinkX*, 2017.
- [67] F. Duan, Q. Ji, B.-Y. Liu, Y. Fan, Energy investment risk assessment for nations along China's Belt & Road Initiative, *J. Clean. Prod.* 170 (2018) 535–547.
- [68] MEES, Adnoc seeks investment injection with six-block licensing round, *Middle East Econ. Surv. (MEES)* 61 (2018) 4.
- [69] MEES, Dhahi fills up two largest post-adma concessions as total, CNPC dive in offshore, *Middle East Econ. Surv. (MEES)* 61 (2018) 5.
- [70] MEES, CNPC hot favorite in Abu Dhabi opening as adnoc eyes Chinese downstream, *Middle East Econ. Surv. (MEES)* 61 (2018) 2.
- [71] Business Voice, Seismic Shift, Abu Dhabi Chamber, Abu Dhabi, 2018, pp. 13–15.
- [72] P.C. Beccue, H.G. Huntington, P.N. Leiby, K.R. Vincent, An updated assessment of oil market disruption risks, *Energy Policy* 115 (2018) 456–469.
- [73] S. Bridge, UAE President Appoints First Special Envoy to China as Ties Strengthen, *Arabian Business*, 2018.
- [74] MEES, Dhahi concludes debut bid round with Indian award, *Middle East Econ. Surv. (MEES)* 62 (2019) 2–3.
- [75] B.A. Kader, UAE and Japan Sign Partnership Initiative, *Gulf News*, 2018.
- [76] IEA, Oil 2018: Analysis and Forecasts to 2023, Market Report Series, OECD/IEA (International Energy Agency), 2018.
- [77] MEES, Dhahi banks on booming petchems demand, *Middle East Econ. Surv. (MEES)* 61 (2018) 8.
- [78] MEES, UAE's adnoc plans \$45bn five-year downstream expansion, *Middle East Econ. Surv. (MEES)* 61 (2018) 10–11.
- [79] MEES, Adnoc joins aramco in \$44bn Indian refining and petchems venture, *Middle East Econ. Surv. (MEES)* 61 (2018) 8–9.
- [80] Business Voice, Ties that Bind, Abu Dhabi Chamber, Abu Dhabi, 2018, pp. 17–19.
- [81] MEES, Post-merger Mubadala: lots of cash, but does the strategy work? *Middle East Econ. Surv. (MEES)* 61 (2018) 5.
- [82] T. Khan, GCC and Britain Announce New 'strategic Partnership', *The National*, 2016.
- [83] H. Bashir, UAE, France Renew Commitment to Strengthening Bilateral Cooperation, WAM - The Emirates News Agency, 2017.
- [84] The United Arab Emirates Ministry of Foreign Affairs and International Cooperation, H.H. Sheikh Abdullah Bin Zayed Heads Delegation in Second Strategic Dialogue between UAE and Italy, (2017).
- [85] MEES, Eni completes Middle East tour de force, *Middle East Econ. Surv. (MEES)* 62 (2019) 4–5.
- [86] MEES, Adnoc Brings Eni, OMV into refining arm ahead of expansion, *Middle East Econ. Surv. (MEES)* 62 (2019) 4.
- [87] The National, Sheikh Mohammed Bin Zayed Meets Putin, Signs 'strategic Partnership', *The National*, 2018.
- [88] T. Karasik, G. Cafiero, Russia and the UAE: Friends with Benefits New Atlanticist, *Atlantic Council*, 2017.
- [89] M. Skalamera, Sino-Russian energy relations reversed: a new little brother, *Energy Strategy Rev.* 13–14 (2016) 97–108.
- [90] MEES, Falih eyes closer Russian ties, Opec+ as Well as Aramco Downstream, vol. 61, *Middle East Economic Survey (MEES)*, 2018, pp. 10–11.
- [91] Business Voice, Strategy of Resolve, Abu Dhabi Chamber, Abu Dhabi, 2018, pp. 41–43.
- [92] S. Jain, US\$320 Billion by 2030?: The Potential Impact of AI in the Middle East, PwC, (2018).
- [93] A. Elsaadani, M. Purdy, E. Hakutangwi, Pivoting with AI: How Artificial Intelligence Can Drive Diversification in the Middle East, *Accenture*, 2018.
- [94] T. Dutton, An overview of national AI strategies, *Medium* (2018).
- [95] Business Voice, Intelligent Thinking, Abu Dhabi Chamber, Abu Dhabi, 2018, pp. 6–11.
- [96] *Gulf News*, 16 MoUs signed at UAE-China Economic Forum in Beijing, (2019).
- [97] O. Churchill, China's AI dreams, *Nature* 553 (2018) S10–S12.
- [98] resourcetrade.earth, Chatham House, 2018.
- [99] A. Molavi, China's Global Investments Are Declining Everywhere except for One Region, *Foreign Policy, Slate Group, LLC*, 2019.