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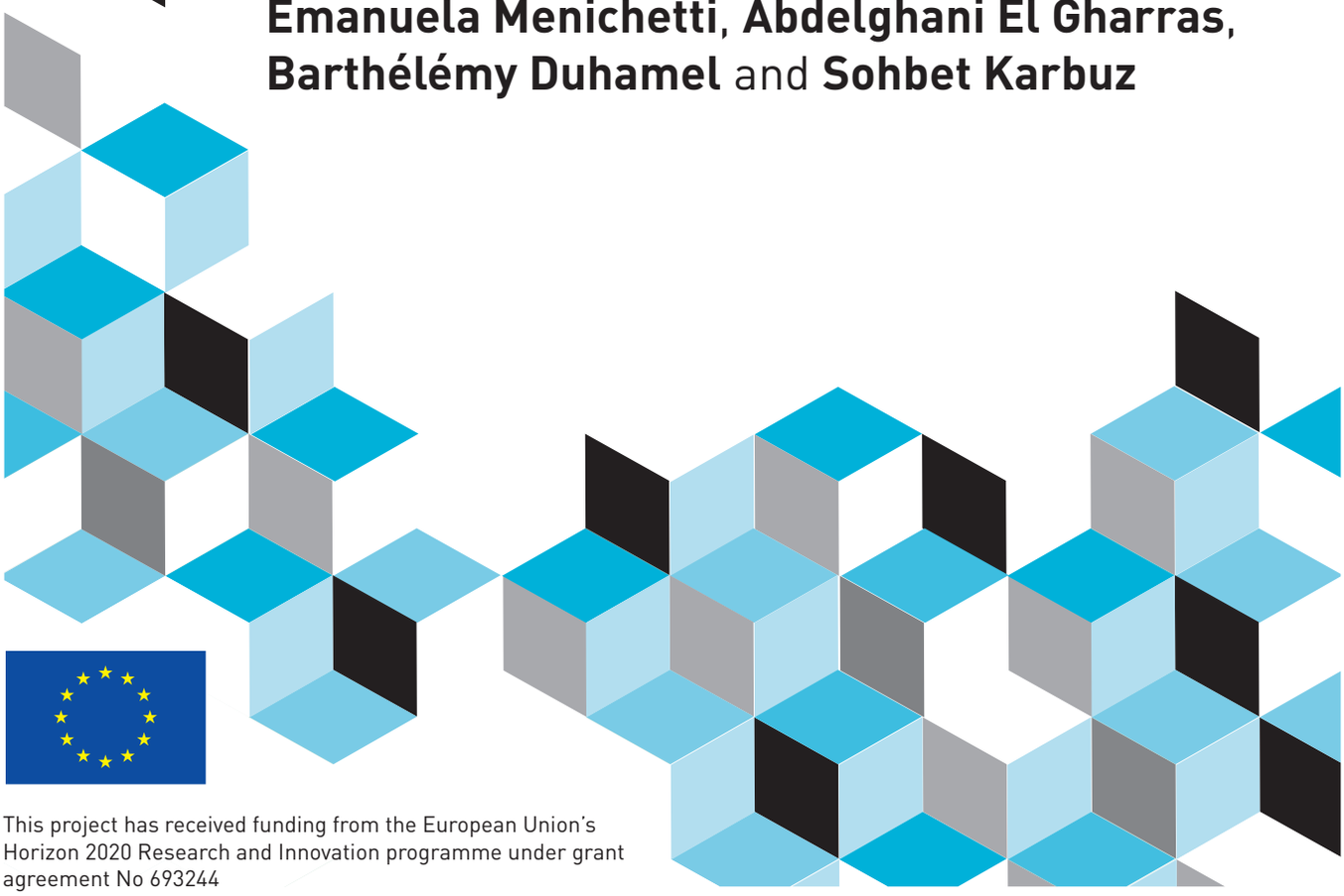
THE MENA REGION IN THE GLOBAL ENERGY MARKETS

Emanuela Menichetti, **Abdelghani El Gharras**, **Barthélémy Duhamel** and **Sohbet Karbuz**



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ABSTRACT

This paper explores how the current dynamics in the energy market sector affect, and are affected by, the interactions between the Middle East and North Africa (MENA) region and the global order. In particular, it aims to answer the overarching question: "Is MENA peripheral to or embedded in global dynamics in relation to energy?" To do so, the paper builds on the methodology and concept paper issued by the MENARA consortium in November 2017 (Csicsmann et al. 2017) and particularly seeks to address the research questions identified in the paper. After presenting an overview of the main global and regional energy trends, the paper analyses the current relationships between the key global energy players and the MENA countries at policy, industry and market levels. It discusses the role of critical actors that have an influence on the MENA energy landscape, and identifies the main hotspots for discussion.

INTRODUCTION

The global energy landscape is experiencing deep transformation. Overall, the global energy demand continues to increase, albeit at varying rates at the regional level. Demand in the countries of the European Union, the United States and other industrialized countries is either stabilizing or decreasing, whereas demand in other countries, namely China, India and other countries in Asia, is showing a sharp increase. Overall, the demand for energy is also increasing in the countries of the Middle East and North Africa (MENA). However, significant differences can be observed between energy importing and energy exporting countries. Thanks to their geographical location, the abundance of fossil fuel reserves in several MENA countries, the existing infrastructure and historical policy ties, MENA countries are embedded in the global energy order and have contributed to some extent to shaping it. However, recent socio-economic and political developments, coupled with major technology innovations in energy markets that have shifted attention away from the fossil energy reserves in the MENA region, are challenging the role traditionally played by MENA countries. The current paper aims to determine whether the MENA region is peripheral to or embedded in current global energy dynamics. To do so, it looks at current trends at the global level before focusing on the regional situation. The role of key energy actors and the implications for the MENA countries are also discussed.

To address the main issues and isolate key hotspots, the following research questions are explored: (1) How will global energy trends impact the region – and vice versa? (2) What role will the region play in the future, especially in oil and natural gas markets? How will it be affected

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by the increasing share of shale oil and gas among the energy market commodities, as well as the evolution of the liquefied natural gas (LNG) trade? How will growth in the electric car market impact oil demand? (3) What is likely to be the impact of shrinking export levels and decreasing oil prices on state revenues and policies in the future? (4) How can renewable energy sources help MENA countries retain their leadership position in global energy markets?

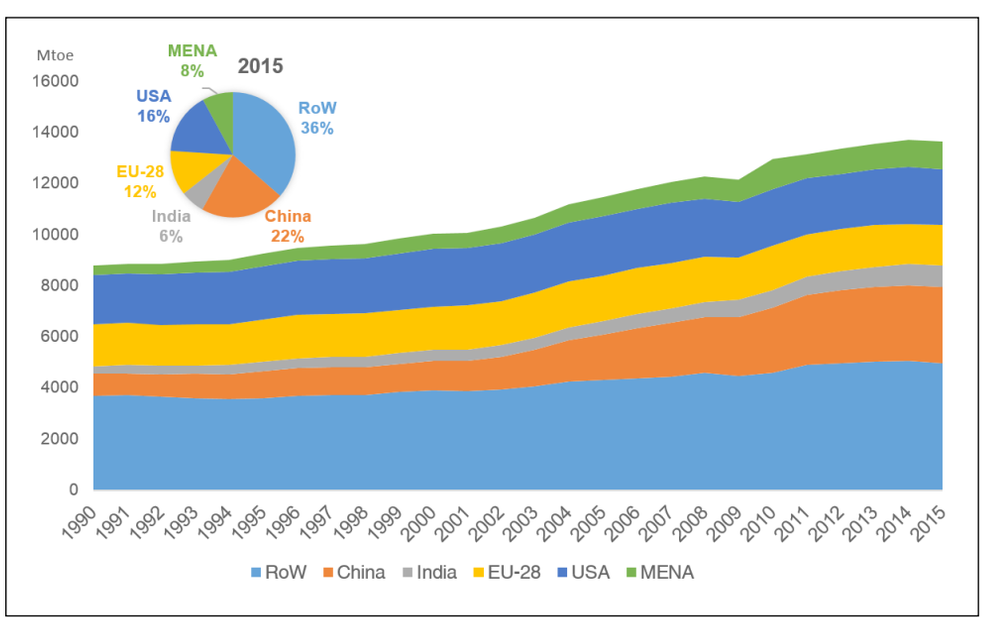
1. GLOBAL ENERGY TRENDS AND DYNAMICS

1.1 GROWING ENERGY DEMAND DRIVEN MAINLY BY CHINA AND INDIA

World energy demand totalled 14 gigatons of oil equivalent (Gtoe) in 2015, with an average annual increase of 1.8 per cent per year since 1990. Two main energy markets are behind the increasing demand, mainly China and India. The USA and the EU, on the other hand, are instead experiencing a downward trend (Figures 1 and 2).

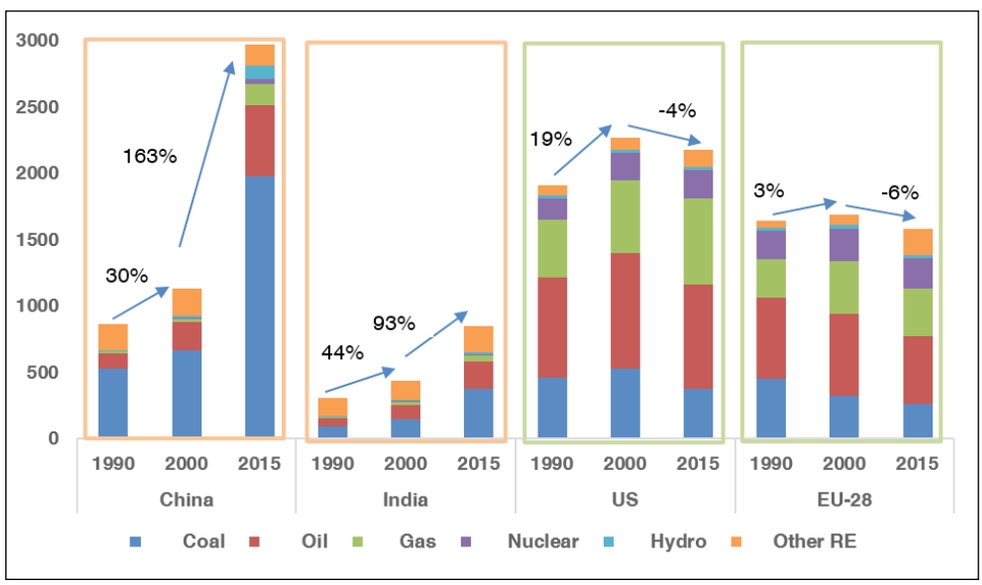
Together, the USA, the EU, India and China accounted for 56 per cent of total primary energy demand in 2015. Thus, any changes in the energy systems of these major markets, China in particular, will have wider implications for the energy system worldwide.

Figure 1 | Total primary energy demand, by region/country



Source: OME and IEA.

Figure 2 | Energy demand change in major markets



Source: OME and IEA.

Some of the main trends witnessed in different regions of the world that are relevant for the MENA countries can be summarized as follows:

- The role of the USA in global energy markets has gradually increased, especially in the light of recent discoveries of shale gas, making it a major contributor to world energy supply. The country hosts 2.8 per cent of the world's proved oil reserves and 4.7 per cent of natural gas reserves. In particular, US tight oil output witnessed a rise of 8 million barrels per day (mb/d) from 2010 to 2015, whereas gas production reached 749.2 billion cubic metres (bcm) in 2016 (BP 2017). Shale gas will account for the largest rise in gas production, an increase of 630 bcm between 2008 and 2023, which has fuelled investments in petrochemicals and other energy-intensive industries in the country (IEA 2017b). These dynamics are more likely to challenge incumbent suppliers, as the USA will become the world's largest LNG exporter by mid-2020 and a net exporter of oil, especially light crude and (a few years later) refined products, yet it will remain an important importer of heavy crude oil for its refineries.

- EU countries are progressing towards a more sustainable energy mix. Energy demand decreased by 4 per cent in 2015 compared with 1990 levels, and the share of fossil fuels in the energy mix is declining due to the expansion of low-carbon technologies.

- In India, energy demand increased by 178 per cent in 2015 compared with 1990 levels, accounting for 6 per cent of world primary energy demand. In the future, most of the global demand growth will come from India, which will have to be met through imports. More energy will be needed to meet its growing energy needs as its economy expands and its population increases. Currently (as of 2016) there are 239 million people in India who lack access to electricity.

- China is by far the greatest energy consumer in the world. It has witnessed the largest energy demand increase of any country (241 per cent compared with 1990 levels), alone accounting for

22 per cent (2,973 million tonnes of oil equivalent, Mtoe) of world primary energy demand in 2015. China is gradually moving away from a heavily fossil fuels-based energy system (with fossil fuels currently accounting for 91 per cent of its energy supply). The year 2013 marked a major shift in China's energy system orientation as, for the first time, the largest share of new electric capacity additions came from wind, solar photovoltaics (PV) and hydropower. In terms of oil and natural gas demand, China's economy will absorb a quarter of the projected rise in global gas demand (with imports of 280 bcm in 2040), while the EU will come second (IEA 2017b). China will become the largest oil consumer (overtaking the USA by around 2030) in 2040 according to the IEA New policies Scenario, with imports reaching 13 mb/d.

Table 1 | Major energy markets and their share in global energy demand

	1990		2015	
	Energy demand (Mtoe)	**Share (%)**	**Energy demand (Mtoe)**	**Share (%)**
EU-28	1,646	19	1,586	12
USA	1,915	22	2,188	16
India	305	3	851	6
China	870	10	2,973	22
MENA	370	4	1,084	8
Rest of the World	3,669	42	4,965	36
Total	8,775	100	13,647	100

Source: OME analysis based on IEA statistics.

1.2 INCREASING ROLE FOR UNCONVENTIONAL FOSSIL FUEL SOURCES AND LNG

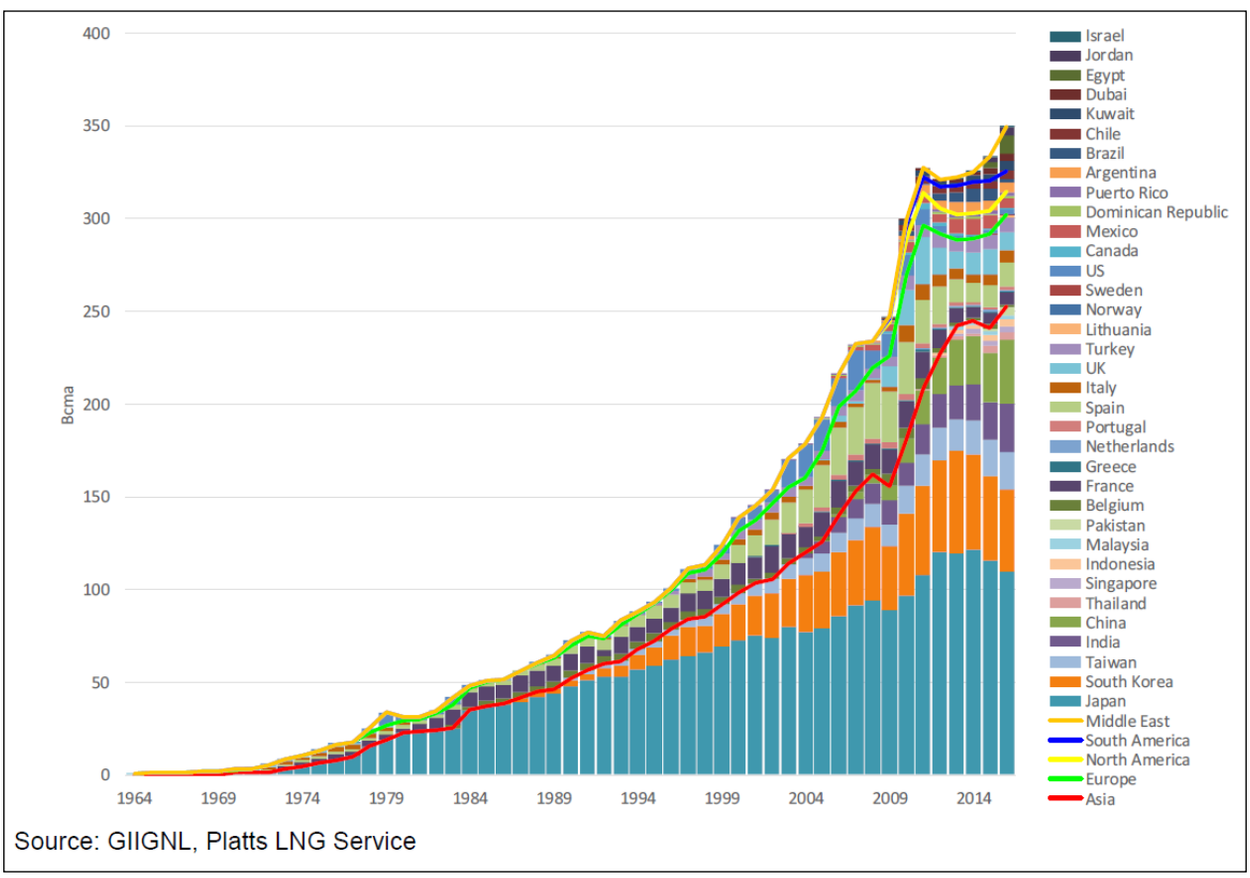
Unconventional fossil fuel sources are increasingly playing an important role in several areas of the world. US shale gas production, for example, accounted for 5 per cent of total US gas production in 2004, 10 per cent in 2007 and 60 per cent in 2016. This development has turned the USA from a gas importer in 2007 to a gas exporter in 2016. The US shale revolution, combined with the rapid expansion of LNG capacity worldwide, has already started to reshape the regional and global natural gas market. These developments have put pressure on the price of natural gas in all major gas markets. The shale gas revolution is not only a challenge to the MENA region in gas export markets, but will also be a threat to the expansion of the chemical and petrochemical industry in the region, which is export oriented.

The rise of shale gas production in the USA has shifted the market outlook from scarcity to abundance and driven the USA into the LNG export business. The USA is now projected to become one of the top three LNG exporters in the world in the next few years, according to industry experts.

LNG is arguably the fastest-growing segment in the global energy business. By 2040, more than half of the world's gas trade will be via LNG rather than pipeline, according to the International Energy Agency (IEA). The volume and diversity of LNG trade flows have increased rapidly with the appearance of new exporting and importing countries. The number of LNG importing countries (Figure 3) has grown from one in 1964 to fifteen in 2005 and thirty-nine in 2017. During this period,

more and more countries in the region have become LNG importers. Other countries, such as Morocco, may also join this group in the future.

Figure 3 | LNG importing countries, 1964–2014



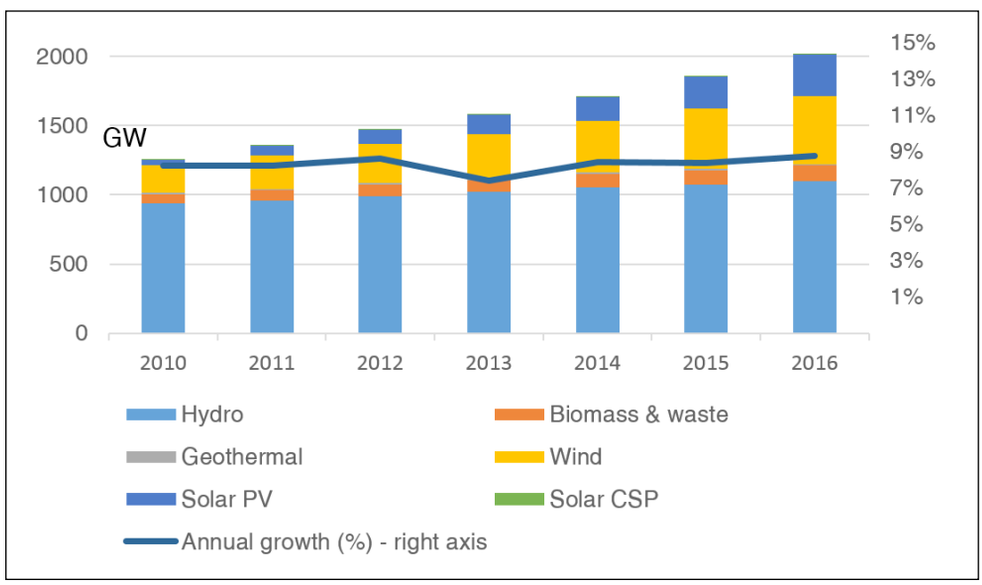
Source: Rogers (2017: 4).

The number of LNG exporting countries has also risen dramatically, from one in 1964 to more than twenty in 2017. Booming gas production and high gas prices have motivated many countries to expand their LNG export capacities or to become gas exporters by building LNG plants. In the MENA region, Qatar (the largest LNG exporter in the world), Algeria, Oman, the United Arab Emirates (UAE) and Egypt are currently among the main LNG exporting countries. An emerging problem, however, is that the LNG export rush has created excess supply, which may be extended as far as 2025.

1.3 RENEWABLES ARE LEADING THE DECARBONIZATION EFFORTS OF THE POWER SECTOR

Even though the share of renewables has remained constant in total primary energy demand, the impressive deployment growth dynamics of renewables can be clearly observed in the power sector. At the global level, renewable electric installed capacity increased by more than 8 per cent annually between 2010 and 2016, from 1,251 gigawatts (GW) in 2010 to 2,017 GW in 2016 (Figure 4).

Figure 4 | Global renewable electric installed capacity, 2010–2016



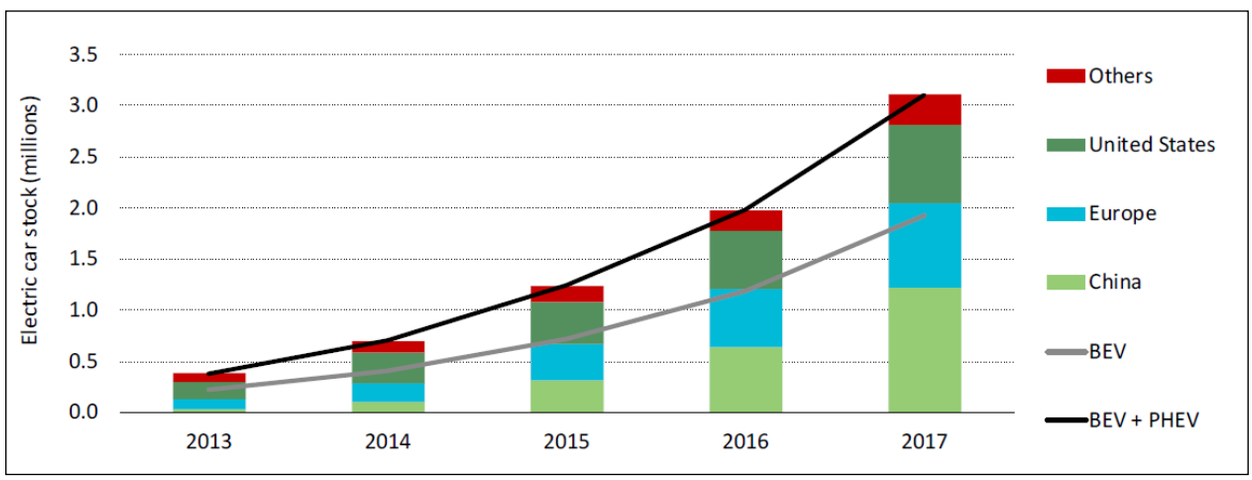
Source: OME analysis based on REN21 (2017) data.

By technology, wind and solar PV have been the main drivers for such growth. Together, wind and solar PV doubled their share in total renewable installed capacity from 19 per cent in 2010 to 40 per cent in 2016. The incremental installed capacity of wind and solar PV installed in 2016 matched, for the first time, that of coal and gas. Developing economies have taken the lead over developed countries in terms of investments in renewable energy technologies. In particular, China, India and Brazil accounted for over half of global investments in renewables (excluding large hydro) in 2017, with China alone accounting for 45 per cent (Frankfurt School-UNEP Centre/BNEF 2018: 20).

1.4 IMPRESSIVE GROWTH IN ELECTRIC VEHICLES

The electric vehicles market has expanded rapidly over the last two years. Total sales of new electric cars surpassed 1 million in 2017, with the total global electric car stock reaching more than 3 million that year. The electric vehicle market is well advanced in Nordic European countries, mainly Norway, Iceland and Sweden, with electric cars accounting for 39 per cent, 11.7 per cent and 6.3 per cent of total new car sales respectively in 2017. In terms of market share, China alone accounted for 40 per cent of the global total electric car stock in 2017, having already surpassed the USA in 2016 (Figure 5). Meanwhile, the stock of electric buses reached 370,000 units, and electric two-wheelers reached 250 million, with China alone accounting for more than 99 per cent of both electric bus and two-wheeler stocks (IEA 2018a).

Figure 5 | Evolution of the global electric car stock, 2010–2017



Notes: Electric cars (or passenger light-duty vehicles, PLDVs) include battery-electric (BEV), plug-in hybrid electric (PHEV) and fuel cell electric vehicles (FCEVs). Only BEV and PHEV are included in these figures.
Source: IEA (2018a: 9).

2. REGIONAL ENERGY TRENDS

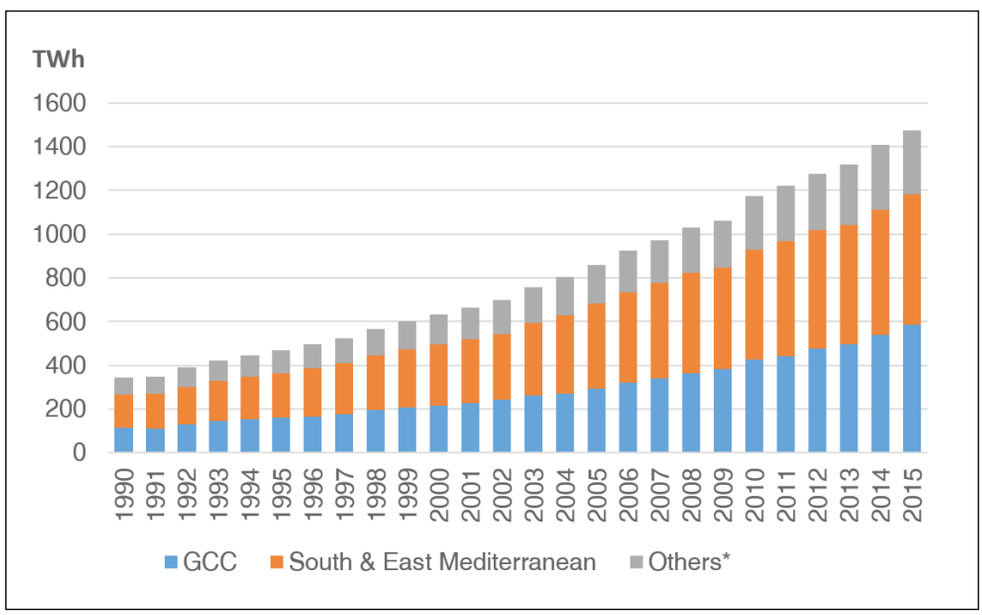
2.1 HIGHER ENERGY DEMAND GROWTH RATE THAN THE GLOBAL AVERAGE

Compared with global energy demand growth, the MENA region as a whole has doubled its share in world primary energy demand, from 4 per cent (370 Mtoe) in 1990 to 8 per cent (1,084 Mtoe) in 2015. By sub-region, most of the growth has been observed in the Gulf Cooperation Council (GCC) countries as well as in Iran. For instance, Qatar and Oman witnessed the fastest growth in energy demand, with annual average rates of 8.1 per cent and 7.4 per cent respectively during the 1990–2015 period. In 2015, two countries, Saudi Arabia and Iran, accounted for 42 per cent of total primary energy demand (TPED) in the region, followed by Turkey (12 per cent), Egypt (7 per cent) and Algeria (6 per cent), with the rest accounting for the remaining 23 per cent.

The rapid increase in energy demand, for electricity in particular, is arguably the most notable trend in the region. Whereas global electricity demand has been increasing by around 2.9 per cent on average annually, the increase was much larger in the MENA countries, at 6 per cent annually during the 1990–2015 period (Figure 6). In 2015, Saudi Arabia accounted for the largest share of electricity consumption, with 21.1 per cent (313 terawatt-hour, TWh) of total electricity consumption in the MENA region, followed by Iran with 16 per cent (236 TWh), Turkey with 14.6 per cent (215 TWh), Egypt with 11 per cent (160 TWh) and the UAE with 8.5 per cent (118 TWh).

Significant compound annual growth rates (CAGR) in electricity demand were seen in Oman, Qatar and UAE, with 8.4 per cent, 9 per cent and 8.5 per cent respectively during the 1990–2015 period. Most of the other countries had rates above 5 per cent.

Figure 6 | Electricity consumption in the MENA region, 1990–2015



Note: * Iran, Iraq, Yemen and Sudan.
Source: OME and IEA.

On a per capita basis, electricity consumption rates vary significantly across the region. Some countries in the region have the highest per capita rates in the world; for instance, Bahrain's consumption rate (20.1 megawatt-hour, MWh) is more than double the average rate for Organization for Economic Co-operation and Development (OECD) countries and six times higher than the world average.[2] Qatar, Kuwait, UAE and Saudi Arabia also have consumption rates above the average for OECD countries. The demand for electricity in the region is expected to increase due mainly to economic development and population growth, combined with increasing needs for water desalination and air conditioning.

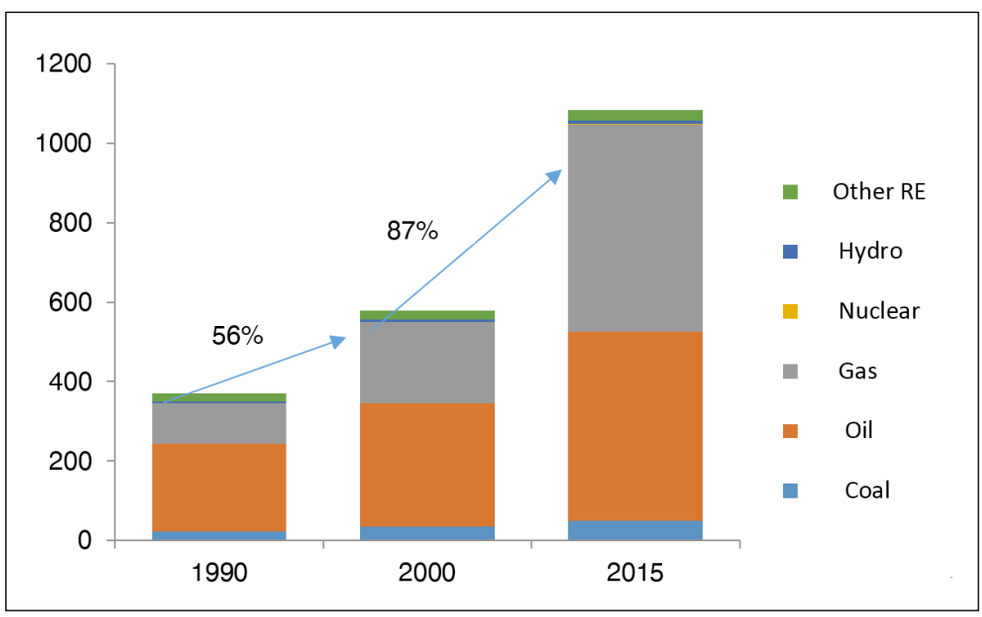
The increasing demand for energy is likely to have far-reaching implications for economies of the region. Some countries, including Saudi Arabia, Qatar, Kuwait and Iraq, export more than half of their energy production. However, these countries might see their export capacities shrink should the current energy demand trends be maintained. In GCC countries, for example, rising energy demand, driven by huge development projects in the domestic, service and infrastructure sectors (Qader 2009), as well as growth in industrial consumption, mainly in the steel, aluminium and petrochemical industries (Hart 2010), is expected to put pressure on government budgets and reduce hydrocarbon export potential, thereby resulting in a loss of foreign exchange revenues (Ebinger et al. 2016).

2 OECD members include the world's most advanced countries as well as emerging countries such as Mexico, Chile and Turkey.

2.2 AN ENERGY SYSTEM STILL HEAVILY RELIANT ON FOSSIL FUELS THOUGH GRADUALLY INTEGRATING RENEWABLES

The energy mix in the MENA countries is heavily dependent on fossil fuels – natural gas (48 per cent), followed by oil (44 per cent) and then coal (5 per cent). Renewables accounted for the remaining 3 per cent in 2015 (Figure 7).

Figure 7 | Total primary energy demand (Mtoe) by fuel in the Mediterranean, 1990–2015



Source: OME and IEA.

Oil has been the dominant energy source in the MENA region for a long time but its share in the energy mix has been shrinking, reaching 44 per cent in 2015. Natural gas has gained in importance across the region, surpassing oil as the primary source of energy and accounting for 48 per cent of total energy demand in 2015. It saw the fastest growth rates (6.8 per cent CAGR) during the 1990–2015 period, increasing from 102 Mtoe to 522 Mtoe. Natural gas accounts for the largest share of TPED in Bahrain, Qatar, Oman, UAE, Algeria, Egypt and Iran, and is particularly relevant for power generation. This upward trend is more likely to continue in the future, thanks to locally available sources and the abundant world supply of shale gas and LNG.

With the exception of Iran, nuclear energy is non-existent in the energy mix in the region, but the political decision to invest in nuclear energy remains an option for the future. The UAE and Turkey are advancing their nuclear programmes, with the Barakah and Mersin plants under development. Saudi Arabia, Egypt and Jordan also have plans to introduce nuclear power into their energy mix, while others (i.e., Algeria, Morocco and Tunisia) are in a more exploratory phase. The nuclear option has been advanced to address several challenges: meeting the rising demand for electricity, maintaining export levels to guarantee a sustained revenue stream, addressing energy security concerns and moving towards a low-carbon economy. The nuclear option seems to be perceived as offering other benefits as well, as it is seen as a contingency plan against Israel's and Iran's nuclear programmes. In particular, in 2008 the Arab League Secretary General Amr

Moussa encouraged members of the League to start civil nuclear energy programmes as a way to counterbalance Israel's weight in the sector. Regardless of motivation, the nuclear option is gaining momentum and is likely to be adopted by some countries in the region. However, given the high up-front investment costs compared with other power generating technologies, the nuclear option might not be feasible in all countries, especially those with government funding constraints such as Egypt, Jordan and Morocco, and even in oil rich states while oil prices remain below 50 US dollars per barrel, placing further pressure on public finances (Nakhle 2016). Some of the above-mentioned countries are turning to Russia and possibly China to finance their nuclear energy programmes, an issue with important geopolitical implications.

Despite their potential, the contribution of renewables to total primary energy demand is still minor, yet their role in the power sector is increasing. Renewables have been developed mostly in energy importing countries. Historically, hydropower (used for power generation) and biomass (traditional biomass, used in some countries for heating and cooking) have been the most dominant sources of renewable energy. The development of other renewable energy sources has made significant progress, however, reaching more than 27 Mtoe across the region in 2015 (up from 20 Mtoe in 1990). Despite their slow deployment, the outlook for renewables, wind and solar PV in particular, is promising and their share in electricity generation capacity is increasing.

3. IDENTIFICATION OF HOTSPOTS

Based on the analysis of some primary critical energy trends at the global and regional levels, the current and future role of MENA countries will be discussed through the lens of four research questions. The aim is to determine whether MENA countries will play a leading role in the global energy scene, thus influencing future scenarios, or conversely if they will be impacted by the evolving trends and therefore become peripheral players in the global energy game.

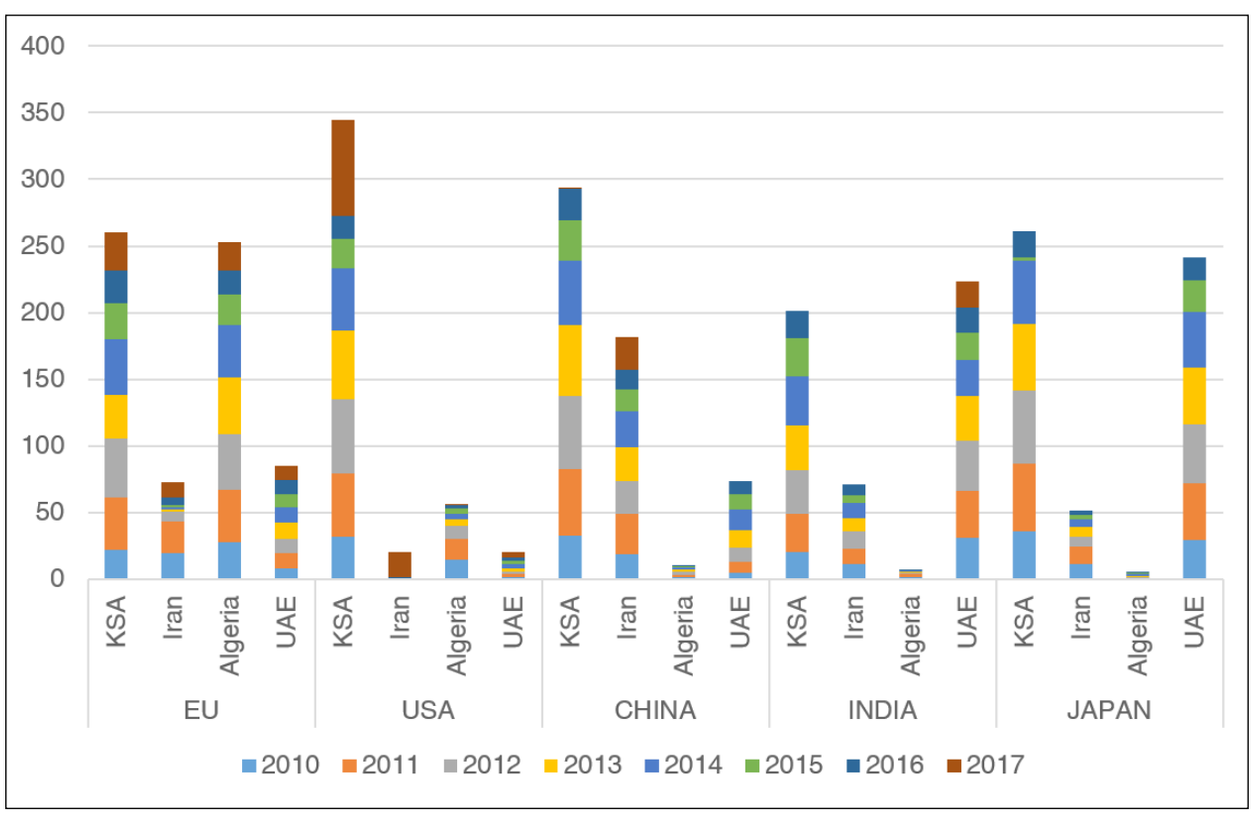
3.1 HOW WILL GLOBAL ENERGY TRENDS AFFECT THE REGION – AND VICE VERSA?

Changes in the major energy markets will have far-reaching implications for the MENA region. Energy demand (for oil in particular) is increasing, especially in China, India and other Asian countries. Some countries, such as Indonesia, produce oil, but not enough to meet their growing energy demands. They will therefore have to turn increasingly towards the MENA countries to meet their needs. Already in 2012, the import share from the MENA region to the Asia-Pacific was 65 per cent. Asia consumed 53 per cent of total Middle East production in 2014 (BP 2015). This trend is likely to continue, thus counterbalancing the shrinking level of exports to traditional commercial partners such as the USA, which is less and less dependent on energy imports from MENA. The US shale gas revolution has substantially reduced crude oil imports to the USA (IEA 2017b). However, an important factor to consider is price. Unconventional oil, in particular, in the USA is still not competitive with oil from the Middle East, and therefore the leadership of MENA countries in this market segment will not be challenged anytime soon.

These two opposing trends can be observed within individual MENA countries. By analysing the evolution of export levels from 2010 to 2016/17 in four MENA countries (Saudi Arabia, Iran, UAE and Algeria), as shown in Figure 8, two points can be inferred. Firstly, the overall level of exports

declined considerably from 2010 to 2016/17. Secondly, the role of certain traditional commercial partners, such as the USA and Japan, has shrunk, whereas the relative importance of Asian players, in particular India and China, has grown. The US share in oil export revenues in Saudi Arabia and the UAE has declined, whereas Asia's share has increased. In 2010, Saudi Arabia exported 31.41 billion US dollar-worth of oil to the USA, and 32.83 billion US dollar-worth to China. However, in 2017, Saudi exports to China and the USA declined respectively to 28 and 18.88 billion US dollars. Therefore, over the period, China's share has increased with respect to that of the USA. Similarly, in 2010, UAE exports accounted for 1.2 billion US dollars to the US and 4.45 billion US dollars to China. In 2016, a clear Asian preponderance in the export market was observed, with India reaching 19.24 billion US dollars, Japan 17.29 billion and China 9.99 billion, whereas the USA only purchased 0.9 billion US dollars.

Figure 8 | Selected MENA countries' exports to global economic powerhouses (USDbn), 2010–2017



Sources: OME based on European Commission, *Trade Statistics*; US Census Bureau, *Foreign Trade*; WITS Trade Stats; Saudi Arabia General Authority for Statistics, *Foreign Trade Statistics: Exports*; Statistical Center of Iran.

The IEA projects that the United States' oil imports from MENA will shrink by 2035 as a result of increasing domestic oil production and decreasing domestic demand (IEA 2012), whereas the Asian demand for oil will surge until at least 2040 as domestic production declines. This region will indeed become a key driver for energy demand globally as its economy triples in size and its total population expands by one-fifth. In this context, MENA oil exporting countries will be able to strengthen their already dominant position in the Asian market. However, several challenges lie ahead for MENA exporting countries. The Asian market is becoming increasingly competitive with the emergence of the USA as a new entrant, the development of substitute sources of energy and

the reinforcement of the Asia–Russia energy axis.

Another important factor is the decreasing cost of renewable energy technologies, driven by major markets such as China, which constitutes a real opportunity cost for MENA countries with far-reaching economic benefits. The wider deployment of clean energy technologies will help direct some of the oil and gas in the fossil fuel exporting countries to international markets. For the energy importing countries, exploiting locally available renewable energy sources would increase their energy security by lessening their dependence on foreign energy sources.

These observed trends will reshape the energy landscape. Whether MENA countries will become peripheral or not will depend on their market strategies and supply profile diversification. The decreasing demand from traditional importers such as the USA can be compensated for by increased imports from other world regions, in particular from Asia; however, the geopolitical implications of such shifts need to be considered. With respect to sustainable energy technologies, MENA countries risk becoming peripheral in the currently evolving context. In fact, despite its vast potential, in particular for solar and wind, the MENA region is lagging behind in terms of new capacity installed compared with other world regions. However, some positive examples can be identified. For instance, Saudi Arabia expects to start up to 7 billion US dollar-worth of renewable energy projects this year, with solar plants leading the way, for a total of 4,125 GW of capacity. Saudi Arabia and other Middle Eastern oil producers are indeed looking at renewables to feed growing domestic consumption that is soaking up crude they would rather export to generate income. Moreover, in terms of market and industrial leadership, some MENA companies such as the Saudi Acwa Power and the Emirati Masdar are positioning themselves as key renewable energy developers, investing in projects even beyond regional borders.

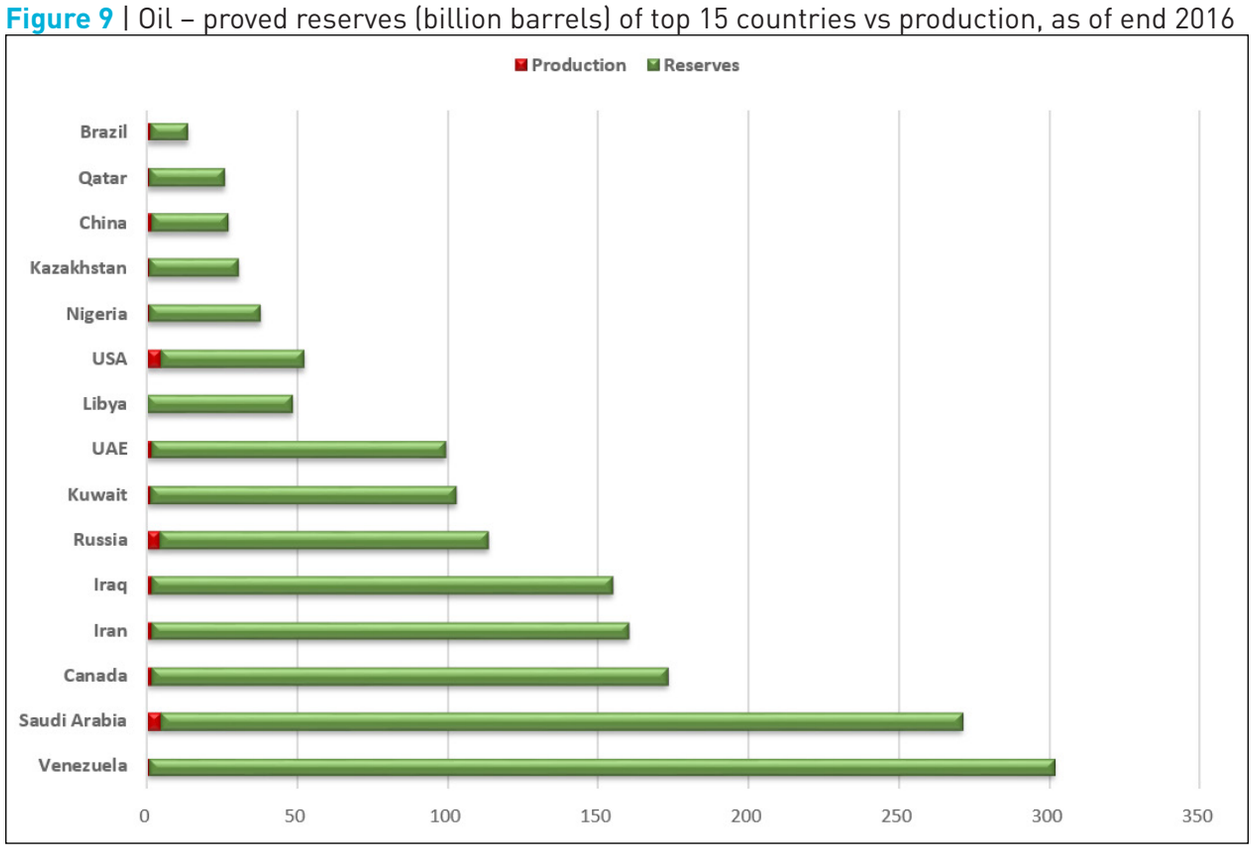
3.2 THE REGION'S ROLE IN THE OIL AND NATURAL GAS MARKETS IN LIGHT OF THE INCREASING IMPORTANCE OF UNCONVENTIONAL FOSSIL FUEL SOURCES, AND THE IMPACT OF ELECTRIC MOBILITY ON OIL DEMAND

With the exception of Algeria and Libya, all southern and eastern Mediterranean countries are currently net energy importers. In particular, the dependence rate on foreign resources in Jordan, Lebanon and Morocco is more than 90 per cent. Conversely, all GCC countries, plus Iran and Iraq, are energy exporting countries, as are the aforementioned Algeria and Libya. The region is endowed with a vast supply of fossil fuel resources, with some countries hosting the largest reserves of oil and gas at the global level, which has left many countries in the region well positioned to shape the energy landscape worldwide. Therefore, the abundance of fossil fuels puts the region in a favourable position to continue playing an important role in global energy supply.

Despite the many oil supply disruptions that occurred in several countries (Libya, Syria and Yemen) following the Arab uprisings in 2010, as well as the sanctions on Iran, crude oil production in the region has seen continuous growth to meet the growing energy demand both domestically and abroad. At the global level, three countries – Saudi Arabia (13 per cent), the USA (13 per cent) and Russia (12 per cent) – accounted for around 40 per cent of global crude oil production in 2016. The MENA region's production accounted for around 38 per cent (34.6 billion barrels of oil/day) of total world oil production in 2016. It has maintained a 36–38 per cent share over the years, albeit with an

annual increase of 1.9 per cent on average of production during the 1990–2016 period in absolute terms. Saudi Arabia has been by far the largest producer of crude oil in the world, while also accounting for 36 per cent of total production at the regional level. It also accounts for the largest share of OPEC's spare capacity (Saudi Arabia's spare capacity claimed to be around 2 mb/d), which could be brought very quickly to the market. With 13 per cent of the region's total production, despite security concerns, Iraq has continued to increase its output, reaching 4.5 mb/d. Iran has also increased its production following the lifting of sanctions, but the US retreat from the nuclear deal could potentially reduce investments in the sector and thereby output. The UAE accounted for 12 per cent of the region's production, with the remainder shared among the other countries, mainly Qatar, Algeria, Oman, Egypt and Libya. Despite the increase, Libya's output is still lower than it was prior to the social unrest.

Figure 9 | Oil – proved reserves (billion barrels) of top 15 countries vs production, as of end 2016

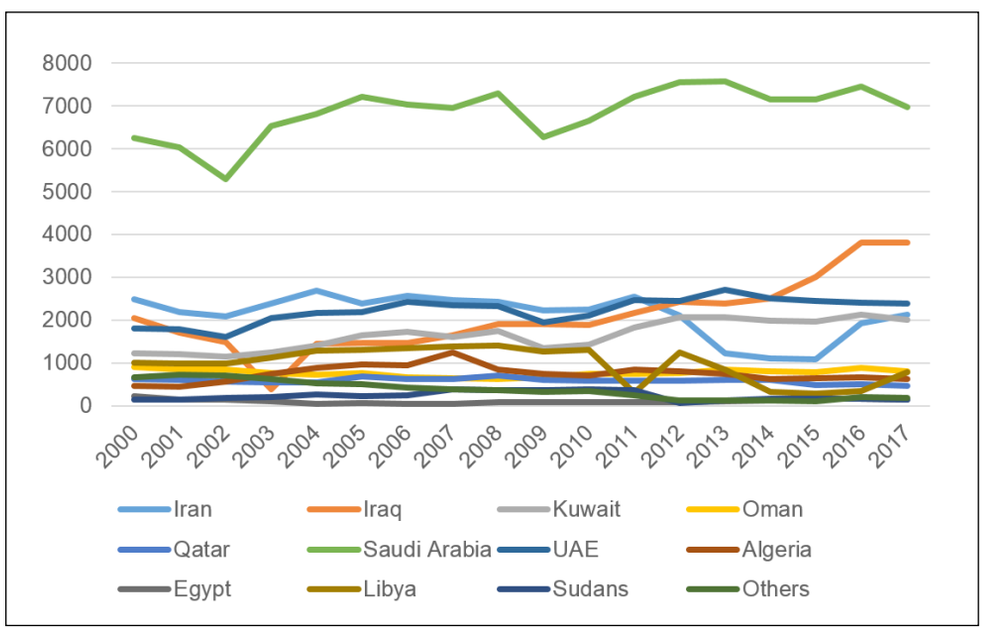


Source: OME analysis based on BP (2017).

With around 52 per cent (879 billion barrels of oil) of total proven oil reserves in the world, the region is undoubtedly at the centre of global oil supply. At the global level, Venezuela leads with 18 per cent of global oil reserves, followed by Saudi Arabia (16 per cent) and then Canada (10 per cent), while Iraq and Iran account for 9 per cent each. At the regional level, reserves are concentrated in the following countries: Saudi Arabia (30 per cent), Iran (18 per cent), Iraq (17 per cent), Kuwait (12 per cent), UAE (11 per cent), Libya (6 per cent) and Qatar (3 per cent) (BP 2017). Figure 9 shows the top fifteen countries (representing 78 per cent of global production and 93 per cent of global reserves) in terms of reserves as of 2016 at the global level.

The abundance of oil reserves and production volumes means that the region is well placed to play a key role in global oil markets. Global crude oil trade reached around 44.75 billion barrels per day in 2017 (OPEC 2018), with the region accounting for around 45 per cent of this supply. Saudi Arabia is by far the largest exporter of oil in the world, with around 7 billion b/d in 2017 (Figure 10). While North America has seen a downward trend in crude oil imports from the region, imports by Europe and the Asia-Pacific region (the latter is the largest importer of MENA crude oil) increased in the 2012–17 period (Table 2).

Figure 10 | Crude oil exports (1,000 b/d) of MENA countries, 2000–2017



Source: OME analysis based on OPEC (2018).

Table 2 | MENA crude oil exports to major consumers (1,000 b/d), 2012–2017

	2012	2013	2014	2015	2016	2017	Change (%), 2012-17	Share (%) in 2012	Share (%) in 2017
Europe	3,148.3	2,985.3	2,626.1	2,773.7	3,245.6	3,682.1	17	16	19
North America	2,501.1	2,323.0	2,001.3	1,645.1	2,004.9	1,999.7	-20	13	10
Asia & Pacific	12,676.7	12,103.7	11,534.8	11,931.9	13,232.7	12,909.1	2	66	67
Latin America	207.9	120.8	104.0	161.1	249.8	145.5	-30	1	1
Africa	409.5	300.2	273.4	270.9	239.2	234.3	-43	2	1
Middle East	290.1	282.2	277.8	293.2	274.2	204.0	-30	2	1
Total	19,233.7	18,115.1	16,817.5	17,075.9	19,246.5	19,174.6	-1.0	100	100

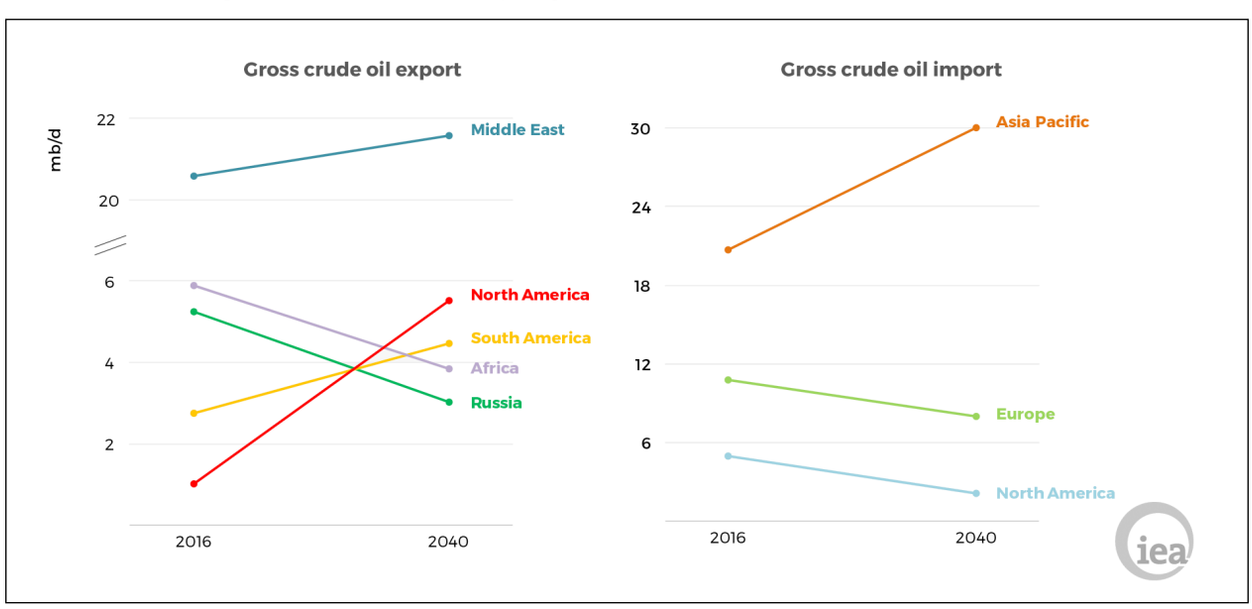
Note: MENA countries considered are the followings: Algeria, Iran, Iraq, Kuwait, Libya, Qatar, Saudi Arabia and UAE.
Source: OME analysis based on OPEC (2018).

Should the growing domestic energy demand be stabilized, the MENA region could continue to play a key role in global oil markets, as oil is expected to account for the largest share in total primary

energy demand. Despite the impact of electric mobility, oil demand is expected to continue to increase until at least 2025. From the supply side, with the increasing role of the USA in global oil markets, accounting for 80 per cent of the increase in world oil supply to 2025 (with the USA becoming a net oil exporter by the late 2020s), North America will become the second-largest supplier of crude oil by 2040. After US tight oil stabilizes and non-OPEC production falls back in the late 2020s, oil from OPEC will be needed to balance the market. A small amount of growth is expected in the Middle East's crude oil exports, however, due to increasing domestic consumption and the expansion of its refining capacities both inside and outside the region (more than 4 mb/d of net refinancing capacity is expected by 2040), making the Middle East not only the largest crude oil exporter, but also the largest oil products exporter (its oil products exports will increase by two-thirds by 2040, much of which will be destined for Asian markets). Less than 1 mb/d would become additionally available for export despite the increase of crude oil production by 4.5 mb/d by 2040, however (IEA 2017b).

As far as demand is concerned, a shift in trade flows will shape the global oil markets landscape (Figure 11). The Asia-Pacific will account for the largest growth in demand for oil, with a 9 mb/d increase between 2016 and 2040, reaching 30 mb/d, mainly driven by China and India as well as Southeast Asia. Accounting for 50 per cent today, the Asia-Pacific region will be responsible for 67 per cent of total crude oil imports. Less appetite for oil is expected in Europe and North America, however (IEA 2018b, 2017b).

Figure 11 | Change in crude oil trade by region in the IEA New Policies Scenario

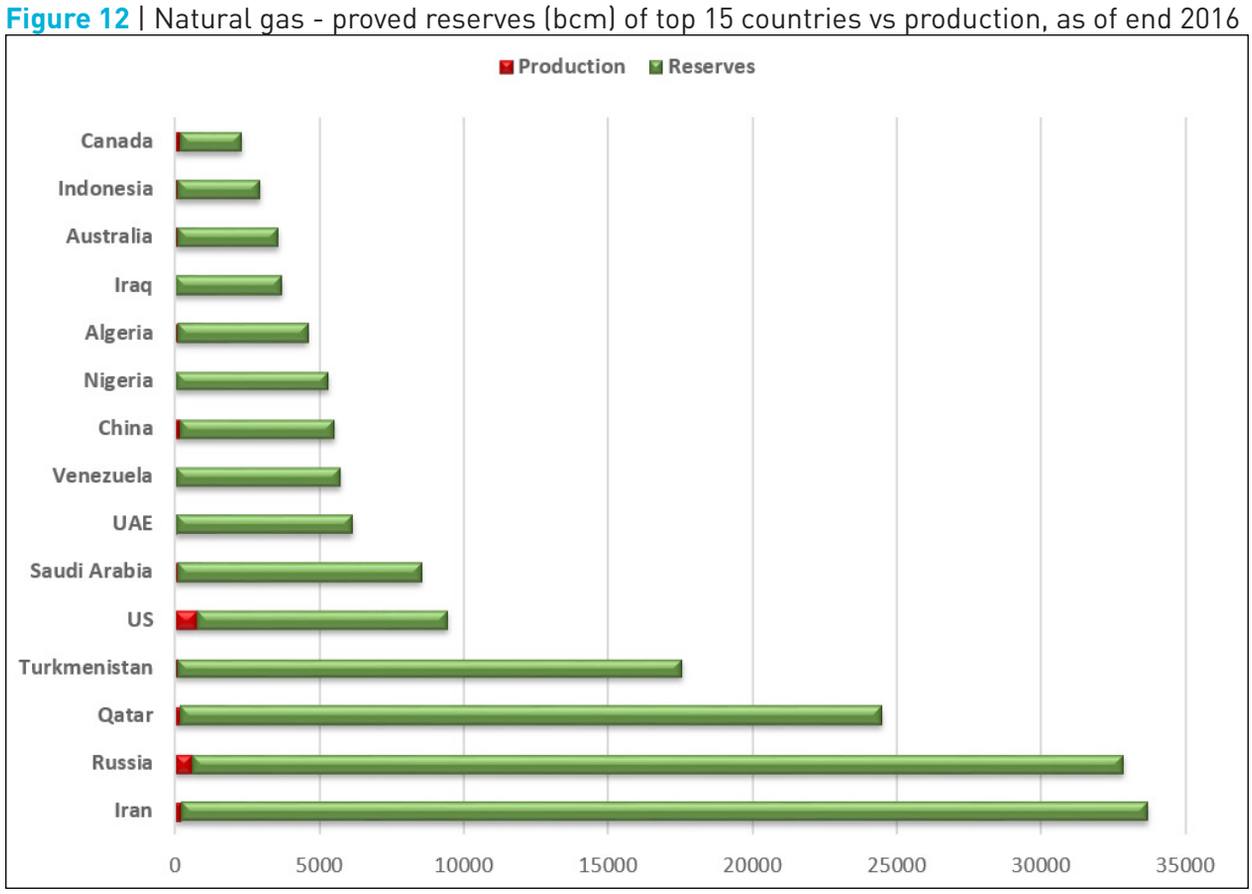


Source: IEA (2017b).

Natural gas markets have been shaped by a number of developments, including the shale gas revolution in the USA and the growing role of LNG, thereby positioning new players well at the global level, especially the United States and Australia. In terms of production, the USA has become the largest producer of gas, accounting for 21 per cent of global production, followed by Russia (16 per cent) and then Iran (6 per cent) and Qatar (5 per cent). The MENA region's share

of world gas production has grown as production volumes have increased on average by 6.1 per cent annually during the 1990–2016 period. The region's production accounted for around 22 per cent (about 772 bcm) of total world gas production in 2016. At the regional level, Iran and Qatar accounted for the largest share, with 50 per cent of the regional gas production, followed by Saudi Arabia (14 per cent), Algeria (11 per cent), the UAE (8 per cent) and Egypt (6 per cent), with the remainder split mainly between Oman, Libya, Bahrain and Kuwait. Figure 12 shows the top fifteen countries (representing 72 per cent of global production and 88 per cent of global reserves) in terms of reserves as of 2016 at the global level.

Figure 12 | Natural gas - proved reserves (bcm) of top 15 countries vs production, as of end 2016



Source: OME analysis based on BP (2017).

Three countries (Russia, Qatar and Norway) account for more than 40 per cent of total gas exports at the global level. The MENA region accounted for around 20 per cent of global gas exports in 2016, while Qatar maintained its leading position as the largest LNG exporter in the world (30 per cent of total LNG exports in 2016). Most of the gas exported from the MENA region is to the Asia-Pacific (62 per cent, mainly to Japan, South Korea, India and China), followed by Europe and Eurasia (28 per cent, mainly to the United Kingdom and southern Europe).

In addition to oil, the region is also endowed with significant natural gas reserves. The region hosts 47 per cent (87 trillion cubic metres) of global proven gas reserves as of 2016, meaning the region is well positioned to play a pivotal role in natural gas markets. Iran and Qatar are the leading

countries in the region in terms of both reserves and production levels of natural gas. Together they account for 31 per cent (57.8 trillion cubic metres) of global proven gas reserves as of 2016. At the regional level, reserves are concentrated in the following countries: Iran (38 per cent), Qatar (28 per cent), Saudi Arabia (10 per cent), UAE (7 per cent), Algeria (5 per cent) and Iraq (4 per cent), followed by Libya, Egypt and Kuwait (2 per cent each) (BP 2017).

A trade shift towards natural gas is also expected. Natural gas will constitute the second-largest share in the global energy mix (a position historically held by coal) after oil, accounting for a quarter of global energy demand in the IEA New Policies Scenario by 2040 (a 45 per cent increase). Although 80 per cent of the projected growth in gas demand will come from China (with the largest growth seen in gas imports, making China the second-largest gas importer after the European Union), India and other developing countries in Africa, Latin America and the Middle East, the European Union will remain the largest gas importer, accounting for 389 bcm by 2040 (IEA 2018b, 2017b).

Despite gas imports, especially in fossil fuel poor countries, the MENA region's role in gas markets will be further strengthened and it will maintain its position as a net gas exporter through to 2040, when it will rank as the second-largest net gas exporter after Russia, and before the United States. Table 3 lists net importing and exporting countries by 2040.

Table 3 | Net importing and exporting regions (bcm) in 2040

Net importing regions in 2040	**2016**	**2025**	**2040**
European Union	-329	-374	-389
China	-73	-177	-278
Other Asia Pacific	52	-47	-178
Japan and Korea	-165	-150	-181
India	-24	-55	-99
Other Europe	24	9	-18
Net exporting regions in 2040	**2016**	**2025**	**2040**
Russia	188	265	314
MENA	150	183	248
North America	-1	119	192
Caspian	80	87	140
Australia	45	100	137
Sub-Saharan Africa	29	48	106
Central and South America	10	-6	5

Source: OME analysis based on IEA (2017b) New Policies Scenario.

As for exploration in the region, there remains potential overall for further increases in reserves (mainly oil and gas) in the future. Most areas in the southern Mediterranean, for example, especially offshore, are either underexplored or unexplored. Gas discoveries in Israel have sparked interest in more exploration activities in the basin of the eastern Mediterranean countries, which should

improve the entire region's position in the energy dynamics. With the Tamar field having come into production in 2013, the Leviathan field (expected to come into production in late 2019) should boost Israel's position and enable it to both meet domestic demand and export to neighbouring countries. Likewise, the discovery of the super-giant Zohr offshore field in Egypt in 2015 has confirmed the substantial hydrocarbons potential in the Mediterranean Sea. The Calypso gas discovery made by Eni in January 2018, 180 kilometres south-west of Cyprus, also provides evidence of further gas potential in the region. Nevertheless, geopolitical considerations, including contested maritime territory between Turkey and Cyprus and the Israeli–Lebanese border dispute, may limit the region's prospects for the development of new and potential offshore discoveries.

Unconventional hydrocarbon resources development activities are still in the early stages in the region. In the Mediterranean region, for example, activities continue to focus on resource assessment and exploration (OME 2015). Thus, should new discoveries be made, the region will undoubtedly continue to play a key role in global oil and gas markets (Menichetti et al. 2017).

Therefore, despite output disruptions, whether due to geopolitical tensions or agreed cuts under OPEC, overall oil output from the MENA region has been increasing. In addition, the region remains a key player in balancing the market in case of disruptions despite the output shortage in a number of countries, including Libya and Iran.

Nevertheless, energy export trends are expected to change drastically in the near future if energy consumption continues at its present rate (TPED increasing annually by 4.5 per cent), thereby leading to reductions in export capacities in order to meet increasing domestic energy demands.

Electric mobility could also have an indirect impact on the region's role in the global energy system due to its potential impact on oil demand. As discussed earlier, the electric vehicle market is expanding, with impressive growth having been observed in the last two years at the global level; a trend which is more likely to continue in the future.

In the MENA region, the electric car market is non-existent in most countries, with the exception of some initiatives in the UAE and Jordan. In the UAE, the Dubai Electricity and Water Authority has begun an electric vehicle charging station infrastructure initiative, called the Green Charger Initiative, in Dubai. In Jordan, the German company e-Charge is planning to build more than 10,000 smart electric vehicle charging stations.

In order for the electric vehicles market to expand in the MENA region, a plethora of policy measures would need to be enacted to push for the adoption of electric vehicles, including public procurement, diesel and gasoline taxes and favourable customs duties, as well as the development of infrastructure.

Electric mobility offers an opportunity to move towards a more sustainable energy future. The electric car market is expected to boom in the future, driven by supportive policies and cost reductions. The increased use of electric vehicles (EVs) would translate into increased demand for electricity, thereby impacting on global oil demand for the transport sector.

The IEA estimates that global electricity consumption by EVs will increase between seven-fold and seventeen-fold compared with 2017 consumption levels, depending on the scenario by 2030. The EV fleet is expected to displace between 5 exajoule, EJ (120 Mtoe, 2.57 mb/d – equivalent to the total energy demand of Turkey in 2014) and 9.2 EJ (220 Mtoe, 4.74 mb/d – equivalent to total energy demand of Saudi Arabia in 2015) of diesel and gasoline demand in 2030 (Table 4). Although relevant, such figures do not yet represent a game-changer vis-à-vis global oil demand, given that a significant share of oil consumption comes from trucks, aviation and the petrochemical industry.

Table 4 | Summary table of electric cars' impact

Scenario	New Policies	EV30@30
Time frame	2030	2030
Number of electric cars (million)	125	220
Electricity consumption (TWh)	404	928
Energy savings	5 EJ (120 Mtoe or 2.57 mb/d)	9.2 EJ (220 Mtoe or 7.74 mb/d)

Source: OME based on IEA (2018a).

Therefore, the increased adoption of electric vehicles will have an impact on total global oil demand, but not to the extent that it will dramatically curb the appetite for oil, as oil will continue to account for the largest share in total primary energy demand in the future. Nevertheless, the pace of oil demand growth is expected to slow, as some of the oil demand for road transport, passenger cars in particular, will be offset by the increased electric vehicles penetration.

Even in an ambitious scenario involving wider-scale deployment and adoption of electric vehicles, oil demand would continue to grow, though at a moderate rate. World oil demand reached an average of 97.86 mb/d in 2017 and is expected to reach 104.7 mb/d in 2023 (approximately a 7 per cent increase compared with 2017 levels) based on a positive economic outlook, and it will continue to increase by 1 mb/d a year after 2023 (IEA 2018b), as it is used by other sectors, including the petrochemical industry, shipping and aviation.

The move towards a more sustainable energy system affects the entire system, including the electric mobility sector. The increased penetration of electric vehicles will put upward pressure on electricity demand, thereby contributing to the electrification of the energy system. From an environmental perspective, in particular, the key question remains how this increased electricity demand to feed electric vehicles will be met – whether through conventional energy or through clean energy sources.

In addition to its impact on oil demand at the global level, the adoption of electric vehicles in the MENA region could also have other effects on both oil rich countries and energy importing countries. For importing countries, the adoption of electric vehicles would help them diversify their energy mix by decreasing their dependence on oil and thereby lessen the burden on government budgets. It is true that adopting electric vehicles at a larger scale would offset global oil demand. Nevertheless, electric mobility could offer oil-rich countries the opportunity to reduce their energy demand for oil and free up more capacity for export. In all cases, despite the oil demand offset

by electric vehicles, electric mobility would help both energy importing and exporting countries retain their positions at the global level and become more embedded in the global energy system.

Another aspect to consider in determining whether the region is embedded in or peripheral to global energy dynamics is the importance of energy shipments through vessel routes in the region and their likely impact on some countries in terms of revenue. The case of the Suez Canal, for example, is worth emphasizing. Due to the increase in global trade, Egypt's Suez Canal revenues from the oil trade totalled 5.277 billion US dollars in 2017 (compared with 5.111 billion in 2013) and reached record levels in the first quarter of 2018, with 1.351 billion US dollars. However, this increasing trend of shipments is not guaranteed to continue in the future due to the potential effects of the US president's "trade war" and the likelihood that demand for diesel cars in Europe will decline.[3]

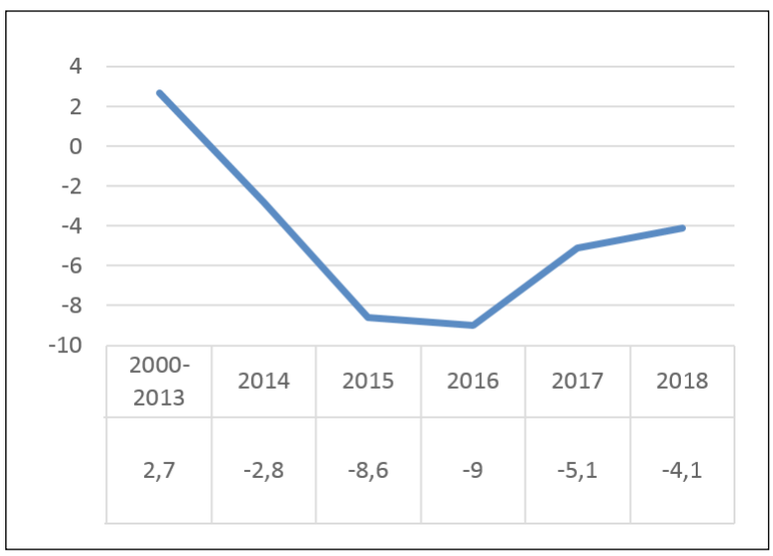
3.3 WHAT IS LIKELY TO BE THE IMPACT OF SHRINKING EXPORT LEVELS AND DECREASING OIL PRICES ON STATE REVENUES AND POLICIES IN THE FUTURE?

Following four years of stability at around 105 US dollars per barrel (Devarajan and Mottaghi 2015), oil prices dropped dramatically from 115 US dollars in June 2014 to 45 US dollars in January 2015 (Berman 2015). Since then, oil prices have partially recovered, reaching 65 US dollars in April 2018 (World Bank 2018), but they are expected to remain within a relatively low trading price range of between 60 and 70 US dollars until the end of the decade, according to the IMF (IMF 2017).

The macroeconomic consequences of these persistently low oil prices are far-reaching for the MENA region, both for oil exporting and oil importing countries. Variations in oil prices have an impact on oil and energy derived revenues and therefore on government budgets. According to the World Bank's 2015 MENA Quarterly Economic Brief (Devarajan and Mottaghi 2015: 1), oil related revenues accounted for over half of government income in MENA's oil exporting countries in 2015. Therefore, a sustained low oil price results in significant revenue losses for MENA oil exporting countries. Indeed, low oil prices from 2013 to 2016 have considerably reduced government surpluses and widened deficits in the region, with fiscal balances in MENA oil exporting states evolving from a 128 billion US dollars surplus to a deficit of 264 billion US dollars. GCC countries alone saw their oil revenues decline by 157 billion US dollars in 2015 (Devarajan and Mottaghi 2015). According to the IMF, the countries whose current accounts were most impacted in absolute terms in 2015 were Kuwait, Qatar, Iraq, Libya, Saudi Arabia, Oman and Bahrain, all of which experienced substantial oil revenue losses (>20 per cent of GDP) (IMF 2015). As shown in Figure 13 from 2000 to 2013, MENA states' overall fiscal balances were positive at a surplus of 2.7 per cent of GDP. However, following the oil price drop in mid-2014, fiscal balances dropped to a level of –2.8 per cent of GDP in 2014, reaching a low of –9 per cent of GDP in 2016, and they are forecasted to be around –4.1 per cent of GDP by the end of 2018.

3 "Suez Canal Shipments, Revenue Up But Trade War Threatens", in *Middle East Economic Survey*, Vol. 61. No. 16, 20 April 2018.

Figure 13 | Fiscal balance, MENA oil exporters, 2000–2018 (% of GDP)



Source: OME analysis based on IMF (2015).

Likewise, Table 5 illustrates how low oil prices have pressurized government budgets in the region. In 2016, with a yearly average oil price of 43 US dollars a barrel, not a single MENA oil exporting country was able to fiscally break even. In 2018, a slightly higher oil price of around 65 US dollars eased the tension on MENA's oil exporters' current accounts. Indeed, several states such as Kuwait, Qatar, UAE, Iran and Algeria so far have broken even. However, the remaining states still require higher oil prices for their budgets to reach equilibrium. It must be noted that some GCC oil exporters such as Saudi Arabia have the capacity to alleviate the impact of low oil prices with massive sovereign wealth funds or reserve assets. However, other more vulnerable oil exporting countries such as Yemen and Libya, whose budget revenues are 95 per cent dependent on oil revenues, do not benefit from such buffers (Devarajan and Mottaghi 2016).

Table 5 | Fiscal break-even oil prices for MENA oil exporters (in US dollars per barrel)

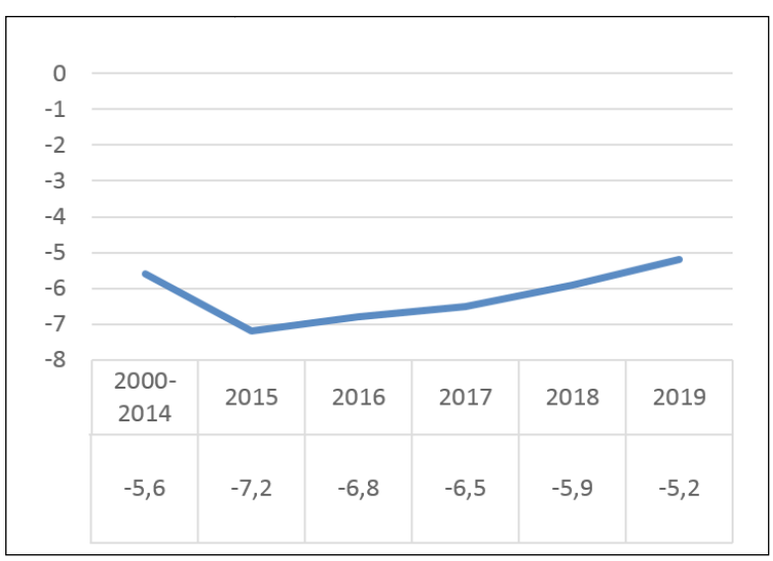
MENA oil exporters	2016	2018 (projected)
Algeria	93.0	63.3
Bahrain	105.7	97.7
Iran	73.1	58.8
Kuwait	46.5	50.4
Libya	212.8	90.6
Oman	80.1	78.8
Qatar	54.6	54.9
Saudi Arabia	93.7	74.4
UAE	58.6	58.6
Yemen	364.0	125.0

Source: Devarajan and Mottaghi (2016).

In the case of MENA's oil importing countries, economic activity should be stimulated because low oil prices increase households' and firms' real income. The World Bank (2013) quantified that a 10 per cent decrease in oil prices could raise growth in oil importing economies by between 0.1 and 0.5 percentage points, depending on the country's ratio of oil imports to GDP (World Bank 2013). Beyond economic growth, low oil prices also bring gains to oil importing countries via their fiscal accounts.

Moreover, MENA oil importing states witnessed improvements in their budgets in the aftermath of the 2014 oil price drop because of lower import bills alongside eased fiscal burdens due to lower costs for fuel subsidies. Overall, as is illustrated in Figure 14, budget deficits observed in the MENA oil importing countries narrowed from –7.2 per cent of GDP in 2015 to –5.9 per cent of GDP in 2018 and this trend is forecasted to continue, reaching –5.2 per cent of GDP in 2019. The states whose fiscal balances gained the most from 2015 to 2016 were Lebanon (1.75 percentage point of GDP) and Egypt (0.5 point of GDP) (IMF 2018). Nevertheless, the IMF and independent studies (Mohaddes and Raissi 2018) have pointed out that indirect factors could, in the medium term, counterbalance the benefits of low oil prices for MENA oil importers. In addition, an economic slowdown in MENA's oil exporting countries resulting from low oil prices could impact MENA's oil importing economies through trade remittances, grants and foreign direct investments (FDIs). The relative importance of the direct positive impact of lower oil prices and the negative impact of spillovers from exporting countries varies greatly between MENA importers, as illustrated in Figure 14. Mohaddes and Raissi (2018) calculated that a 51 per cent drop in the price of oil in year 1 and a 45 per cent drop in year 2 following a supply shock would benefit Egypt and Mauritania by +0.2 per cent of GDP, equivalent to an influx of 670 million US dollars and 10 million US dollars into their economies respectively. By contrast, negative spillover effects would dominate in Jordan, Morocco and Tunisia, affecting their economic growth negatively by by –0.5 per cent, –0.7 per cent and –0.2 per cent respectively, representing a loss for these economies of 190 million US dollars, 700 million and 90 million respectively (Mohaddes and Raissi 2018).

Figure 14 | Fiscal balance, MENA oil importers, 2000–2019 (% of GDP)



Source: OME analysis based on IMF (2018).

Furthermore, along with other endogenous factors, low oil prices boost domestic demand for oil in MENA states. This is particularly problematic for MENA's oil exporting countries. In 2015, 33 per cent of the oil produced in the Middle East was consumed domestically, whereas in 2000 the figure was only 20 per cent (BP 2015). This energy consumption trend will prove unsustainable if current export levels and derived government revenues remain unchanged. Domestic oil consumption in Saudi Arabia reached 32 per cent in 2015 compared with 17 per cent in 2000 (BP 2016). Under a business as usual scenario, forecasts indicate that if other sources of energy are not exploited or if actual oil consumption patterns are not modified, Saudi Arabia's oil production could be completely absorbed by domestic consumption by 2038 (Lahn and Stevens 2011). Thus, in the medium to long term, the more pressing challenge for MENA's exporting countries is rising oil demand rather than low prices. This could make it difficult for countries in the region to sustain their economic development with regard to vast public spending, particularly the dilemma of supplying citizens with cheap subsidized oil, fuelling household demand and in turn leading to a decline in export capacity. This should lead MENA governments to reform their policies in order to reduce their vulnerability to oil price fluctuations and macroeconomic shocks as well as to increase trade with economies with potentially high oil demand.

Box 1 | Sovereign wealth funds (SWFs)

Sovereign wealth funds are investment structures held by a state. They derive their revenues either from natural resources (mostly oil and gas) possessed, controlled or taxed by the state or from trade surpluses, and reinvest those into the domestic economy or abroad. In 2018 there were around seventy-eight SWFs in existence, with assets representing more than 7.45 trillion US dollars (Prequin 2018). Those structures have experienced very rapid development in the past and are forecasted to continue to do so in the future, with assets controlled expected to reach 15 trillion US dollars by 2020 (PwC 2016: 1). Seventy-five per cent of all SWFs have revenues stemming from hydrocarbons exports and 49.9 per cent are concentrated in the MENA states (Moody's 2015).

In order to answer the question of why energy exporting states have SWFs, it is important to understand specific issues affecting hydrocarbon-based economies and how SWFs are meant to address them. Firstly, natural resource prices vary greatly as a function of demand, supply shocks and speculative moves. Exporting countries therefore face negative consequences for their export levels and budget revenues resulting from volatile oil and gas prices and thus struggle to reach budget equilibrium. Secondly, resource rent economies are dependent on the stock of resources they exploit, and those are exhaustible. States whose economies depend on these resources face the responsibility of providing future generations with the ability to meet their economic needs at a time when the stock of resources may be depleted. Thirdly, they face an economic phenomenon called Dutch disease. This stipulates that a too high level of hydrocarbons export leads to an increase in domestic consumption of hydrocarbons and an influx of foreign currency. The resulting situation is a rise in both inflation and the exchange rate, which is noxious for exports in other sectors of the economy. These issues perfectly illustrate the central threat MENA states face of becoming peripheral, less relevant economically and vulnerable to global macroeconomic shocks. SWFs have the ability to prevent

this in three different ways, all of which involve transforming hydrocarbons revenues into international diversified investments, generating revenues in the long run. Firstly, SWFs enable countries to hedge against hydrocarbons price volatility and stabilize revenue flows derived from their exportation. They substitute stable and recurring income for fluctuating and cyclical revenue from natural resources. They make these revenues profitable during periods of high prices, which enables them to meet the financing needs of the government during downturns. This is the primary objective of funds such as the KIA in Kuwait and the Investment Authority in Libya. Secondly, SWFs also aim to sustain income from non-renewable fossil resources and distribute them equitably across generations. They convert exhaustible raw materials into long-term financial assets. They act as savings mechanisms and build on today's wealth to build the heritage of tomorrow. In addition, the placement of these incomes prevents them from being spent, which prevents the rest of the economy from suffering from Dutch disease. This is the other goal of SWFs such as ADIA in Abu Dhabi and funds from Kuwait, Qatar and Libya. Thirdly, other SWFs aim to take on strategic holdings. They aim to reduce the share of hydrocarbons in the economy by diversifying it towards industry, real estate and services, abandoning family management to attract specialists and promote the emergence of a private sector. These funds can finance infrastructure, establish industrial partnerships or invest in strategic sectors for the development of the country. Plenty of evidence shows that local economies in the Persian Gulf are supported by SWFs, such as Saudi Arabia's Public Investment Fund, Abu Dhabi's Mubadala, Dubai's ICD and Qatar's QIA.

Beyond remedying hydrocarbon-based economies' structural problems, SWFs can constitute decisive vehicles for MENA economies to wield more influence economically and geopolitically worldwide. With regard to the increasing frequency of speculative crises, SWFs can position themselves as counter-cyclical poles of stability. Likewise, the short-termism of financial markets could make SWFs long-term investors and vastly increase their influence. For instance, only 10 per cent of total investments today have a long-term objective and the average holding period on the New York Stock Exchange has increased from almost ten years in 1960 to less than a year today (WEF 2011). By contrast, the long-term capital requirements are increasing: nearly 100 trillion US dollars 2030–40, for infrastructure and the fight against global warming (Della Croce et al. 2011). Finally, SWFs can wield significant power within the companies in which they invest, for example to encourage more environmentally sustainable or ethical practices. Norway's SWF maintains a so-called "ecological code" stipulating that it will not invest in firms that generate emissions at a level they consider "unacceptable" (NBIM 2018: 15). In the MENA region, Saudi Arabia, as part of its Vision 2030 Project, has announced plans to sell 5 per cent of Aramco, the state-owned oil company, to a 2 trillion US dollars SWF, making it the largest fund globally (Saudi Arabia 2016). If Riyadh's assertion that its new SWF will be able to control more than 10 per cent of global investment capacity is accurate (Timberlake and Abdulla 2016), the implications in terms of geopolitical influence will be enormous. By making a number of states and large companies dependent on Saudi money, it is a safe bet that the country will use this leverage to influence certain political and diplomatic issues.

3.4 HOW CAN RENEWABLE ENERGY SOURCES HELP MENA COUNTRIES RETAIN THEIR LEADERSHIP POSITION IN GLOBAL ENERGY MARKETS?

As highlighted earlier, meeting the rapidly growing domestic energy demand, particularly for electricity, is a real challenge facing all MENA countries. The main conundrum is that increased domestic energy demand would mean that less spare export capacity would be available for export, thereby diminishing the importance of the MENA region in global energy markets. Addressing this challenge with demand side management, including energy efficiency measures, could eventually slow this growth, but more is needed. Alternative energy sources, in particular the deployment of renewable energy technologies on a wider scale, could address this challenge and thereby help MENA countries (oil and gas rich countries in particular) retain their important role in global energy markets.

The region is well suited to the development of renewable energy technologies for different applications. As far as solar energy technologies are concerned, most of the countries are located in the so-called sunbelt, with global horizontal irradiance (GHI) values ranging from 1,600 kilowatt-hours per square metre per year (kWh/m²/y) in coastal areas of the Mediterranean to 2,600 kWh/m²/y in the desert, and direct normal irradiance (DNI) varying from 1,800 kWh/m²/y to more than 2,800 kWh/m²/y. This is one of the best endowed areas of the world with respect to solar energy for both solar photovoltaic (PV) and concentrating solar power (CSP) applications (Al-Shalabi et al. 2014: 190). The potential for wind energy is also very high in several countries of the Mediterranean such as Morocco, Egypt and Turkey, as well as Iran, with more moderate – but still promising – potential in the GCC countries and Iraq.

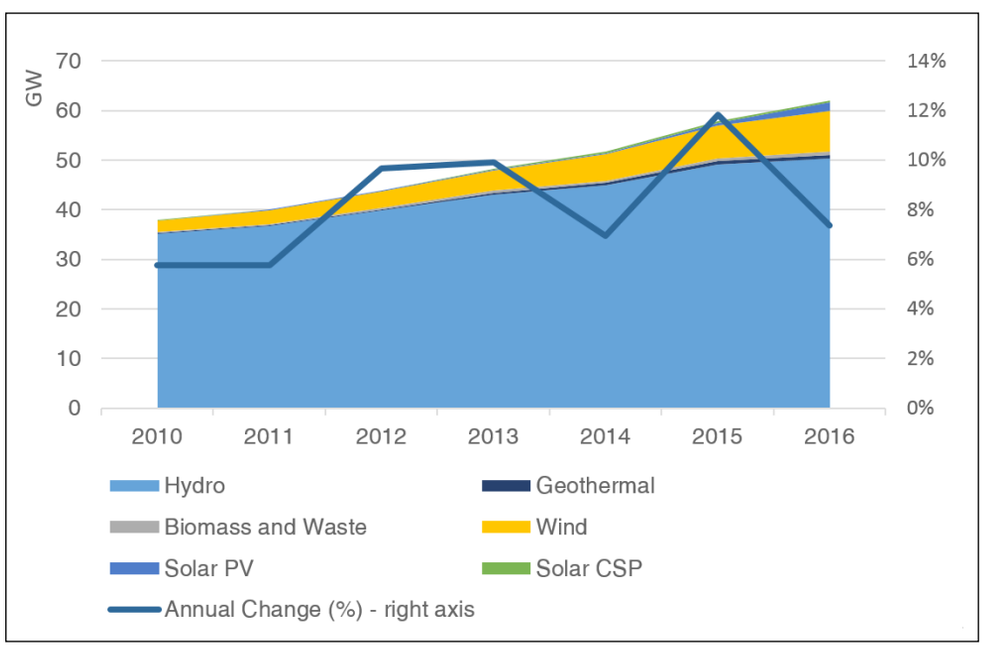
Despite this significant potential, the pace of deployment has been very slow in many countries with the exception of a few such as Egypt, Tunisia, Turkey, Morocco, Jordan, Israel and the UAE. While leading countries (mentioned earlier) are keeping up with this momentum, others are finally realizing this potential and are thereby pushing ahead with their national renewable energy plans albeit at a slow pace.

However, there are several obstacles to the deployment of renewables in the MENA countries that need to be overcome, including weak grid infrastructure, regulatory barriers, access to finance and, most importantly, subsidies to conventional energy. In the GCC countries, for example, the low penetration of renewable energy technologies can be attributed to institutional inertia, no clear separation of roles and responsibilities at the institutional level and the absence of dedicated policies and regulations (IRENA 2017).

Renewables' role in the energy mix (about 35 Mtoe – equivalent to about 3 per cent of TPES – in the whole region) has been negligible in most MENA countries, especially in hydrocarbon exporting countries. Hydropower is still the main renewable energy in the MENA region, reaching 9 Mtoe in 2015. However, in addition to biomass, the development of other renewable energy sources, mainly wind and solar, has progressed significantly, reaching more than 27 Mtoe for the whole MENA region in 2015.

The deployment and significance of renewable energy is particularly notable in the power sector. As far as installed electric capacity is concerned (Figure 15), more than 11 GW of non-hydro installed capacity were in place as of 2016, distributed among the following: wind (7.5 GW), solar PV (1.7 GW), geothermal (0.775 GW), biomass and waste (0.650 GW) and solar CSP (0.347 GW) (OME 2018, IRENA 2017). Hydropower capacity alone totalled about 49 GW in 2016.

Figure 15 | Renewable electric installed capacity in the MENA region (GW), 2010–2016

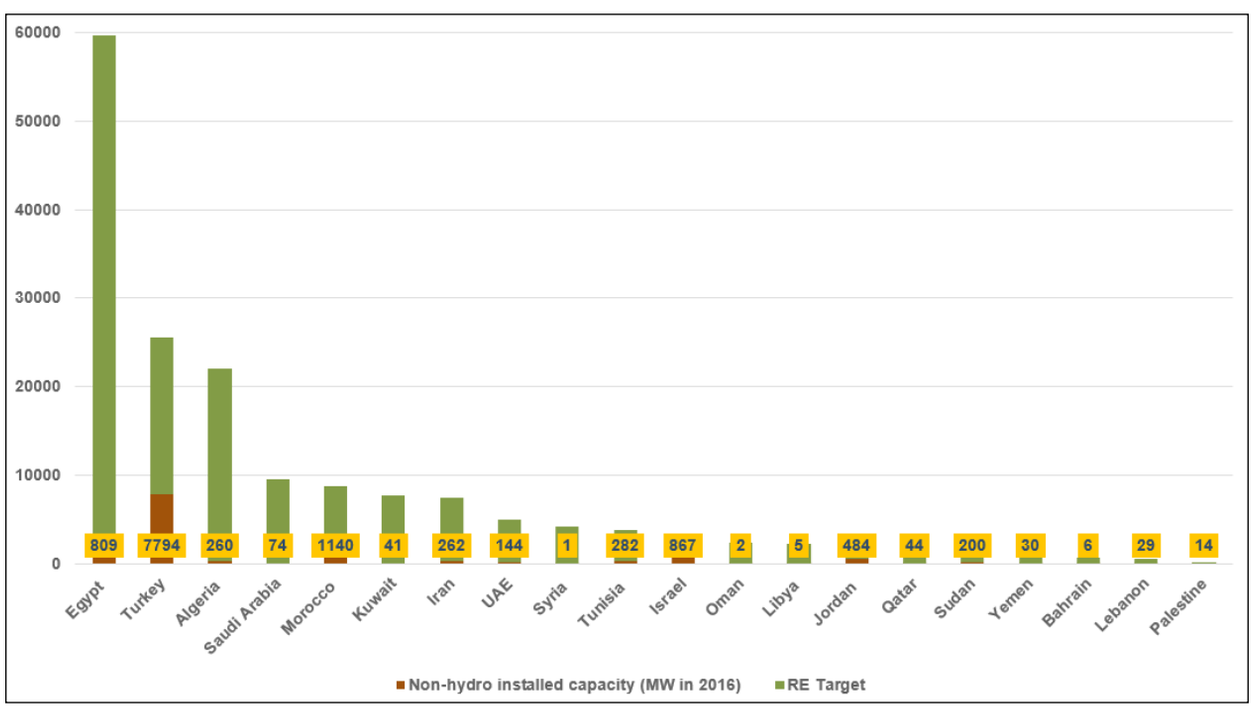


Source: OME and IRENA (2017).

A number of countries have made significant progress in implementing renewable energy projects (excluding hydro). In the southern and eastern Mediterranean countries, Turkey, Morocco, Egypt, Israel, Jordan and Tunisia lead the renewable energy market in the region. Renewable installed capacity in Turkey stands at more than 11 GW (mainly wind energy, but most of the installed PV capacity was completed in 2017). Morocco is on track to achieve its 2020 renewable energy targets with more than 1.2 GW existing capacity in place. A number of large-scale projects are either under construction or under development, including the 850 megawatt (MW) wind project and the ongoing construction of the second, third and fourth phases of the Ouarzazate Noor solar complex as well as other solar projects. With more than 800 MW in place, Egypt is making good progress in its renewable energy programme, including the 2 GW PV under the Feed-in Tariffs scheme. Jordan is also advancing on its renewable energy projects, especially solar PV. After its slow uptake of the Tunisian Solar Plan, renewable energy investments are, finally, gaining momentum in Tunisia, with the recent pre-qualification calls for tender for wind and solar photovoltaics projects announced in May 2018, which would give new impetus to renewable energy projects. Israel is also making good progress in meeting its renewable energy targets, especially solar PV, with the highest installed capacity in the region, but also CSP projects. While Algeria has fallen short of its ambitions (although it has achieved important milestones, including several off-grid PV installations in 2016 and 2017 in the south of the country), the political situation in Libya has prevented progress on the implementation of renewables.

Despite high ambitions, progress in the renewable energy market in the other GCC countries is still lagging. Nevertheless, the UAE is leading the renewable energy market with an existing installed capacity of 357 MW, and with very large-scale solar projects. The 200 MW first stage of the 800 MW third phase of the Mohammed bin Rashid Al Maktoum Solar Park has been inaugurated, with the third and fourth phases totalling 600 MW to be commissioned in 2019 and 2020. In addition, the first stage of the CSP 700 MW fourth phase is envisaged to be commissioned by 2020. After long delays, the Saudi National Renewable Energy Program finally awarded its first 300 MW solar PV project at Sakaka to ACWA Power in early 2018, which is expected to be operational by 2019. The Saudi National Renewable Energy Program intends to install a capacity of 9.5 GW by 2023, with the aim of also developing a local manufacturing industry, but the speed of implementation is quite slow. In comparison, the estimated renewable energy potential is 200 GW. Through the development of renewables and the expansion of the grid, this could potentially help Saudi Arabia play an important role in the regional renewable energy market. However, a clear strategy is needed.

Figure 16 | Non-hydro electric installed capacity in MENA countries (MW) in 2016 vs RE targets



Notes: Target years; 2020 (Jordan, Israel, Lebanon and Palestine); 2023 (Saudi Arabia and Turkey); 2025 (Libya and Yemen); 2030 (Algeria, Bahrain, Iran, Kuwait, Morocco, Oman, Qatar, Syria, Tunisia, UAE); 2031 (Sudan), 2035 (Egypt). The official target year of Saudi Arabia is 9.5 GW by 2023. For the UAE, Dubai has a target of 5 GW by 2030 and Abu Dhabi 7 per cent of installed capacity by 2020.
Source: OME, IRENA (2017) and REN21 (2017).

Currently, there are several obstacles to the development of renewables in the region. Therefore, an enabling environment is key to the wider development and deployment of renewable energy technologies and to attracting investments to the sector. In order to encourage the deployment of projects, a number of countries have adopted a mix of supporting tools, including renewable energy plans and objectives, tendering, price mechanisms (feed-in tariffs and feed-in premiums), quota systems and tax incentives as well as long-term power-purchase agreements (PPA) – the latter is

undoubtedly one of the unlocking measures for renewables potential. In particular, government-backed tenders have resulted in some of the most cost-effective projects at the global level for solar and wind, with record low prices in Morocco and the UAE. The world record low price of 73 USD/MWh for CSP with storage of the giant 700 MW project in Dubai announced in September 2017 might promote uptake of the CSP market in the future in the whole region. In Morocco, record bids of around 30 USD/MWh for the 850 MW wind project are among the lowest prices announced for wind energy in the world (Menichetti and El Gharras 2017). Figure 16 presents the existing non-hydro electric installed capacity and targets in the MENA region.

Despite encouraging progress, and in order to maintain momentum, further changes are needed in order for MENA countries to be able to exploit their renewable energy potential and position themselves as sustainable energy champions. Although the amount of progress made varies by country, the main transformations required should occur at the following levels: (1) mandatory renewable energy targets set within a stated deadline; (2) establishment of an institutional framework with clear allocation of roles and responsibilities to allow for a transparent market; (3) definition of fair rules to guarantee market access to independent power producers; (4) adoption of policy support measures for renewable energy projects based on the project scale, the degree of maturity of the technology and the type of application (electricity vs other use); (5) gradual phase out of subsidies for conventional energy technologies; (6) accurate market design and overall assessment of the impact of renewable energy's increasing share on the grid; and (7) access to finance and ease of raising capital, especially access to lower-cost finance, which will be necessary for the wider deployment of renewable energy technologies (Menichetti and El Gharras 2017).

Thus, renewable energy constitutes a real opportunity for MENA countries, for both energy importing and exporting countries. Deploying renewable energy technologies on a wider scale would undoubtedly position the MENA region to play a leading role in global energy markets, especially through energy savings that could be gained through renewables, thereby freeing up more oil and gas for export. Furthermore, the implementation of large-scale energy projects could favour international partnerships that could project the MENA countries into global energy markets.

Box 2 | Regional Cooperation in the Euro-Mediterranean Context

Energy has been a dominant consideration in EU initiatives since the mid-1990s, notably in the Barcelona Process (in 1995), the European Neighbourhood Policy (2003) and the Union for the Mediterranean (2008), as well as many other multilateral and bilateral agreements in the region. New impetus was given in 2011 by the EU to strengthen its relations with its neighbours in the energy field. Conversely, the oil and gas industry has been developing cooperation strategies for decades, making it possible to build extensive international infrastructures, especially in the natural gas sector. In recent years electricity, and more specifically electricity from renewables, has reinforced Mediterranean cohesion around energy.

There are clear signals of EU willingness to revitalize cooperation with the Mediterranean countries. This is illustrated by the launch of three energy platforms under the auspices of the Union for the Mediterranean (UfM) and the definition of a new neighbourhood policy. Consi-

dering the challenges ahead and the high expectations from and for the entire region, it is important that the platforms deliver. From its side, the new European Neighbourhood Policy should be more ambitious and more effective than in the past, when it failed to live up to very high expectations.

At the Malta High Level Euro-Mediterranean Conference (11 July 2014) on "The role of gas developments in the Mediterranean region" and at the Rome High Level Conference (19 November 2014) on "Building a Euro-Mediterranean energy bridge: the strategic importance of Euro-Med gas and electricity networks in the context of energy security", EU energy ministers, ministers from southern and eastern Mediterranean countries, and the European Commission confirmed the importance of regional energy cooperation for ensuring secure, affordable and sustainable energy for the region and beyond. They also agreed that further strengthening regional cooperation in the Mediterranean on energy is required in order to achieve the above-mentioned goals. The Rome Ministerial Conference decided to establish three thematic platforms dedicated to pursuing high-level dialogue and to provide a permanent high-level forum for discussing energy policy objectives and measures, with a view to identifying specific and concrete partnership actions and following up on their implementation: the Platform on Gas (initiated at the Malta Conference), the Platform on Regional Electricity Market (REM), and the Platform on Renewable Energy and Energy Efficiency (REEE).

The overall objective of these platforms is to enhance cooperation in the Euro-Med region between all the stakeholders through a bottom-up approach in order to identify barriers and opportunities in terms of demand, supply, market structure and so forth.

The implementation of these objectives is laid down in a work programme for each platform setting out specific priorities and platform activities, concrete deliverables and interim milestones, agreed by consensus among UfM members.

Under the supervision of the UfM co-presidency, the UfM secretariat runs the REM and REEE platforms' secretariats while Observatoire Méditerranéen de l'Energie (OME) runs the secretariat of the UfM Platform on Gas.

The UfM Senior Officials Meeting of 31 March 2015 in Brussels agreed to frame energy cooperation at large among all forty-three UfM members on the basis of the three platforms. On 6 May 2015, the Moroccan capital, Rabat, hosted the launch of the three platforms.

Box 3 | **Subsidy challenge and price reform initiatives in the MENA region**

The high energy demand growth observed in most MENA countries could also be attributed to the energy pricing policies that are in place. Price distortions, through subsidies, thus constitute a major challenge for all countries, especially by increasing energy demand and putting pressure on state budgets. Some states in the region are known to have some of the lowest prices for fuel, gas and electricity, while having some of the highest per capita energy consumption.

In addition to providing support for basic consumption products and goods, energy subsidies, in particular, are among the main barriers to the deployment of renewable energy in the region. Two countries, Iran and Saudi Arabia, have the lowest gasoline prices, for example, at 0.30 and 0.24 US dollars per litre respectively as of 2017, and account for more than 61 per cent of total fossil fuel subsidies in the region, with more than 34 billion US dollars and around 30 billion US dollars, respectively, in 2016 (IEA 2017).

Nevertheless, several countries have embarked on structural reforms, some of which have been put forward by the IMF, including subsidy reforms, the gradual phasing out of energy (fuels and electricity) subsidies in particular, in order to lessen the burden on their state budgets. Since 2011, oil importing countries such as Egypt, Yemen, Mauritania, Morocco, Tunisia and Jordan have initiated energy subsidy reforms.

In January 2016, Algeria increased prices of gasoline by 34 per cent and diesel by 37 per cent while also increasing the prices of electricity and gas. In Morocco, diesel prices spiked by 14 per cent and gasoline by 20 per cent in 2012, and in 2014, gasoline and fuel subsidies were scrapped, with their prices scrutinized on a monthly basis (IMF 2017c). In Egypt over the period 2012–13, gasoline prices rose by 112 per cent and those for fuel for energy and non-energy intensive industries increased by 50 per cent and 33 per cent respectively. Additionally, domestic electricity prices rose by 16 per cent and fuel oil prices by 33 per cent (Sdralevich et al. 2013: 45). Further subsidy reform efforts were enacted in July 2014, 2016 and recently in 2017 (increasing diesel and gasoline prices). After Tunisia increased subsidies following the 2011 revolution, the pace of subsidy reform was very slow; in April 2016 Tunis announced that it would index fuel prices to global market prices (IEA 2016), and only in July 2017 did the country cut energy subsidies.

By contrast, oil exporting countries, with the exception of Iran, only recently started to review their subsidy systems. In Iran, the cabinet approved the removal of gasoline quotas (mechanism through which each vehicle is given a consumption quota of subsidized gasoline) for public and private passenger vehicles in May 2016. In May 2016, Oman began to adjust gasoline and diesel prices based on global market prices. The UAE and Oman have made excellent progress, with fuel prices converging towards the international average (IMF 2017). In addition to increasing electricity prices, Bahrain has recently increased the price of regular gasoline and premium gasoline by 60 per cent and 56 per cent respectively. In May 2017 Kuwait raised electricity prices for the commercial sector. Qatar also started adjusting gasoline and

diesel prices according to global market prices at the beginning of 2016, while also increasing the price of gasoline. In 2015, Saudi Arabia increased the price of gasoline and electricity. Sudan also cut fuel subsidies on two occasions, in 2013 and 2016. Despite the gradual phase-out, however, fuel prices remain considerably lower than the global average in most GCC countries.

Nevertheless, the reform efforts undertaken so far by the respective governments are already having important fiscal effects. The energy subsidy reforms have helped almost all countries in the region reduce the burden on their budgets. Overall, energy subsidies decreased by around 51 per cent during the 2013–16 period.

Table 6 | Fossil fuel subsidies (real 2016 million USD) in some MENA countries

	2013	2014	2015	2016	2013–2016 change (%)
Oil	130,004	121,413	73,220	53,319	-59
Electricity	44,551	42,170	42,319	26,734	-40
Natural gas	43,665	39,601	34,405	26,145	-40
Total	218,220	203,184	149,944	106,198	-51

Note: MENA countries covered include: Algeria, Bahrain, Egypt, Iran, Iraq, Kuwait, Oman, Libya, Qatar, Saudi Arabia, and UAE.
Source: OME analysis based on IEA statistics.

Therefore, moving towards energy prices that reflect market energy costs would eventually help to limit the rapid growth in energy demand and make renewables a real alternative to conventional energy sources, as well as lessen the government's budgetary burden.

Despite its overall economic and financial rationale, and the savings and expected benefits for governments and economies in the region, efforts have fallen short of their intended results in several countries. In addition to price increases for a number of consumption goods, populations in several countries, including Jordan, Morocco, Sudan and Tunisia, have demonstrated against the increases in fuel and electricity prices, calling on the government to intervene to further regulate the sector.

Yet the real challenge ahead is to find new ways of implementing subsidy reforms, with clear deadlines and awareness-raising campaigns, as well as to promote alternatives (i.e. renewable energy technologies, especially solar photovoltaic for water pumping and solar water heaters for domestic and industrial water heating, as well as encouraging public transport). Otherwise, adopting subsidy reforms without providing real alternatives might not achieve the expected results.

CONCLUSIONS

The current paper aimed at exploring the role of MENA countries in the evolving energy context. Some key trends have been analysed, mainly the shift of energy consumption patterns towards Asia, the availability of new energy commodities such as unconventional fossil fuels and renewable energy sources, the increasing importance of LNG and the expanding role of electricity, including for transportation.

Several MENA countries are among the largest oil and natural gas suppliers globally. As such they are clearly embedded in the global energy system. However, their growing energy needs are challenging their export capacities and could potentially impact their budget revenues.

Some of the observed trends have been found to have a direct impact on the future role of MENA countries, whereas others are less relevant. The increasing trend of oil and gas demand growth is expected to continue, and thus is not foreseen to peak very soon. Despite the unconventional fossil fuels revolution, especially in the USA, oil from the MENA region will be needed to fuel world economies. A real challenge for MENA countries, however, is the increasing domestic demand, which might jeopardize the region's export capacities. In particular, the growth of the electric car market, though curbing oil demand in the transport sector, still is not replacing global oil demand and thus not challenging the export potential of oil producing countries. Moreover, the price of US unconventional oil is not yet competitive with the MENA supply. Conversely, the expanding market for LNG, with an increasing number of producers, is creating an excess of supply which could potentially challenge the export capacity of MENA countries.

Another energy market segment in which MENA countries are lagging behind is renewable energy technologies. The use of renewables is expanding rapidly across the world, with the role of developing countries and economies in transition increasing in this sector. However, MENA countries are far from fully exploiting their potential. Renewables could be a valid alternative to meet some of the challenges facing the MENA countries' energy systems. However, their institutional and regulatory systems must evolve towards more business-oriented models. Some MENA countries have begun the transition towards sustainable energy, and several MENA companies are positioning themselves as key industrial players, even outside regional borders. But their speed of implementation will need to be accelerated further if MENA countries want to maintain leadership in the energy market and avoid becoming peripheral players.

ANNEX 1: SELECTED MENA OIL EXPORTING COUNTRIES' OFFICIAL DIVERSIFICATION STRATEGIES

Algeria – New Economic Growth Model (2016–19) (launched in 2016)
• Boost non-hydrocarbon exports to 9 per cent of total exports by 2019, from less than 5 per cent currently
Iraq – Private Sector Development Strategy (2014–30) (launched in 2014)
• Increase the private sector up to a share of 60 per cent of GDP by 2030 • Improve the country's business environment, particularly for SMEs • Reduce the unemployment rate to 4 per cent or less by 2030
Kuwait – Kuwait Development Plan (2015–20) (launched in 2015)
• Increase the private sector up to a share of 40 per cent of GDP by 2020 • Create public–private partnerships to carry out infrastructure projects • Increase the number of Kuwaiti employees in the private sector from 92,000 to 137,000 by 2020
Oman – Ninth Five-Year Development Plan (2016–20) (launched in 2016)
• Reduce the contribution of oil to GDP at current prices from 44 per cent in eighth five-year plan to 26 per cent by 2020 • Focus on the private sector and activate public–private partnerships; (c) Focus on SMEs
Qatar – National Vision 2030 (launched in 2008)
• Increase and diversify the participation of Qataris in the workforce • Create a business climate capable of stimulating national and foreign investments • Manage the optimum exploitation of hydrocarbons resources • Expand industries and services with competitive advantages derived from hydrocarbons industries
Saudi Arabia – Vision 2030 (launched in 2016)
• Increase SME contribution to GDP from 20 per cent to 35 per cent by 2030 • Increase foreign direct investment from 3.8 per cent to 5.7 per cent percent of GDP by 2030 • Increase the private sector's contribution from 40 per cent to 65 per cent of GDP by 2030 • Raise the share of non-oil exports in non-oil GDP from 16 per cent to 50 per cent by 2030 • Increase non-oil government revenue from SAR 163 billion to SAR 1 trillion by 2030 • Generate 9.5 GW of new renewable energy by 2030

Source: Tagliapietra (2017).

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Middle East and North Africa Regional Architecture: Mapping geopolitical shifts, regional order and domestic transformations (MENARA) is a research project that aims to shed light on domestic dynamics and bottom-up perspectives in the Middle East and North Africa amid increasingly volatile and uncertain times.

MENARA maps the driving variables and forces behind these dynamics and poses a single all-encompassing research question: Will the geopolitical future of the region be marked by either centrifugal or centripetal dynamics or a combination of both? In answering this question, the project is articulated around three levels of analysis (domestic, regional and global) and outlines future scenarios for 2025 and 2050. Its final objective is to provide EU Member States policy makers with valuable insights.

MENARA is carried out by a consortium of leading research institutions in the field of international relations, identity and religion politics, history, political sociology, demography, energy, economy, military and environmental studies.

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