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Chief executive officer: Claudio Descalzi
Board of Directors: Andrea Gemma, Pietro Angelo Guindani, Karina Litvack, Alessandro Lorenzi, Diva Moriani, Fabrizio Pagani, Domenico Livio Trombone
Piazzale Enrico Mattei, 1 - 00144 Roma
www.eni.com

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■ ***Editorial Director***
Marco Bardazzi

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■ ***Authors***
Adib Fateh Ali, Ali Al-Saffar, Adnan Z. Amin, Eleonora Ardemagni, Brian Efird, Jonathan Fulton, Steven Griffiths, Brahim Maarad, Naysan Rafati, Nicolò Sartori, Manal Shehabi, Eric Verdeil

■ ***Editorial Staff***
Piazzale E. Mattei, 1
00144 Roma
tel. +39 06 51996385
+39 06 59822894
+39 06 59824702
e-mail: info@abo.net

Social:
@AboutWEnergy
@AboutWEnergy
@AboutWEnergy

■ ***Authors' portraits***
Stefano Frassetto

■ ***Photography***
AGF, Contrasto, Freepick, IPA Independent Photo Agency, Getty Images, SIE Masterfile, Luca Campigotto, Parallelo Zero, Epa/Ansa, Archivio Eni, Agnieszka Kowalczyk-Unsplash

■ ***Design***
Cynthia Sgarallino
■ ***Graphic consultant***
Sabrina Mossetto
■ ***Graphics and layout***
Imprinting www.imprintingweb.com
■ ***Printer***
Tipografia Facciotti Srl
Vicolo Pian due Torri, 74
00146 Roma
www.tipografiafacciotti.com

■ ***Translated by:***
LOGOS GROUP - www.logos.net

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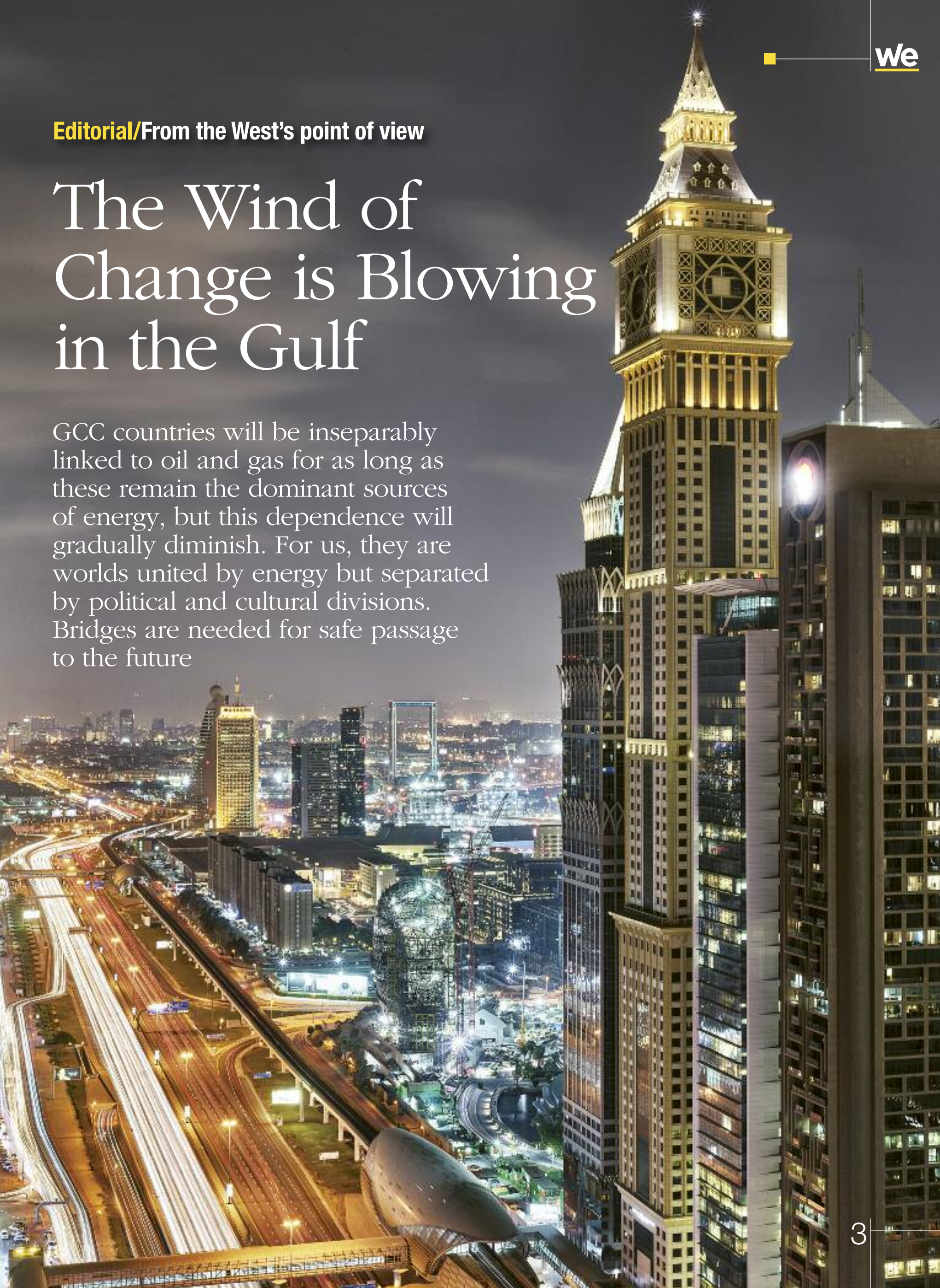
Editorial/From the West's point of view

The Wind of Change is Blowing in the Gulf

GCC countries will be inseparably linked to oil and gas for as long as these remain the dominant sources of energy, but this dependence will gradually diminish. For us, they are worlds united by energy but separated by political and cultural divisions. Bridges are needed for safe passage to the future



emocracies, kingdoms, sultanates, petro-monarchies. Many words and political categories can be used to describe the countries of the Gulf, and there are many good reasons to talk about them and their systems of government. The West is experiencing severe difficulty with the functioning of its institutions. As it regularly does, the guiding compass provided by the U.S. has begun to swing towards isolationism, perhaps more desired than practiced (a global power cannot escape its destiny) but nevertheless sufficient to affect the range and movement of all the other actors in different ways. The European Union is waiting for a breakthrough; its mechanism is jammed, Brexit has triggered a new era. And there are no detailed maps to understand what the future really holds. The East is going through an expansionary and probably growth-maturing phase, while its systems of government, which are extremely varied (think of the contrast between the one-party system of China and the multi-party system of Japan), in turn depict its destiny and set the course for the Pacific area as a whole. The Middle East has entered another chapter of its history; while it's materially and conceptually bigger than the Gulf, its story has this geopolitical area as its fulcrum. People in the West, who think of themselves as being at the center of everything, often fail to read the facts and above all to interpret the direction in which these countries are moving. They may be dominated by the use and processing of energy resources, but they have cultural roots that were established long before their gas and oil pipelines. The winds of political change are blowing in the Gulf, economies are pawing the ground, power relations are shifting as the world order breaks up and re-forms.

A multi-polar political game

After the Yalta Agreement and the fall of the Berlin Wall, these countries discovered they could play a multi-polar geopolitical game of light and shadow, clarity and opaqueness, while they experimented with new forms of diplomacy and improved the capacity and power of their hardware and software. They depend on oil and gas, this link is and will be unbreakable for as long as these are the dominant sources of energy, but their evolution is clear, this dependence will gradually diminish, in some cases it is already smaller than other production factors. Interpreting this scenario by looking at the economy alone cannot provide a full picture of what is happening in the Gulf. The mechanical approach of economists often leads to fatal misunderstandings that underestimate historical processes. We have seen rich countries in the West enter a period of political tension that contrasts with the well-being-equals-stability equation. There are no perfect formulas to define the course of human history, we navigate by sight and sometimes without the moon, in thick fog and with only a few stars to guide us. Culture and religion are the pillars that support everything, they come well before oil deposits, platforms, explorations, government strategies and energy companies. Islam is a dynamic force in desert tents, bright cities, at sea, in ports, in religious centers and in state buildings. The Prophet and the Koran are the guide, and the process of secularization, which has changed (perhaps "upset" would be a better word) the heart of Europe, has a completely different trait here. No comparisons can be made and it is futile to preach the development of "Western" values where a thousand years of history have carved another story. In his book *The Art of the Novel*, Milan Kundera describes this loss of direction among Europeans by taking Cervantes's masterpiece, *Don Quixote*, and giving it an insightful interpretation: "As God gradually retired from ordering the universe and its system of values, having separated good from evil and given a meaning to everything, Don Quixote came out of his house and found he could no longer recognize anything. In the absence of the supreme Judge, a terrible ambiguity had suddenly arisen: the only divine Truth had broken up into hundreds of relative truths, which humans shared among themselves. Thus the modern era was born, and with it the novel, its image and model." The past, present and future are the story of Caesar and God, right, strength, religion, a vision of the world, cosmogony. Dubai is a physical and

metaphysical example of this landscape, Abu Dhabi is another brilliant piece in the puzzle. The glass and steel skyscrapers of these cities represent an aspiration to touch the sky, the projection of an (im)possible desire, thanks to the financial means provided by oil and gas, which has developed into tourism and services. As the price of oil fell, so Dubai's real estate capitalization took off. These are of course the stages of boom and bust, but that's what economies are about. And they apply to everyone, at any latitude. And, fortunately, not everything can be explained by the economy.

Culture, to build bridges

Culture remains the decisive point from which to build bridges, rather than divisions, to share experiences, not conflicts, understanding is the basis of everything. How can you think of describing the development of Oman without knowing that its capital, Muscat, is one of the oldest centers in the Middle East? The city was the starting point of the Frankincense Trail that led caravans on a two-month, 2400-kilometer journey to the Mediterranean. And the same road that entered Saudi Arabia passed by legendary cities like Medina (the "illuminated city"), Dedan (the ancient city of the kings of Arabia, mentioned in the Bible) and Hegra (the first site in the country to be recognized by UNESCO, in 2008).
In Western imagination it is a glimmer in the desert, but the reality is a landscape as rich as a mosaic, with the sea, the mountains, the sudden sparkle of the oases and a caravan culture that still exists alongside the most developed air fleets in the world. The culture of travel and transport. Emirates, the Dubai airline, was founded in 1985 and only had two airplanes. Thirty years later, it has the world's biggest fleet of Airbus 380 and Boeing 377 aircraft. This mix of ancient and modern is stronger than in Europe—not to mention America, a young country where the frontier culture of the race to the West is hard to discern today—and it constitutes the mystery, the charm and often the source of misunderstandings between East and West, the title of a fundamental book by René Guénon, whose teaching, as the philosopher Franco Volpi wrote, is centered on "the collision between Western civilization, characterized by an extraordinary material development and a corresponding moral and metaphysical impoverishment, and civilizations that still retain the vestiges of a traditional order. As, indeed, the Islamic one." Close but distant worlds, united by the routes of energy, too often separated by political and cultural divisions. Let us build bridges, we both need a safe passage to the future.

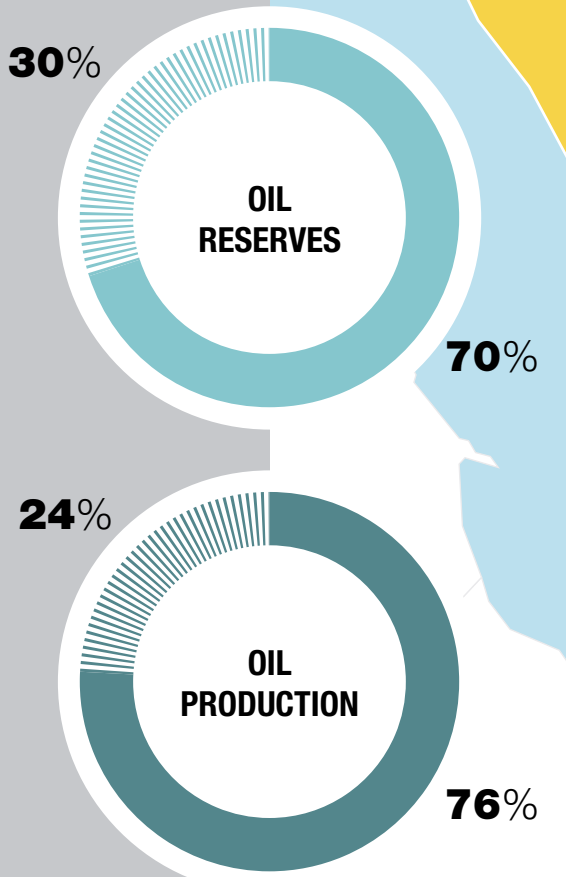
ALONG THE INCENSE ROUTE
Culture remains the decisive point from which to build bridges, rather than divisions, to share experiences, not conflicts—understanding is the basis of everything. In the photo, the Prophet's Mosque, Medina, Saudi Arabia, along the Incense Route that began in Oman and Yemen and stretched to the Mediterranean Sea.

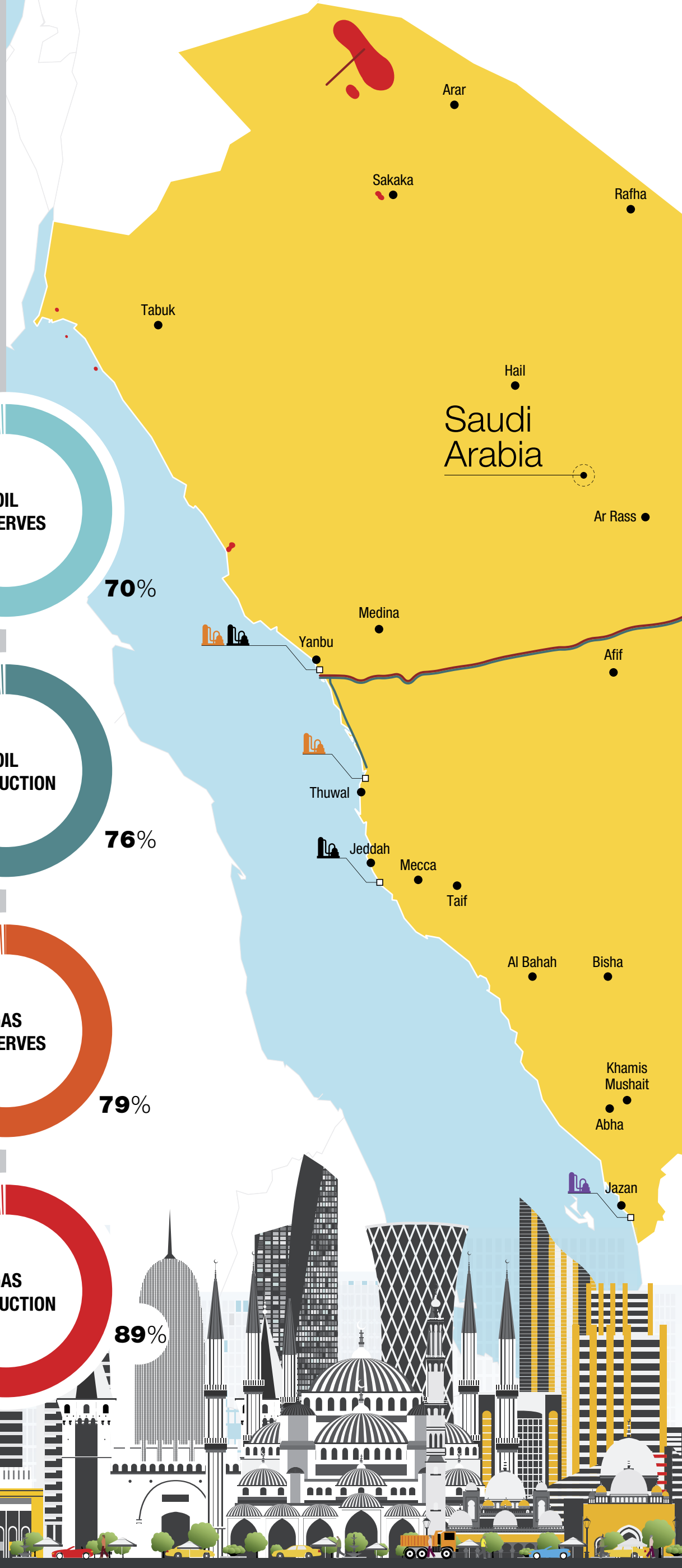
we

visual

Treasure peninsula

The countries of the Gulf Cooperation Council (GCC), which brings together Saudi Arabia, Kuwait, Qatar, United Arab Emirates, Bahrain and Oman, have a surface area of just over two and half million square kilometers, but own a quarter of the world's gas reserves, as well as six percent of global refining capacity. Given the vast resources historically available in the region, oil and gas consumption is also particularly high: on a per capita basis, Saudi Arabia is the biggest consumer of oil and the third biggest consumer of gas in the world. Oil and gas continue to be the main sources of revenue for the countries in the area, which are, however, increasing their efforts to diversify their economies and adopt a more sustainable development model. In the field of energy, this translates into ambitious goals for renewable sources and efficiency. The map shows the main oil and gas fields and the infrastructure for transporting these resources and refining crude oil.





PIPELINES
- OIL
- GAS

FIELDS
- OIL
- GAS

PLANTS
- (R) REGASIFICATION
- (L) LIQUEFACTION

REFINERIES
- OPERATING
- PLANNED
- ENGINEERING
- UNDER CONSTRUCTION

Data processing by Riccardo Mercuri and Simona Serafini - Eni

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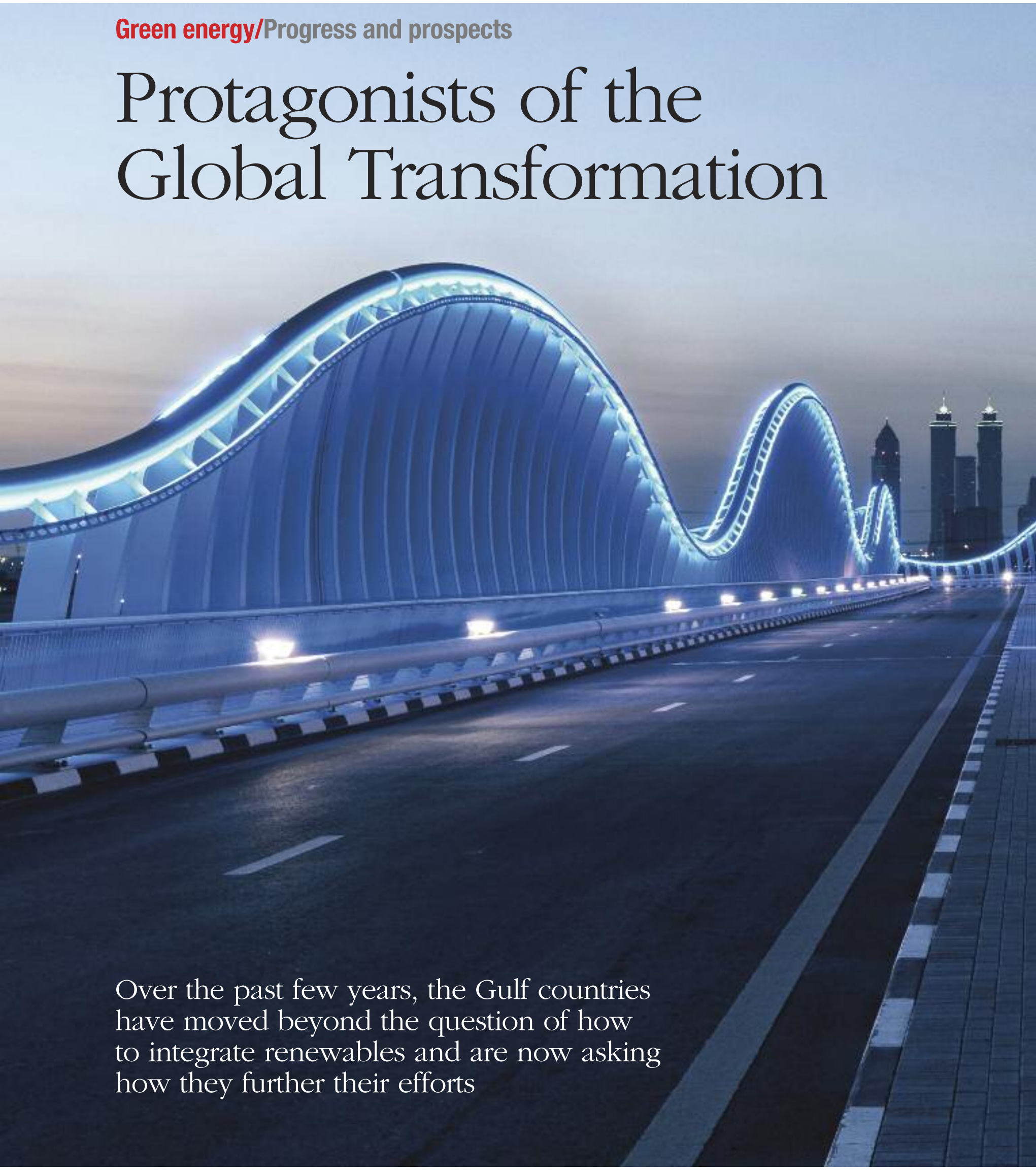
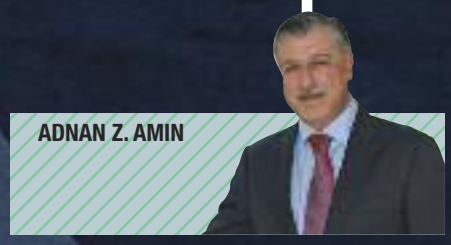
KUWAIT CITY
Hafar Al Batin
Bahrain
MANAMA
Al Jubail
Az Zulfi
Qatar
DOHA
Dubai
RIYADH
Al Duwadimi
Al Kharj
Al Aflaj
UAE
Al Ain
ABU DHABI
MUSCAT
Nizwa
Sur
Wadi ad-Dawasir
Oman
Mirbat
Salalah

Protagonists of the Global Transformation



Over the past few years, the Gulf countries have moved beyond the question of how to integrate renewables and are now asking how they further their efforts

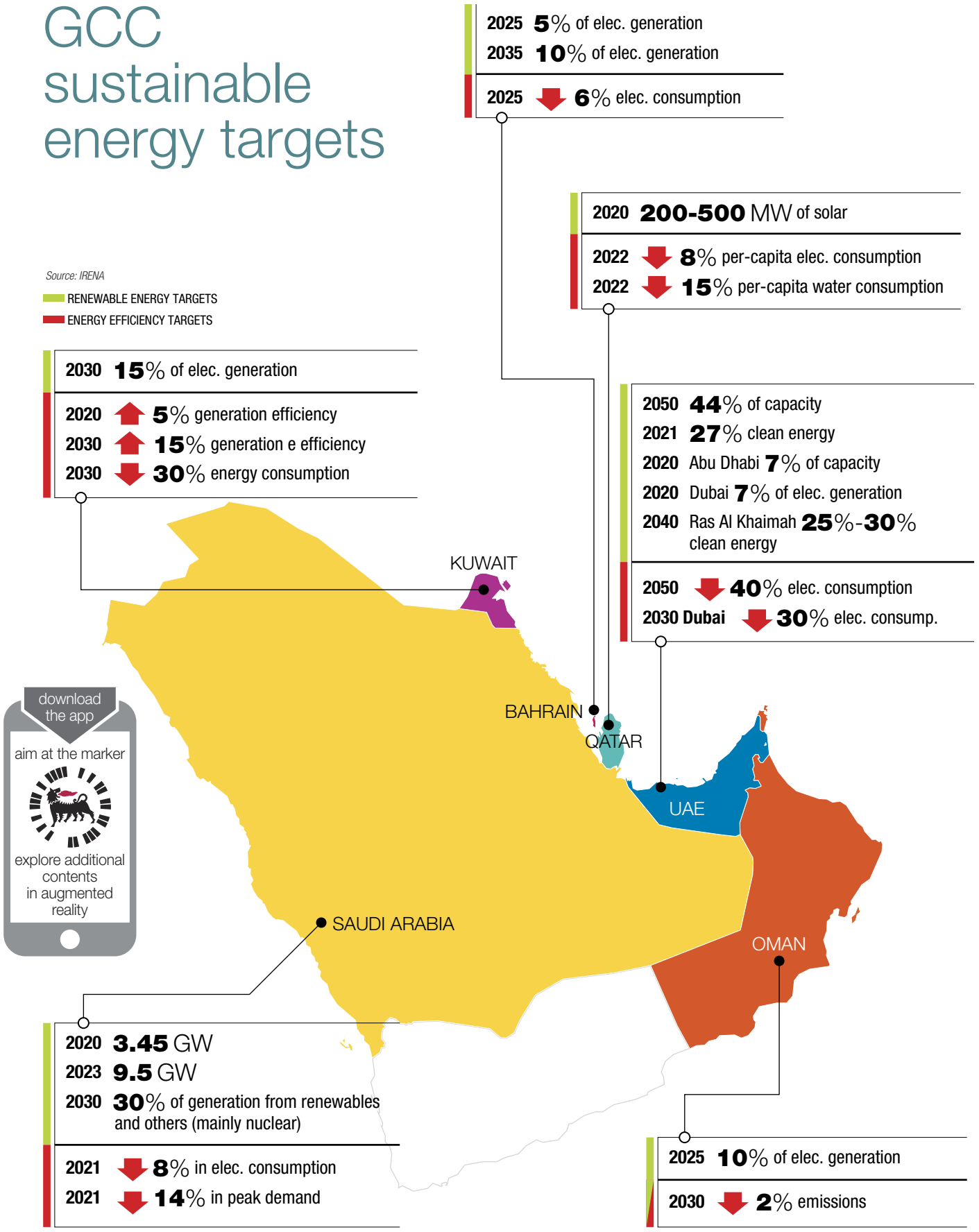


ADNAN Z. AMIN

He is the outgoing General Manager of the International Renewable Energy Agency (IRENA). During his eight years on the job, the Agency expanded to include 160 state members. Previously, he held numerous positions in the United Nations related to renewable energy issues and sustainable environmental and development policies, in particular at UNEP.

The world is undergoing a fast-moving global energy transition that is redefining the way we produce, distribute and consume energy. Renewables are at the heart of this transition, powering the future with sustainable, affordable and reliable energy sources. Accelerated renewables deployment is driven by strong business arguments, underpinned by cost reductions, innovations, and enabling frameworks. Analysis by the International Renewable Energy Agency (IRENA) shows that by 2020 renewables will be the cheapest choice for power generation in many parts of the world. Furthermore, the urgency to tackle climate change is adding impetus to the uptake of renewables. As a result, countries across the world are more ambitious to develop their renewable energy resources. The countries of the Gulf Cooperation Council (GCC) are increasingly part of this global momentum as they seek to →

GCC sustainable energy targets



meet their growing energy demand and diversify their economies. Traditionally known for their oil and gas reserves, the Gulf countries have considerable renewable solar energy potential, as they lie in the so-called Global Sunbelt, with some of the highest solar irradiances in the world. IRENA's report, "Regional Energy Market Analysis: GCC 2019", published last January, analyzes the progress made in establishing enabling policy and regulatory and investment frameworks in these countries and offers an outlook for renewables deployment in the region.

Cutting costs in the UAE and Saudi Arabia

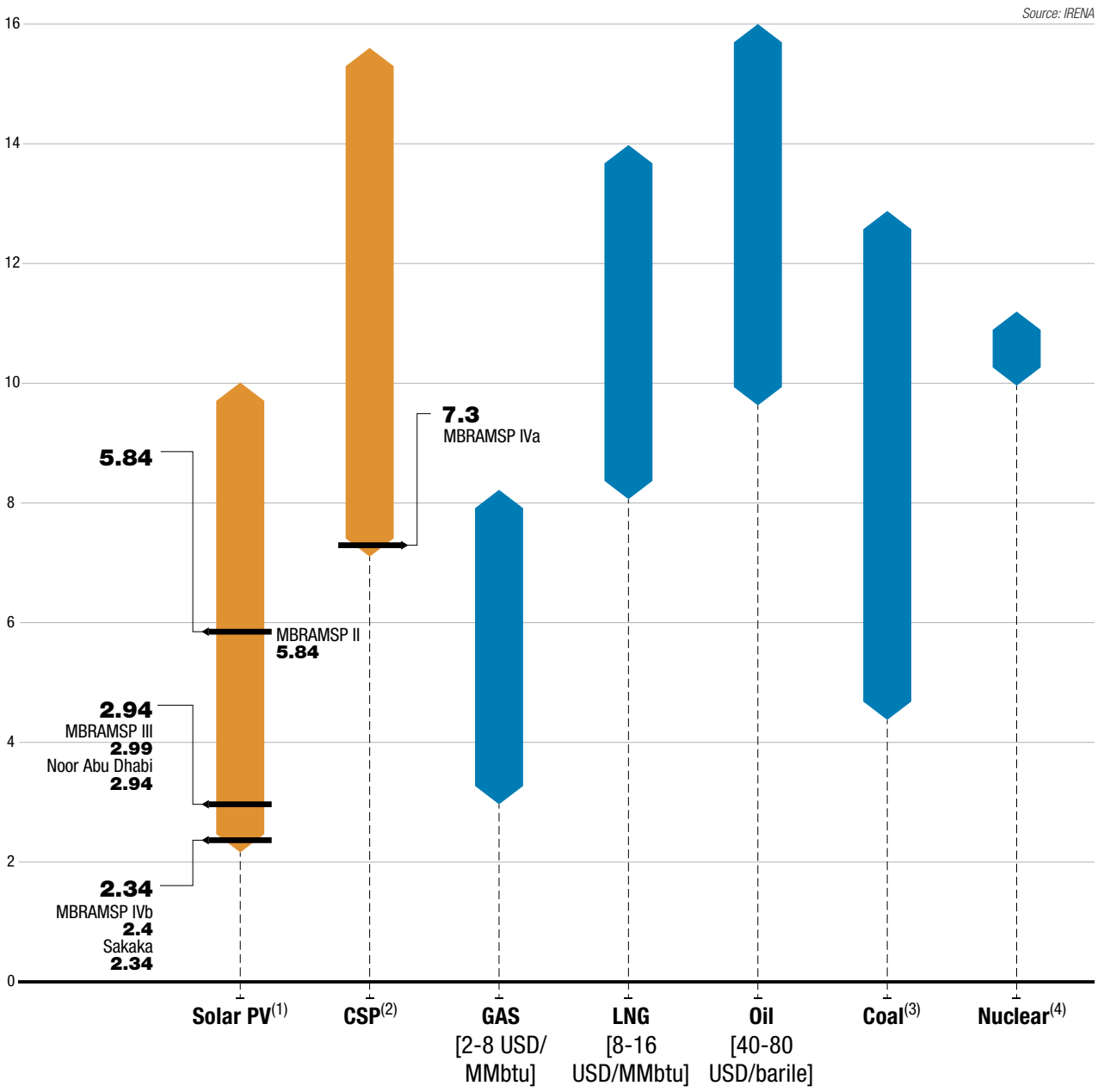
The United Arab Emirates (UAE) is at the forefront of such developments. The host country of IRENA and a strong proponent of renewable energy, it launched its "Energy Strategy 2050" in 2017, a plan to generate 44 percent of its power from clean energy by 2050, cut carbon emissions by 70 percent and improve energy efficiency by 40 percent. This UAE focus has contributed significantly to cost reduction for renewables, particularly for solar photovoltaic (PV) and concentrated solar power (CSP) technologies. As a result, its large-scale solar PV price broke world records in May 2018 with a bid of US¢ 2.99/kWh for the 800 MW Phase II of the Shaikh Mohammed bin Rashid Al Maktoum Solar Park in Dubai. An even lower price of US¢ 2.40/kWh was seen for the 250 MW of solar PV for Phase IV of the park in late 2018. The 700 MW CSP for the Phase IV of the park was awarded the record-low of US¢ 7.30/kWh with storage. Such cost declines make renewables the cheapest source of electricity for new projects in the Gulf. Saudi Arabia is also contributing to this downward price trend. In May 2018, the 300 MW Sakaka solar project in Saudi Arabia saw a record low price at that time of US¢ 2.34/kWh. Additionally, in January this year, the country awarded the contract for a 400MW wind farm for a record low price of US¢ 2.13/kWh. It also announced to add 40GW of solar and 20GW of wind capacity by 2030. Under its Vision 2030 economic development plan, the country aims to source 10 percent of its power from renewables by 2023. In the near term, the region is set to see major acceleration in renewable deployment. Led by the UAE, Oman and Kuwait, a total of nearly 7 GW of new power generation capacity from renewables is planned to come online by the early 2020s. Although solar PV and Concentrated Solar Power (CSP) is leading this development, there is growing momentum to harness the region's wind energy potential as well, particularly in Kuwait, Oman and Saudi Arabia.

Social and economic objectives

Renewables will also deliver on environmental, social and economic objectives. IRENA's analysis shows that by harnessing renewable resources, the Gulf countries will add 220,500 new jobs through 2030. They will also reduce water withdrawal for power production and associated fuel extraction by 11.5 trillion liters in 2030. This is particularly important given the water stressed nature of the region. Saudi Arabia, the largest consumer of fossil fuels for power production in the region, will account for about 40 percent of the GCC wide fuel savings in that year. The UAE will account for 39 percent. As the momentum of energy transition continues to strengthen, its impacts will reverberate beyond the energy system. There will be far-reaching geopolitical implications for which countries need to prepare. The report of the Global Commission on the Geopolitics of Energy Transformation, published by IRENA, highlights that the transformation will result in changes in the relative position of states, the emergence of new energy leaders, more diverse energy actors, changed trade relationships and the creation of new alliances. It will present both opportunities and challenges and the benefits will outweigh the challenges only if the right policies and strategies are put in place. Under such circumstances, it is critical for fossil fuel exporters to reinvent their economies to be less re-

PRICE OF UTILITY-SCALE ELECTRICITY GENERATION TECHNOLOGIES IN THE GCC

Price (USD cent/kWh)

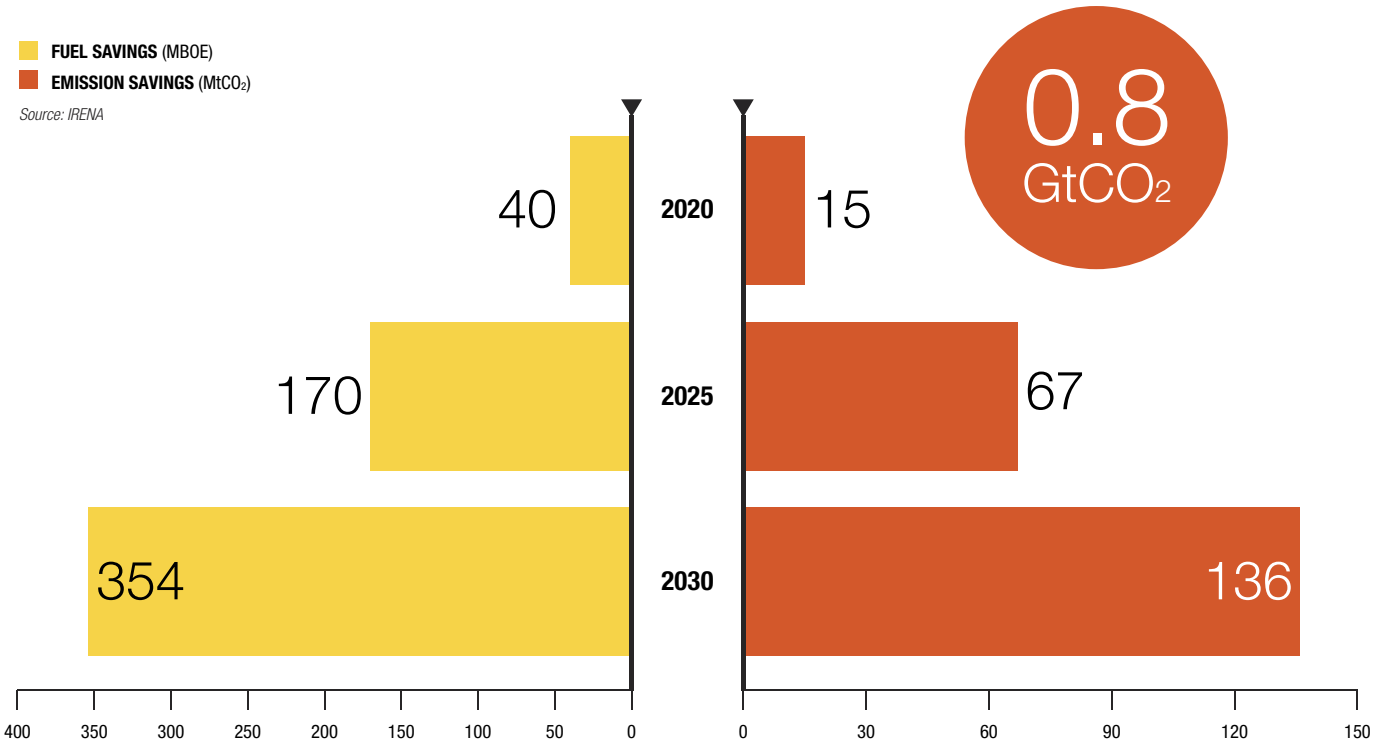


Solar PV is emerging as the cheapest source of electricity generation for new projects in the GCC, beating natural gas, liquefied natural gas, oil, coal and nuclear. Meanwhile, CSP costs less than what some utilities such as the Dubai Electricity and Water Authority pay for gas-based options.

(1) *Low = price for 300 MW Sakaka solar PV. High = a conservative assumption based on project data and expert opinion.*
(2) *Low = price for 700 MW MBRAMSP IVb in Dubai. High = price for Morocco's Noor II.*
(3) *Low = price for the Hassyan Clean Coal Power Plant. High = estimate for coal with CCS.*
(4) *Estimated range for nuclear power based on (Mills, 2012) and (Scribbler, 2015).*

liant on fossil fuels. Once again, the UAE is a prime example with its forward-looking economic diversification strategy. Masdar, a subsidiary of the state-owned Mubadala Investment Company, has invested USD 2.7 billion in wind and solar projects worldwide, with nearly 3 GW in generation capacity that displaces nearly 2.5 million metric tons of carbon dioxide per year. With Equinor, it has a 25 percent stake in the 30 MW Hywind, the world's first floating offshore windfarm off the coast of Scotland. It is pushing boundaries in innovation as well. Just last month, Etihad flew the first commercial jet on biofuel that Masdar sourced and developed using locally grown algae. It was not too long ago that the Gulf countries were debating if they should have renewables. In just a matter of few years, not only have they moved the needle of the discussion to "how much renewables can we integrate," but they are now asking "how do we go further" within and beyond the region.

BENEFITS OF RENEWABLE ENERGY DEPLOYMENT IN THE GCC



Achieving renewable energy deployment targets by 2030 can save fossil fuel consumption in the power sector; reduce its emissions; create more than 220,500 direct jobs; and reduce water withdrawal by 11.5 trillion liters.

Analysis/The GCC's response to the changing energy landscape

The Dawn of a New Era

Shifting energy dynamics will make the Gulf countries less critical to the world and less stable at home. How they adapt, in terms of energy diversification and shifting alliances, will be one of the big stories in the years to come

IAN BREMMER

President of the Eurasia Group and GZERO Media, and author of the volume *Us vs. Them: The Failure of Globalism*, a *New York Times* bestseller published in Italy with the title of *We against Them* (Bocconi University Publisher, 2018).

The post-World War II global order is fracturing. While the 21st century's shifting energy dynamics are not the cause of this fracturing, they are helping to accelerate the breakdown, and geopolitical relationships with Gulf countries that were once considered sacrosanct are now being busily rewritten. This new energy environment also threatens the long-term domestic stability of these countries, and leaders in the Gulf have begun bracing for a world where revenues from energy exports may no longer be enough to buy political stability at home. It's a brave new world, whether Gulf countries want it to be or not.

Development of the downstream sector

This is not to say Gulf countries have been caught flat-footed by these developments. In response to evolving global energy dynamics—and particularly the rise of the U.S. as a dominant energy producer in the world—Gulf countries have been proactively developing downstream and petrochemical sectors to diversify themselves away from relying on revenue from crude oil production and its exports. The focus on petrochemicals is based largely on the Gulf states' perceived comparative advantage in accessing cheaper feedstocks linked to upstream production; this is in addition to securing customers and long-term demand growth given their geographic proximity to manufacturing and end-user markets in Asia. It's no coincidence that Saudi Crown Prince Mohammed bin Salman (MbS) is now gearing up to announce the Kingdom's formal entry into China's Belt and Road Initiative (BRI), in addition to positioning Saudi Arabia as the hub point for Chinese investment into Africa. It's an attempt to bring inline economic necessities with geopolitical opportunism, albeit one that does little to diversify the region's core reliance on petroleum and oil as the center of Gulf diplomacy.

To be fair, even if Gulf countries are eventually successful in diversifying themselves away from a reliance on oil production, energy more broadly will remain an important component of both their economies and →

strategies that change

In response to the rise of the United States as the world's main energy producer, the Gulf countries have developed their **downstream sector** in order to diversify their economies and reduce their excessive dependence on crude oil.

The younger generations are exposed to a greater variety of ideas than their parents. **Social media**, very popular in the Gulf states, are normalizing freedom of expression and participatory debate.

The structure and nature of OPEC have changed significantly. Saudi Arabia and the United Arab Emirates continue to look for new ways to consolidate **cooperation with Russia** in the management of oil markets.

Saudi Crown Prince Mohammed bin Salman (MbS) is preparing to announce the Kingdom's official entry into the Chinese **New Silk Road** initiative, as well as making Saudi Arabia a hub for Chinese investment in Africa.

their diplomatic outreach. To that end, we've seen an emerging relationship between OPEC and Russia—OPEC's mechanics and spirit have materially changed with Saudi Arabia playing a critical role in leading, along with Russia, the most recent round of production cuts. Saudi Arabia and the United Arab Emirates will continue to seek new ways to cement cooperation with Russia to manage oil markets. News of a proposal to establish a Saudi-Russia centric OPEC replacement should not come as a surprise.

But as Gulf countries begin reorienting themselves on the international stage in earnest, they must also address political issues closer to home, especially given that the security and political environment in the broader Middle East affect energy production and pricing. While the geopolitical landscape in the region remains complex, one of the few certainties is that MbS is not going anywhere, international outcry over the Khashoggi killing not withstanding. But MbS needs a more stable Gulf given his own economic and political challenges at home, and the rest of the Gulf needs it too as fluctuation in oil prices only adds more risk for the Gulf diversification programs—if prices are too low, it jeopardizes fiscal resources; if prices are too high, it dulls the will for implementing much-needed change. This need for geopolitical stability will most likely necessitate a climbdown from the Saudis on the war in Yemen and will push the Saudis to engage with Qatar in a more proactive manner, most probably by enlisting the Kuwaitis to act as negotiator. It will also force Riyadh to accept the realities on the ground in Syria by recognizing that Bashar Assad has won and make peace with it, and to tone down the prospects of direct confrontation with Iran. It helps that both sides have their own domestic challenges to worry about—Tehran is heading into a serious economic recession this year.

The internal challenges for the new generation of leaders

All that said, it must be acknowledged that the politics in the GCC states will be significantly transformed in the coming decade. A new generation of leadership is seizing the reins in Saudi Arabia, the United Arab Emirates, Qatar, and Bahrain—and even to some extent in Oman. Until recently, this new generation has consistently been portrayed as erratic, but it has now become much more predictable and pragmatic. Nevertheless, these new leaders will be challenged by growing internal, bottom-up pressure for greater popular participation among a youthful workforce that is chronically underemployed, and in particular by those agitating for representation of specific marginalized groups, including young people, women, religious minorities and citizens living in the less well-off areas of Saudi Arabia, Oman, Kuwait, Bahrain and the UAE.

Changes in the availability of education and information are adding to expectations of greater transparency, freedom of expression and political participation. Far greater freedom of information has a particularly pronounced impact in countries where the media were previously tightly controlled by the state, as in the Gulf; young people are exposed to a far greater diversity of ideas than were their parents. Social media, hugely popular in the Gulf states, are normalizing the public expression and participatory debate of views. These intensifying pressures will not necessarily lead to revolution, but if the Gulf rulers do not act to accommodate changing public expectations, more discontent could arise in the coming years. That discontent may not turn into successful protests, given the tools and resources that Gulf governments have to maintain power. But struggles over power and wealth could polarize social, ethnic or religious groups; opposition movements could become radical and divisive, like the government policies that engender them; and larger regional and international powers could take advantage of unaddressed political weaknesses.

For decades now, energy has been one of the few constants for Gulf countries. That has been both a blessing and a curse, making Gulf countries vulnerable to fluctuating international oil prices while at the same time providing more than enough revenues to buy the political peace at home. But as the shift in energy dynamics makes the Middle East less critical to the world from a geopolitical perspective, Gulf countries will be hard-pressed to make this new energy calculus as successful for themselves as the old one.

The Long Road towards "Better" Diversification

In order to reduce their dependence on the oil sector, the Gulf countries should implement microeconomic reforms, such as those aimed at increasing industrial competitiveness, labor market reform, and the development of a private sector

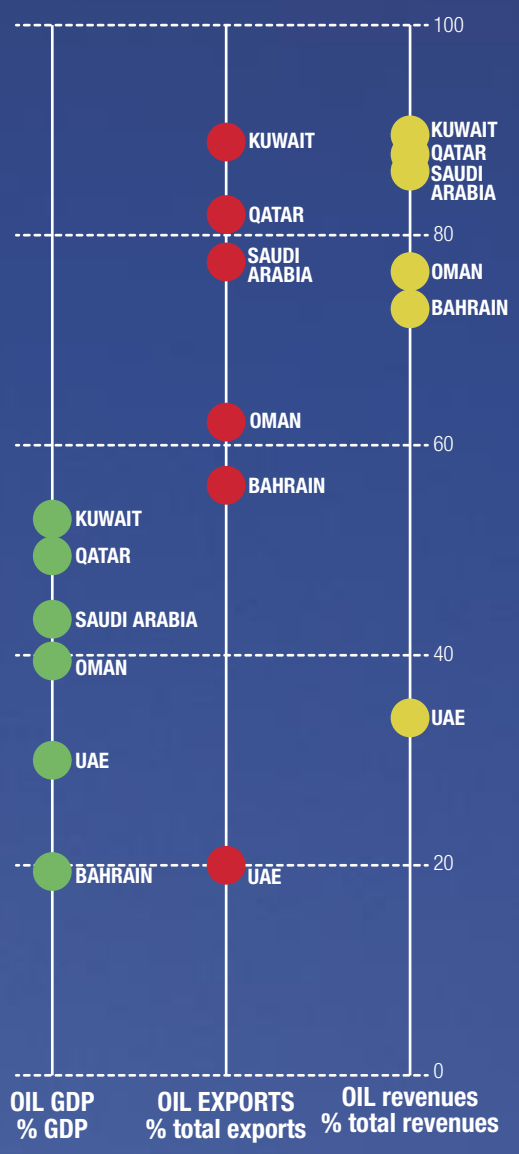
MANAL SHEHABI E BASSAM FATTOUH

Bassam Fattouh is the Director of the Oxford Institute for Energy Studies.

Manal Shehabi is the KFAS (Kuwait Foundation for the Advancement of Sciences) Supernumerary Research Fellow of the Oxford Institute for Energy Studies.

For decades, economic diversification has been a key goal for the Gulf oil exporting countries, as evidenced by their various national development plans. For countries that are highly reliant on oil export revenues, achieving this goal is seen by policymakers as essential for both political and economic security and for sustainability. Some Gulf oil exporters have made progress in diversifying their economic base away from the oil sector over the past few decades. Nevertheless, most indicators of economic complexity, diversity and export quality continue to be lower in oil-exporting Gulf economies than in many emerging market economies, including other commodity exporters. For the Gulf economies, the biggest challenges have been to diversify the sources of government income, for instance through raising additional revenues by taxing individuals and →

OIL GDP, EXPORTS, AND REVENUES, 2015-17



The oil sector accounts for an average 40 percent of GDP in the GCC. Except in the UAE, oil exports are more than 65 percent of total goods exports, and oil revenues, more than 75 percent of total fiscal revenues.

businesses, and to generate non-oil export revenues through building export-oriented industries. But why is economic diversification an ever more important priority for the Gulf States? Are they really as undiversified as widely believed? If so, how can they achieve a more meaningful diversification?

The urgent need to diversify

For an oil-dependent economy, the dilemma is as follows. On the one hand, the oil sector remains very profitable and is likely to enjoy higher margins per unit of expenditure than any industries into which most governments might aim to diversify. The large flow of oil rents also promises enviable wealth to fund growth and development and support generous welfare systems. On the other hand, from a developmental and sustainability perspective, heavy reliance on oil export revenues is uncertain and volatile, owing to challenges relating to the nature of the oil industry and the major transformation of global energy markets.

First, oil prices fluctuate widely and are highly volatile, so reliance on oil revenue does not generate a stable or predictable source of income. This also means that in some countries with large populations. oil rents might not be big enough to provide sufficient income or a sufficiently extensive welfare system to support growing populations and their need for infrastructure, health care and education. Second, the oil industry is capital intensive in nature and therefore does not generate enough jobs for the hundreds of thousands entering the labor market each year. Third, oil demand is not expected to increase strongly over the next two decades as there has been a paradigm shift about the future prospects of global oil demand. While in the past it was widely accepted that oil exports were not sustainable due to the exhaustibility of the resource base, it is now clear that the more serious factor threatening sustainable oil exports is a potential fall in global oil demand. Technological improvements, acceleration in efficiency measures and changing social preferences and government policies aimed at addressing climate change and air pollution are all expected to slow oil demand growth globally. The concept of "peak oil demand" has become more accepted, with many scholars, company executives and policymakers predicting a peak within the next decade.

Yet the reality is that no one knows when or whether oil demand will peak, because projections to that effect are highly sensitive to underlying assumptions. Thus, it is difficult to draw firm conclusions about the

NON-ENERGY GROWTH
The Gulf States have effectively diversified their economic base, as demonstrated by the growth of non-energy sectors that have contributed more and more to economic production, employment and consumption. In the photo, students in a cafeteria, Kuwait City.

speed of the current energy transition. However, regardless of when oil demand peaks, the debate, in light of current energy trends, places the topic of diversification in a new light. Creating new and more secure revenue sources now becomes an ever more urgent priority, as governments are faced with the imminent reality that while oil revenues might drop significantly, and might do so considerably faster than previously anticipated, government spending is expected to continue to rise. These economies have very generous and costly welfare systems that are rooted in their political–economic structures. Gulf oil producers have competing priorities, some of which such as the funding of enviable social welfare measures which underpin their societies, tend to take precedence over others. These social welfare measures span a wide array of areas such as housing support, guaranteed public sector employment, energy subsidies, employment support and other allowances. The costs of these welfare programs are very high and the subsidies are among the highest in the world.

These subsidies are also highly energy intensive, and that reduces the share of oil production available for exports. Very generous energy subsidies and almost free access to energy have contributed to making Gulf oil exporters among the highest global energy users per capita. Domestic consumption is also high, given the energy needed to deal with a very hot climate that lasts for months, and with the high requirements for water desalination in a very water-scarce region. This means that, even in the unrealistic scenario of a constant oil price and stable demand, local consumption will continue to increase, driven by growing populations and improved income.

The need for broader structural reforms

So how should Gulf oil exporters feed the above trends and challenges into their strategic thinking and economic diversification agenda? To answer this question, it is essential to first explore the state of diversification in the Gulf States. Are the economies of the Gulf States as undiversified as has been proclaimed in popular discourse, and how can they achieve meaningful diversification?

While the dominant view holds that these economies are not diversified, an examination of economic data at the macro and sectoral levels over the last four decades indicates a more nuanced picture. The Gulf States have, in fact, succeeded in diversifying their economic base, as evidenced by growing non-energy sectors, which have increasingly contributed to value added economic production, employment, and consumption. In most of these economies, at least one-third, and in most cases one-half, of gross domestic product is generated by non-energy sectors. But what the data also show is that this diversified base makes a minimal contribution to either export earnings or fiscal diversification and, therefore, to economic sustainability. So why have these economies failed to achieve diversification of earnings, despite higher economic diversification? This failure is due to various structural constraints and economic distortions. These factors include:

- The non-energy sector, although sizable, is largely geared towards non-tradables, so it contributes little to export earnings.
- The fiscal structure is designed to rely heavily on oil revenue with few other sources. In this structure, the private sector and individuals contribute negligible shares to government revenue, while all public and private sectors as well as individuals receive pervasive subsidies instead.
- Large fiscal commitments cause fiscal rigidities that limit the scope and flexibility of public expenditure. These rigidities stem first of all from the large size of current expenditure and the significant public sector wage bill. For example, in Kuwait, current expenditure constitutes 80 percent of government expenditure, and half of this expenditure funds the public sector wage bill. Second, rigidities are caused by large transfers and subsidies to households and firms. Despite some recent energy pricing reforms throughout the region, these rigidities persist and in many cases attempts to reduce them have been faced with political opposition.

- Capital is captive in capital-intensive public-owned energy industries or is largely funneled to investments abroad in sovereign wealth funds and the Gulf States have some of the largest sovereign wealth funds globally. As such, there is limited capital available to support non-energy industries and their growth.
- In addition to a high degree of specialization in hydrocarbons and this sector's dominance over trade, the Gulf Cooperation Council (GCC) economies are constrained by public sector dominance. The public sector dominates economic production, capital formation and employment.
- Public sector employment policies emphasize guaranteed employment to nationals and offer salaries exceeding those in the private sector for similar levels of education and technical training. These policies result in bloated public sectors and disguised unemployment, together with a very high public wage bill. This structure also offers limited incentives for nationals to move to the private sector, even in the presence of wage equalization mechanisms under nationalization schemes.
- Another result is a highly segmented labor market where, in effect, there are two separate labor markets. Throughout the Gulf, expatriates comprise the majority of the labor force (83 percent in the case of Kuwait in 2015), the majority of whom are employed in the private sector at lower wages than nationals at the same skill level. These expatriates are also employed on flexible labor contracts, so they can be let go or leave their jobs, and their employment is dependent on employer sponsorships. Importantly, access to expatriate labor offers large economic efficiency gains and an adjustment mechanism for the economy during times of oil price shocks. As such, there is little incentive for the private sector to employ national labor. Similarly, as mentioned above, nationals are largely concentrated in the public sector and enjoy guaranteed jobs with inflexible contracts. Therefore, the non-energy sectors offer little contribution to local employment growth.
- Finally, Gulf economies are dominated by oligopolistic firms. While it is natural for all economies to have oligopolies, short-run oligopoly rent is destroyed in the long run by competition-induced innovation. But this has rarely occurred in the Gulf States. While the small size of their economies, coupled with efficient technology, would tend to lead to the emergence of oligopolies or monopolized industries, oligopolies are particularly pervasive in the industries of all Gulf economies. This is problematic to the extent that oligopolies distort markets and prices, and their sustained

rents engender strategic behaviours that limit creative destruction and detract from growth-enhancing innovation. Governments in the GCC have adopted plans to increase industrial competitiveness and expand the private sector, yet reform attempts have had limited success and are politically sensitive.

Thus, what the GCC economies need is not just diversification, but better economic diversification that can reduce the dependence of exports and government budgets on the oil sector. Meaningful diversification can be achieved by removing some or all of the constraints above. Such moves would include microeconomic reforms such as those aimed at increasing industrial competitiveness and labor market reform. But it is also necessary to develop a private sector that increases its share of employment of locals and contributes to fiscal diversification. Yet reforms must also be politically viable and should avoid undermining political stability in these countries. Thus, diversification is a complex process and requires broad reforms that go beyond the economic sphere.

The role of the energy sector

Economic diversification in the Gulf States should also build on their intrinsic strengths and must go hand in hand with adaptation to current energy trends and a reassessment of the role of the energy sector in their economies. After all, the oil sector will continue to dominate the Gulf economies because there is no alternative industry on which governments can rely to generate either exports or government revenues. Also, as low-cost producers with some of the largest reserve bases, GCC oil producers are expected to fill the supply–demand gap by investing heavily in their oil sector.

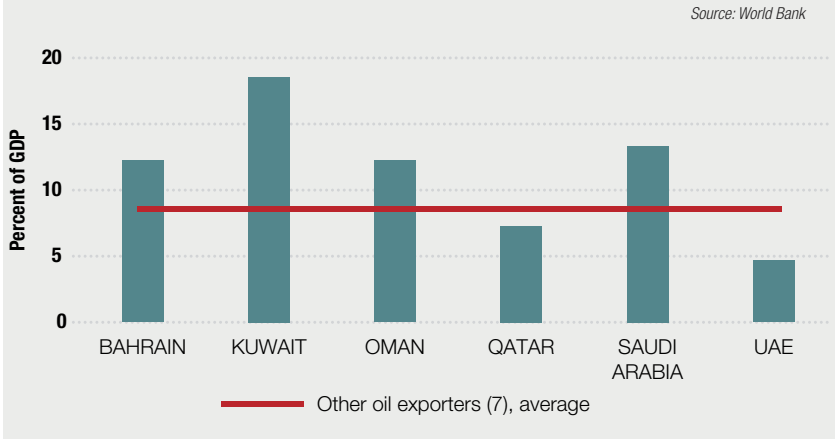
That said, the oil sector needs to play a more active role in the diversification process. This involves, for instance, extending the value chain beyond simply producing crude oil and exporting it to international markets. By extending the value chain, Arab producers can create different types of jobs in new industries, industries whose product prices are not highly correlated with oil prices. In the past, the focus has been on exporting basic petrochemicals (for instance, converting ethane to ethylene), exports which did not generate much of the expected benefits for two reasons. First, the prices of basic petrochemical products are highly correlated with oil prices. Second, the refining and petrochemicals industries are also highly capital-intensive industries and don't generate many jobs. Therefore, the recent emphasis in some of the GCC countries has been on extending the value chain to more complex petrochemical products, and even to finished products manufactured in industrial parks that attract both the private sector and foreign direct investment. Adding more stages to the oil value chain in this way not only generates more jobs but different types of jobs, such as service sector work that includes trading, marketing and sales, procuring and logistics, while also supporting accounting, finance, and human resource management. In addition, regardless of the speed of the energy transitions, GCC governments should pursue policies aimed at optimizing the use of the resource base and reducing the domestic consumption of energy. These policies would include the implementation of energy efficiency measures, rationalizing domestic energy consumption, reforming energy prices and the power sector and diversifying the energy mix by increasing the shares of gas and renewables. Given the challenge that Arab oil exporters face in providing low-carbon solutions, they might tackle this challenge through enhancing the importance and role of the knowledge economy.

In this regard, Gulf States should not miss out on the renewables revolution. Renewables are at an inflection point. While there are many uncertainties induced by the energy transition, there is almost a consensus among forecasts provided by various organizations that the share of renewables in the energy mix will rise. The high levels of irradiation throughout these countries, and of wind potential in some, create a unique opportunity for the Gulf economies to exploit their renewable resources to their full potential, to serve rising domestic demand whilst also harmonizing with the changing global energy landscape in which renewables are fast becoming mainstream. In doing so, Gulf economies should rethink their energy models to include renewables, in order to help meet domestic demand and free hydrocarbons for export, rather than simply aiming to replace their oil exports with renewables exports, as renewables generate almost no rents and thus will not ensure fiscal sustainability. In the long run, economic diversification of earnings remains the main adaptation strategy that these economies need to pursue.

Support growth of non-energy sectors

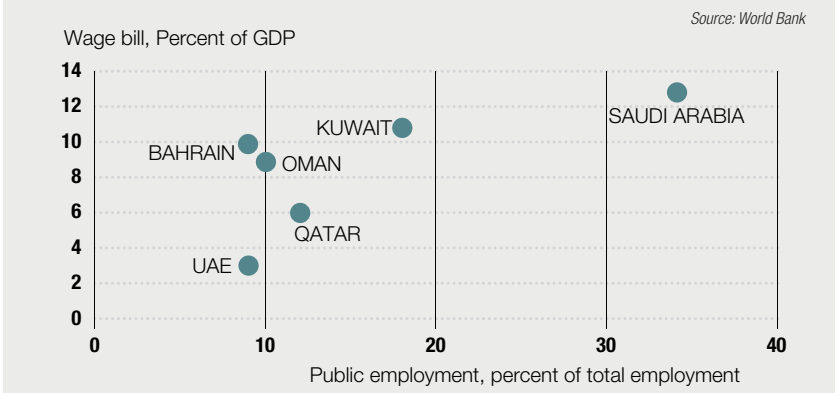
In short, what the GCC economies need is not just economic diversification, but "better" economic diversification that can remove some or all of the constraints above and support the growth of non-energy sectors that will contribute to both diversifying earnings and reducing economic exposure to oil price and oil demand shocks. A reconsideration of the role of the energy sector in the economy is also required. After all, the real problem lies in the economic and political structures and in policies surrounding the energy sector; these factors not only constitute barriers to meaningful diversification, but also limit this sector's contribution to broader and deeper diversification.

PUBLIC WAGE BILL, 2000-16



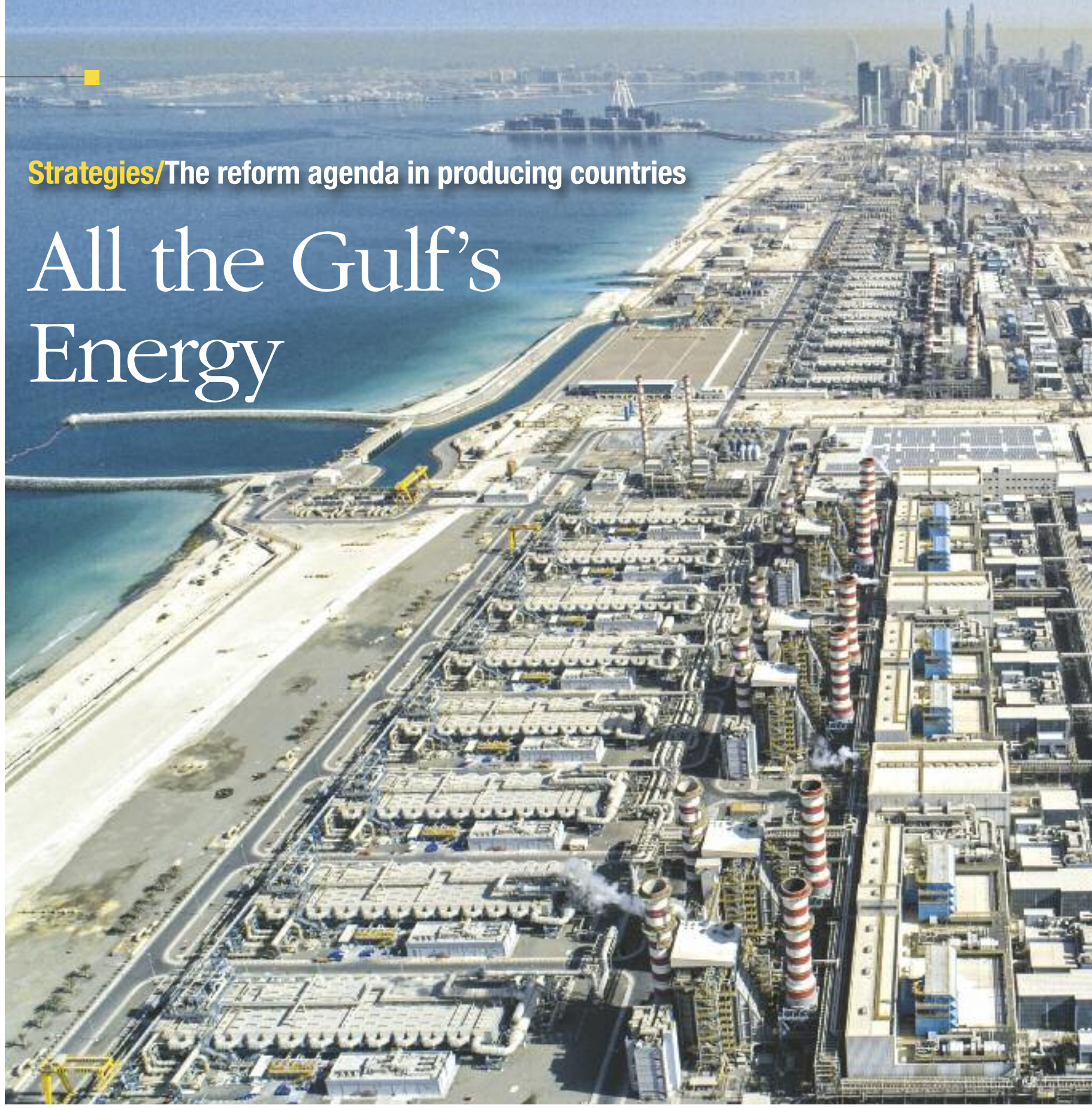
Public wage bills are large as a percentage of GDP in the GCC economies compared to other oil producers or the rest of the world.

PUBLIC EMPLOYMENT, 2005-16



The large public wage bills are the result of high levels of public employment and unusually large compensation.

All the Gulf's Energy



Extending the supply chain downstream, rethinking the use of gas, exploiting the potential of renewables and new technologies, improving energy efficiency, and investing adequately upstream are the strategies for making the energy sector a platform for development

ALI AL-SAFFAR

He is Middle East and North Africa Program Manager for the International Energy Agency (IEA).

he oil price cycle of the last decade has again exposed some of the enduring structural economic weaknesses in countries for whom oil and gas revenue constitutes a significant proportion of exports and fiscal revenue. As the most prominent producing region in the world, the impact of the change in oil prices has been particularly acute in the Middle East. In the Gulf Cooperation Council countries, for example, average net incomes from oil and gas fell by 45 percent in 2015-18 compared to their highs in 2010-14. Across the region, the public debate on the need to diversify oil- and gas-dependent economies has once again gathered steam, with several countries, including Saudi Arabia, Kuwait and the United Arab Emirates, announcing

ambitious reform programs aimed in large part at reducing their dependence on hydrocarbons revenue. Recognition of the need for economic diversification is not new; it was identified as a strategic necessity in development plans across the region as early as 1970. But success in achieving this objective has been limited, partly because the urgency with which reform was pursued has tended to follow the oil price cycle, diminishing when prices rose.

Future uncertainty in the energy markets

Future uncertainty in the energy markets means that, now more than ever, this pattern needs to be broken. On the supply side, the shale revolution in the United States has changed the calculus across energy markets. By 2025, projections in the IEA's (2018) World Energy Outlook suggest, the U.S. could account for one in every five barrels of oil produced globally and one-quarter of the world's natural gas production, and the nature of the short-cycle investments associated with this production increases the potential of price volatility in the short- and medium-term, which could impact budgets in oil dependent economies. On the demand side, improved efficiency and the move towards electrification of cars are making a dent in oil demand in the transportation sector, which currently accounts for over half of all oil consumption. Increasing public perception of the challenges of climate change and the growing policy push towards energy transitions add to the uncertainty around future oil demand, providing further incentive for producer economies to enact changes now that will increase their resilience in the future.

In the IEA's recently-released "Outlook for Producer Economies," we assessed what the impact of a lower oil price environment would be on producer economies. We found that if oil prices trend lower (because of increased supply, decreased demand, or a mixture of the two), the impact on producer economies would be stark: across the Middle East, per capita income would be 50 percent lower by 2040 than in a scenario where demand keeps growing and prices remain robust. The cumulative lost income from oil and gas to 2040 would reach USD 6.5 trillion, equivalent to almost three years of the region's current total gross national product.

The reform agenda for producer economies is, of course, much wider than energy, encompassing a range of issues including the need to improve the general business environment and the conditions for private-sector growth, and the introduction of prudent counter-cyclical fiscal policies that smooth price and revenue fluctuations. But one question we wanted to answer in the "Outlook for Producer Economies" is: how can the energy sector adapt to ensure that it acts as a platform for development, rather than a crutch for an unbalanced economy? Some of the most promising options are described below.

Capturing more value from hydrocarbons

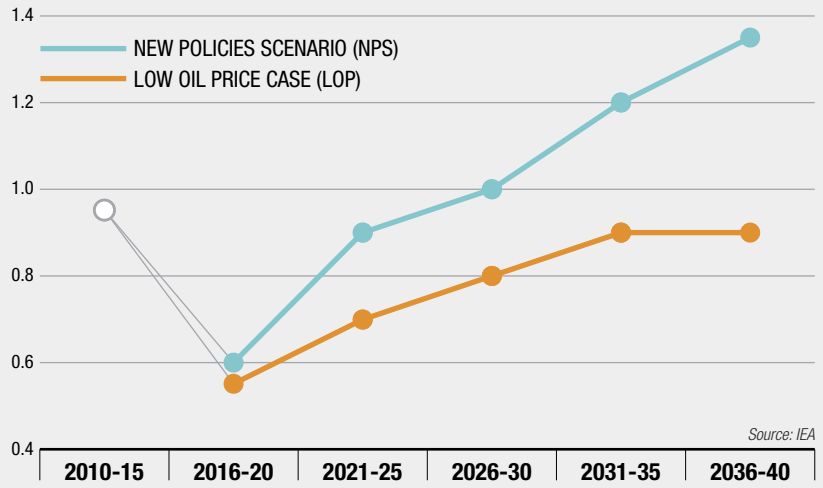
Across the Middle East, producers have already made significant efforts to move downstream in an effort to capture additional value from hydrocarbons resources. The Middle East currently accounts for around 10 percent of global refinery runs, and that share is set to increase as several large-scale projects, such as the Jubail, Yanbu and the Jizan complex in Saudi Arabia, are already under construction across the region. Countries are not limiting this increase in capacity to their home territories, and several are pursuing growing markets, notably in Asia. Saudi Aramco recently reached agreements to invest in refineries in China, India, Indonesia, Malaysia and the United States, while the Kuwait Petroleum Corporation is looking at investments in India's Bina Refinery.

There are several motivations behind this downstream drive, including a wish to extract more value from the oil the region produces, and to secure outlets for crude exports. The expansion increases revenues for each barrel produced, and thereby also risks increasing dependency on oil revenue. However, downstream earnings typically move in a different direction from upstream earnings—they tend to be higher when crude oil prices are low, and vice versa—so they also provide a hedge against lower oil prices.

Producers across the Middle East are also pursuing large investments in petrochemicals complexes. Beyond the attraction of potentially higher and more resilient margins, the likelihood of a robust outlook for petrochemicals products in all scenarios means that these offer a degree of hedging against the possibility of a contraction of oil demand as a result of a rapid uptake of electric vehicles or higher levels of efficiency improvements in a transitioning energy world. Indeed, even though there →

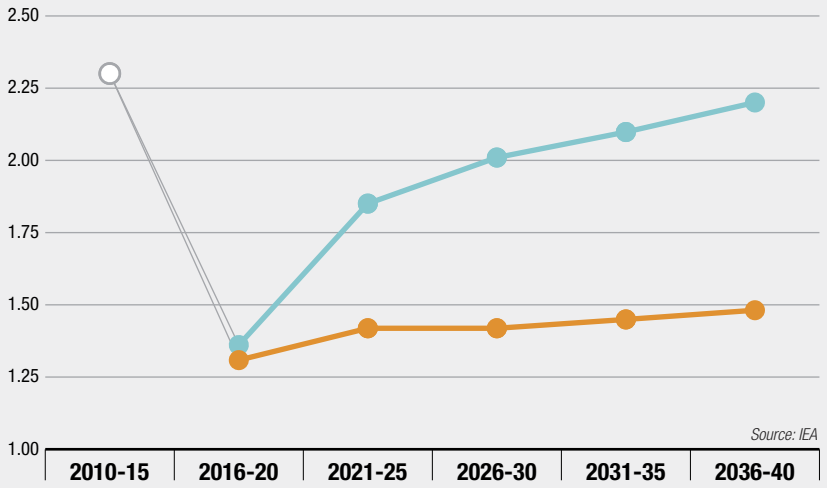
NET INCOME FROM OIL AND GAS, TOTAL

(TRILLION DOLLARS, 2017)



NET INCOME FROM OIL AND GAS, PER CAPITA

(THOUSAND DOLLARS, 2017)



In the event of a downward trend in oil prices (between USD 60 and 70 per barrel between now and 2040), caused by an increase in supply, a fall in demand or a combination of the two factors (Low Oil Price case – LOP), producer economies would suffer serious repercussions: throughout the Middle East, by 2040, per capita income would be half the level expected in a scenario in which demand continues to increase and prices remain high (New Policies Scenario – NPS). The total loss of revenue from oil and gas by 2040 would amount to 6.5 trillion dollars, a figure almost equivalent to the three-year value of the region's total gross national product.

is growing attention on reducing single-use plastics and increasing plastic recycling, especially in advanced economies, the impact of these trends is more than offset by surging demand in developing economies and the increasing use of plastics in place of other materials such as wood and metal.

Middle East chemicals production is expected to double between today and 2040—allowing the region's share in global chemicals production to increase by four percentage points, reaching 17 percent by 2040 on the back of feedstock cost advantage and the high level of efficiency of newly built facilities. A corollary of this increase in downstream activity is that, out of a 6.5 million barrels per day (mb/d) incremental increase in oil supply to 2040 from the region, only 800 thousand barrels per day (kb/d) is exported as crude with an additional 2.1 mb/d passing through refineries and 3.6 mb/d being used in petrochemicals production.

Using natural gas strategically in support of diversification

In several prominent oil producers, natural gas has been considered a sometimes-convenient by-product of oil extraction, and the unique opportunities it could offer in sustaining an industrial base have often been overlooked. There is a pressing case for a fundamental rethinking of the strategic importance of natural gas and where it is likely to bring the best value within the energy system, especially in countries where there are strains on the gas balance. For example, there is a strong economic case across the Middle East for faster deployment of solar photovoltaic (PV) technology to displace gas as well as oil in power generation, which would increase the availability of gas for use in value-added industries. On the supply side, to fully harness the potential of gas, some countries will need to reassess their pricing policies to incentivize upstream activity and review the priority sectors for gas consumption. Some progress has been made recently, with Saudi Arabia and the United Arab Emirates both taking steps to increase local gas prices, but these remain significantly below the cost of imported liquefied natural gas.

Tapping the potential of renewables

The anticipated growth in demand for electricity in a number of producer economies raises questions about the economic viability of the current mode of electricity supply. Across the Middle East, for example, a 5.7 percent per year increase in electricity demand has translated to a doubling in the region's oil consumption for power generation over the last 20 years, reaching around 1.8 mb/d in 2017. This diverts oil away from exports towards inefficient domestic consumption and incurs a significant opportunity cost—especially significant in periods when global spare production capacity look thin.

At present, peaking capacity in many parts of the Middle East is provided by oil-fired plants, often burning crude oil directly or using heavy fuel oil. In Saudi Arabia, for example, the daily load curve in summer reaches almost twice its peak in winter months because of air conditioning use. This means that 20-25 gigawatts out of a total of 88 gigawatts of capacity are used only for around half the year. These are mostly oil-fired plants, and they increase daily liquids burn by as much as 500 kb/d in peak summer periods relative to winter months. In the future, without a significant improvement in efficiency over time, and considering the large anticipated increase in the use of air conditioners across the Middle East, where demand for space cooling alone could skyrocket from 135 terawatt-hours (TWh) today to over 300 TWh in 2040), the peak will grow significantly, giving a measure of the imperative for a more efficient electricity system going forward.

Solar resources are abundant and are ideally suited to meeting this peak as daily demand for cooling peaks in the early afternoon, matching the normal peak in solar PV output. At present, this potential is almost entirely untapped, with the 1.2 GW of solar capacity providing less than 0.5 percent of total generation capacity in the Middle East compared to over 90 GW of oil-fired capacity. But fast-falling costs for solar PV mean that, even if oil were priced for a generation at USD 40/barrel, unsubsidised solar would be displacing it quickly on a cost competitive basis (see chart on page 23).

Although the economic case for renewable power is compelling, reaching deployment levels that reflect this will depend on removing barriers to their uptake. However, at current levels of deployment, concerns about the impact of variable renewables on grid stability in the Middle East are limited, although care will be needed to ensure that network planning matches plans for new utility-scale renewable projects. Most GCC countries in particular have generation fleets that are flexible enough already to enable a much higher penetration of renewables, and the rise in electricity demand for desalination could provide a further synergy for renewables, providing the option of their being used as a demand response facility, helping to ensure an outlet during periods of excess electricity production.

Phasing out subsidized use of energy to improve its efficiency

According to estimates by the IEA, fossil-fuel consumption subsidies totalled around USD 105 billion across the Middle East in 2017. Artificially cheap energy encourages wasteful consumption. Primary energy demand in the Middle East has grown at 4.4 percent per year since 2000, a rate that is more than double the world average. Among other things, this has meant that two in every five new barrels of oil production have been consumed domestically during this time. Economies across the region are now among the most energy-intensive in the world—the United Arab Emirates, the least intensive in the region, requires 10 percent more energy to generate a dollar of economic output than the world average.

Beyond the fiscal burden and the impact on consumption, subsidies also distort broader investment incentives across the energy sector. Low natural gas prices, for example, have reduced the incentive for private companies to invest in new explo-

ration and production projects in parts of the Middle East.

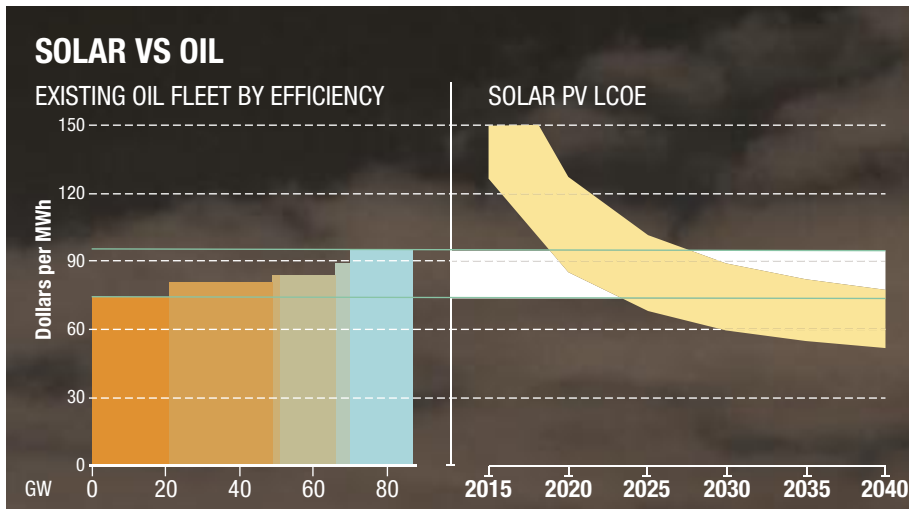
Besides accommodating the fact that low-cost energy is deeply embedded in the social contract in many producer economies, successful reform must also reconcile the need to reform prices with the imperative of sustaining or even enhancing industrial competitiveness. Across the Middle East, even without subsidies, most oil and gas producers would still have a comparative advantage in energy, since a low production cost base can provide a stable low domestic price. The implications of pricing reform for energy consumers can be mitigated substantially if reform is paired with enhanced energy efficiency measures. Raising fuel and electricity prices reduces the payback period for products with higher efficiency, and helps raise public awareness of the links between efficiency and the cost of the energy they consume; but a push is typically required on the supply side to ensure that more efficient products are available on the market.

Ensuring adequate investment for a dynamic upstream sector

The ability to maintain oil and gas revenues at reasonable levels provides an important element of stability for the economy as a whole, especially when market conditions are tough. In this regard, though it may sound counter-intuitive in the narrative on economic diversification, it remains crucial for producers to attract investment and maintain or improve the productivity of their upstream sectors. Occupying the bottom end of the oil supply cost curve, Middle East producers could remain integral producers even in a Paris-compliant energy landscape where oil demand peaks imminently and falls to around 70 million b/d by 2040. Some GCC producers, led by Saudi Arabia and the United Arab Emirates, have already also shown that through intensified efforts to eliminate gas flaring and methane leakage they are also extremely competitive on the basis of greenhouse gas emissions intensity, a factor that could differentiate suppliers of oil in the future.

Sustaining the development of cleaner and more efficient energy technologies

The Gulf Cooperation Council's producers have world-leading expertise in energy technologies; in addition to their potential in renewables, they are also well positioned to develop new approaches that reduce or minimize the lifecycle emissions of oil and gas. The argument becomes particularly compelling when synergies are found between industries. This is already happening to some extent, for example, in the United Arab Emirates, where over 40 million standard cubic feet per day of carbon dioxide are being captured at the Al Reyadah steel plant and piped to be used in enhanced oil recovery. This has the added benefit of freeing up much-needed natural gas that would otherwise be used for the same purpose. Oman is pioneering the use of large concentrating solar projects for enhanced oil recovery. There are large-scale opportunities to use solar energy to meet the Middle East's increasing demand for clean water through desalination. This is a particularly crucial area, with the production of desalinated seawater in the region projected to increase almost 14-fold by 2040. The shift from thermal processes towards electricity-fed reverse osmosis has the dual benefits of reducing hydrocarbons combustion for water while also providing an outlet for excess renewable power at certain times in the day, thereby reducing the problem of curtailment. It should not be assumed that the comparative advantage in energy of today's major producers will diminish in the energy transition.



The two charts compare the levelized cost of solar photovoltaic energy (LCOE) with the cost of oil-generated energy with a price set at USD 40 per barrel. It is evident that, over time, photovoltaics become economically more competitive.

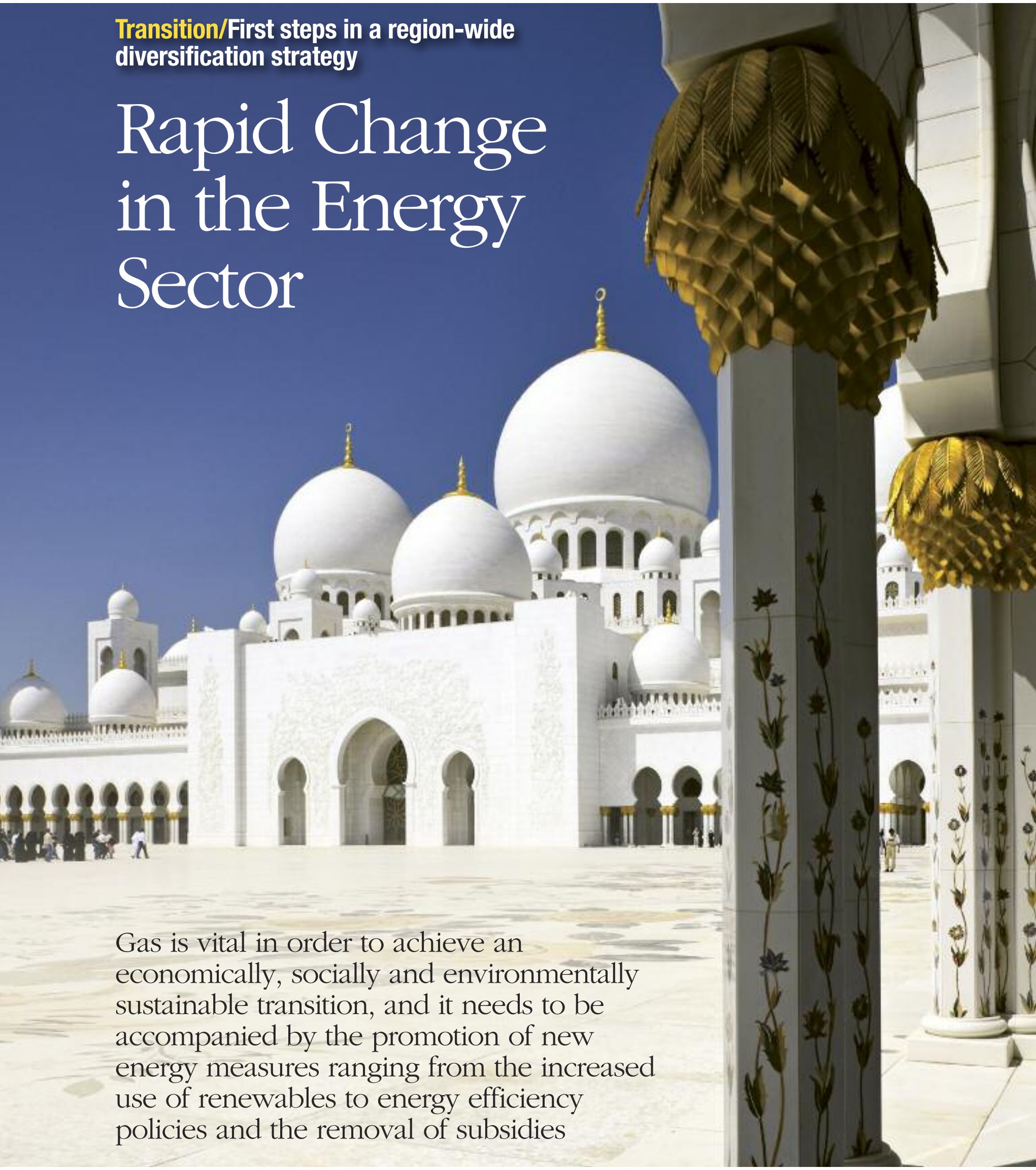
Source: IEA

Support growth of non-energy sectors

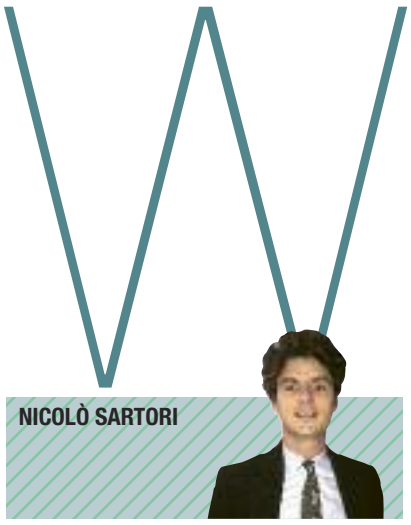
Although the risks are not evenly distributed across producers, demographic pressures and uncertainties on both the supply and demand sides mean that the imperative is growing for countries that rely on oil and gas revenues to reorient their economies. The transformation process will no doubt be complex and challenging, but the way it unfolds will have profound implications for the producer economies themselves, and the global energy system and energy security more broadly. This is because the prospects for stability in oil markets are increasingly linked with those for the reform agenda in producer economies. Venezuela provided a cautionary example of how developments in one producer economy can have serious implications for global balances. Price cycles are likely to continue to be a feature of commodity markets, and may even become more frequent given the increased prominence of short-cycle shale investments in the global supply picture. Periods of higher prices can provide relief but also bring with them a considerable risk, particularly if they ease the pressures for change at the same time they increase the incentives for large consumers to accelerate the policy momentum behind alternatives to oil and gas. This risk means that successful transformation of producer economies, underpinned by a strong energy sector, is of fundamental importance to actors well beyond those countries themselves.

Transition/First steps in a region-wide diversification strategy

Rapid Change in the Energy Sector



Gas is vital in order to achieve an economically, socially and environmentally sustainable transition, and it needs to be accompanied by the promotion of new energy measures ranging from the increased use of renewables to energy efficiency policies and the removal of subsidies



NICOLÒ SARTORI

He is Senior Fellow and Head of the Energy Program of the IAI (Institute for International Affairs), where he coordinates projects on the issues of energy security, with a focus on the external dimension of Italian and European energy policy.

What today seems to most people a matter of survival could turn into a major opportunity for the members of the Gulf Cooperation Council (GCC), Saudi Arabia, Bahrain, the United Arab Emirates, Kuwait, Oman and Qatar. We are referring to the need of these countries—all heavily dependent on oil export revenues—to diversify their oil-based economic and social structure (except for Qatar) and, with it, the underpinning of their energy sector. The collapse of crude oil prices in late 2014 and the enduring uncertainty and volatility of the oil markets, resulting in OPEC's inability to respond to the changes under way, are nothing short of an existential challenge for the GCC member states. The developments of the last five years have made it necessary for the Gulf's ruling regimes to embark on serious reform efforts aimed at reducing their reliance on oil revenues for their economic activities and for securing domestic political and social stability. In the three-year period from the end of 2014, financial revenues from oil exports dropped by USD 400 billion, while in 2016, after recording average surpluses of 10 percent of GDP for more than ten years, the six GCC member countries ran an aggregate deficit of around 12 percent. Macroeconomic performance obviously varies from country to country, based on the weight of oil in the national economy. In Kuwait, for example, the budget declined by about 30 percent of GDP, compared to 15 percent in Saudi Arabia, while in more virtuous cases like the United Arab Emirates, there has been successful damage limitation and the deficit has been contained to just 2.1 percent—but the trend seems to be unstoppable. In conjunction with falling financial revenues, GCC countries have also experienced a considerable slowdown in economic growth rates, rising unemployment, falling wages, and declining per capita consumer spending.

Rethinking the role of oil

The substantial financial reserves built up in the sovereign wealth funds of Gulf economies have so far enabled the various rulers in the region to cushion the effects of turbulent times and compensate for substantial public deficits. But they cannot provide a definitive solution to the problem. The role of oil in the political, economic and social life of these countries requires rethinking. The current rebound in oil prices and concomitant increase in revenues is the only factor with the potential to secure these countries' economic recovery. This effectively ensures that the Gulf economies will remain entangled in their current predicament. While in the medium-term it is absolutely vital to reduce the weight of the oil sector on these countries' economies, in the short-term a wise and virtuous domestic management of these resources is crucial. The intensive and inefficient use of crude oil and derivatives at home significantly limits these countries' ability to maximize exports and the financial revenue that springs from them. Over the last twenty years, energy consumption levels in the Gulf have rocketed, and between 2000 and 2014, the GCC recorded the world's largest increase in energy demand, second only to China's. Saudi Arabia and Kuwait, for example, consume almost one third of their vast oil production, while in Oman, domestic demand consumes almost the entire national output, and Bahrain actually needs to import oil from its neighbor Saudi Arabia. The only country that remains essentially unaffected by these patterns is Qatar, most of whose oil output is for export since its economic development relies mainly on natural gas. Given the current demographic trends, increasing levels of electrification and rates of economic growth once these economies have recovered, domestic energy consumption seems set to expand even further, with the transport and power generation sectors in the spotlight when it comes to oil demand. But while to some extent the auto sector is at the heart of consumption of oil and derivatives—all the more so in countries where gasoline prices are heavily subsidized, as is the case in GCC countries—the electricity sector's level of dependence is an anomaly and a problem entirely peculiar to the Gulf region. To give an idea of its scale, 40 percent of the GCC countries' electricity generation capacity comes from crude oil, diesel and heavy fuel oil, mainly accounted for by Saudi Arabia (75 percent of national electricity generation) and Kuwait (65 percent), with a much lower contribution by the UAE. These staggering figures signal the need for local governments to abandon this economic model in order to rapidly monetize the value of these resources, especially in view of the fact that the oil market is bound to become more uncertain and less profitable in the long term.

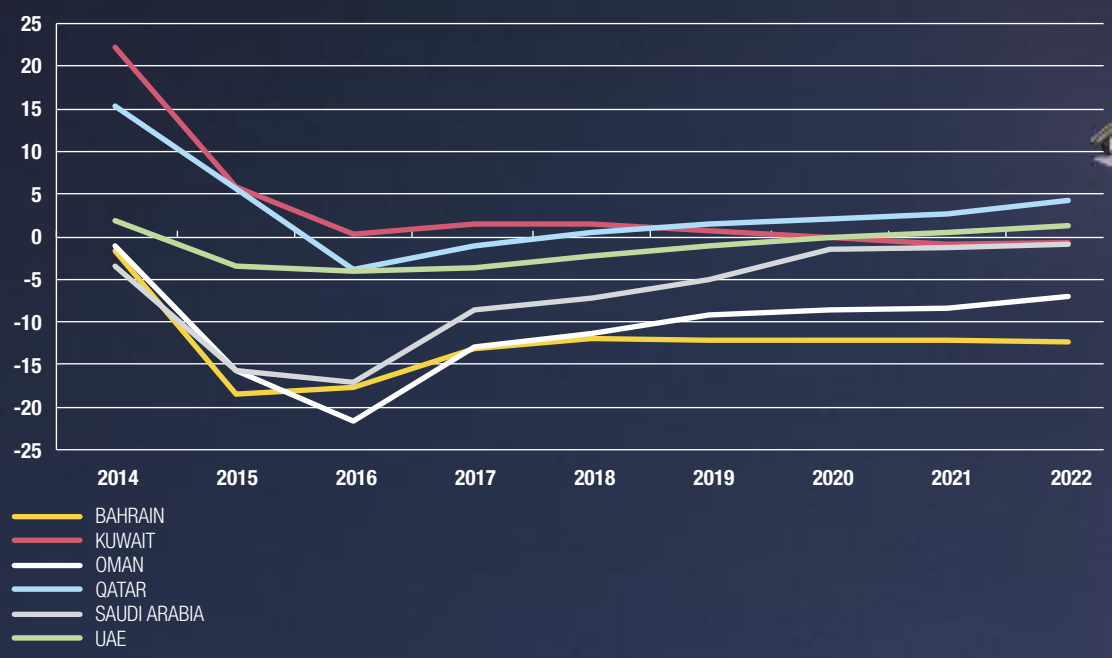
Stepping up on gas

Side by side with the need to monetize the exploitation of oil resources, GCC countries need to promote their natural gas reserves, which are abundant in the region, albeit less so than crude oil. The central importance of oil in the Gulf region often relegates the area's gas potential to a secondary role. Yet, the six GCC countries hold some 42 trillion cubic meters (tcm) of gas, accounting for 22 →

How low oil prices affect the GCC economies

In recent years, the fall in oil prices has had a strong impact on the Gulf economies. The vertical drop in financial revenues from crude oil export has caused large fiscal deficits in the GCC countries, despite the implementation of fiscal consolidation measures (Graph 1). In graph 2: the balance of production, imports and exports of crude oil and natural gas from the GCC countries.

1. OVERALL FISCAL BALANCE (percent of GDP)



Source: IMF

percent of the total reserves discovered globally, while their annual production is around 410 billion cubic meters–almost a third of which are in Qatar, accounting for a "mere" 11 percent of total output. Qatar is the undisputed regional leader in this sector with estimated gas reserves of 25 tcm, the world's third largest after Russia and Iran, and an annual production of 123 bcm, most of which is exported. The remaining GCC countries, besides very low production rates compared to their potential, have virtually no gas export strategy. Saudi Arabia, the second largest producer, uses all of the 84 bcm of gas produced from its fields to supply the domestic market, as do Kuwait and Bahrain. The United Arab Emirates, with an annual production of 81 bcm, are net gas importers despite selling small amounts (5 bcm annually) on the LNG markets, while Oman, also via LNG, exports 10 bcm per year, accounting for around one third of its national output.

In the context of energy transition, these resources can play a key role both regionally and globally. Natural gas, due to its lower CO_2 intensity compared to oil and coal, is universally recognized as the "bridge" fossil fuel for economies to achieve complete decarbonization in the decades to come and meet the pressing challenges of climate change. By focusing immediately and decisively on developing their gas resources, GCC countries can achieve three key goals, spread over different timescales. First, it allows them to free up oil resources used inefficiently at home (especially in power generation activities), and thereby maximize export earnings before further volatility and uncertainty hit the crude oil markets. Second, it secures the strategic positioning of GCC countries on the gas markets, which are set to grow exponentially—especially in Asia—as a result of global decarbonization policies. Thirdly, it ensures an economically and environmentally sustainable domestic transition in line with the goals of reducing global greenhouse emissions set by the Paris Agreement. With this in mind, institutional players and the private sector seem more inclined than ever to grasp the intrinsic opportunities offered by the gas sector. And while the choice made by Qatar—the leading global LNG producer—to leave OPEC in order to focus on gas production and distribution seems inevitable, the announcement by Saudi Aramco (Saudi Arabia's state oil company and world's largest oil producing company) to invest massively in gas could not go unnoticed. On the one hand, Saudi Arabia's energy minister Amin Nasser has launched the regime's strategy to increase the share of gas in the energy mix from 50 to 70 percent thanks to new domestic production. On the other, the Saudi giant has decided to invest USD 160 billion in the development of conventional and non-conventional fields in the country so as to be able to tap into the growing demand for gas from China and India. Kuwait is also moving in this direc-

2. CRUDE OIL AND NATURAL GAS: PRODUCTION, EXPORTS AND IMPORTS

Source: KAPSARC

tion. Firstly, it plans to increase external gas supplies through the LNG terminals at Mina al-Ahmadi and al-Zour, in order to reduce the share of oil in its electricity sector. It is also boosting investments in the country's upstream sector with a view to reaching a production of 11 bcm per annum by 2023. Finally, the United Arab Emirates, in partnership with Eni and Wintershall, is planning to develop a giant upstream project in the Hail, Ghasha and Dalma fields, with the capacity, once in full production, to meet 20 percent of its domestic demand.

Learning from the past while looking to the future

The exploitation of the region's huge natural gas potential should not distract GCC governments from their countries' priorities, which are to ensure an economically, socially and environmentally secure and sustainable transition. In this respect, investments in gas must be seen as the first step in a region-wide diversification strategy and not as a shift towards a new form of dependence from energy resources through the gradual replacement of crude oil with natural gas. To this end, the development of gas reserves needs to be accompanied by concrete efforts to promote new energy measures ranging from penetration of renewables to energy efficiency policies and the phase-out of subsidies. GCC governments made such efforts in the aftermath of the collapse of oil prices, but they have been slackening since the oil markets started to recover, albeit slowly. Saudi Arabia, for instance, plans to develop 30 solar and wind projects with an installed capacity of about 9.5 GW by 2023, in the framework of the 2023 Vision strategic plan. The Arab Emirates have launched their own initiative aimed at achieving a 50 percent contribution of renewables to total energy consumption and reducing the carbon footprint of power generation. These are ambitious plans which, thanks to technological evolution on the one hand, and to the region's meteorological/climatic conditions on the other, could enable these countries to achieve truly outstanding results. Through the combination of abundant natural gas resources and the huge potential for renewables in the region, GCC countries have the opportunity to tear down once and for all the (oil) dependence models that have hindered and continue to hinder their economic and sociopolitical development. Although the implementation of these strategies is bound to meet with strong resistance seeking to maintain the existing order, at least until the point of no return, the first steps taken by the regional players in the gas sector nevertheless offer some hope that a secure, fair and sustainable transition can be achieved across the whole region.

The Who’s Who of Energy

The economic and energy transition underway in the countries bordering the Gulf is mostly being led by young ministers, albeit highly experienced in the field of oil and gas, cosmopolitan and acutely sensitive to the new dynamics buffeting the region

KHALID AL FALIH [SAUDI ARABIA]**.** “We are no longer going to be inward-looking and focused only on monetizing the Kingdom’s resources. Going forward the world is going to be Saudi Aramco’s playground.”

BRAHIM MAARAD

He is a journalist specializing in the Arab world and migration. He is foreign affairs editor of Agenzia Italia, and worked previously at *L’Espresso*. He is the author of *Nel nome di chi*, published by Rizzoli.

he new generation of energy ministers around the Gulf now called upon to lead a crucial sector of their economies at a pivotal moment in the region’s history are an impressive group. Highly educated, with most having studied at western universities, they have both a deep awareness of culture and history and an openness to the world.

Al-Falih, innovation built on the tradition of oil

A pioneer of the renewal process since 2016, Khalid Al-Falih, now occupies the most sensitive post in Saudi Arabia, hitherto jealously held by Ali Al-Naimi, 81, who led the world's oil markets for 30 years. With the encouragement of the new heir to the throne, Mohamed bin Salman (MbS), even the name of the ministry he runs has been changed from the Ministry of Petroleum to the Ministry of Energy, Industry and Mineral Resources. Al-Falih’s task is not only to shore up Riyadh’s increasingly shaky economy but also to achieve the “ambitious goals” set by MbS in the Vision 2030 plan.
Upon his appointment, Al-Falih set a path of innovation but without altering oil policy.
The 59-year-old mechanical engineering graduate from Texas A&M University, with a Master’s Degree from King Fahd University of Petroleum and Minerals, aims to produce 70 percent of Saudi energy from gas and to list shares of the oil giant Saudi Aramco, where he himself grew to become CEO in 2009. He headed the national company until 2015, when King Salman entrusted him with the first task of his political career: to lead the Ministry

SUHAIL AL MAZROUEI [UNITED ARAB EMIRATES]**.** "The UAE has already put in place a strategy to reduce water consumption. This is the priority for everyone to look at now for the sake of future generations."

KHALED AL FADHEL [KUWAIT]**.** "Renewable energy is our compass for investments in every sector in Kuwait. We are working to achieve the set goals and we have all the potential to do it."

MOHAMMED BIN SALEH AL SADA [QATAR]**.** "We didn't see ourselves fitting anymore in OPEC. I suggested to our leadership that we should exit OPEC. I know people and media would love to politicize this and they have politicized it because they don't know the facts."

of Health. In 2017, as Minister of Electricity, he presented his investment plan for renewables: thirty projects to implement in order to achieve the objective of producing 60GW—10 percent of the country's consumption—from renewable resources by 2030. Specifically, the plan calls for 40GW from solar power and another 20GW from wind and other sources.

The long list of positions Al-Falih held in the past include that of Chairman of South Rub' al-Khali (SRAK), a joint-venture between Shell, Total and Saudi Aramco.

Al-Fadhel, an engineer focusing on renewables

Riyadh is not the only one looking forward to a green future in the Gulf. On December 24, Kuwait entrusted the Ministry of Petroleum, which includes responsibility for Water and Electricity, to a completely new political figure: Khaled Al-Fadhel, a 46-year-old academic, who taught engineering at the University of Kuwait before joining the government. He has a doctorate in chemical engineering from Lehigh University in the U.S. In 2018, he was appointed undersecretary to the Ministry of Trade, his first encounter with the political world. While he will not be playing a transformative role in the management of Kuwait's oil and gas industry, which is entrusted to the Supreme Oil Council, he does have an ambitious plan for renewables: to produce 15 percent of of Kuwait's energy from clean sources by 2030. Hitting this percentage would allow the country to save 2.46 billion dollars a year and, above all, cut emissions.

Al-Mazrouei's focus on sustainability

Another 46-year-old, an oil industry engineer, Suhail Al-Mazrouei currently heads the UAE's Ministry of Energy and Industry. He is an engineering graduate of the University of Tulsa in the U.S. Before joining the ministry in Abu Dhabi in 2013, he held numerous positions on the boards of major oil and investment companies. In particular, he chaired the board of directors of the Spanish company Cepsa, as well as Borealis and the Nova Chemical Company. He was also a member of the Supreme Oil Council. Before that, he worked at the Abu Dhabi National Oil Company (ADNOC) for ten years, where he was CEO until 2007. In 2018, he became chairman of OPEC. As head of the Federal Electricity and Water Authority, Al Mazrouei, when attending the 2018 Bloomberg Middle East Global Leaders Forum, stated that what "keeps him up at night is water" and that sustainability is a key component of his mission." In 2017, the government launched the "Energy Strategy 2050," which aims to reduce energy production from fossil fuels and increase energy efficiency by more than 40 percent. Al-Mazrouei's objective is to reach 44 GW of solar energy by 2050 and increase renewable sources to 50 percent of the total.

Saleh Al-Sada, 34 years of experience in oil and gas

At a time of serious crisis with Saudi Arabia, Qatar continues to rely on the expert hands of Mohammed Saleh Al-Sada, who has headed the ministry in Doha since 2011. In →

MOHAMMED BIN KHALIFA BIN AHMED [BAHRAIN]**.**
“We need to keep up with digital changes and be prepared for all that is new on the world stage. For this reason, we need to invest in many projects for the economy of Bahrain, starting from the oil sector.”

MOHAMED ARRAMHI [OMAN]**.**
“All Arab countries are required to have projects to develop renewable energy.”

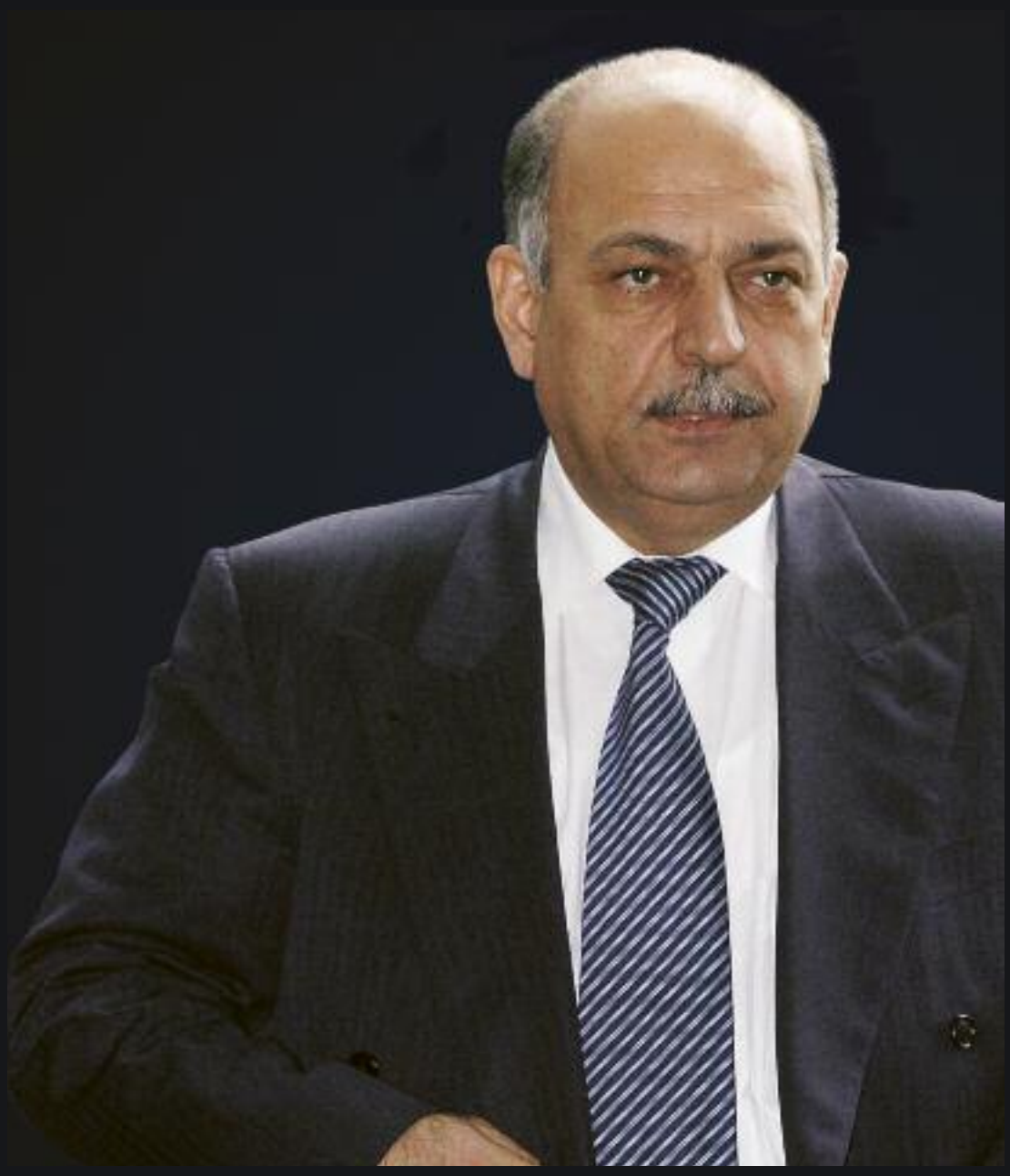
2014, he was entrusted with the whole energy and industry sector and the management of the national oil company, Qatar Petroleum. A 34-year veteran of the oil and gas sector, he is also chairman of the Qatar Gas Transport Company (Nakilat), Qatar Electricity & Water Company and Qatar Solar Company. He has a doctorate from the University of Manchester, U.K., and a degree in Marine Sciences and Geology from the University of Qatar. Before becoming a minister, was undersecretary for Energy and Industry from 2007 to 2011. His Vision 2030 plans to invest 200 billion dollars to increase the use of renewable energy in the country. The aim is to achieve between 700 and 750 MW of solar energy an hour, to cut back the ever-increasing demand for crude oil, especially from the east. The Qatar government has also announced an important nationalization plan to achieve self-sufficiency in the industrial sector linked to oil and gas. In particular, Doha would like to be able to do without imports that cost 2.47 billion dollars a year; they project that cutting imports could produce an increase in GDP of 1.6 percent. The decision is also dictated by the embargo imposed by neighboring—in terms of borders, not relationships—Saudi Arabia. The smallest emirate—inhabited by around 2 million people, 1.5 million of them in Doha—is one of the richest countries in the world in terms of per capita GDP. In addition to its bounty of oil, it has the world’s biggest natural gas reserves.

Bin Ahmed, modernization involves digital development

Mohammed bin Khalifa bin Ahmed is also part of the generation of 46-year-olds leading the energy sector. A Cambridge graduate with a Master’s Degree from Imperial College, London, he is currently Bahrain’s Minister of Oil and Gas. He is aiming to modernize the country, investing in new technologies in particular. “We need to keep up with digital changes and be prepared for all that is new on the world stage,” he explained a few days ago. “For this reason, we need to invest in many projects for the economy of Bahrain, starting from the oil sector,” he added. Bin Ahmed is therefore focusing on innovation, both to increase crude production and to diversify the economy. Bahrain, which is aiming to become the first country to have total 5G network coverage, is preparing to activate its 100 MW plant, one of the country's biggest renewable energy projects. Once completed, the plant will supply 2.5 percent of the total energy produced. The aim is to increase this to 5 percent by 2025.

Mohamed Arramhi, dynamic and globally interactive economy

The Sultanate of Oman also has its Vision, but this one looks ahead to 2040. The strategic plan, which is still very abstract, aims to continue the policy of building a “diversified, dynamic and globally interactive economy.” Oil Minister Mohamed Arramhi, born in 1960, is chairman of the board of the Oman Oil Company. He is a staunch supporter of the idea that “all Arab countries are required to have projects to develop renewable energy.” The Sultanate is aiming to produce 15 to 20 percent of its energy from green sources by 2030. Miraah, the gigantic thermodynamic solar power plan inaugurated last year in the Dhofar governorate, in the south of the country, is moving the country in this direction. Costing 600 million dollars, the project will use solar power to recover



THAMIR ABBAS GHADHBAN [IRAQ].
"We will do our best to stabilize the market . We will look after our country as a first priority but will not put aside the interests of the consumers."

BIJAN NAMDAR ZANGANEH [IRAN].
"Oil is not a weapon, it is not a political tool to be used against some countries, producers or consumers. The market should be depoliticized and any use of oil as a weapon or as a tool against some countries should be condemned."

oil and gas. For the Oil & Gas Minister, this is an important turning point for the Sultanate as it will strengthen its leadership in the regional energy convergence sector. The use of solar power in Oman's oil fields will reduce the industry's use of natural gas.

Thamir Abbas Ghadhban, choosing continuity

Less visionary is the government of Iraq, now enjoying a period of precarious stability that leaves little room for government vision. On October 24, 2018, new president Barham Salih decided to place the ministry of oil in the knowledgeable hands of Thamir Abbas Ghadhban, a 74-year-old who has been dealing with oil at the ministry in Baghdad since 1973. Originally from Kerbala, he is a geology graduate of University College, London, with a Master's Degree in Oil Engineering from Imperial College, London. In his long political career he was a member of the Iraqi constituent commission and, under the government of Saddam Hussein, presided over the Oil Marketing Foundation. He first served as Oil Minister during the provisional government of 2004-2005.

The current government's first objective is to increase daily production of crude oil to 6.5 million barrels a day by 2022. However, there are two main challenges: local reconstruction and repair of the plants destroyed by the passage of the so-called Islamic State and production in the territories situated in Iraqi Kurdistan. Ghadhban has given an assurance that over 40 billion dollars will be invested in the first, which will be spent not only on oil but also on a new national structure for the production of liquefied natural gas. Meanwhile, negotiations will start with the Kurdish areas to start selling the over 250,000 barrels extracted every day by the administration in Erbil.

Bijan Namdar Zanganeh, the doyen of ministers

If being an oil minister in Iraq today is not exactly easy, it is even less so in neighboring Iran. Unsurprisingly, Bijan Namdar Zanganeh—the doyen of ministers—has held posts in as many as twelve governments in the Islamic Republic. Born in 1951, the only Kurd in Hassan Rohani's government, he has an international reputation. He gained a Master's Degree in Reconstruction Engineering at the University of Tehran in 1975. Regarded as a reformist, he was never appointed to a ministerial post during Mahmoud Ahmadinejad's terms of office. In 2013, the newly elected Rohani entrusted him with the Oil Ministry, convinced of the need for an expert who could revive the country's stagnant economy. Zanganeh held onto his post in the government reshuffle, although, according to reports in Tehran, Zanganeh would have gladly done without the assignment and apparently suggested some younger figures. "I want someone in the Oil Ministry who can achieve 100 billion dollars of revenue a year. Can the person you are suggesting do that?" Rohani is reported to have said. "We want someone for the ministry who is credible abroad, someone who is recognized by foreigners. Bijan Namdar Zanganeh fulfills this requirement and he's a trademark," he apparently added.

Smart city/How to deal with climate change and cut emissions

Sustainable Urbanization?

It is at the city level that sustainability policies need to be defined and solutions implemented. Over the past decade, many Gulf Cooperation Council governments have actively promoted urban environmental projects. Their uneven results reveal objective limits and contradictory trends

ERIC VERDEIL

He specializes in urban geography. Since September 2016, he is University Professor at Sciences Po Paris. He conducted most of his research in the Middle East and particularly in Lebanon, after a dissertation dealing with planning cultures and urban polics through the case of Beirut's reconstruction.

Since 1987 and the release of the Bruntland Report on sustainable development, concerns over climate change, biodiversity and other global threats have grown, and urbanization is at the core of this global anxiety. The world's urban population, as recorded by the UN, has now reached 4.2 billion, or 55 percent of the total population, and is expected to grow an additional 2.5 billion by 2050. This tremendous urban population will consume considerable resources and emit about 75 percent of the world's greenhouse gases. Cities are a major factor of unsustainability at the same time cities and urban dwellers increasingly suffer from global environmental changes. Gulf cities are no exception to these problems. Record breaking temperatures in Kuwait in 2016 highlighted the unbearable summer heat Gulf cities are facing and will have to cope with. Sea level rise or extreme rainy events may also affect the future of cities in this region. At the same time, governments, international organizations and urban authorities insist that if cities are both the cause and victims of global threats, they can also be the solution. Hence, cities have to be the place for implementing solutions, and policies have to be designed at the city level. These policies must both reduce the urban environmental footprint and unleash the resilience of cities.

Environmental protection through social inclusion

The New Urban Agenda adopted in Quito in 2016 underscored the two-faceted nature of sustainability; i.e., that environmental preservation must go hand in hand with social inclusiveness.

How have Arab Cities and governments moved in this direction? The continuous urban growth in this region of the world, in the face of harsh climatic conditions, has historically been made possible only through an extravagant use of cheap and widely available energy, and to date urban forms and consumption patterns are clearly at odds with sustainable practices. Until recently, there were few signs of ecological concerns in this part of the world, and Arab cities are scarcely present in city networks that are at the forefront of environmental transition. For instance, the C40 Cities Climate Change Leadership Group includes only three Arab Cities: Cairo, Amman and Dubai. Out of more than 1500 members, the Local Governments for Sustainability network includes only 10 from the Middle East and North Africa, five of them from Turkey. Despite this low profile in international arenas, Gulf governments loudly and glitteringly advertise their commitment to sustainable urban agendas, and in the last ten years governments have actively promoted projects and plans that demonstrate their will to implement sustainable strategies. However, their motivations are complex, and impressive achievements have objective limitations and should not hide contradictory trends.

Masdar City represents the first and to date most telling expression of urban sustainability ambitions. The famous carbon-neutral city in the suburb of Abu Dhabi, designed by Norman Foster, was launched in 2008. It uses brand new technologies in building design, energy management, renewable energy, water and waste management, as well as innovative transportation technologies. It is intended to become first a lab, and then a model for future urbanism in the region and beyond. The project indeed became a showroom, as Abu Dhabi also managed to attract the headquarters of IRENA, the International Renewable Energy Agency and to develop spectacular solar projects connected to the neighborhood. As cities in the Gulf region compete against each other in order to attract investments, governments have designed projects that emulate Abi Dhabi's vision. This is the case with the new Saudi towns of King Abdullah Economic City and above all, the futuristic ciity Neom. In Dubai, several initiatives also express the will to compete with Masdar City, for instance the recent Sustainable City megaproject.

Developing renewables and improving efficiency

These urban projects are increasingly integrated into wider strategies aiming at developing renewable energy, as well as energy and natural resources efficiency schemes. All governments in this region have set up targets for renewable energy (RE) production and regularly upgrade them. The UAE targets 27 percent clean energy capacity in 2021 while Saudi Arabia targets 10 percent RE capacity in 2023 and 30 percent in 2030. The continuous decrease of KWh price for solar technologies, both CSP and PV, as shown in the latest bids in Dubai and Saudi Arabia, renders these targets within reach. At the end of 2018 the share of renewable energy has more than quadrupled in four years, from 210 MW in 2014 to 867 MW. But this amounts to less than one percent of electricity capacity.

Governments have also adopted ambitious schemes for energy efficiency. Green building councils have been established in almost every country in the region and they have adopted international standards for energy saving norms, such as Leadership in Energy and Environmental Design (LEED), to the approaches, such as the Pearl rating system in Abu Dhabi. Gulf states have also begun to roll back costly subsidies to fossil fuel, electricity and water. Several cities are also building massive public transportation schemes, and Dubai has been a pioneer and now runs two metro lines. Similar projects are under construction in Riyadh, while Abu Dhabi plans its own system. But these transportation means will in the short term mostly serve the foreign population and not the nationals, who prefer to use cars. Plans for electrifying the automobile system are now actively being prepared, but they require huge additional generation capacities and a complete revamping of the energy distribution system.

Preparing for a post-oil world

There are several differences in the narratives local authorities in this region use to justify their commitment to sustainable urbanization. In contrast to most world cities active in promoting ecological transition strategies, climate change concerns are not prominent in the governments' discourses. Instead the clearest element justifying the move is the necessity to prepare their economies for a post oil future as economic diversification away from fossil energy is necessary. Clean techs and real estate stand at the core of the new green capitalism that unfolds. In this respect, sustainable urbanization appears not as a response to global threats but rather as a concern for the political stability of the countries and a new direction for economies. Abu Dhabi has taken the lead in this orientation with Masdar and other related plans. Indeed Masdar is not only a local project but a company active in the field of renewable energy, one investing abroad and aiming at replicating its technological innovations in other contexts. Prince Mohamed Bin Salman's Saudi 2030 plan very openly seeks to emulate those of his rivals from the Gulf shore.

In the short term, fiscal pressures added to the justification for this long term goal of diversifying the economy. With the slump of oil on in- →

MASDAR CITY
Masdar literally means “the source city.” Designed by Norman Foster, it is located in the United Arab Emirates, a few kilometers from Abu Dhabi, and was created with the ambitious goal of being the first carbon-neutral and zero-waste city in the world. It is home to the headquarters of the International Renewable Energy Agency (IRENA).

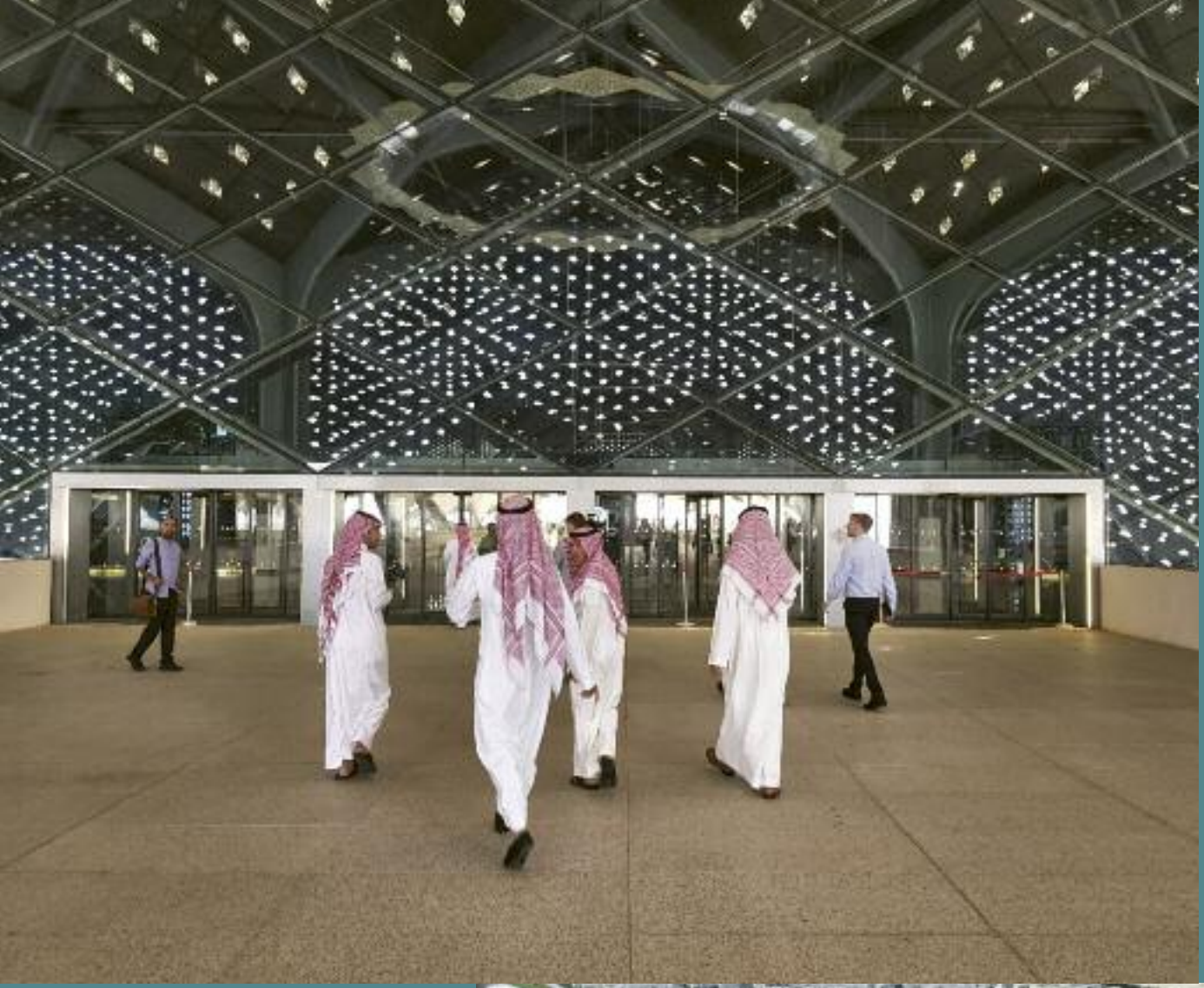
17,500 MWh
the amount of megawatt-hours of clean electricity produced at Masdar City’s 10-megawatt solar plant per year.

The cities of the future

NEOM CITY
This is the latest Asian center on the list of cities designed by Norman Foster and will be built in Saudi Arabia. The plans call for Neom to be built by 2030, over an area of 26,500 square kilometers, and for it to be powered entirely by renewable sources. The project is part of the "Vision 2030" plan.

72.4 GW
It is the amount of energy that the city will produce for energy autonomy, with 100% from renewable energy.

ternational markets in 2014, most oil-based economies in the region experienced fiscal tensions because oil revenues no longer covered social expenses. This strongly affected the more populated states of Saudi Arabia and Oman, where social demands are more heavily felt. Fiscal pressures played a determinant factor in reforming electricity, fuel and water prices, reforms which have been enforced in the last four years.
Having noted the high ambitions Gulf governments express and their original motivations, it is nevertheless necessary to underscore the limitations of those schemes. Four points come to mind: The vulnerability of these urban sustainable projects/markets to real estate cycles remains high. The real estate crisis of 2008-09 administered a blow to Masdar City and highlighted some of the weaknesses of this kind of project, and it was downsized and reprofiled as a more traditional real estate project. New developments remain well below the initially foreseen pace. The project did not fulfill its ambitious technological promises, even if the achievements already represent a strong departure from ordinary planning practices in the region. It is far from being carbon-neutral even if renewable energy and energy savings allow for about a 50% reduction in energy demand. Clearly, other sustainable megaprojects also depend upon foreign investments and stand at risk of similar real estate ups and downs. For instance, the delayed achievements of the futuristic cities KAEC and Neom in Saudi Arabia illustrate their difficulty in convincing foreign investors and the fierce competition between these cities and projects, where returns are determined not only by technological advancements but also by political conditions.
This highlights the political nature of arrangements regulating access to infrastructure and resources in cities of this region and hence a certain level of uncertainty regarding the capacity of local governments to maintain the direction in the face of contradictory demands. For years the political legitimacy of regimes in this part of the world has been linked to the provision of modern infrastructural services at a cheap, if not free, price. As explained above, under fiscal pressures, governments have recently slashed subsidies for fuel, water and electricity. This effort needs to be pursued and expanded. Until now, no major projects have failed over this issue, but it remains sensitive. Beyond that, urbanism remains car-centric and based on individual housing for nationals. This kind of urbanization, even with all its improvements and the increasing availability of renewable energy, remains unsustainable in the long run in terms of resource consumption (land, energy and water). The shortage of available land in the face of strong demand creates political tensions, as al-



KAEC
This is the King Abdullah Economic City, the smart city planned by Abdullah Bin Abdulaziz Al Saud, the sixth king of Saudi Arabia. It is expected to extend over a total area of 173 square kilometers and will be required to implement best practices from around the world, applying them wherever possible.

€51 Million
is the investment of King Abdullah Economic City for the design and construction of a sea water desalination plant powered by solar energy.

SUSTAINABLE CITY
This is an eco-residential experiment located less than 25 kilometers from the center of Dubai. About 3,000 people live here. There are solar panels on the roofs of houses, parking lots and companies, and this generates enough energy to reduce this community's consumption of fossil fuel to zero.

10 MW
is the production of solar energy used to power this city.

ready observed in Kuwait. As stated by researcher Sharifa Alshalfan, because of the "limits on development including access to land and infrastructure, supply in Kuwait struggled to meet rising demand. In 2015, the Public Authority for Housing Welfare had over 106,000 applications on the waitlist for housing, yet from the start of the housing program in 1954 and until 2015, the state was only able to provide 114,600 units. For the state to fulfil the current demand, it would need to develop almost the same amount of housing units it had provided over the past sixty years." The sprawl of the low density Kuwait City connected by hundreds of kilometers of highways creates huge traffic congestion.

Environmental decay around large cities

Another dimension of sustainability pertains to the huge degradation of the local environment around the big cities of the region. The extensive transformation of the shoreline in the Emirates as well as in Saudi Arabia has deeply devastated local ecosystems, for instance, the mangrove areas, also hurt by oil spills. The massive production of desalinated water also produces negative environmental outcomes. Most of the Gulf desalination plants currently use thermal technology, which requires much more energy than osmose reverse technology, and also emits a lot of greenhouse gases (GHG). In any case, for every liter of fresh water, 1.5 liters of brine and various chemical particles is discharged into nearby water, destructing sea life because of the increase of salinity and higher water temperature. The introduction of the newly improved reverse osmose technology fueled by renewable solar energy will gradually improve this dire situation, as the new Taweela unit installed by Abu Dhabi Water and Electricity Authority shows.
The higher share of renewable energy, the improvement of energy intensity and of water use do not mean that the use of resources will decrease in the future. Currently, a city like Dubai emits three times more GHG per capita than New York City. On average, GCC countries exhibit levels of carbon emissions per GDP unit much higher than the world average and beyond East Asian and North American competitors. This is even stronger when considering per capita average. Future trends anticipate an increase in carbon intensity, from 6.96 cubic meters (cbm) of carbon per capita in 2016 for the MENA region toward 7.5 cbm in 2030, while world average would remain below 5 cbm.
The continuous growth of population and urban surfaces in the coming years means that the ecological footprint will continue to rise, even if at a reduced pace. Strictly speaking, urban sustainability in the Gulf remains an elusive promise.

Saudi Arabia/The Vision 2030 development plan

A Testbed for Change

The Gulf petrostates, led by Riyadh, have outlined strategies to adapt to a world in which their current economic and political structures are no longer sustainable. Succeeding in this venture will require overcoming significant obstacles

MOISÉS NAÍM

He is a distinguished Fellow at the Carnegie Endowment for International Peace, in Washington, D.C. and a founding member of *WE*'s editorial board. His most recent book is *The End of Power*.

EVERYONE IS WAITING
GCC countries are preparing to carry out some national transformation experiments that will be followed with a mixture of interest and concern by the whole world, because their success will be vital for everyone.
Photo: Museum of Islamic Art, in Doha, Qatar.

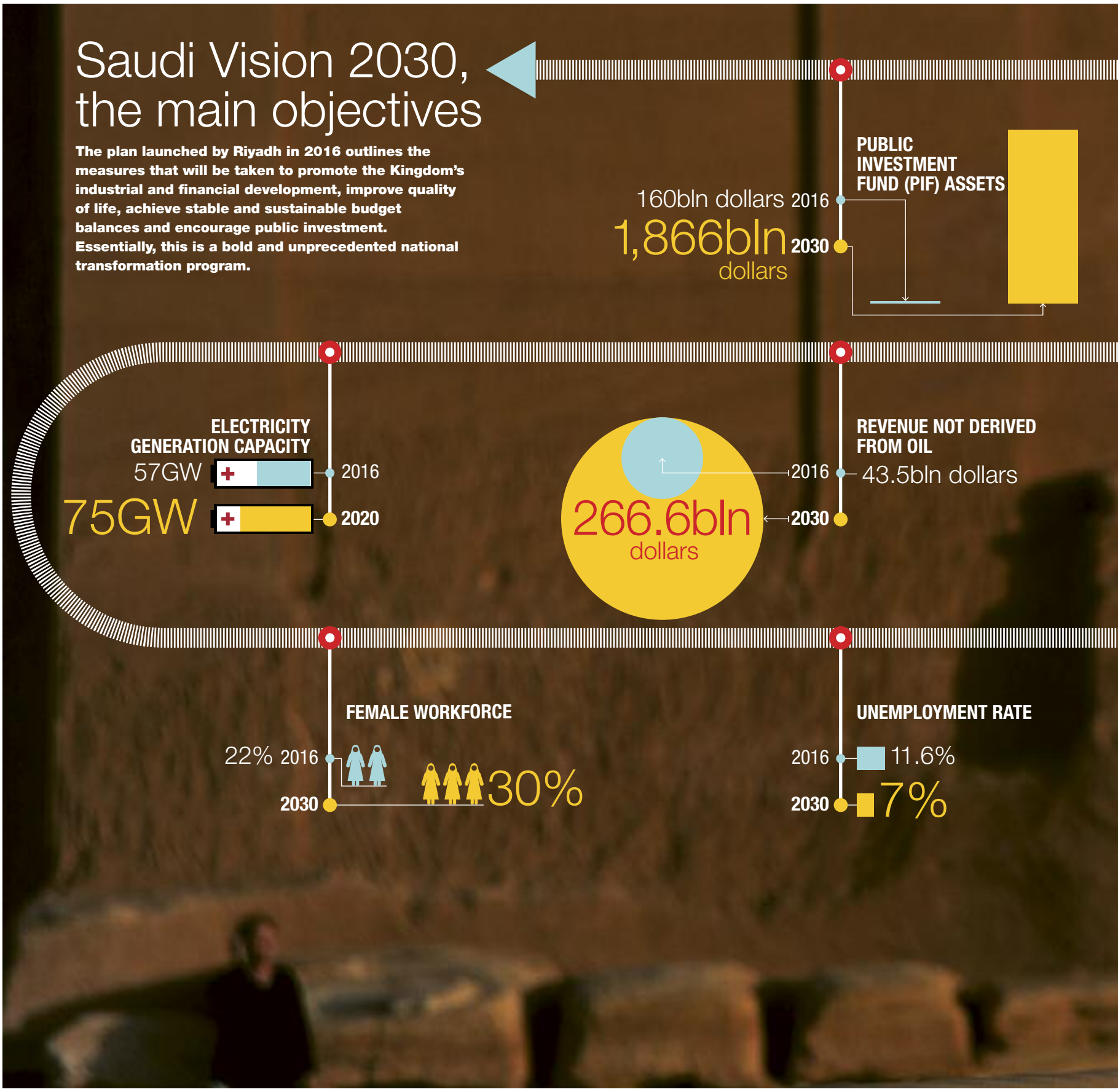
he Gulf countries are laboratories where the answer to one of the most vexing questions of our time is being sought. Can petrostates—that is, nations whose economies rest almost exclusively on the production and export of oil and gas—diversify and generate other sources of economic activity and growth?

As the social, political and economic pressures to lower the world's consumption of hydrocarbons mount, identifying and encouraging other sectors that could drive the economy have acquired unprecedented urgency for oil exporting countries.

Oil not only shapes a country's economy, it also determines many traits of its state, its politics and even its culture. The options open to petrostates at this juncture are more determined by previous conditions and decisions than those of nations with more diversified economies. The influence of the past in defining the set of options available to a country or a company is what social scientists call "path dependence." And petrostates suffer an extreme case of path-dependence. Can they break away from their past trajectory?

The non-economic consequences of oil dependency

So far no petrostate has been able to develop a substantial non-oil economic sector. That is in part because when combined with a fragile system of democratic checks and balances, the economic dependence on oil revenues lead to dysfunctional politics and distorted economies, in short, to a petrostate. In countries with institutional strengths, a large private sector and an effective government, this need not happen. Norway and the United States are the usual examples of nations with large oil and gas sectors that have not suffered the ravages of what is commonly called "the oil curse." For others, such as Nigeria or Venezuela, the dependency of their revenues on oil and gas exports creates a kind of autoimmune disease which feeds chronic inequality, corruption and poverty, while either undermining democracy or blocking it altogether. No petrostate has been successful in converting oil revenues into stable prosperity for the majority of its population. It's not that leaders fail to realize they need to diversify their economies. In fact, all oil countries have invested massively in the development of other sectors. Few of these investments succeed, largely because overvalued exchange rates stunt the growth of agriculture, manufacturing, or tourism, making the countries less competitive in international markets. They also become highly vulnerable to the volatil- →



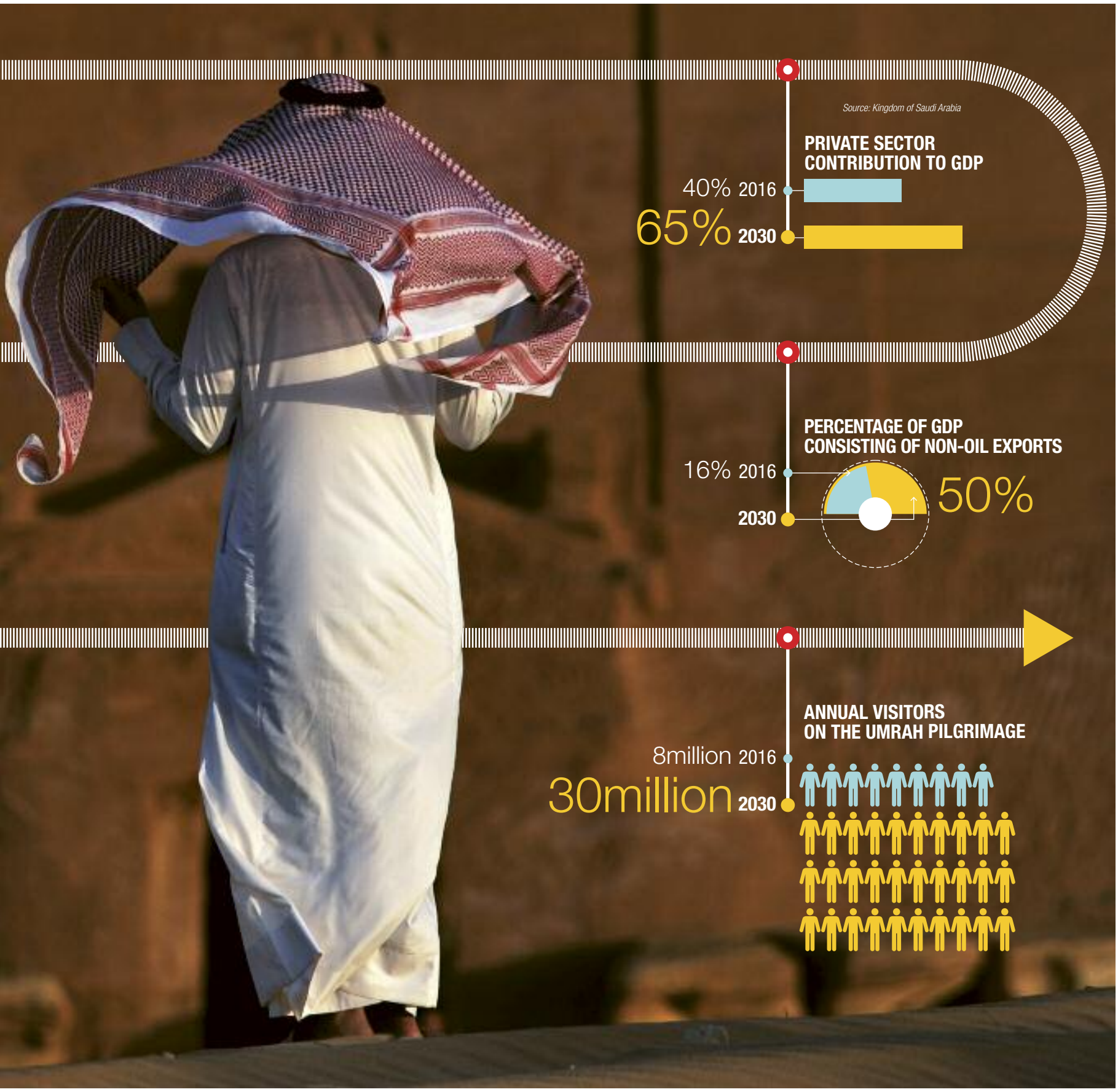
ity of oil prices, which result in deeply damaging cycles of economic boom followed by an impoverishing bust. Not surprisingly, in petrostates, the fight over control and distribution of the nation's oil rents often becomes the gravitational center of political life.

In nations in which the large-scale exploitation of hydrocarbons becomes the dominant economic activity before a strong state, effective institutions and internationally competitive private sector exist, a dysfunctional petrostate obtains. Once in place, the economic and political arrangements it nurtures become almost impossible to shed.

Saudi Arabia and the other Gulf States

In the 1960s and, particularly during the 1970s, thanks to the spike in prices produced by the 1973 oil embargo, the Arab Gulf States: Bahrain, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates (UAE) were among the world's fastest growing nations. Today they face the possibility of a permanent drop in their oil and gas revenues as their prices might enter a new phase of chronic weakness. This is a trend that many analysts consider irreversible. In a 2018 report for the Carnegie Endowment for International Peace, Jihad Yazidi and his colleagues warn that "the rentier model and its redistribution mechanisms, upon which Arab economies were built, have unraveled."

In response to these threats, the Gulf States have announced ambitious plans to reform their economies and modernize their institutions and policies. The Saudi plan, titled Vision 2030, is perhaps one of the boldest and most comprehensive. It offers seven programs, each spelling out the actions that will be taken to boost, for example, industrial and financial development, improve the quality of life, achieve stable and sustainable fiscal balances and stimulate public investment. This is, in essence, an aggressive and unprecedented program of national transformation. Economic diversification efforts outlined in the Saudi plan emphasize skill training for the population, an expanding role for



women and the young as well as better living conditions for the non-Saudi population. The plan calls for the privatization of state-owned enterprises and government services, for a bigger role for small and medium size enterprises and for what the authors call the "Saudization" of the renewable energy and industrial equipment sectors, with specific targets to be accomplished within the next two to three decades.

The Saudi plan is as necessary as it is audacious—and therefore risky. Reality and unexpected events often interfere, derail or even block the best thought-through plans. There is no reason to assume that, in this case too, unexpected events will fail to shape its execution and its outcomes. In fact, reality has already started to interfere. For example, the Saudi authorities have been forced to postpone the initial public offering (IPO) of the national oil company, ARAMCO. That IPO is an indispensable requirement for the financing of the plan. Women can now drive in Saudi Arabia, but the activists that led the movement that yielded that outcome have been jailed. These events undermine the trust—domestic and international—that is indispensable for the plan's successful implementation.

Saudi Arabia's reform plan is the most significant, visible and consequential, given that nation's weight in the world's energy and financial markets and its geopolitical role in a highly volatile region. But all the other petrostates of the Gulf region are facing similar challenges and have drawn plans to adjust to a world in which their current economic and political arrangements are untenable. They too will face the difficulties of implementing their plans in the face of significant obstacles. The world will be watching these experiments in large-scale national transformation with interest and anxiety. Their success matters, and not only for the nations that are trying to align their governments and societies to the realities of the 21st Century. What happens in the Gulf will not stay in the Gulf.

UAE/The political feasibility of policy options

A Potential Breakthrough

One of the biggest obstacles to energy transition is the lack of detailed action plans. Some objectives, such as those that relate to renewables and nuclear power, are within reach, while others, such as a carbon tax, appear difficult to achieve

BRIAN EFIRD AND STEVEN GRIFFITHS

Brian Efird is Senior Researcher and Program Director for Policy and Decision Science at King Abdullah Petroleum Studies and Research Center (KAPSARC), Riyadh, Saudi Arabia.

Steven W. Griffiths is Senior Vice-President of Research and Development and Professor of Practice at the Khalifa University of Science and Technology, Abu Dhabi.

he United Arab Emirates (UAE) has said it wishes to transition toward a less carbon intensive energy system, both as part of its Nationally Determined Contribution (NDC) within the United Nations Framework Convention on Climate Change (UNFCCC), and as one of a number of investments in green research and development, technology and power generation. However, given the complexity of the UAE's political system, which requires consensus among seven relatively sovereign and independent emirates, as well as commercial and financial interests, it is not clear which policy instruments are politically plausible.

This article summarizes the results of a longer analysis of the UAE policy process that utilized the King Abdullah Petroleum Studies and Research Center (KAPSARC) Toolkit for Behavioral Analysis (KTAB) platform, a model of collective decision-making processes (CDMPs), to evaluate the political feasibility of six different policy options that could help achieve the efforts of the United Arab Emirates to change its energy system to a less carbon-intensive one (hereafter referred to as the UAE Energy Transition).

KTAB is a platform that enables the modeling and analysis of CDMPs. CDMPs capture the political bargaining process, both explicit and implicit, among a set of actors—individuals, institutions, constituencies or identifiable groups or "blocs." KTAB simulates how actors interact with and influence one another over time to arrive at a "feasible outcome" for the modeled question. This reflects a model-based view of the expected outcome for actors' collective support for—or opposition to—each of the policy alternatives included in this article. We will only discuss the aggregate findings from the larger study, rather than provide a detailed summary of the preferences, evolving political will, and expected behavior of each actor in all of the relevant policy dimensions.

An energy-intensive but environmentally-friendly country

The UAE is the world's seventh-largest oil producer and fourth-

largest exporter. It also has substantial natural gas reserves and its power and water sector is almost entirely dependent on natural gas. Although the country has made great efforts toward economic diversification, energy intensive industries still dominate the landscape, with more than 60 percent of total final UAE energy consumption coming from the industrial sector. Industrial energy intensity, a hot and arid climate that requires substantial energy for cooling and water desalination, and subsidized energy and water prices have made the UAE one of the world's highest energy consuming countries per capita.

The UAE has a long history of cautious economic development, particularly when it comes to minimizing the effect of economic activity on the environment. The UAE's first President, Sheikh Zayed Bin Sultan Al Nahyan, undertook measures to protect the environment including, among others, an early decree to reduce the flaring of associated natural gas, a byproduct of oil production. In 1973, the Abu Dhabi Gas Liquefaction Company Limited (ADGAS) was established to collect and liquefy natural gas in the Emirate for export to Japan. Additionally, all the UAE's power and water desalination plants were designed to use a gas feedstock supplied by ADNOC. Since then, Abu Dhabi has flared very little gas.

In 2006, in response to increasing global concerns about carbon emissions, state-owned Mubadala established an entity to develop and invest in clean energy. Known as the Abu Dhabi Future Energy Company, or Masdar, this company quickly spawned into a large-scale enterprise that invested in renewable en- →

FIGURE 1. SUMMARY OF CONSENSUS VIEWS ON ENERGY TRANSITION POLICIES

Component of Energy Transition	Current Political Will	Expected Political Will
Carbon pricing	None	Weakly negative
Renewables	Positive	Strongly positive
Nuclear energy	Mixed but positive	Strongly positive
Energy efficiency	Mixed but positive	Moderately positive
Energy subsidy reform	Mixed but positive	Weakly positive
Natural gas	Mixed but positive	Weakly positive

Source: KAPSARC

ergy innovation and deployment in the UAE and abroad through a variety of projects.

Masdar completed its first solar project in the UAE in 2013 with the 100MW Shams 1 concentrated solar power plant, the world's largest at the time. Since 2013, both Abu Dhabi and the neighboring emirate of Dubai have moved ahead with a number of renewable energy projects. Abu Dhabi is also building the Gulf Cooperation Council's (GCC) first nuclear power plant at Barakah, where Emirates Nuclear Energy Corporation (ENEC) is constructing four reactors. The first reactor, originally scheduled for completion in 2017, has been postponed until 2020 due to regulatory delays.

Masdar's creation has been complemented by a number of master plans or vision statements broadly covering the UAE's sustainable economic development and climate change aspirations. Masdar takes its cue from Abu Dhabi Vision 2030, but in recent years the UAE federal government has published its UAE Vision 2021, the Emirate of Dubai has its own Plan 2021 and the Dubai Integrated Energy Strategy 2030 that map out distinct visions for a sustainable future.

Strategy 2050 objectives and implementation tools

More recently, in 2017, the UAE Ministry of Energy announced a new UAE Energy Strategy 2050 that outlines a number of UAE energy targets for 2050, including:

- Power: 44 percent from clean energy, 38 percent from natural gas, 12 percent from clean coal and 6 percent from nuclear energy.
- Energy Efficiency: 40 percent improvement relative to current annual growth in electricity demand of 6 percent.
- Carbon Emission Reduction: 70 percent reduction in carbon emissions from power generation.

In parallel, the UAE's federal Ministry of Foreign Affairs submitted its Intended Nationally Determined Contribution (INDC) to the United Nations Framework Convention on Climate Change (UNFCCC) in October 2015, in advance of the 21st session of the Conference of the Parties (COP21) meeting in Paris. The document was ratified in September 2016, becoming its Nationally Determined Contribution (NDC). The document sets a target of increasing clean energy contribution to the UAE's total energy mix from 0.2 percent in 2014 to 24 percent by 2021. In 2018, the target for clean energy in the total mix was raised to 27 percent.

The UAE Energy Strategy 2050 and documents such as the UAE NDC contain general ambitions for sustainable national development and aspirational targets, but do not specify precisely how the ambitions and targets will be implemented.

One reason for this, if not the overarching one, is the UAE's complex decision-making process, resulting from the country's being a federation of seven nominally independent emirates. Power is polarized between Abu Dhabi and Dubai, which historically strictly guard their policymaking independence. The remaining smaller emirates, known collectively as the Northern Emirates, tend to follow Abu Dhabi's policy lead.

For the purposes of this study, we have identified six policy instruments:

1 | Carbon pricing: Implementation of a carbon focused tax or related policy measures that directly impose a price on carbon. In order to maintain a level playing field within the UAE, it would be necessary for the introduction of carbon pricing to be a federal policy, uniformly adopted by all the emirates. The UAE has no explicit commitment to a certain level of carbon emissions abatement.

2 | Renewables: Increased deployment of renewable energy sources, solar and/or wind, for electric power generation and desalination. The implementation of renewable energy projects is currently the policy domain of individual emirates and their respective utility companies.

3 | Nuclear energy: Implementation of previously planned deployment of nuclear energy in electric power generation. Only the emirate of Abu Dhabi has decided to develop nuclear energy and ENEC, the company charged with building four nuclear power plants in Abu Dhabi, is fully owned by the Abu Dhabi government. However, the UAE nuclear regulator, the Federal Nuclear Energy Authority (FANR), is a federal institution, with a board composed almost exclusively of officials from Abu Dhabi.

4 | Energy efficiency (EE): Increased implementation of EE standards with monitored performance and audits to achieve greater EE technology adoption and demand side management. Each UAE emirate implements its own EE regulations and standards for buildings, although regulation of appliance energy efficiency is at the federal level through the Emirates Authority for Standardization and Metrology (ESMA).

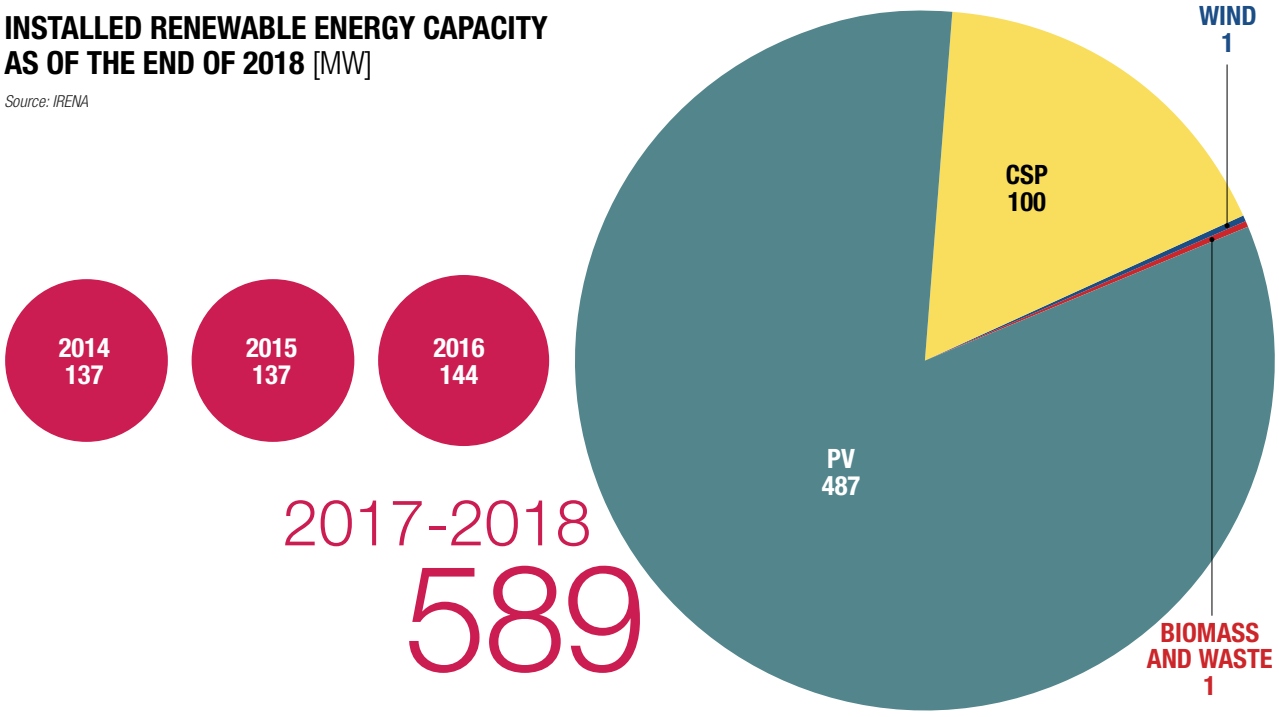
5 | Energy subsidy reform: Further reform of energy subsidies for power, water and transportation fuels. Transport fuel prices in the UAE are harmonized between all the emirates. In recent years, the federal Ministry of Energy has taken a lead in introducing variable prices for retail transportation fuels, gasoline and diesel, based on the international market price. Electricity and water prices are established by each emirate, with Dubai taking an initial lead in establishing cost reflective pricing, but with the other emirates making substantial progress in recent years.

6 | Natural gas: Maintaining the use of natural gas in electric power generation, perhaps taking advantage of new sources of cheap liquefied natural gas, or new gas field development. The emirates of Abu Dhabi, Dubai and Sharjah all produce natural gas, either from gas fields or in the form of associated gas. However, gas production in the UAE is not enough to supply growing demand from its power sector and from industrial users. Since 2006, the UAE has imported gas from Qatar via the Dolphin pipeline (17.9 bcm in 2016) and more recently has expanded liquefied natural gas imports (3.9 bcm in 2016) through Dubai. It is introducing floating storage and regasification units (FSRU) in Abu Dhabi and Sharjah. Plans for a fully-fledged gas terminal in the emirate of Fujairah appear to have stalled, given the more attractive near term economics of FSRUs. ADNOC is also putting renewed efforts into the development of non-associated sour gas fields, with new developments expected to bring billions of cubic feet a day (bcf/d) of new gas to the UAE within the next several years. Increased use of natural gas for power and water generation is a policy choice made by individual emirates which have control over their respective electricity and industrial sectors, though the smaller Northern Emirates are dependent on Abu Dhabi for much of their power supply and thus can be clustered with it.

We can summarize the current level

INSTALLED RENEWABLE ENERGY CAPACITY AS OF THE END OF 2018 [MW]

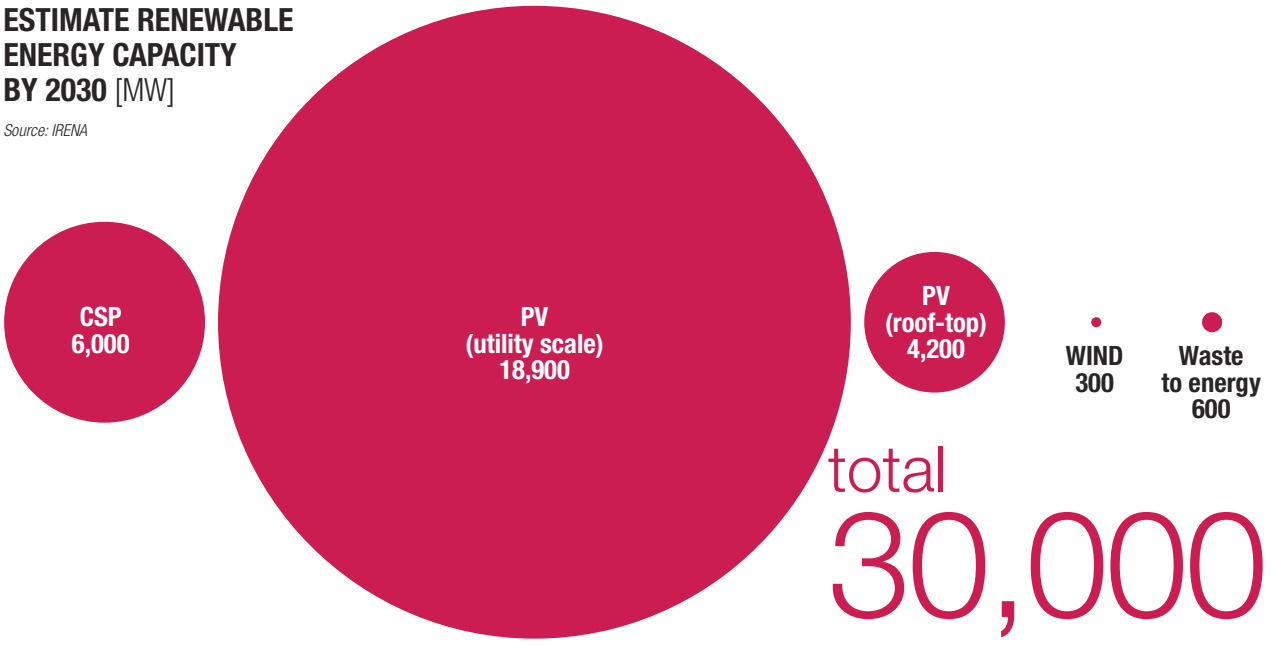
Source: IRENA



The United Arab Emirates are at the forefront of the promotion of renewable sources among the Gulf countries. While still representing two percent of the country's total electrical capacity, installed renewable energy capacity has more than doubled over the last two years compared to 2016.

ESTIMATE RENEWABLE ENERGY CAPACITY BY 2030 [MW]

Source: IRENA



Ambitions for renewable energies in the UAE appear to have solid political backing, which should ensure achievements are made. According to IRENA estimates, in 2030 the UAE will have a capacity of 30,000 MW, more than half of which will consist of large-scale photovoltaic energy.

of consensus for each of the policy alternatives, based on the data collected for the larger KTAB study. Based on the KTAB simulation results, we can also make an assessment about the expected level of future political will for each policy alternative. These results are summarized in Figure 1 on p. 42.

Based on Figure 1, we can see that currently there is no consensus regarding carbon pricing, a positive consensus in favor of renewables, and an uncertain consensus for the remaining policy instruments. In other words, there is uncertainty and debate around each policy option considered in this study.

Political feasibility for each policy option

The UAE has committed to a target of achieving 44 percent total of renewable energy in power generation capacity by 2050, with a further commitment to achieving significant curtailment of electricity demand growth in the same timeframe. This commitment to renewable energy and energy efficiency complements a commitment to nuclear energy that should ultimately result in four operational nuclear reactors in the UAE by 2021 or soon thereafter. Although the UAE has published a NDC that is supportive of mitigating greenhouse gas emissions, no definitive commitments have been made to a specific level of greenhouse gas emission reductions in the near or long term. The implication from the KTAB modeling, that explicit carbon pricing in the UAE is politically unlikely, reinforces the notion that the country is reluctant to address greenhouse gas emissions directly.

Regarding the UAE's sustainability commitments, a key challenge to realization is that political visions are in place without detailed strategies and roadmaps to guide policy and regulatory approaches. The situation is additionally challenging given the relative sovereignty that each UAE emirate has over its energy policy. Nonetheless, the results of this work provide insights as to the policy instruments most likely to be implementable based on political consensus, even without clearly defined plans—or perhaps implying which may enjoy clearer plans in the future.

From a policy perspective, it seems clear that the UAE can effectively deliver in the near term on renewable energy ambitions with continuation of the utility scale solar energy tenders that have already proven successful. Nuclear power to the level of 5.6GW is a commitment that the UAE will almost certainly deliver, although support for nuclear beyond this level of deployment is uncertain.

A perhaps surprising outcome from this study is the somewhat neutral, although still positive, view on natural gas given the current dominance of natural gas in the UAE power sector. An explanation may rely on the value of natural gas in many uses for the UAE beyond power generation, most notably enhanced oil recovery and as a feedstock for petrochemicals. Even for power generation, natural gas would be expected to play a role in system balancing for intermittent renewable energy.

On the demand side, energy subsidy reforms in the UAE have already been undertaken and are expected to continue, perhaps due more to fiscal challenges from low international oil prices than direct climate concern. Policies targeting appliances and building energy efficiency as well as demand response will further support energy demand management and when targeted toward the commercial and residential buildings sector should not be politically troublesome. Although energy intensive industrials might be expected to oppose energy efficiency and conservation in the same way they oppose carbon pricing, this was not found to be the case in this study. Rather, energy efficiency policy appears a plausible approach to realizing sustainable energy in the UAE. This affords an opportunity, because only limited overall progress can be made toward the UAE energy transition if the industrial sector, which by far has the greatest contribution to the UAE's final energy consumption, is not in agreement with policies that are developed and implemented. Hence, energy efficiency and demand management in industry is a policy area that should be further strengthened as a complement to the current focus on renewable energy for the power sector. If the UAE is to achieve a true energy transition, the more holistic and seemingly politically acceptable approach will be necessary.

Historic Visit to the Gulf

The Pope's trip to the United Arab Emirates, important to local Catholics, also has broader implications for the region's future geopolitical role

ROBERTO
DI GIOVAN PAOLO

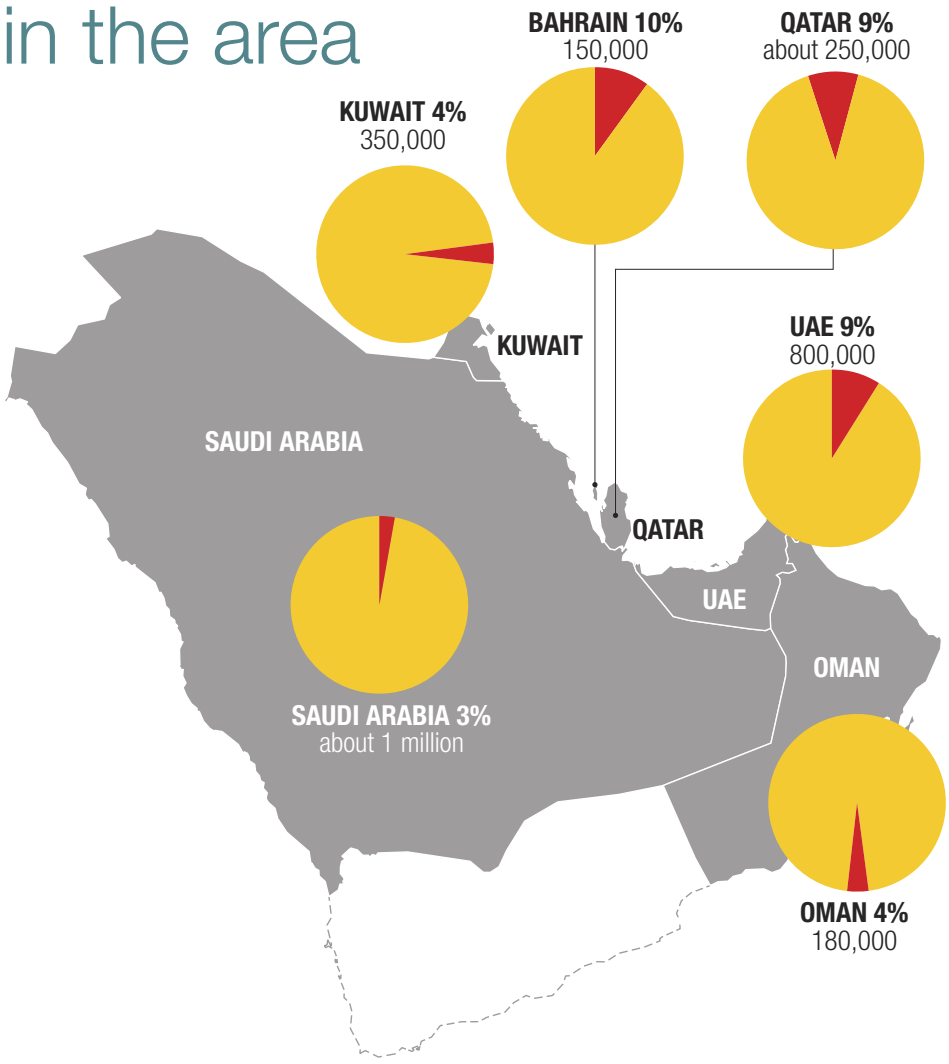
A journalist, has written for, among others, ANSA, *Avvenire* and *Famiglia Cristiana*. He was Secretary General of the Italian Association for the Council of European Municipalities and Regions, and he is a lecturer at the University of International Studies of Rome.

Some visits must be made in order to maintain diplomatic relations. Others mark a historic moment, while some appear to consolidate a new fabric of relationships and preconditions. These subtexts are often invisible at the time and reveal themselves only months or years later. The Pope's February, 2019 visit to the United Arab Emirates, eight centuries after the meeting between St. Francis and the Sultan of Egypt Malik Al Kamil, definitely does not fall into the first category, nor likely the second, despite such the important historical precedent. It is much more likely that, given the new resourcefulness of the Gulf countries, the budding relations between the Gulf, the Middle East and the opposing countries of Asia, we could be seeing an increasing geopolitical importance for the region. In the near future, we will frequently return to the changes made in the political Gulf region and its surroundings.

A journey unlike others

Clearly, Pope Francis's 27th trip was unlike his earlier trips, even if the European newspapers did not apportion to it the prominence it deserved. This is not a great time in journalistic history, with domestic news and social media taking up all the space. Most focused on the most obvious reason for the Pope's journey: a pastoral visit for the Catholic community, who in the UAE are free to express their beliefs. The Bishop of Rome may have also seen a chance to build interreligious dialog. This is never a trivial matter in Muslim countries. And yet Pope Francis did not miss the possibility for a political and diplomatic drama with an effect on the surrounding countries, but also on leaders around the world. The visit referred above all to the relationship Pope Francis has long been developing with the Great Imam of Al Azhar, Ahmad Al Tayyb (this was their fifth meeting), as well as with the leaders of the United Arab Emirates. This was an interreligious occasion, but also a meeting of holy men who often feature in important religious and other dialogs around the world. Ahmad Al Tayyb hails from a Sufi family, one of the denominations of Islam that has been historically attentive to the cultural exchange of profound values of faith, and also historically identified with tolerance and the ability to enter into dialog with other religions based on faith itself, without yielding culturally to forms of syncretism (amalgamation). It was therefore significant, but also consequential, that the Pope had an interreligious meeting that, through Al Tayyb, came into contact with the Muslim Elders Council, which plays a vital role in the UAE. Their relationship plays a role in peace talks with the surrounding countries, especially in countries with not only Catholic churches but also Hindu temples and even a synagogue. The message was certainly addressed to the Catholics of the Emirates, but at the same time with the power of a dialog through the main monotheistic religions, even in their associated denominations, to all the ruling classes of the Arab countries who intend

Christians in the area



to govern international relations on the basis of respect for religious denominations and forms of popular associations. For these groups, especially in the Arab countries and in Asia, religion constitutes a political challenge: while it creates unity from a social point of view, it can also be divisive when the contrast is considered in terms of cause and effect (or more often, effect and cause) regarding political and diplomatic confrontations. Indeed, when dealing with the Gulf countries, it is clear that the Pope's visit was not only a pastoral matter for his community of Catholics, or a interreligious confrontation, despite these being the main features recounted by the media. This is an area where for years, since 1981, the Gulf Cooperation Council, formed by Saudi Arabia, Bahrain, the United Arab Emirates, Kuwait, Oman and Qatar, has experienced confrontational conditions dictated by economic laws concerning the exploitation of the area's natural resources, but also from a political point of view, in terms of the often-differing and even opposing relations between religious ethnic groups and the governments attempting to deal with them: Iraq and more especially Iran. Not least the conflicts underway in the Middle East, especially in Syria, as well as the neverending conflict between Israel and the Palestinian nation.

The cautious stance of the Emirates

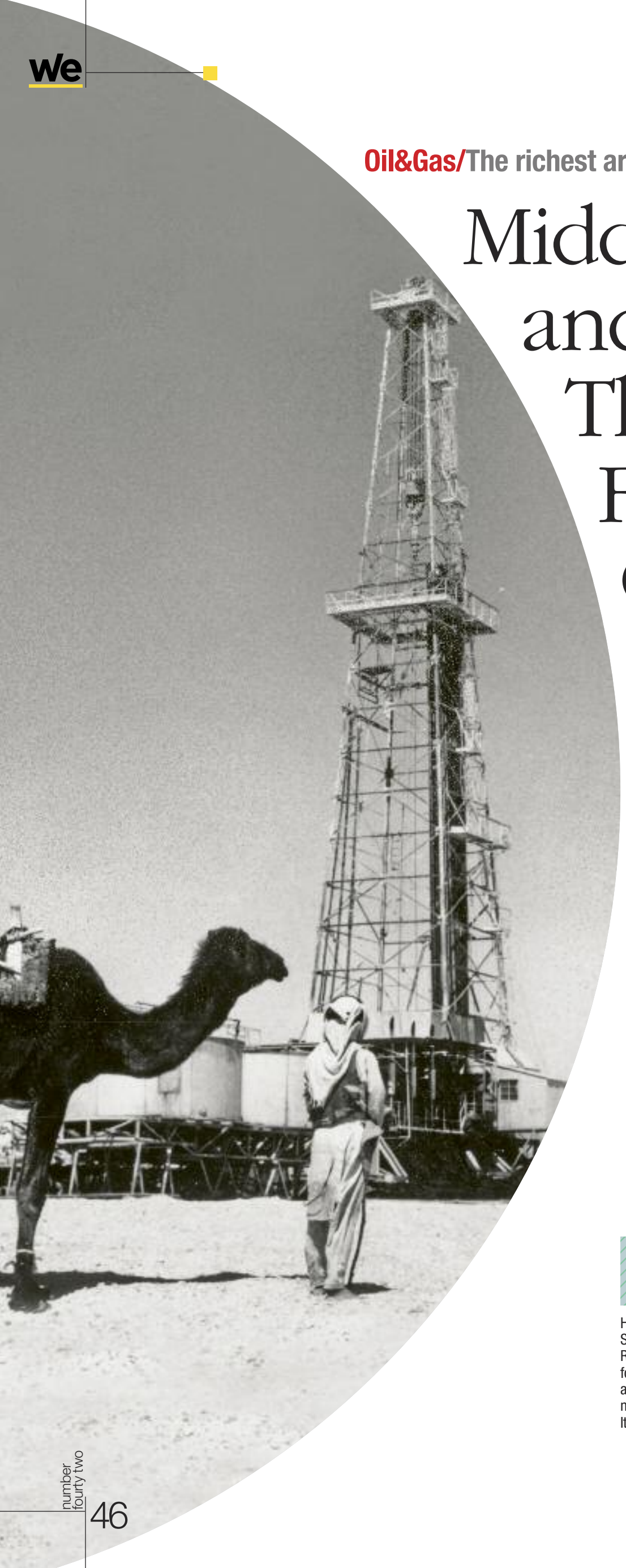
It has definitely not escaped the attention of the Vatican diplomats, who have always been attentive to this region, that Qatar has exited from OPEC. In this case it is clear that their exit stems from a breakdown of relations mainly with Saudi Arabia, the United Arab Emirates, Egypt and Bahrain on the strategy to be followed in relations with the most radical Islamic groups, often connected to Iran. Of course, these matters are very significant for the Gulf, too. Not to mention the real or alleged role attributed by these countries to Iran in the conflicts in Yemen and Syria. In this sense the stance in the Emirates is as cautious and mediatory as possible. This clearly convinced the Vatican diplomats to act with similar caution. The cautious and mediatory UAE position (even if officially deployed) is also intended to maintain tradition and innovation through the younger generations, nascent or possible leadership and the search for general societal conditions of mutual tolerance. Domestic tolerance and religious coexistence is a prerequisite for the construction of a civil society (now embryonic) that responds better to the challenge with modernity, far from the social explosion that we saw in the so-called Arab Spring, the most profound effect of which would be on the current leadership. Building a civil society and a middle class as well as a welfare state not only tied to dynastic generosity is one of the challenges faced by contemporary Arab States. Those who see the meeting with Pope only as an umpteenth victory with the West for an Arab state to compete with the others are mistaken. Instead, it is a strategy aimed at a political and diplomatic alliance. To deal with Islamic radicalism and much more. There is also an implicit recognition that policy reform must move forward alongside economic process.

A strategy of high-level diplomacy

Once the doubt has been excised that it was merely one of many of the Pope's scheduled meetings around the world, it will be clear that the value of this visit will withstand the scrutiny of time. In other words, the now-built relations will result in a network of relationships in the other Arab countries of the Gulf, all the members of the Gulf Cooperation Council as well as the Vatican in the broadest terms. As we know, these relations are strong in Iraq and respected in Iran and especially in the Middle East. Pope Francis has demonstrated that he is willing to assume the responsibility for this diplomatic mission, in the knowledge that his visit would be a historic one, and not only in domestic terms.

Middle East and Southwest: The Two Faces of the Oil World

Since ancient times, there have been two planets in the oil galaxy: Texas and the Middle East. But ultimately the Arabian Peninsula will be the one to ensure continuity of production and new discoveries



FRANCESCO GATTEI

He is Executive Vice President, Scenarios, Strategic Options & Investor Relations of Eni, previously responsible for the E&P portfolio at Eni, where he also held numerous planning, negotiation and commercial roles in Italy and abroad.

The Middle East is the oil industry's Goldilocks Zone. Just as in astronomy there is an ideal band for life, depending on the distance from the sun and the potential presence of liquid water, there are ideal conditions in the world of hydrocarbons as well, conditions that include a long process of sedimentation of organic material in an environment free of oxygen and the availability of large geological traps to contain the oil and gas.

These conditions manifested themselves in the Middle East when, during the Jurassic era, the region was near the Equator and bordered by the Tethys Ocean.

There has been evidence of oil since ancient times. The perennial fire at Kirkuk in Baba Gurgur, which translates as "Father of Eternal Fire" in Kurdish, has been burning for 4000 years and is mentioned in the Stories of Herodotus. Oil's historic presence can also be seen in the use of bi-

tumen on the walls and streets of Babylon, perhaps even at the base of the Tower of Babel, and from the presence of hydrocarbon seepage on both sides of the Gulf.

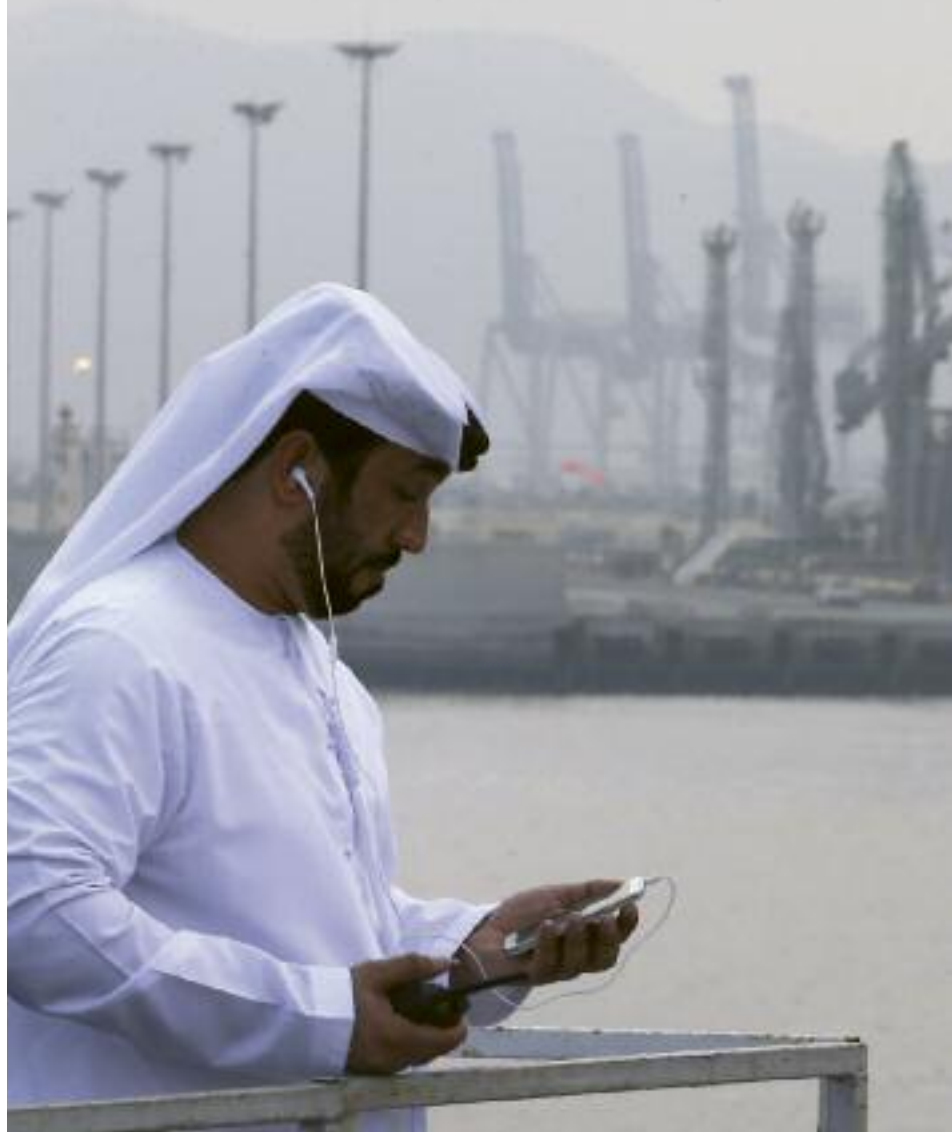
But the result of prospecting in the region was not a foregone conclusion. While in Iran, the oil potential was ascertained at the beginning of the century, with Iraq following in 1927 in Baba Gurgur itself, the prospects for discoveries further south seemed limited. British engineers who probed the region considered the Arabian Peninsula free of crude oil, unsuited to the genesis of oil, so much so that they bet they could drink every drop of oil found south of Basra.

Some, however, had a different perspective: Frank Holmes a New Zealand army major, believed in the existence of a large oil field running from Kuwait along the coast of the Arabian Peninsula. Holmes, who trusted his nose more than geological maps of the time, was not entirely mistaken. His searches led to the discovery of the large oil fields of Bahrein and Kuwait. But he failed to discover the big oil field he had imagined, called Ghawar, in Saudi Arabia. This is the largest deposit in the world, with a length equivalent to the distance between Milan and Venice. On its own, it accounts for 5 percent of global production, and there are many gems in the Gulf in addition to Ghawar. Following a line that runs along the Arabian Peninsula there are hundreds of giant oil and gas fields that make this region the hydrocarbon Eldorado.

Planet Texas

There is another planet in the oil galaxy where ideal conditions exist for the generation of oil and gas: the United States, and in particular Texas. Here too, the evidence of oil is ancient—the Spanish conqueror De Soto wrote about the use of bitumen in the canoes built by the natives as well as their use of crude oil as a medicine.

But expectations for significant discoveries in Texas, during the first American oil boom in Pennsylvania and California, were smaller. Only the perseverance of another amateur geologist with a name worthy of a Tolkien novel, Patillo Higgins, led to the discovery of the enormous wealth in what would become the capital of American crude oil. In 1901, the Spindletop well produced a gusher, a scenic but uncontrolled and dangerous eruption of crude oil. The event brought the price of oil down from 2 dollars to 25 cents a barrel, and the field, which produced 100,000 barrels per day (bpd), half of all U.S. production, was cannibalized by thousands of rigs and was exhausted within a few years.



Discoveries were subsequently made across the state, moving from East (another giant, East Texas and another price drop) to West. One of the biggest deposits in the world was discovered here in 1923. The well, which did not initially seem very promising, was named Santa Rita 1, invoking the saint of impossible cases.

The West Texas field actually revealed a series of geological strata which, like a giant millefeuille, cover an expanse between Texas and New Mexico of about 500 km in length and 400 km in width and which are defined as the Permian basin.

The Permian is at the cornerstone of what is today the American tight oil revolution, which has brought the declining oil industry back to new production records. In fact, now that the traditional deposits (the creamier layers of the millefeuille) have been exhausted, fracking is allowing extraction of the crude oil contained in the hardest layers, which had been uneconomical for decades.

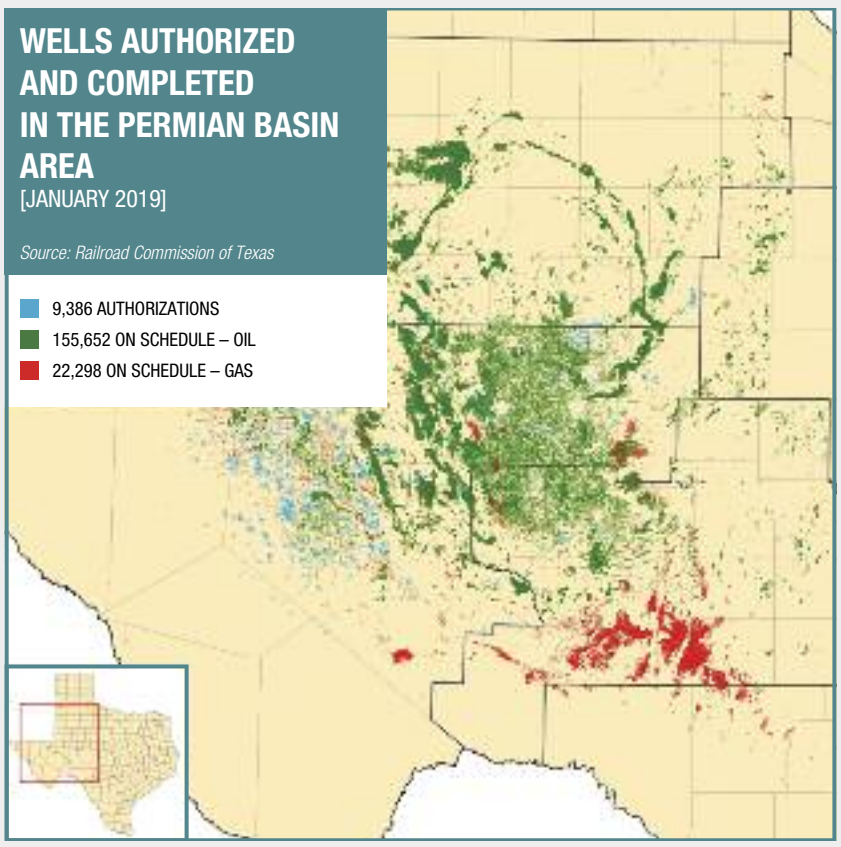
According to the USGS, the government agency that estimates the potential of American mining, the Permian contains up to 46 billion barrels of oil, 20 billion NGLs and 280 Tcf (trillion cubic feet) of gas, doubling the total amount known in the U.S. and rivaling the top deposits in the Gulf.

Therefore, Texas, which was producing 1 million bpd just ten years ago, is now producing 4 million. If it were part of OPEC, it would be the third largest producer after Saudi Arabia and Iraq. U.S. tight oil production, which includes contributions from oil fields in North Dakota and New Mexico, amounts to 6.7 million bbl/day, more than half of all U.S. production.

This second oil planet, however, is also the most destabilizing factor for the oil market, as the operating rules of this particular world are vastly different from the industry's traditional procedures. The U.S. oil system is the full expression of the animal spirit of American capitalism. It is based on a parcelization model with thousands of operators coexisting side by side, from Exxon to the so-called strippers who produce a few dozen barrels of oil a day from the yards of their own homes.

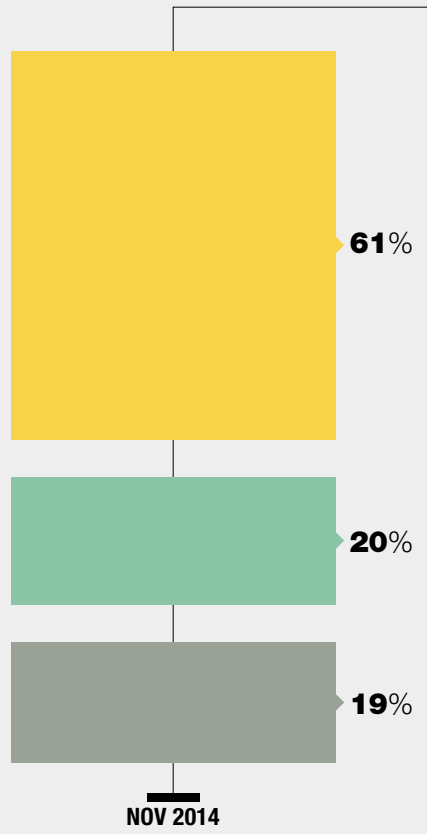
Historically, production has been governed by the Rule of Capture, a principle derived from English Common Law that applies equally to all captured natural resources, whether oil or game animals. Just as a wild pig is the property of whoever catches it, the oil found underground is owned by whoever extracts it. Hence the race to produce oil, including by positioning the well on the boundary with your next door neighbor in order to "capture" the adjacent crude, thereby maximizing production and avoiding the risk of losing it. This is essentially a Far West like scenario, with everyone against everyone else, making orderly management of production impossible and often causing overexploitation of the oil field due to the drive to produce without limits with little concern for the long term. Today, there are still thousands of American oil producers, and disciplined production is not one of their virtues. While no longer exposed to the risk of "capture," since tight oil comes from low-permeability rocks where flow is more difficult, growth is taking place in a frenetic and disorderly fashion and prices can collapse due to overproduction. This leads to the slowdown of production activities and a fall in output that causes a new oil price hike, until a new rebound, oversupply and collapse cycle begins again.

In 2016, output fell to 400,000 bpd due to a reduction in activities after the price of oil dropped below USD 30 a barrel. Two years later, when the price bounced back to over USD 70, production rose to 1.2 million bpd and a new slowdown is currently underway. American tight oil is an animal that moves at a frenetic pace and is capable of accelerating and slowing down in the space of a few months. And the activities are on a unique and unequalled scale. In the Permian



USA, frenetic extraction

There are thousands of U.S. producers and production discipline is not one of their virtues. The number of wells in the country is growing at such a frenetic and disorderly pace that prices are falling due to excess production. In the Permian alone, 5,000 wells are being drilled on average every year, adding to the existing 180,000, which dwarfs the 18,000 wells across the whole of the Middle East.



alone, an average of 5,000 wells is drilled every year, on top of the already existing 180,000. This figure makes the 18,000 oil wells in the entire Middle East pale in comparison. The unequal number of oil wells in the two regions conceals a further difference that makes the U.S. model structurally fragile. Tight oil wells have an average output capacity of 500 bpd, which rapidly declines, with production falling by 50 percent within the space of a year. They are basically like a giant, seemingly inexhaustible, matchbox, but one that requires ongoing replacement activities. It is estimated that 60 percent of the wells drilled annually in tight oil regions are designed to offset declining output.

These low productivity levels and high decline rates will set a physical limit to American output growth. When the number of new wells that need to be drilled in a year exceeds the number of drilling sites or drilling capacity, growth will stop. As with all oil fields, production always follows a parabolic trajectory. The light from the matchbox will grow fainter and fainter. For the time being, we are still far from the inflection point, but according to the most authoritative sources, like the International Energy Agency, American output is expected to come to a plateau from the middle of the next decade.

Planet Gulf

In the other planet, the Gulf, where production is controlled by a handful of national oil companies in joint ventures with a number of foreign companies, operating conditions are very different. The massive scale of crude oil production (the Arabian Peninsula alone accounts for 20 percent of global output) and the productivity of individual oil wells, often in the region of 10 to 20,000 bpd, and their low annual decline rate (4-5 percent), make management planning easier and more stable. The fields in this region continue to produce for decades and even centuries. To give an idea, four out of the five discovery and appraisal wells in Ghawar are still in production after almost 70 years of activity.

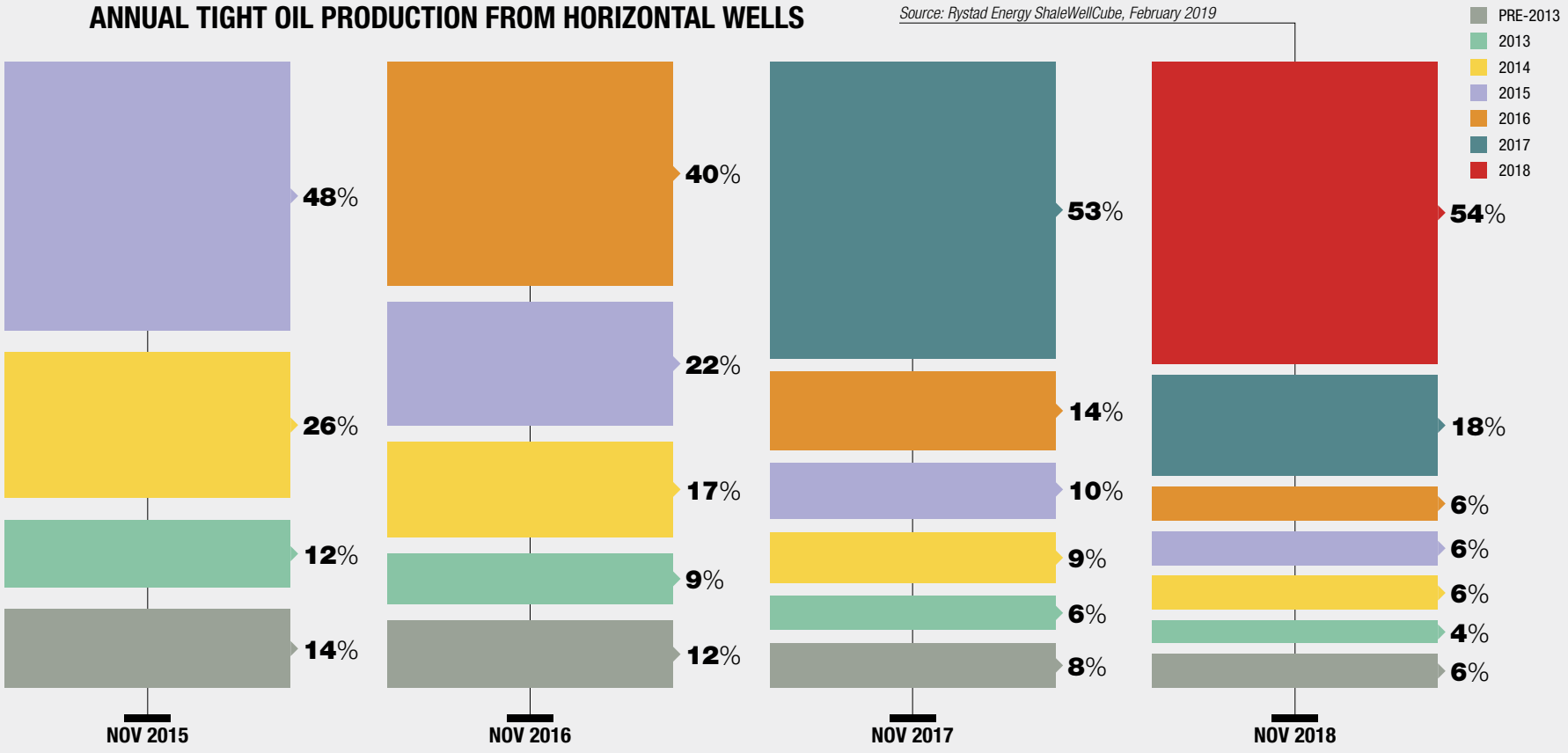
A further key factor in the region is its role as an oil reserve in case of crisis. A few countries (Saudi Arabia, Kuwait and the UAE) maintain a spare production capacity that gives them the ability to raise output quickly and offset possible supply shocks. Today this buffer, which amounts to 3 percent of global demand, means that 3 million bpd can be put into production within 90 days and sustained for an indefinite period. Without these supplies, and in case of shocks, one should expect American drilling to offset any shortfalls. But bottlenecks in drilling and fracking activities are likely to occur. Prices would probably rocket, and falling demand would effectively become the balancing factor in the market.

In conclusion, despite the strong focus and emphasis placed on American oil output, the world of oil will continue to revolve around the major reserves of the Middle East. The revival in U.S. production is an important but temporary phenomenon. It gives a perception of abundance but does not eliminate the risk of oil price spikes. It requires an ongoing effort to develop what is a fragile and ephemeral production capacity. The other side of the galaxy, the traditional Arabian Peninsula, will continue to be key for guaranteeing the continuity of production, at a lower cost, and could still have major surprises in store in terms of new discoveries as exploration has been limited in the last forty years.

We are binging on fast food, on hamburgers and Coca Cola. This is a practical and quick way to build up calories. But it is not a balanced diet. It won't be long before we return to something more traditional.

ANNUAL TIGHT OIL PRODUCTION FROM HORIZONTAL WELLS

Source: Rystad Energy ShaleWellCube, February 2019



Investments/The Belt and Road Initiative's role in GCC economies

An Authentic Synergy

Relations between China and GCC countries date back to long before the BRI, and the New Silk Road is now a major opportunity for both. From China's perspective, the region offers three unique and crucial factors for the initiative's success: geography, energy and Islam

JONATHAN FULTON

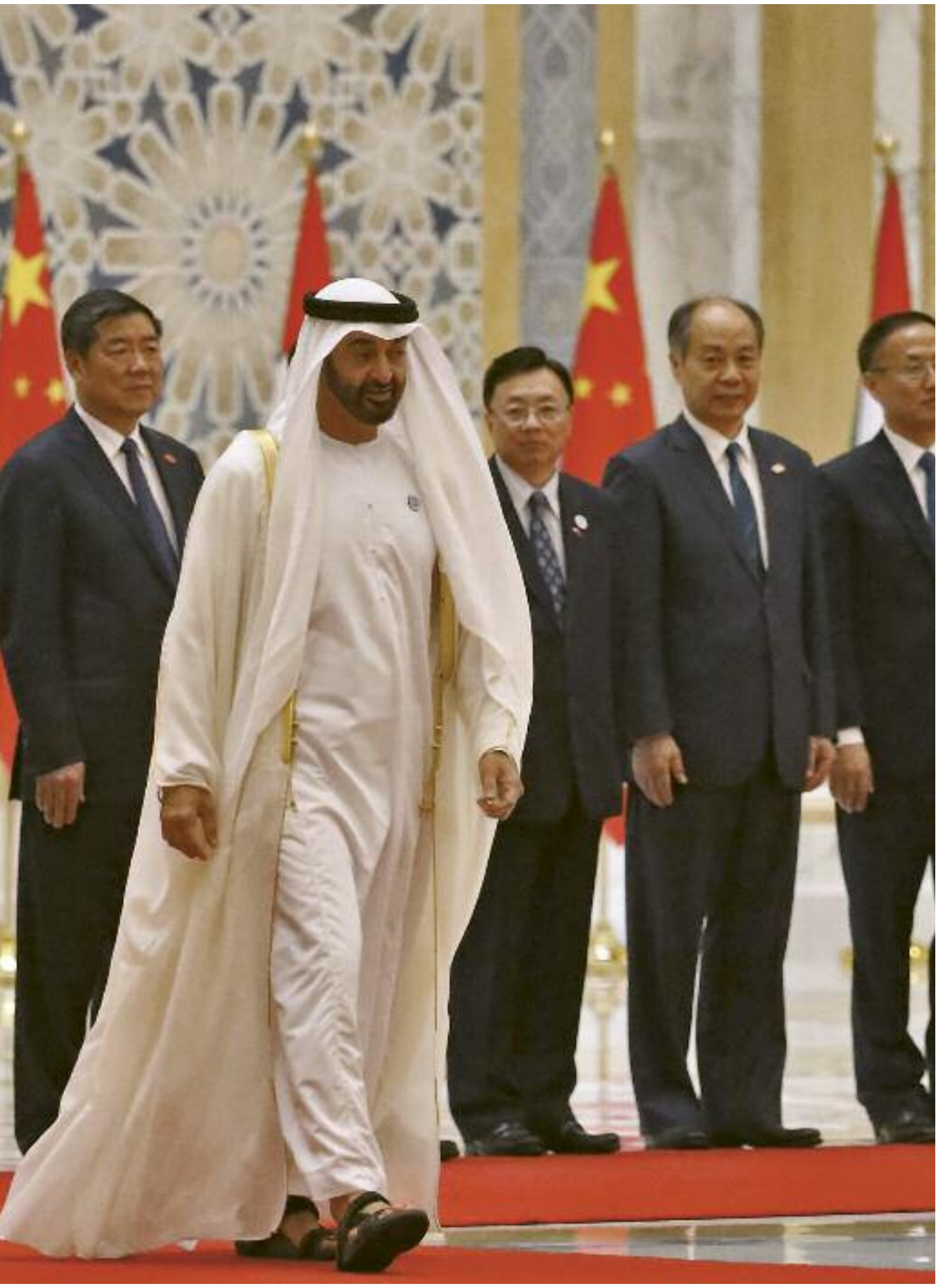
He teaches political science at Zayed University in the United Arab Emirates. He is the author of *China's Relations with the Gulf Monarchies* (Routledge, 2018).

The announcement of the Belt and Road Initiative (BRI) in 2013 signaled a confident and assertive turn in Chinese foreign policy. No longer content to wait in the wings, China would, according to President Xi Jinping, "be proactive in seeking achievements." Five years into the initiative, we are at a point where we can start to take stock of its impact. In some states and regions, China's ambitions have experienced economic and political challenges. In the Gulf, a particularly volatile regional security complex, the BRI has been largely welcomed. The Gulf monarchies (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates [UAE]) have actively engaged China in BRI projects, drawing Chinese investment into their states as they implement "Vision" development plans to diversify their economies. These deeper relations are not a short-term anomaly; China's power in the Gulf is rising.

What is the Belt and Road Initiative?

The BRI has its roots in the "Going Out" policy of the mid-1990s, with the realization that Chinese companies needed to expand their interests and investments beyond the domestic market in order to become internationally competitive. This led to Chinese state-owned enterprises expanding their presences in states in regions where China did not typically have much of an economic footprint; by the end of the first decade of the 2000s, Chinese citizens and assets had gone global. Significantly, Chinese companies had accumulated substantial foreign reserves—approximately USD 3.2 trillion in 2013 when the BRI was formally introduced.

At this point, the architecture of the BRI had already been established in several regions. Projects like the New Eurasian Land Bridge, the China-Pakistan Economic Corridor and the China-Myanmar-Bangladesh-India Economic Corridor all predate the BRI, leading one observer to describe it as "a new slogan on stuff they've wanted to do for a long time." What was new, however, was



MUTUALLY BENEFICIAL TALKS
The Chinese initiative has been welcomed by many states in the region. In the photo, Crown Prince of Abu Dhabi Sheikh Mohammed bin Zayed Al Nahyan (right) receives Chinese President Xi Jinping (left) at the presidential palace on July 20, 2018.

packaging all of these projects together under the BRI brand.
The overland Eurasian component, the Silk Road Economic Belt, was rolled out in a speech by Xi Jinping in Kazakhstan, and the Indian Ocean region component, the Maritime Silk Road Initiative, was introduced in an address to the Indonesian parliament a month later. Taken together, it provided a framework for understanding China's westward expansion. An important feature of the BRI at this stage was the emphasis on it as an initiative, rather than a strategy. Whereas a strategy is typically understood as being against a third party, an initiative is inclusive. So it is with the BRI, as Chinese leaders underscore that the BRI is open to all, described by Foreign Minister Wang Yi as a symphony, not a Chinese solo. Its economic benefits are highlighted, with hard power and military issues conspicuously absent. The BRI's guiding document, "Vision and actions on jointly building Silk Road Economic Belt and 21st-Century Maritime Silk Road," lists five cooperation priorities—policy coordination, facilities connectivity, unimpeded trade, financial integration, and people to people bonds—all of which are meant to be politically neutral, highlighting development and economic goals, with Beijing's consistent "win-win" refrain.
The development focus in the BRI is crucial for understanding its appeal for partnering states. A report from the Asian Development Bank estimated an $8 trillion gap in Asian infrastructure needs between 2010 and 2020, and existing lending institutions like the World Bank, International Monetary Fund, and Asia Development Bank had nowhere near the available capital to address this shortfall. On top of that, their policies and procedures contribute to the perception that the projects they do fund are slow. Chinese firms, in contrast, have established a reputation for creating fast infrastructure with no political strings attached.
When the 19th Party Congress was held in October 2018 and the BRI was officially included in the Chinese Communist Party's (CCP) constitution, it was clear: the BRI, linked to the leadership of both Xi Jinping and the CCP, is not going away. It will undergo different manifestations as it gets field tested in high-risk environments where China has relatively little political and security experience, and it has also faced reputational problems as smaller economies get saddled with long-term Chinese debt. It is, however, the center of China's →

foreign policy, articulating a vision of Chinese power and influence from the East China Sea to the Mediterranean. In short, it is an important feature of global political and economic order, and states and regions around the world are starting to recalibrate their foreign policies in response, either to accommodate it or keep it at bay.

Situating the GCC in the BRI

The Gulf monarchies are among those states welcoming deeper Chinese engagement and are well-positioned to take advantage of the BRI. As with other participating states, China-GCC relations pre-date the BRI, and the foundation of these bilateral relationships is consistent with the five cooperation priorities. This makes it easy to graft the BRI onto pre-existing economic and political ties.

From the Chinese perspective, the Gulf monarchies offer three unique and important factors that contribute to the success of the BRI: geography, energy, and Islam. In terms of geography, the BRI is about connectivity, and the Arabian Peninsula's geostrategic importance makes it especially important. Linking South and Central Asia to the broader Middle East and East Africa, the GCC states occupy crucial BRI real estate. With global maritime choke points on either side of the Arabian Peninsula and the Red Sea providing access to the Mediterranean, the region would be an important strategic consideration for any aspiring Indian Ocean power.

That it is home to thirty percent of the world's oil reserves features in China's logic as well. China has become the world's largest importer of oil and is projected to continue at a pace of 11 million barrels per day by 2030. With over fifty percent of its oil imports coming from the Middle East, this adds another important consideration for China in the Gulf. The attraction is mutual; the Gulf monarchies see in China a growing long-term market for their energy exports. Saudi Arabia is consistently China's largest or second largest source of overseas oil, providing it with 16 percent of its imports, and Oman (10 percent), the UAE (4 percent) and Kuwait (3 percent) export substantial quantities as well. As China moves toward making liquefied natural gas (LNG) a larger source of its energy consumption—the goal is 10 percent by 2020—Qatar is also becoming an important energy source for China, as seen in the 22-year contract for LNG signed in 2018.

More than just Energy

China's role in the GCC's economy is denser and more diverse than just energy trade. Between 2000 and 2017 China-GCC trade has grown from just under USD 10 billion to nearly USD 150 billion per year. Chinese foreign direct investment into GCC states has increased substantially as well, with over USD 60 billion invested between 2005 and 2017. And the financial sector has planted roots in the Gulf as well, with China's four largest banks having opened branches in Dubai to service the growing number of transactions. The Chinese renminbi (RMB) is growing in use, and both Qatar and the UAE have signed currency swap agreements with China. Activated in 2017, the UAE swap was used to clear more than USD 7 billion in transactions in 2018. The growth in relations was further cemented during Saudi Crown Prince Mohammad bin Salman's 2019 trip to China, when 35 memorandums of understanding were signed, valued at tens of billions of dollars. Discussing the state of China-Saudi relations, he described China as a good friend and partner, and claimed that "Over such a long period of exchanges with China, we have never experienced any problems."

Yet another consideration for China is the importance of the Arabian Peninsula, and Saudi Arabia in particular, in Islam. Islam will be an important factor in China's success in implementing the BRI as it passes through many Muslim-majority states. China itself is home to a diverse population of more than 23 million Muslims. However, the mass detainment of Uighurs in Xinjiang, framed by China as a domestic concern and a response to internal security issues, could seriously undermine its credibility along the Silk Road. Other than the recent condemnation from Turkey, China has not drawn public criticism from other Muslim-majority states, and as the custodian of Islam's holiest sites, Saudi Arabia's silence on this issue is helpful for Beijing. This was reinforced during Crown Prince Mohammad bin Salman's recent trip to China, during which he described the situation in Xinjiang as a domestic political consideration, saying "China has the right to carry out anti-terrorism and de-extremization work for its national security."

The opportunities for Islamic investment in BRI projects will also be an important feature, and one which the UAE is poised to profit from. Islamic finance was estimated to be valued at over USD 2 trillion in 2016, making it a significant consideration in BRI investment. Dubai is home to the world's largest Islamic Sukuk hub, listed on Nasdaq Dubai, and has been holding annual conferences with Chinese institutions to explore partnerships in Islamic banking and finance.

Given these natural endowments, it is not surprising that each of the Gulf monarchies have been deepening their relations with China, using the BRI as a framework. This is especially important as each GCC state has embarked upon economic diversification programs: Saudi Vision 2030, Abu Dhabi 2030, New Kuwait 2035, Qatar National Vision 2030, Oman Vision 2040 and Bahrain's Economic Vision 2030. In each of these programs, Gulf states are working to build stronger private sectors and diversify their economies, and infrastructure and construction projects are central to much of what they intend to accomplish. As such, the already strong Chinese experience in Gulf infrastructure is seen as a way to coordinate "Vision" plans with the BRI.

Future plans

The most important indicators of China's BRI ambitions for the Arabian Peninsula are the prominence of the UAE, Saudi Arabia, and Oman in Middle East connectivity projects. During the 2018 China-Arab States Cooperation Forum minister's meeting, China unveiled the awkwardly-named "Industrial Park—Port Interconnection, Two-Wheel and Two-Wing" approach for linking states and markets within the BRI. The interesting part is the parks and ports focus, under which Chinese-developed industrial parks in the UAE, Saudi Arabia, and Oman will be linked with regional ports in Oman, the

一带一路

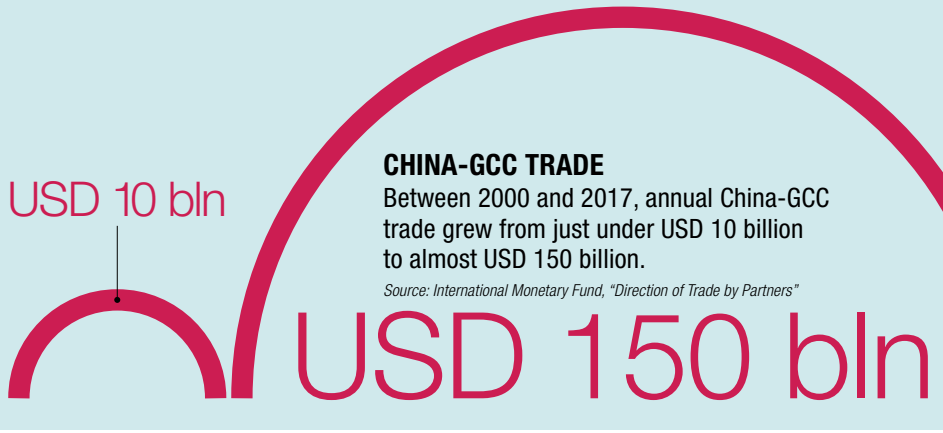
Through the New Silk Road (in Chinese "yidai yi lu," 一带一路)), Beijing seeks to build new infrastructure links via land and maritime networks between Asia, Africa and Europe. This global program involves 68 countries that collectively account for 65 percent of the global population, 40 percent of global GDP, and 75 percent of known energy reserves.

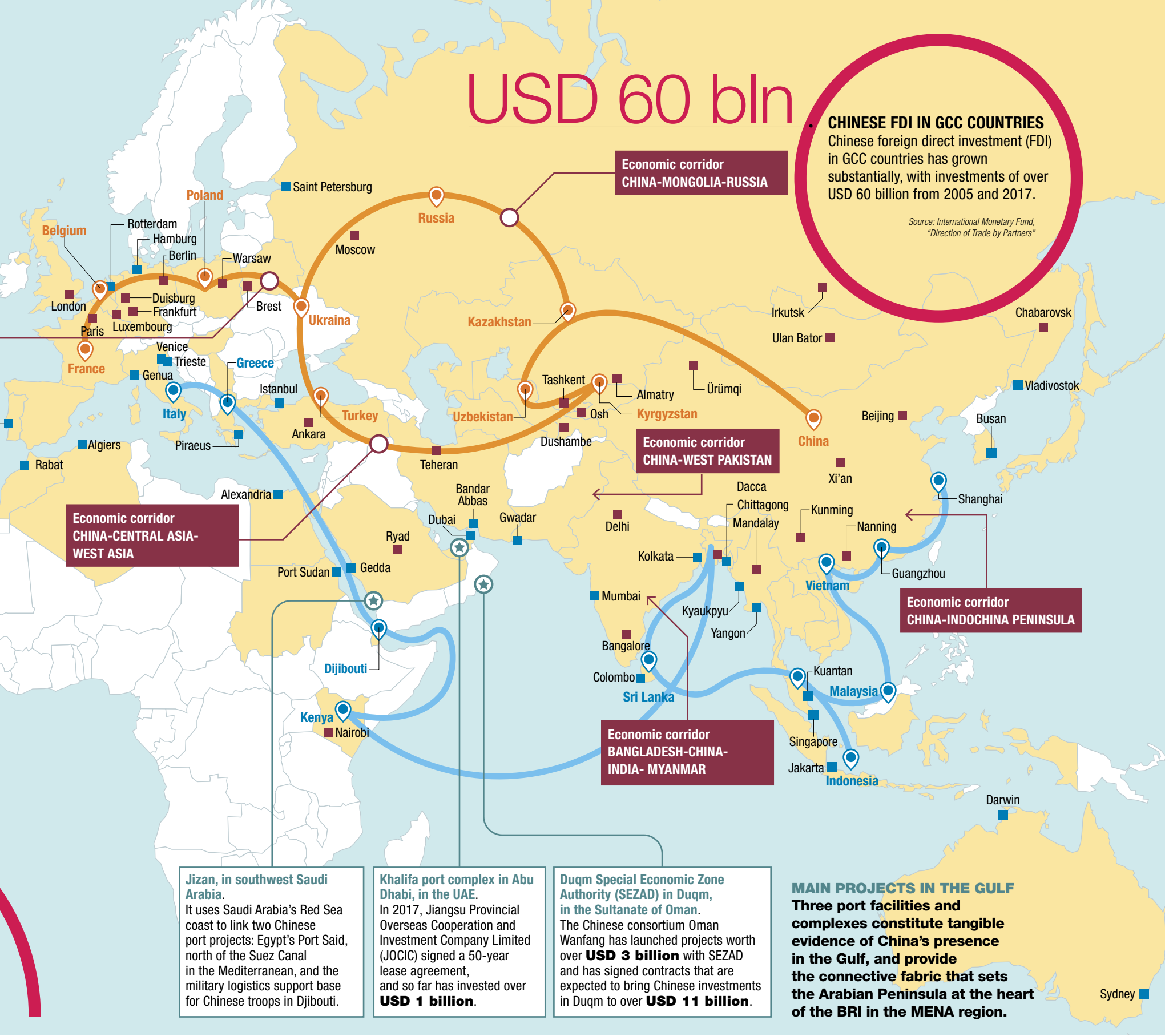
In the five years since its launch, the BRI has generated infrastructure investments in the countries it covers amounting to around USD 400 billion. According to Chinese data, investments could reach the USD 1 trillion mark by 2029.

This vast plan, which is both shared and inclusive, is set to transform Eurasia. It involves the development of 900 new infrastructure projects across six economic corridors, and is expected to generate trade exchanges worth USD 780 billion with the countries located along the ancient 16th century trade routes.

Goods trade between China and the countries along the BRI route is expected to grow by USD 117 billion over the course of 2019.

The BRI is structured into six economic, transport and communications corridors. Two of these corridors form the 21st Century Maritime Silk Road, and a further four constitute the overland Silk Road Economic Belt.





Jizan, in southwest Saudi Arabia.
It uses Saudi Arabia's Red Sea coast to link two Chinese port projects: Egypt's Port Said, north of the Suez Canal in the Mediterranean, and the military logistics support base for Chinese troops in Djibouti.

Khalifa port complex in Abu Dhabi, in the UAE.
In 2017, Jiangsu Provincial Overseas Cooperation and Investment Company Limited (JOCIC) signed a 50-year lease agreement, and so far has invested over **USD 1 billion**.

Duqm Special Economic Zone Authority (SEZAD) in Duqm, in the Sultanate of Oman.
The Chinese consortium Oman Wanfang has launched projects worth over **USD 3 billion** with SEZAD and has signed contracts that are expected to bring Chinese investments in Duqm to over **USD 11 billion**.

MAIN PROJECTS IN THE GULF
Three port facilities and complexes constitute tangible evidence of China's presence in the Gulf, and provide the connective fabric that sets the Arabian Peninsula at the heart of the BRI in the MENA region.

UAE, Djibouti, and Egypt, where China has also been developing facilities. This physical connectivity will link supply chains across the Middle East, and the Arabian Peninsula will clearly be the hub.

In this approach, the focal points are the Duqm Special Economic Zone Authority (SEZAD) in Duqm, Oman, the Khalifa Port complex in Abu Dhabi, the UAE, and Jazan, Saudi Arabia. SEZAD has generated the most notice thus far. Situated on Oman's Arabian Sea coastline, Duqm is a project that the Omani government has been developing since at least 2006. With an oil refinery and the Middle East's largest oil storage fulcrum, SEZAD offers an energy hub that avoids the Hormuz Strait chokepoint. Oman Wanfang, a Chinese consortium, has begun projects in SEZAD worth over USD 3 billion, and has signed contracts that are expected to bring the value of Chinese investments in Duqm to over USD 11 billion.

In Abu Dhabi, the Khalifa Industrial Zone Abu Dhabi / Khalifa Port Free Trade Zone is another joint park-port complex where a Chinese consortium is creating a deeper footprint. The Jiangsu Provincial Overseas Cooperation and Investment Company Limited (JOCIC) signed a 50-year lease in 2017 and has made investments of over USD 1 billion to date. Both Chinese and Emirati officials have linked JOCIC's Abu Dhabi presence to the BRI and the UAE's own domestic development program, Abu Dhabi Economic Vision 2030.

The third Arabian Peninsula Chinese industrial park is in Jazan, in southwest Saudi Arabia. This takes advantage of Saudi's Red Sea coastline to link with two Chinese port projects: Egypt's Port Said, at the north of the Suez Canal on the Mediterranean Sea, and the People's Liberation Army Support Base in Djibouti. Taken together, these three park and port complexes are a physical manifestation of China's Gulf presence, as well as the connective tissue fixing the Arabian Peninsula at the center of the BRI in the Middle East and West Africa region (MENA).

For the Gulf monarchies, having a rising power as an engaged partner is especially welcome in the face of a perceived softening of U.S. commitment to the Middle East. American foreign policy in the region has been inconsistent throughout Pax Americana, and in response, Gulf leaders have adopted a two-pronged strategy: more assertive foreign policies and deepening ties to other powers. Among these powers, China's BRI offers the most clearly articulated path to stabilizing the MENA status quo. The focus on economic development without political reform resonates throughout the region as well. While the inclusive nature of the BRI means it offers the same opportunities to regional rivals like Iran and Turkey, the Gulf monarchies are betting that they have more to win from Beijing, and the Industrial Park—Port projects demonstrates that China sees them as the pillars of the BRI in the Middle East.

Scenarios/Three decades of economic and geopolitical growth

The New Players

The peninsula now aiming at economic diversification is a natural platform for the transit of Asian goods to Europe. For China, India and Russia, positioning themselves in these economic and financial routes in the post-oil era has become a strategic factor

LAPO PISTELLI

He has been Eni's Executive Vice President of International Affairs since April 14th, 2017. Between 1996 and 2015, he was a member of the Italian and European Parliaments. In Brussels, he dealt with Economic and Monetary Affairs and Foreign Affairs. He was also Deputy Minister for Foreign Affairs and International Cooperation. He has taught at the University of Florence, the Overseas Studies Program at Stanford University and other foreign universities.

Since the fall of the Berlin Wall, and especially since the major agreements on the liberalization of world trade in the early 1990s, the Gulf has experienced three decades of extraordinary economic growth and continuous expansion of its geopolitical role.

A quick glance at the map is enough to understand how the Arabian Peninsula is now the natural platform interconnecting the routes from the new Asian giants to the European market and across the Horn of Africa. One can easily see the strategic nature of the control and position of each of the countries bordering the two shipping routes there, the Straits of Hormuz and the Bab el-Mandeb.

The Gulf exports energy and organizes the logistics of Asian goods in transit to Europe through free-trade zones with major tax incentives. It has attracted investments, developed sophisticated financial services and exerts a growing fascination as a tourist destination with its iconic architecture and a dense calendar of sporting, musical and cultural events. The Dubai Expo in 2020 and the World Cup in Qatar in 2022 serve as proof of a long-desired centrality.

The three eras in the Gulf

The transformation of the region has been impressive. All the natural history museums in the Gulf States are now celebrating this transformation based on the long-term vision of their ruling families: from old black-and-white photos of traditional pearl fishers' boats to the current oil wealth, in anticipation of the post-oil future of economic diversification, widespread technology, smart cities and smart education, all already under construction.

The Gulf in "pre-oil" times was a region of British protectorates, a low-cost investment in the most powerful families to maintain order and protect the trading foundations of the British Empire. Since World War II, after the historic meeting of Franklin Roosevelt and Abdulaziz Ibn Saud, the Gulf had chosen an American "oil for protection" arrangement, but the last twenty years have been marked by the entry into the region of new stakeholders who had previously been excluded.

Beijing, a long-term cooperative partner

The first silent protagonist is China, and a true protagonist it is. Beijing leads energy imports from and goods exports to the region. In 2016, China was also the leading investor with a volume of resources exceeding the joint volume of U.S. and European investments. President Xi Jinping received King Salman in Beijing in 2017 and signed agreements worth USD 65 billion and visited the United Arab Emirates the following year. The Chinese call our Middle East "Western Asia," and consider the Gulf as the penultimate stage of the Belt and Road Initiative. 90 percent of Chinese goods are shipped by sea, making the Gulf Straits an essential hub. This economic strategy is underpinned by political doctrine and recently also by a discreet military presence. In 2016, China adopted a new "Arab Policy Paper," and the next year its first military base in the region was established in Djibouti. In the Gulf, Beijing offers itself as a long-term cooperative partner without ideological constraints, as a loyal friend, impervious to change, as patient, with no intention of disturbing the 40,000 U.S. troops still positioned in land bases and on the two aircraft carriers stationed in the region.

Delhi's Growth Corridor

With less strength and strategic continuity, India has recently become a stakeholder in the region. Delhi is attempting to counterbalance the spider's web of the Chinese Belt and Road Initiative with their "Asia-Africa Growth Corridor," in partnership with Japan. This Indian initiative identifies the Omani ports as the gateway to the region and the energy corridor between Duqm and the Iranian port of Chabahar as an alternative route to the two narrow overcrowded Straits.

The loyal collaboration of Moscow

Russia—with its huge tactical and strategic capacity and low profile in navigation—has finally thrown its hat into the region. Moscow does not have the same degree of financial resources as China and knows that its military presence would be well beyond Washington's redlines. At the same time, the slow strategic U.S. withdrawal after so many costly interventions, and above all the loyal collaboration Moscow has recently offered OPEC to counter the U.S. "tight oil" challenge and to stabilize oil prices via agreed cuts in production, have given Russia the opportunity to overcome the invisible historico-political "border" at Damascus. This line has been crossed in the opposite direction by many of the Emirs when visiting President Putin for the first time.

pre-oil

In the "pre-oil" era, the Gulf was a region of British protectorates. Above, the routes of the East India Company, 1886.

oil

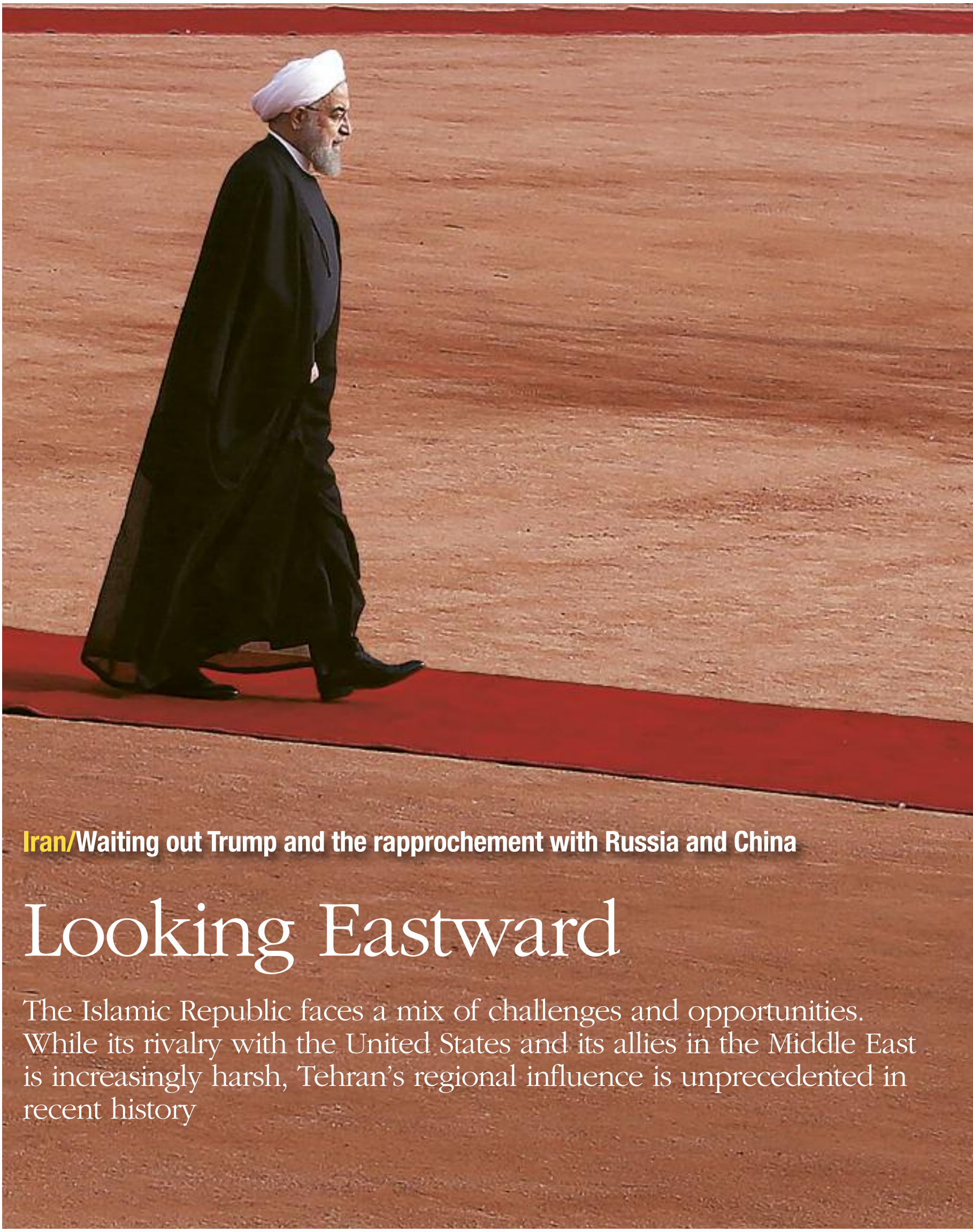
Since the Second World War, the Gulf countries have plumped for the U.S.'s "Oil for Protection."

post-oil

The "post-oil" era, characterized by economic diversification, has been marked by the entry of China, India and Russia into the region.

This must be the place

The Gulf is thus the new "must-be place" of the globalized world. While Kingdoms, Sultanates and Emirates cooperate and compete among themselves in the new geopolitical infrastructure and ports, in cultural diplomacy, in the search for new technologies, in the religious soft power of their own Koranic schools and in the media of its satellite broadcasters, the new global players are seeking a prominent position there by investing economic and political resources. With oil coming to an end, preparations for the future are already being made at these latitudes.



Iran/Waiting out Trump and the rapprochement with Russia and China

Looking Eastward

The Islamic Republic faces a mix of challenges and opportunities. While its rivalry with the United States and its allies in the Middle East is increasingly harsh, Tehran's regional influence is unprecedented in recent history

NAYSAN RAFATI

He is Crisis Group's Iran Analyst. His research is focused on the Iran nuclear deal and Iran's regional policies. He joined the organization in October 2017. Naysan has written for a variety of publications including *Foreign Affairs*, *Foreign Policy*, *Le Monde Diplomatique*, and the *Financial Times*.

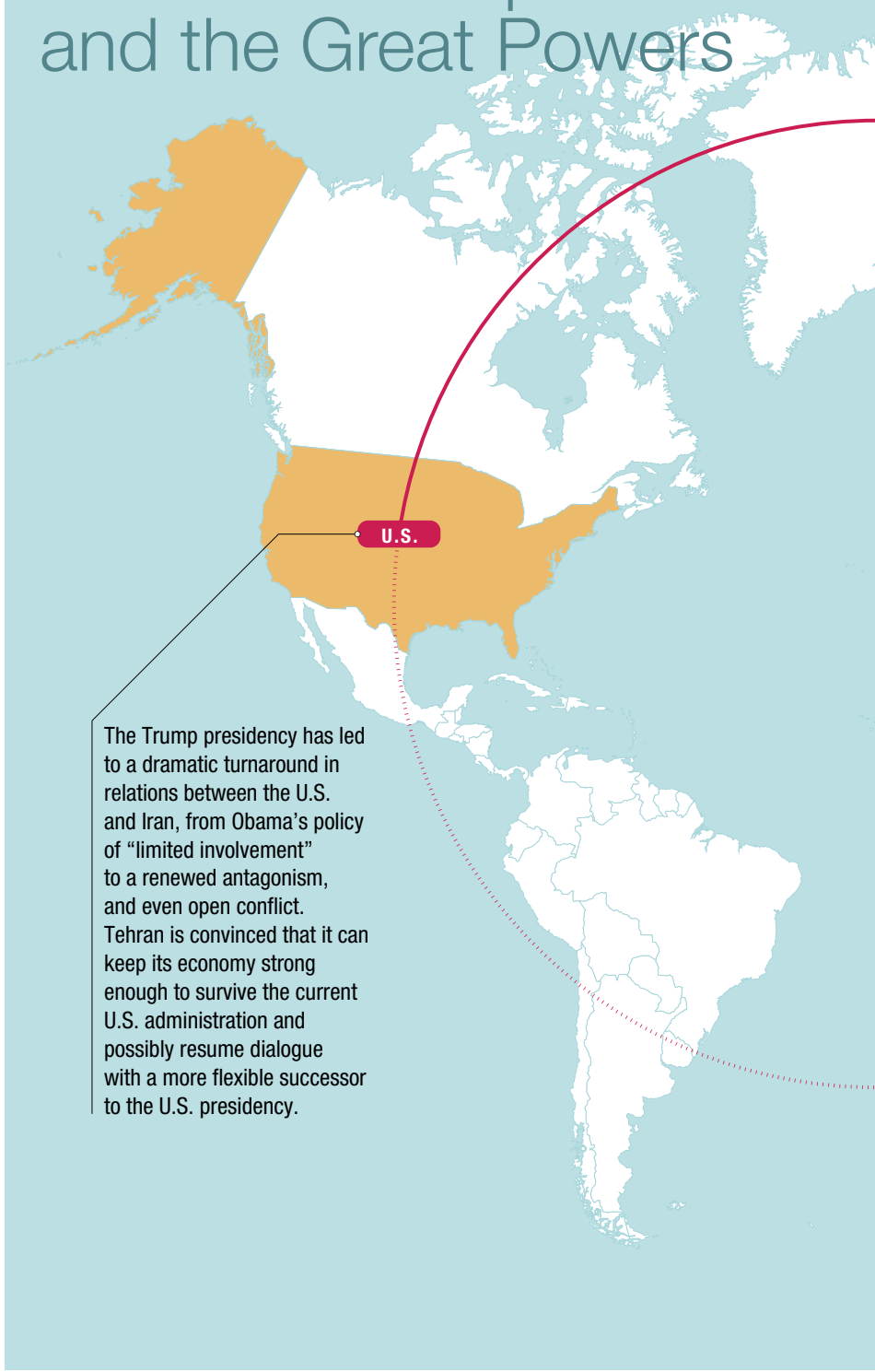
n February, Iran marked the fortieth anniversary of the 1979 revolution. That pivotal event fundamentally recast the country's domestic socio-political structures, upending centuries of monarchical rule in favor of a new Islamic Republicanism that has interwoven, at times to considerable strain, participatory and authoritarian dimensions. It also upended Iran's relations with both its neighbours and world powers, replacing a firmly pro-Western government with an ideologically-minded new leadership who championed export of their revolution and an independent path between the Cold War's rival camps. Four decades on, Iran finds itself in a moment of great opportunity as well as great peril, entangled in a growing rivalry with the U.S. and its Middle East allies while pursuing a degree of regional influence arguably unmatched in recent times.

The difficult relationship with Washington

None of Iran's relations with the great powers demonstrates the transformational impact of the revolution as starkly as Tehran's relationship with Washington. Under the last Shah, Mohammad Reza Pahlavi, Iran was a stalwart U.S. ally and key regional partner, one of the two "twin pillars" of American policy in the Middle East (the other was Saudi Arabia). Ayatollah Ruhollah Khomeini, who emerged as the most vocal opponent of the Shah and took the reins of power after the monarchy was toppled, accused the U.S. of having helped the Shah suppress popular movements, causing deep resentment as the country was reduced to a superpower's vassal. The takeover of the U.S. embassy in 1979 and ensuing 444-day hostage crisis remain, in Washington's eyes, the Islamic Republic's original sin, to which it has only added over the following decades with unceasing cries of "death to America," attacks against U.S. targets, support for a panoply of non-state groups that undermine and threaten U.S. interests as well as those of its allies, and, since the early 2000s, a nuclear program whose suspected military dimensions became a potent and growing concern.

The mistrust and grievances are mirrored by the Iranians, who are convinced that Washington has never reconciled itself to the loss of its influence in the country and seeks to undermine its present system wherever possible. "We've never been forgiven by the U.S. for having exercised our right to self-determination," Iran's foreign minister, Javad Zarif, recently argued. "As a result, we have long been the target of an unhealthy fixation—an obsession—which continues to this very day." →

The Islamic Republic and the Great Powers



The Trump presidency has led to a dramatic turnaround in relations between the U.S. and Iran, from Obama's policy of "limited involvement" to a renewed antagonism, and even open conflict. Tehran is convinced that it can keep its economy strong enough to survive the current U.S. administration and possibly resume dialogue with a more flexible successor to the U.S. presidency.

Yet the enmity of the past four decades between Iran and the U.S. has not precluded brief windows of tactical cooperation, such as arms sales under President Ronald Reagan and collaboration on toppling the Taliban in 2001. Under the Clinton administration there were even hesitant, and ultimately short-lived, steps towards détente. None of these exchanges, however, was as focused, overt and substantive in outcome as the negotiations that in 2015 led to the Joint Comprehensive Plan of Action (JCPOA). That agreement, struck after years of mounting apprehension over Iran's nuclear program and painstaking negotiations, traded constraints on Iran's nuclear activity for relief from some international sanctions. While Tehran formally reached the deal with the five permanent members of the UN Security Council and Germany, in its latter stages the discussions required parallel backchannel bilateral talks with Washington to push it across the finish line.

In the aftermath of Donald Trump's ascendance to the presidency, the pendulum swung dramatically from the Obama era's limited engagement to renewed rivalry, if not outright confrontation. Regarding the nuclear deal as a fool's bargain and alarmed by the perceived rise of Iran's influence across the Middle East, the U.S. unilaterally withdrew from the JCPOA in May 2018—and not only that, it declared that it would pursue a "maximum pressure" campaign against Tehran, primarily waged through the resumption of sweeping sanctions which had been frozen under the JCPOA's terms. The intention, laid out as twelve demands by Secretary of State Mike Pompeo last year, is to not only drive Iran to make additional concessions on the nuclear front, but to substantially roll back its regional gains. Tehran sees these aims as thinly-veiled ambitions for no less than wholesale regime change.

Tehran is looking forward to Trump's successor

Unilateral U.S. sanctions, particularly those targeting energy exports, are undoubtedly causing considerable economic strain: oil sales have waned, inflation has waxed, and foreign firms, fearing the wrath of U.S. enforcement authorities, are exhibiting a shrinking appetite to do business in Iran. But for the moment there is little to suggest an imminent Iranian capitulation to American demands. Tehran believes that while difficult days may lie ahead, it can nevertheless manage to keep its economy afloat long enough to outlast the current administration and perhaps resume dialogue with a less problematic successor. At least it appears willing to wait for the outcome of the 2020 U.S. elections before deciding what course to take.

But between U.S. confidence over its ability to mete out eventually unbearable hardships and the equally resolute Iranian belief in its ability to survive the siege lies a dangerous potential for incremental escalation that could spiral out of control. This could happen either in the nuclear realm or across a fraught regional landscape where the two countries compete for influence. Furthermore, even as Washington's coercive approach is viewed with great favor among regional allies such as Israel, Saudi Arabia and the UAE, all of whom share a perception of Iran as a destabilizing, dangerous and ascendant foe, it has opened a growing divide with governments still party to the JCPOA (the UK, France, Germany, China and Russia).

Europe's dilemma

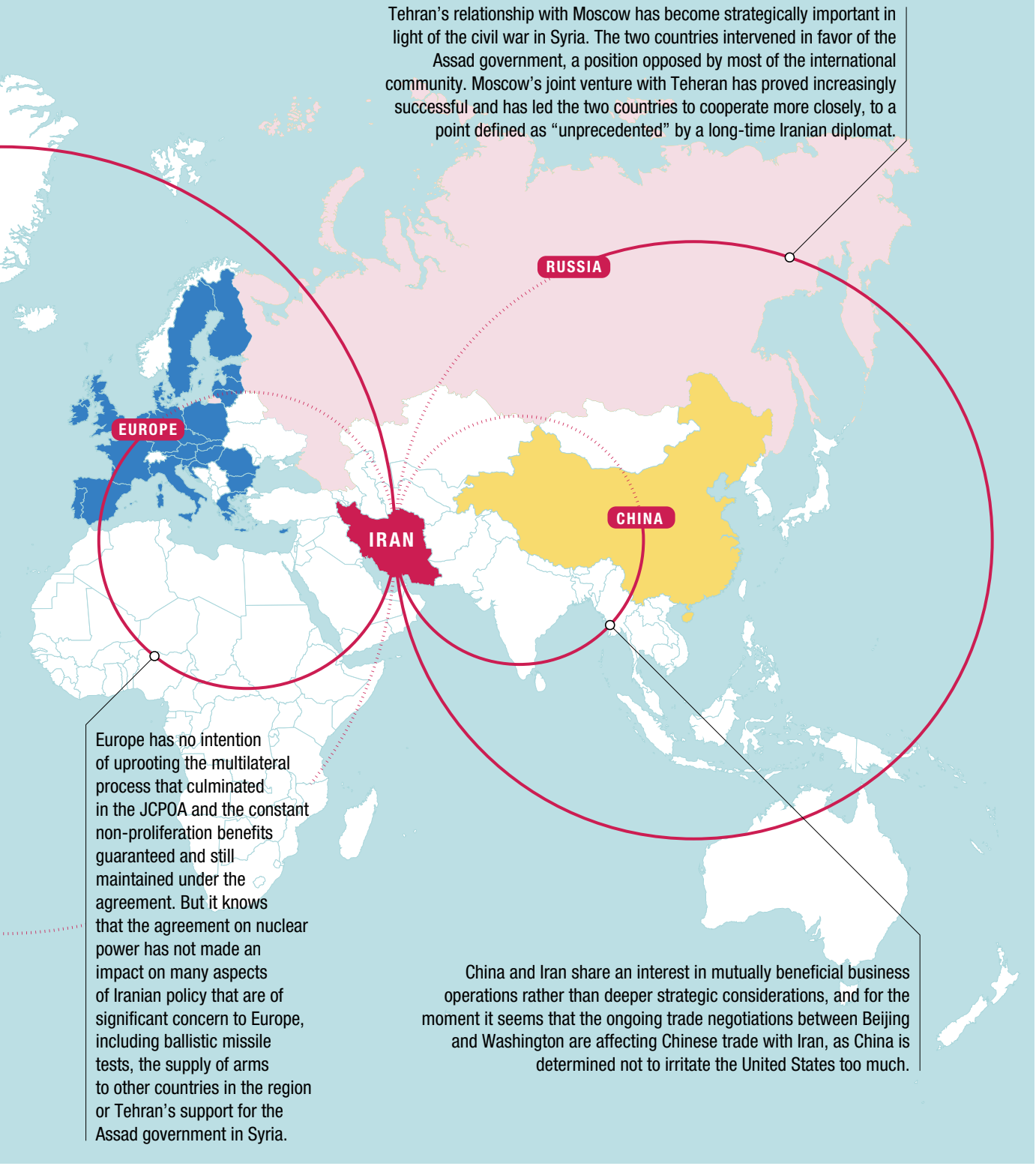
Iran's ties with Europe bear little of the animus that has characterized its relations with the U.S., but they, too, have gone through spells of promise as well as tension since the revolution. From the early 2000s, Iran's suspected pursuit of nuclear weapons became the dominant concern and subject of persistent European diplomacy, initially by national governments and later with the institutional inclusion of the European Union. Like the U.S., the Europeans introduced sanctions against Iran to curtail its nuclear activity, notably enacting a ban against imports of Iranian oil in 2012. Keen on drawing foreign investment and finding partners capable of modernizing its transport and infrastructure sectors after the lifting of sanctions, Iran went on a post-agreement spree of contracts with European companies—though the lingering chill of suspended secondary sanctions and remaining primary U.S. embargo on Iran was still potent enough to keep many banks wary of underwriting such ventures.

The U.S. decision to pull out of the JCPOA, despite the fact that Iran continues to implement its end of the agreement, has put its European allies in a serious quandary. On the one hand, the transatlantic relationship is a core and longstanding interest for the European Union as well as its individual member states. On the other hand, the multilateral process which culminated with the JCPOA, and the continued non-proliferation gains secured and still maintained under its terms is something they do not wish to see collapse. The nuclear deal, they reason, has certainly not curtailed many aspects of Iranian policy which they, like the U.S., view with significant concern. The testing of ballistic missiles and supply of weapons to regional proxies, Tehran's role in buttressing the Assad government in Syria and revelations concerning suspected Iranian government involvement in a series of attempted bombing and assassination plots on European soil against Iranian dissidents are among the key areas where Europe, like the U.S., believes Iran to be firmly in the wrong.

Between a rock and a hard place

Unlike the current U.S. approach, however, the Europeans are in favor of ring-fencing the nuclear agreement from these non-JCPOA issues so long as Iran remains compliant with its commitments under the deal, believing that continued cooperation on the critical non-proliferation front might lead to more productive discussions with Iran on other issues. Iran has, for example, held a series of discussions with the UK, France, Germany and Italy on the conflict in Yemen. Thus, while the Europeans in January approved targeted sanctions against Iranian intelligence operatives, London, Paris and Berlin also agreed later that month to set up a new mechanism, the Instrument in Support of Trade Exchanges, or INSTEX, to facilitate trading with Iran. This arrangement will begin with humanitarian goods, whose sale to Iran is permitted in theory but is often hamstrung in practice by unilateral U.S. sanctions.

Consequently, Europe finds itself between a rock and a hard place as it is under increasing pressure from Washington to abandon an agreement which it still regards as a success, and



under growing criticism from Tehran for failing to significantly deliver on the economic normalization it had expected. The latter dynamic could eventually prompt a high-risk gambit by Iran to test the JCPOA's boundaries in the belief that this might push the Europeans to redouble efforts at mitigating the impact of sanctions—but this could just as easily backfire, pushing Europe closer to the U.S. position.

The strategic interests of Russia and China

Finally, there are the two members of the UN Security Council, Russia and China, that remain supportive of the JCPOA, and each has key interests in Iran that go beyond the nuclear issue. However, Iran will likely be disappointed by the results if it believes that a policy of "looking to the East" can fully counterbalance or compensate for deteriorating ties to the West, not least in the event of a renewed nuclear crisis.

Iran's post-revolutionary relations with Russia have oscillated between acrimony, particularly in the early years, and more constructive periods of diplomatic engagement. However, Tehran's relationship with Moscow has taken a particular strategic significance in light of the civil war in Syria. The two countries have intervened on behalf of the Assad government—a position that most of the international community opposes, not least because of the tragic humanitarian costs and brutal methods used by the regime in maintaining its hold on power. Moscow's and Tehran's joint gamble has proven increasingly successful and prompted closer coordination between the two countries, reaching a level a senior Iranian diplomat described as "unprecedented."

Syria's war has also provided fertile ground for new, separate battles, including an increasingly tense standoff between Iran and Israel. Already worried about Iran's support to Hezbollah in Lebanon and Hamas in Gaza, Israeli concerns over Iran's presence across the north eastern border have emerged as a volatile flashpoint. Here, though, it has been clear that Russia's alignment with Iran only goes so far. As tit-for-tat military exchanges between Israeli and Iranian/Iran-linked forces spill into the open, the Russians appear intent on navigating a middle ground between the two sides, complaining about Israeli actions but seemingly disinclined to force the matter.

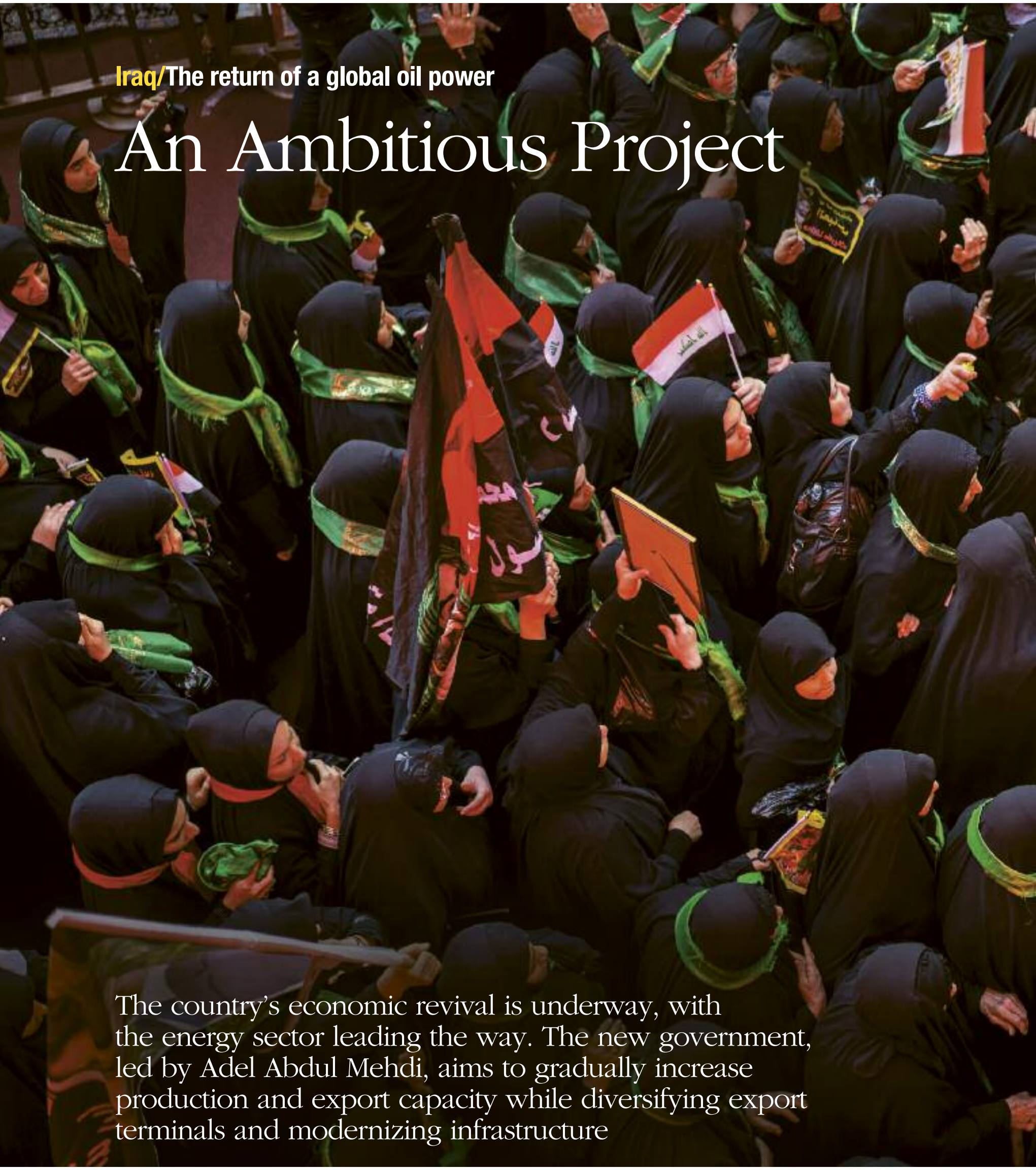
All the same, the Iran-Russia relationship has utility for Tehran that extends beyond the battlefields of the Levant. Russia is a rare sympathetic party to Iran's interpretation of United Nations Security Council decisions pertaining to Iran's missile program, for while the U.S. interprets a key phrase in Resolution 2231—"calls upon"—as that of an injunction, Moscow views it as a suggestion. Owing to Russia's veto power, Iran knows that at least on this issue, Washington's push to penalize Iran's ballistic launches at the UN will run into a potent procedural hurdle.

For Iran, relations with China center on one key issue: trade. The lion's share of Iranian energy sales head east—to India, to South Korea, to Japan, but above all to China, which in 2017 was both Iran's biggest trading partner and primary export destination. All four of these countries received U.S. waivers in November to continue purchasing Iranian oil for at least six months, but on the condition that they demonstrate efforts towards doing so in decreasing amounts. Thus far, China seems to have complied with Washington's terms, cutting Iranian oil purchases by an estimated 27 percent after energy sanctions came into effect in November 2018, and Chinese exports to Iran have also dropped. Sino-Iranian interests converge, for the most part, on a mutually-beneficial transactional basis rather than deeper strategic considerations, and for now it appears that Beijing's ongoing trade negotiations with Washington are affecting its commerce with Iran as China is intent not to unduly anger the U.S. In other words, putting too much hope on China as a lifeline has two downsides for Iran, first by giving Beijing leverage for securing advantageous commercial terms and second by experiencing collateral damage in the U.S.-China trade war.

In a lengthy statement on the anniversary of the revolution, Ayatollah Ali Khamenei, who since Khomeini's death in 1989 has held the position of supreme leader, reflected that "independence means the freedom of the nation and the state from the imposition and bullying of the domineering powers of the world." "Independence" he went on to clarify, "should not be defined as the confinement of the politics and the economy of the country within its border." As it enters its fifth decade, how the Islamic Republic's politics and economy develop beyond those national confines remains unsettled—and its fate depends not just on the U.S.-Iran rivalry, but also on the great powers' competition.

Iraq/The return of a global oil power

An Ambitious Project



The country's economic revival is underway, with the energy sector leading the way. The new government, led by Adel Abdul Mehdi, aims to gradually increase production and export capacity while diversifying export terminals and modernizing infrastructure

ADIB FATEH ALI

Editor of the askanews news agency, where he deals with Middle Eastern politics in the Foreign Affairs newsroom. He contributes to the "Piazzapulita" programme on Italian TV station La7, for which he has produced several reports on Iraq. He has published several articles in various Italian newspapers, including *Donne di Repubblica*, *Diario* and *Il Piccolo* di Trieste.

The International Energy Agency's (IEA) recently published annual oil report included the following highlight: "Iraq is strengthening its position as one of the world's major crude oil producers. As the third global source of new supplies, the country is also driving the growth in supply within OPEC until 2024. Iraq's increased production of crude oil will need to make up for the significant drop in the positions held by Iran and Venezuela, as well as the ongoing fragile situation in Libya. The implications of these developments on energy security are significant and could have lasting consequences."

With production in January of this year standing at 4.7 million barrels per day (bpd), and exports of almost 3.7 million bpd, Iraq is rapidly moving up the ranking of OPEC's crude oil producing countries. Currently in second place behind Saudi Arabia (see chart 1), it's quickly becoming a global power in the field of oil production. The country sees black gold as a means to revive the national economy, defuse fierce internal social conflicts and start the process of reconstructing the regions devastated by jihadist militias in the black years of the Caliphate (2014-2017). The political initiative aims to achieve multiple goals: to gradually increase production and export capacity, diversify export terminals and modernize infrastructure.

It's an ambitious project, as the conflicts that have plagued Iraq for 40 years have put a severe strain on its national oil industry. They include the eight-year war with Iran in the 1980s and the long embargo imposed on the country after the unfortunate invasion of Kuwait by Saddam Hussein, a fuse that triggered the first Gulf War. The UN Oil-for-Food program, implemented to punish the regime in 1995 (and which stayed in place until 2003), effectively blocked the country's production activities. These activities restarted slowly under the control of western multinationals after the overthrow of Saddam Hussein's regime and the arrival of the so-called "coalition of the willing," led by the U.S. (see chart 2).

The ups and downs of production

The first significant turning point in the recovery of the Iraqi oil sector came in 2012, when the government announced a plan to increase production to nine million bpd by 2017, as many as the Wahhabi kingdom of Riyadh was producing at the time. The goal was pursued tenaciously, albeit slowed down by the spread of Abu al-Baghdadi's men in the North and West of the country and followed, in June 2014, by the establishment of the Islamic Caliphate. The huge expenses incurred by the Baghdad government to fund the army in its war against the jihadists were compounded by the loss of strategic deposits and infrastructures, starting with the Biji refinery, north of the capital.

But the conflict did not lead to a total collapse of production in the national energy sector: driven by the southern fields, crude oil production began to increase strongly again from 2015, when the fateful threshold of 4 million bpd was exceeded (see chart 2). The positive trend also continued in the years after that. At the end of January 2018, Jabar al-Luaibi, who was Oil Minister at the time, issued an official statement predicting that crude oil production would reach 5 million bpd by the end of the year and that the record figure of 7 million bpd would be reached by 2022. Will the promise be kept? The IEA's forecasts seem to confirm it.

The scenario has attracted the attention of OPEC and caused significant concern in Riyadh, which has been struggling with multiple problems in recent years: the fall in crude oil prices on international markets, the economic and political cost of the military campaign in Yemen, which has been running since 2015, and internal conflicts which have dented the wealthy kingdom's budget with a public debt jumping to a record level of 17.2 of GDP in 2018 (see chart 3).

The agreement between Russia and members of the OPEC cartel on reducing oil production quotas, which came into force in January 2017, pushed prices up, but for Iraq it led to a fall in exports of over 900,000 bpd in the first month of this year. Data published last January by the Iraqi Ministry of Oil show total production of 4.58 million bpd against crude oil exports of less than 3.65 million bpd, a significant drop which is expected to be offset to a certain extent by forecasts of an increase in the demand for crude oil of 1.24 percent on international markets in 2019.

With proven oil reserves of around 150 billion barrels (see chart 4) and the prospect of increasing them to 250 billion, just below the 264 billion of Saudi Arabia, Iraq seems determined to maintain growth in production and exports. The conditions are all there: the Siniya, Haditha, Qayyara and Kisk refineries, destroyed by ISIS jihadists, have been reactivated and are producing 70,000 bpd. Capacity will also be boosted by the construction of a new refinery in Kirkuk that will produce 70,000 bpd and the full recovery of production at the main refinery in Biji.

The historic law on oil and the new Government

To add to the strong growth in re- →

fining production, an agreement was signed in February 2018 for gas and oil pipelines to be built between Basra, on the Gulf, and the Jordanian port of Aqaba, on the Red Sea. The agreement with Jordan was followed a month later by an important legislative achievement: parliamentary approval of the long-awaited oil law. On March 5, 2018, the Council of Representatives in Baghdad voted in favor of a bill establishing the Iraq National Oil Company. In addition to regulating crude oil production and exports, the state body is tasked with distributing the revenue equally to the different regions of Iraq.

A historic decision, which, according to the government, should allow the country to develop fields, refineries and production plants through local state-owned companies, thereby guaranteeing employment, full sovereignty over its vast resources and independence from foreign companies. All with benefits, even in terms of social peace, for individual regions, which will receive 10 percent of oil revenues. The creation of a new government last October and, above all, the appointment as prime minister of a "uniting" politician like the Shiite Adel Abdul Mehdi have given Iraq's energy ambitions a new boost. Unlike his predecessors, Abdul Mehdi immediately sought to resolve the strong tensions between Baghdad and Erbil which erupted after the independence referendum promoted by the Kurdish minority in the North. Recently, Baghdad decided to resume the payment of salaries to public employees in the autonomous region of Kurdistan, salaries which had been blocked a few years earlier. The decision was immediately followed by an announcement by the Prime Minister of the Kurdish government, Nichervan Barzani, that the Autonomous Region's Oil and Gas Council had been assigned the task of "starting a serious discussion with the Iraqi federal government to resolve all the outstanding issues concerning oil in the framework of the constitution." This announcement promised to make the implementation of Baghdad's energy plans a real possibility. In the event of an agreement, the Kurds would commit to restoring to the central government the management of the more than 250 thousand bpd exported.

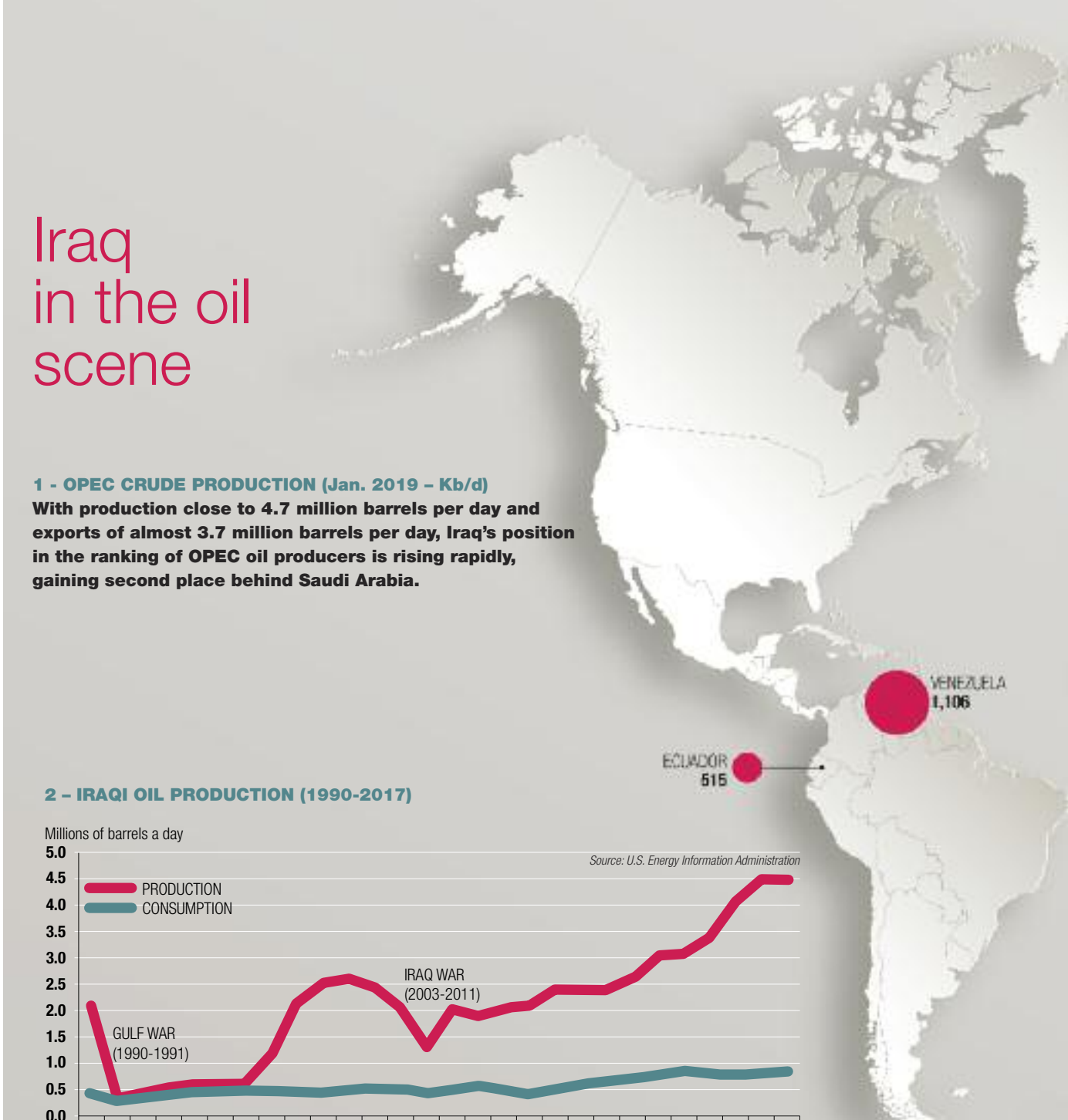
The appointment of an internationally respected and recognized technician to head the oil ministry also reflected the new government's determination to pursue a winning strategy in the energy field. The new minister, Thamir Abbas Al Ghadhban, held the same post after the fall of Saddam Hussein and, in 2004, he led the Iraqi post-war delegation to the OPEC ministerial meeting. He has over three decades of experience in the Iraqi oil industry. After initially working in the field as a petroleum engineer, he moved to the headquarters of the Oil Ministry, where he worked as Director General of the Reservoir and Field Development Department and later as Director General for Planning. He played a leading role in rehabilitating the severely damaged oil industry after the fall of the regime in 2003.

"Iraq will play a constructive, positive and influential role in OPEC. We will work to increase Iraq's production and export capacity and to diversify export terminals and improve infrastructure," said Ghadhban in an interview after announcing his new post last October.

The remaining challenges

The recent defeat of ISIS, both in Iraq and in Syria, has undoubtedly reduced the number of attacks in the country,

Iraq in the oil scene

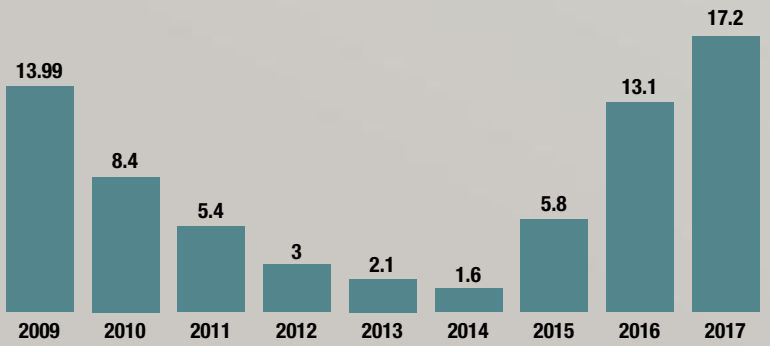


1 - OPEC CRUDE PRODUCTION (Jan. 2019 – Kb/d)

With production close to 4.7 million barrels per day and exports of almost 3.7 million barrels per day, Iraq's position in the ranking of OPEC oil producers is rising rapidly, gaining second place behind Saudi Arabia.

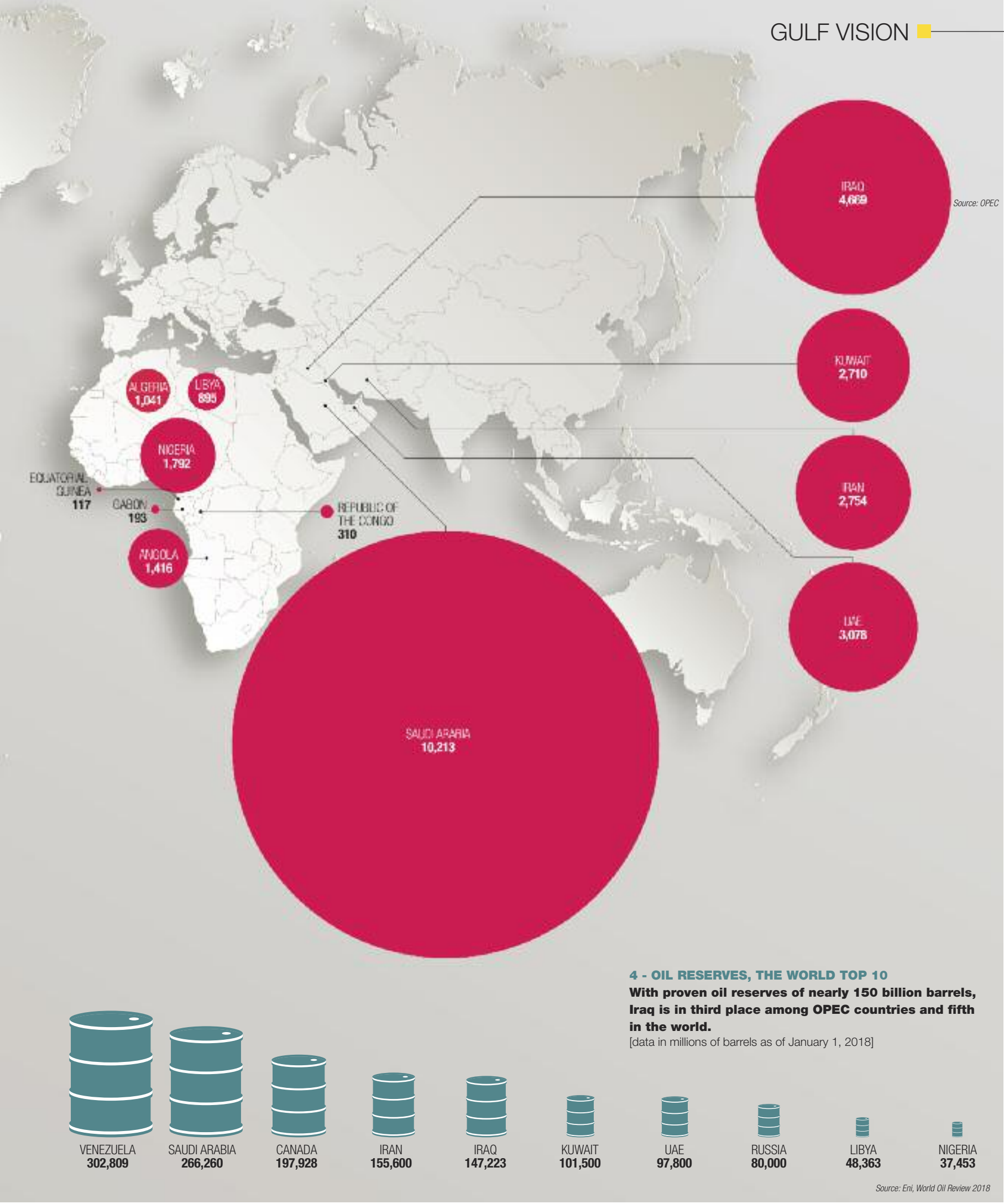
2 – IRAQI OIL PRODUCTION (1990-2017)

After the collapse due to the two Gulf wars and the embargo that followed, Iraqi production began to pick up slowly following the overthrow of Saddam Hussein's regime. The significant threshold of 4 million barrels a day was exceeded in 2015, despite the presence of ISIS in the north and west of the country.



3 – SAUDI ARABIA, DEBT-GDP RATIO

The drop in crude oil prices on the international markets, following the peak reached in 2014, weighed heavily on the budget of the wealthy Saudi kingdom: in 2017, public debt reached a record 17.2% of gross domestic product (GDP).



4 - OIL RESERVES, THE WORLD TOP 10

With proven oil reserves of nearly 150 billion barrels, Iraq is in third place among OPEC countries and fifth in the world.

[data in millions of barrels as of January 1, 2018]

although it would be naive to think that the fall of the Caliphate, at least as a "State," signifies the total elimination of terrorism in Iraq. Thus the age-old problem remains one of reconciling the Shiite majority with the Sunni minority, the latter belonging to the same faith as al Qaeda's jihadists first and ISIS later. The new government led by a Shiite seems intent on not repeating the mistakes of the past, in particular the marginalization of the Sunni element. Even moderate Sunnis, however, seem to acknowledge their responsibility for creating the conditions for jihadists to thrive, as they were long held to be the only way to realize their demands. The hope now is that regional powers, including Shiite Iran on one side and Sunni Turkey and Saudi Arabia on the other, will limit their interference in Iraqi internal affairs by drawing lessons from the Syrian experience, whose conflict has jeopardized the stability of the whole Middle Eastern region. A peaceful and united Iraq can only benefit peace and the fight against terrorism. Not just in the Middle East.

Maritime routes/The key role of straits for trade and security

Hormuz and Bab al-Mandeb, the Oil Gates

The growing Asian demand for oil and gas has enhanced the significance of Middle East chokepoints in global geopolitical balances. Security of navigation and port security are becoming an economic priority for all players in the region

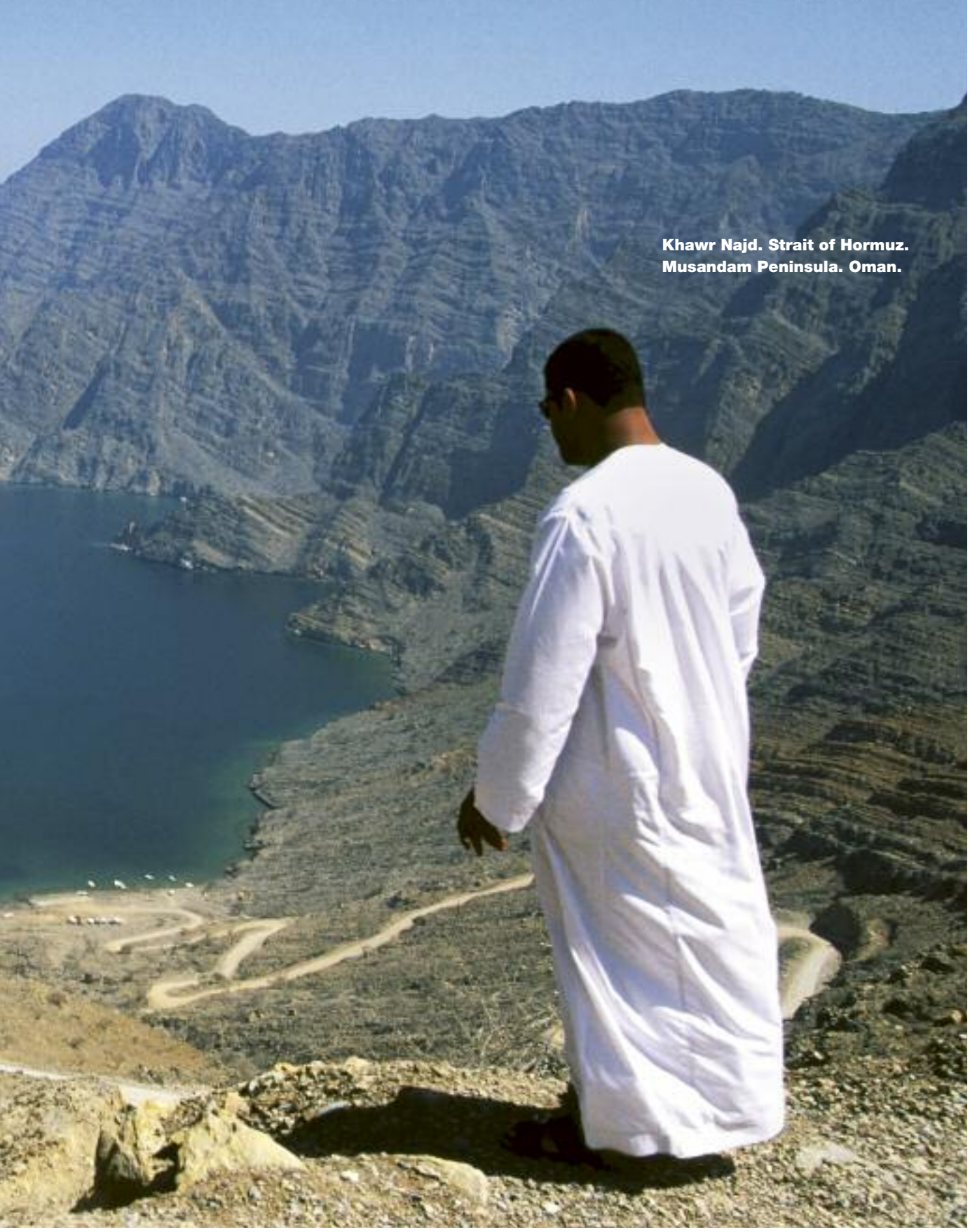
ELEONORA ARDEMAGNI

She is Associate Researcher at ISPI (Italian Institute for International Political Studies), Subject Expert at the Università Cattolica del Sacro Cuore, Milan, and Gulf Analyst at the NATO Defense College Foundation.

Maritime straits, or chokepoints, have always been vital for international trade and security and now play a key role in the new geostrategic competition taking place in the Gulf. The Strait of Hormuz, which links the Gulf with the Indian Ocean, is still one of the major hotspots in the Middle East due to the tension between the United States and Iran as well as between the Islamic Republic and Saudi Arabia. However, the Strait of Bab al-Mandeb, which links the Red Sea with the Gulf of Aden, does not provide a safe alternative to problem-ridden Hormuz since the civil war in Yemen has unleashed new dynamics of insecurity. Moreover, the area stretching from the Horn of Africa to the western Indian Ocean is now at the center of multiple commercial and military rivalries, with strategic implications for the Mediterranean region and Europe.

Maritime trade has been growing in recent years. According to the United Nations Conference on Trade and Development (UNCTAD), global seaborne trade expanded by 4 percent in 2017 and is projected to increase by 3.8 percent in the period 2018-2023. This trend is driven by booming infrastructure investments generated by China's One Belt One Road (OBOR), India through its connectivity strategy and the Gulf monarchies with their projects for building container ports and other efforts to forge energy and trade alliances in the East. Asian powers, now the leading importers of oil and gas from the Gulf, have played a key role in enhancing the significance of the straits of Hormuz and Bab al-Mandeb in global geostrategic balances.

Against this background, the major challenges to maritime security in and around chokepoints come from state actors such as Iran, insurgency and terrorist groups like Yemen's Houthi rebels and the jihadists operating in Egypt's Sinai Peninsula, as well as from other unresolved geopolitical tensions in the Gulf. They also stem from the resurfacing of piracy in the Gulf of Aden and the waters of Somalia, and from the growing nationalist ambitions of the monarchies in the Arabian Peninsula, such as Saudi Arabia and the United Arab Emirates against Qatar. In the medium to long term, the need to counter rising maritime terrorism and to guarantee the security of the many container ports currently under construction or expansion means that freedom of navigation through these chokepoints is becoming an increasingly important issue for both the national interest and the interests of the global community, providing scope for possible bilateral and/or multilateral cooperation,



Khawr Najd. Strait of Hormuz. Musandam Peninsula. Oman.

albeit in a context marked by strong competition.

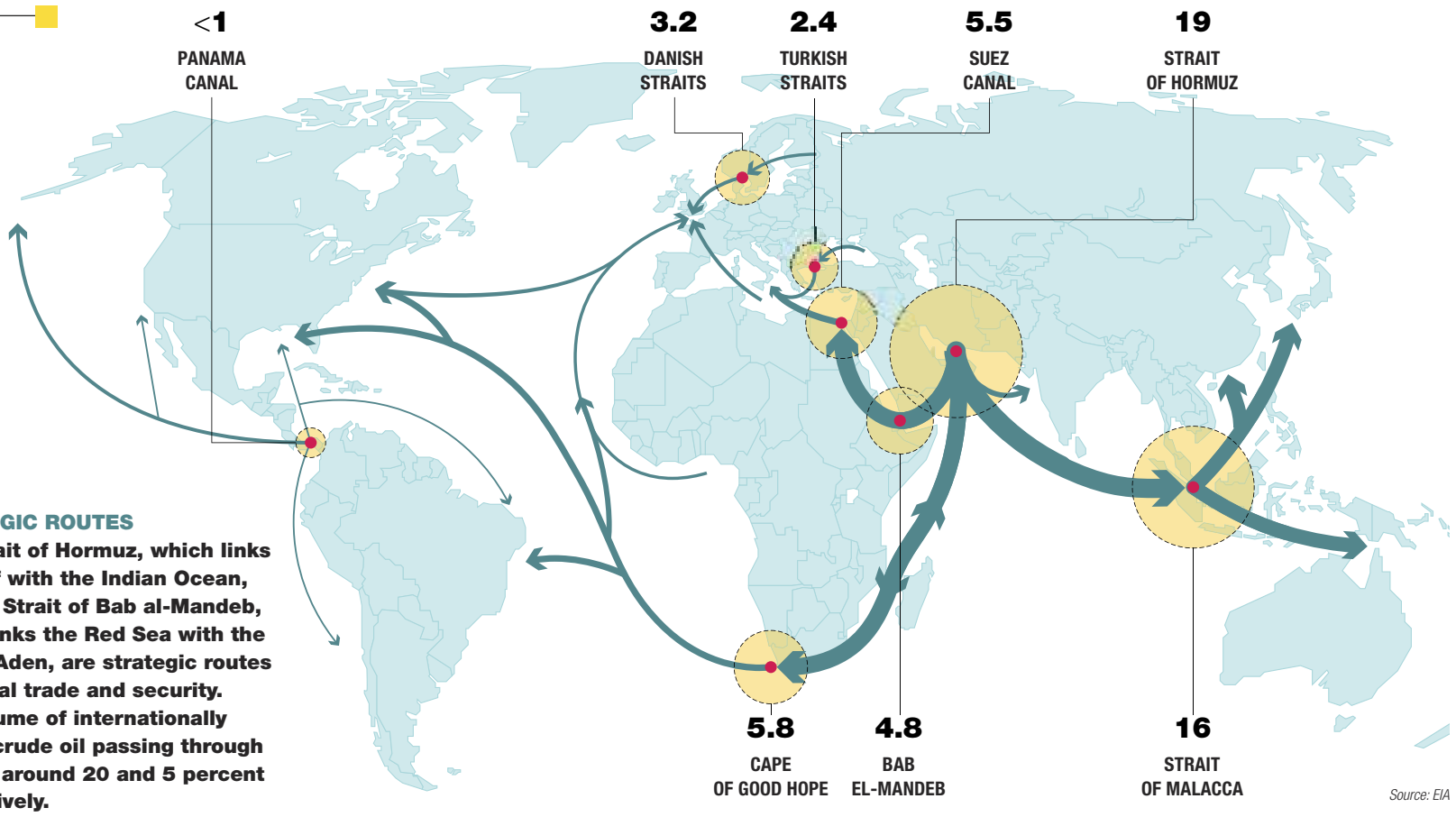
Players, dynamics and imbalances

The threat to block or even close maritime transit through Hormuz is part of the usual rhetoric employed by post-revolutionary Iran as a major tool of geopolitical pressure and as a weapon of verbal deterrence. Since Donald Trump's unilateral withdrawal of the United States from the Iran nuclear deal, Tehran's highest authorities have become more vocal in their threats over Hormuz. A possible U.S. military intervention against Iran, just like the possibility of military action by Israel and/or Saudi Arabia in Iranian territory, would cause disarray in any scenario. Nevertheless, in a situation of escalating political tensions, there are three elements that need to be considered, all of which militate against Iran closing and/or blocking access through the strait. Firstly, Tehran is still massively dependent on the ability to pass through Hormuz in order to export its crude oil, since Chabahar port, in the Sistan va Baluchestan province east of the strait, financed primarily by India, will not be fully operational in the medium term. In 2018, the volume of trade activities of Chabahar increased by around 50 percent, but the port is undergoing expansion, and the plan for a Free Trade Zone is evolving, although the re-imposition of U.S. sanctions is likely to slow down and reduce its development. Secondly, blocking Hormuz would mean bringing Iraq's economy to its knees as the Gulf is Iraq's only outlet to the sea. This would have a direct impact on the social stability of southern Iraq and its Shia majority population, which is dependent on oil exports and is now seeing a growing military, political and economic presence of the pro-Iranian Iraqi militias known as Popular Mobilization Forces. By causing a major crisis in Hormuz, the Iranians would thus jeopardize their strategic depth into the Eastern Mediterranean, depth gained through proxies that hinge on Iraq. Finally, the other country that holds the "geopolitical key" to Hormuz, namely the Sultanate of Oman through the Musandam Peninsula, has never broken off dialogue with the Islamic Republic and actually facilitated informal talks prior to nuclear negotiations between Iran and the United States in 2013. Muscat remains an irreplaceable asset for regional diplomacy, this despite growing pressure from Saudi Arabia to align itself with the positions of the Saudi Arabia-Arab Emirates diarchy. Looking at the Strait of Bab al-Mandeb, although the percentage of oil barrels per day passing through it is lower than that of Hormuz, approximately 4 percent of global supplies compared to 20 percent, it currently poses greater challenges for the bordering region because Yemen is the epicenter of sub-regional insecurity. Most of Yemen's western coastline along the Red Sea is still controlled by the Houthis, the Iran-backed Shiite insurgents in the north of the country, while the port city of Hodeidah is at the center of United Nations negotiations. The Houthi rebels actually launch their missile and drone attacks against Saudi Arabia from the Hodeidah-Sanaa-Saada triangle. The west coast of Yemen is still a war zone: since 2016, the Houthis' long-range missiles and remote-controlled boats filled with explosives have hit American, Saudi and Emirati warships as well as Saudi Oil tankers and merchant ships passing through the southern end of the Red Sea. In summer 2018, Riyadh suspended its oil shipments through the Bab al-Mandeb strait after one of its oil tankers was attacked. The Houthis have also made extensive use of mines, including naval mines, not only in the port of Hodeidah but also in Mokha harbor. Yemen's port city of Aden is still a long way from achieving political stability. It is the seat of the internationally recognized government as well as of the Southern Transitional Council, an institutional body with its own military wing working for southern independence created in 2017. Although the presence of Al-Qaeda in the Arabian Peninsula (AQAP) and of the local branch of so-called Islamic State has grown weaker, Aden is still subject to extensive jihadist infiltration.

From a strategic standpoint, Bab al-Mandeb has become an extension of the Gulf, as shown by the key role played by Saudi Arabia and the Emirates in the peace agreement between Ethiopia and Eritrea. East Africa is becoming an important arena for the geopolitical competition between Saudi Arabia and Iran, as well as between the Middle Eastern powers themselves, Emirates and Saudi Arabia versus Qatar and Turkey, through the construction/concession of commercial ports, military facilities and permanent bases. Also, Hormuz and Bab al-Mandeb have grown increasingly interdependent as a result of Iranian support for Houthi rebels in Yemen, which means that a crisis in one of the straits could have political and military repercussions on the other, thereby making escalation scenarios more likely and, conversely, de-escalation scenarios more complex.

Alliances, naval forces and defense of the seas: the role of the Gulf monarchies

In the geostrategy of the two straits, →



STRATEGIC ROUTES
The Strait of Hormuz, which links the Gulf with the Indian Ocean, and the Strait of Bab al-Mandeb, which links the Red Sea with the Gulf of Aden, are strategic routes for global trade and security. The volume of internationally traded crude oil passing through them is around 20 and 5 percent respectively.

the Gulf monarchies are playing an increasingly prominent role due to their interventionist and ambitious foreign policies as well as growing investments in their naval forces. It is no coincidence that energy and maritime security are at the core of the courses run by the NATO Regional Center in Kuwait. In conventional naval operations, the monarchies enjoy an advantage over Iran in that they can rely on more modern ships and naval systems as well as on American and British protection. Whereas their traditional focus was on coastal defense, Saudi Arabia, the Emirates and Qatar are now investing in the development of "blue water capabilities," the ability to operate in the deep waters of open oceans, but they suffer from a shortage of qualified personnel and training.

Each monarchy, however, has different and sometimes conflicting objectives, strategies and alliances. These differences have been exacerbated since Saudi Arabia, the Emirates, Bahrain and Egypt severed diplomatic relations with Qatar in 2017. For Qatar, currently under a land, sea and air embargo, a maritime projection beyond Hormuz means building a network of alternative relations to secure its economic and commercial survival as well as its regional prestige. The crisis in the Gulf Cooperation Council (GCC) has led to stronger relations, including maritime ties, between Doha, Iran and Turkey, as well as between Qatar, Kuwait and Oman. In 2018, Qatar and Iran started talks to strengthen their port and maritime cooperation.

With regards to the straits, Saudi Arabia can act on two fronts: Hormuz and Bab al-Mandeb-Suez Canal. Riyadh has the biggest fleet in the Gulf and, in 2008, started a modernization program for its Eastern Fleet that is still underway, the Second Naval Enhancement Program II. It is also making substantial investments in its western coast, already the outlet for Petroline, the pipeline that carries crude oil for export from the eastern regions to the terminals. Large-scale infrastructure, tourist and industrial projects linked to the "Vision 2030" plan and post-oil diversification are all being developed on the Red Sea (King Abdullah Economic City, NEOM and Red Sea Project). Freedom of navigation and maritime security along Bab al-Mandeb are therefore a national priority for Riyadh, well beyond energy and trade considerations.

Until a few years ago, the United Arab Emirates' main focus was on Hormuz, since Iran has occupied the UAE islands of Abu Musa and the Greater and Lesser Tunbs since 1971. Although their geographic boundaries are still the same, the Emirates have successfully redrawn their geopolitical boundaries through the development of the commercial Port of Fujairah (east of Hormuz) followed by a rapid but sophisticated military and commercial penetration of the region between south of Yemen and the Horn of Africa that included concession/management of ports, military bases and logistics support. They have thus turned Bab al-Mandeb into the pivot for their projection "beyond Hormuz," partly thanks to their navy, which is the most efficient in the GCC area today.

Kuwait finds itself in a "double bottleneck," one land-based, linked to its long border with previously hostile Iraq, and one sea-based, due to its need to pass through the Strait of Hormuz. This influences its foreign policy, which is geared towards mediation and good neighbor relations while being firmly aligned with Saudi Arabia. Oman enjoys the best geographical position in terms of freedom of navigation. With its coastline facing the Indian Ocean, the Sultanate is engaged in combating piracy in the Gulf of Aden and views with serious concern the economic and military penetration of the eastern coasts of Yemen, the govemorate Mahra, and the island of Socotra by Saudi Arabia and the Emirates. It has a strong and long-established naval cooperation with India, which it has actively pursued since 1993. Lastly, Bahrain is economically and militarily dependent on Saudi Arabia, and its foreign policy is essentially modeled on Riyadh's. Manama's priority, like Kuwait's, is to secure freedom of navigation in the Strait of Hormuz, its only sea passage. Despite spending more on defense than Tehran, none of the monarchies have adequate capabilities for counteracting Iran's asymmetrical maritime activities that include missiles capable of hitting forces and targets on the coast, as well as mines and explosive boats, a failure due to the lack of coordination and interoperability within the GCC. Oman alone has invested in patrol vessels, corvettes and small frigates as part of its anti-Iran policy. Asymmetry, including in the seas and the straits, remains a key strategic advantage for Tehran compared with the other side of the Gulf coast.

Scenarios: security threats and security architectures

The Bab al-Mandeb bordering region is seeing the emergence of new security architectures, such as the Red Sea Alliance, launched in late 2018 by Saudi Arabia with Egypt, Djibouti, Somalia, Sudan, Yemen, and Jordan, but with the exclusion of the United Arab Emirates, who are now key players in the region. The first naval exercises of this alliance, "Red Wave I," were held between December 2018 and January 2019. In November 2018, Egypt hosted "Arab Shield 1," a joint military exercise involving special naval forces from Saudi Arabia, the UAE, Kuwait, Bahrain, Egypt, and Jordan. Maritime coordination initiatives, however, remain potential rather than actual, due to internal rivalries, (see the GCC Joint Naval Operations Center in Bahrain), while the role of Asian powers is set to increase, given their extensive commercial interests, as is that of Great Britain, with the revival of its "East of Suez" engagement and the opening of military bases in Bahrain (2018) and Oman (2019). Asymmetric warfare (Hormuz) and maritime terrorism (Bab al-Mandeb), in which Iran and Yemen's Houthi rebels are the main players, are today's biggest threats to freedom of navigation in the chokepoints of the Middle East. In this context, NATO recently completed its "Ocean Shield" mission, while The European Union Naval Force Operation Atalanta and Combined Maritime Forces continue their engagement in countering maritime threats between Aden and the Indian Ocean. As Admiral Ferdinando Sanfelice di Monteforte of the Italian Navy pointed out in a recent article, the emerging maritime terrorism perpetrated by Houthi rebels in the Bab al-Mandeb region is distinct from piracy and its military capabilities are much more sophisticated. In the medium to long term, the security of ports constitutes an economic and security priority in a period of rapid infrastructure and logistics development.

Refining/Middle Eastern countries and the power of alliances

The Key to Success is Integration

Producers aim to create downstream value by exploiting their competitive advantage. Alliances with major international oil companies, with their state-of-the-art technology, further reinforce this strategy

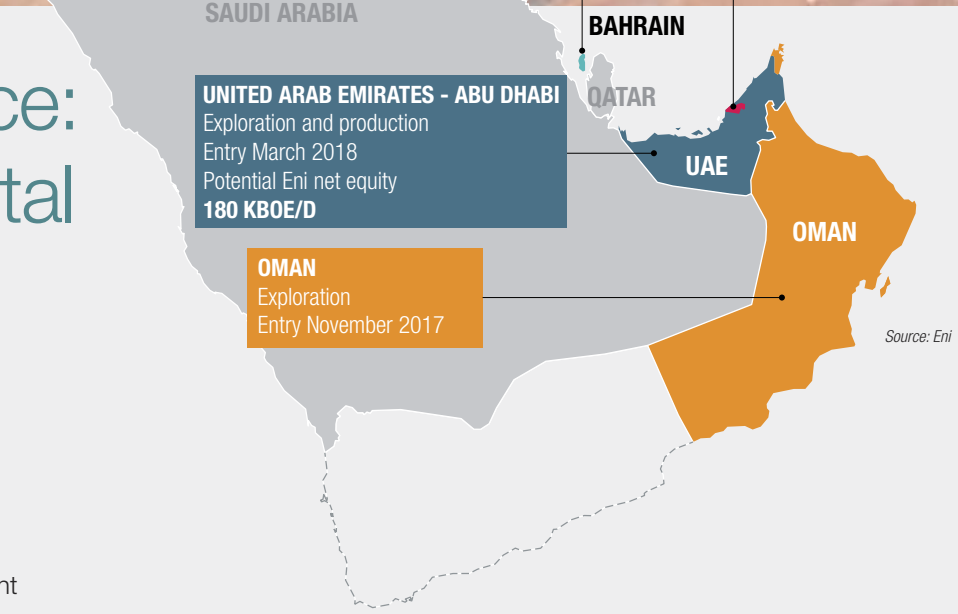
DAVIDE TABARELLI

He is Chairman and co-founder of Nomisma Energia, an independent research company in Bologna that deals with energy and environmental issues. He has always worked as a consultant for the energy sector in Italy and abroad, dealing with all the major aspects of this market.

Every day around the world 100 million barrels of oil are consumed, a rate of 16 billion liters per day or 80,000 liters per second. Oil products are processed in one of over 600 refineries scattered around the world, located especially near centers of consumption. The rule set over the long history of the petroleum industry is that refineries are located close to the end markets, where customers require fuel for their cars, liquefied petroleum gas (LPG), kerosene for airplanes, agricultural oil for farm tractors, lubricants for all types of engines, bitumen for asphalt roads and fuel oil for chemical plants producing plastics, fibers and fertilizers. Logic states it is easier to transport raw material—crude oil—over long distances then to offer individual derivatives to the consumer, thus shifting to lower volumes.

The historical roots of the gap in refining capacity

Petroleum is the energy source and a raw material that above all others has witnessed a major imbalance between regions with reserves, 50 percent of which are in the Middle →



Source: Eni

The ADNOC-Eni Alliance: An Example of Horizontal Integration

In January 2019, the Abu Dhabi National Oil Company (ADNOC) sold a 20 percent equity interest in ADNOC Refining to Eni. The transaction, with an enterprise value of approximately USD 3.9 billion, is one of the largest ever conducted in the refining industry. ADNOC Refining operates three refineries located in Ruwais (Ruwais East and Ruwais West) and Abu Dhabi (Abu Dhabi Refinery) with a total refining capacity exceeding 900,000 barrels per day. The Ruwais Complex is the fourth largest in the world in terms of production capacity and guarantees a high conversion factor, having adopted the best-available technologies and processes with a very high conversion rate. Eni will contribute to the technological development of the plants, having already gained extensive experience at its European refineries in the management of the processes used by ADNOC Refining, processes such as those related to fluid bed catalytic cracking, hydrocracking and residue desulfurization and cocking, and optimization actions aimed at maximizing the margin of refined barrels.

"This partnership is part of our vision to create and address ever-greater value in the various fields of our business," commented Ahmed Al Jaber, Minister of State of the United Arab Emirates and CEO of ADNOC after signing the agreement. "The partners will help us achieve our goal of creating more and more value from every single barrel we produce."
Claudio Descalzi, CEO of Eni, added: "These agreements consolidate our strong partnership with ADNOC.
In less than a year, we have managed to create a hub with excellent upstream activity and

AN IMPORTANT BOND
With the agreement with Abu Dhabi National Oil Company (ADNOC) Refining, Eni acquires one share in the refining activity of the Middle Eastern company. Claudio Descalzi, CEO of Eni, described it this way: "An important bond that will allow us to grow, strengthen integration, and increase our refining capacity." In the photo, an ADNOC system in the Emirates.

an efficient refining capacity, large in size and with further growth potential. This transaction enables us to enter the downstream sector in the United Arab Emirates and represents for Eni a 35 percent increase in our refining capacity."
Eni has been present in the United Arab Emirates upstream sector since March 2018, when ADNOC awarded it 10 percent of the Um Shaif and Nasr oilfields, together with 5 percent of the Lower Zakum reserve, followed in November 2018 by the allocation of 25 percent of the Ghasha field, a massive ADNOC offshore project.
On January 12, 2019, Eni was awarded 70 percent of the offshore exploration fields known as Blocks 1 and 2.
Eni, present is in the Middle East as well as in the UAE, is also present in Oman, Bahrain, Lebanon and Iraq.

East, and its consumers, over 90 percent of which are outside the Middle East. This is one of the reasons why the majority of refining capacity is currently close to its consumers, in order of importance, the United States, Europe and Asia. This is also one of the obstacles that has caused difficulty for oil-producing countries seeking to build refineries near their wells or in their exporting ports. Since Middle Eastern countries took control of extraction work in the early 1970s, the strategy has had to be to appropriate the downstream value with the construction of refineries, which then sell the finished products. The enormous resources that have suddenly been accumulated, due to both nationalizations and the high price of crude oil, have favored the launch of such projects, if with disappointing results. In addition to the issue of distance from the centers of consumption, the other problem was the projects coming on line precisely when the industry was beginning a period of profound crisis, with negative or weak margins for almost twenty years. High oil prices had triggered both a collapse in end demand and a profound change that made simple refineries in which the producing countries had invested outdated and only capable of working at a loss.
The restructuring that followed in the 1990s resulted in the closure of many of these simple plants and forced the remaining ones to implement much more complex and therefore expensive processes. These also required more sophisticated management, frequently in direct contact with the downstream markets and very far from the petroleum-producing countries. Demand for petroleum, concentrated in only a few large-volume, low-quality products, gradually shifted towards a greater variety of derivatives, each characterized by its own specifications, which were more difficult to fulfill. All the refineries had to adapt to sell higher-quality products, often to be modified in a short period, due to demand from the downstream markets. Many of these refineries have become a kind of boutique, releasing products suitable for new cars with limits on pollutants, or others designed for winter or summer use. Previously, it had been easy to produce fuel oil with a great deal of sulfur, intended for power stations, using residue from the bottoms of barrels. Power stations then moved to gas, requiring refineries to convert the residue into gas oil, using very expensive cracking systems. They also invented new products, for example street bitumen, as well as other more sophisticated products such as draining asphalt and special roofing for buildings.
Refineries are now plants that must in all cases produce specialties. For the most requested products, gasoline, diesel oil and kerosene for airplanes, the different engines impose a need for greater sophistication, because the levels of compression, the temperatures of the seals and the durability of the metals are all specifications that must be followed for these higher-quality products. The trade in petroleum products, as with other commodities, has become global, providing every refinery with access to distant markets, including the most profitable ones in Europe or the United States.

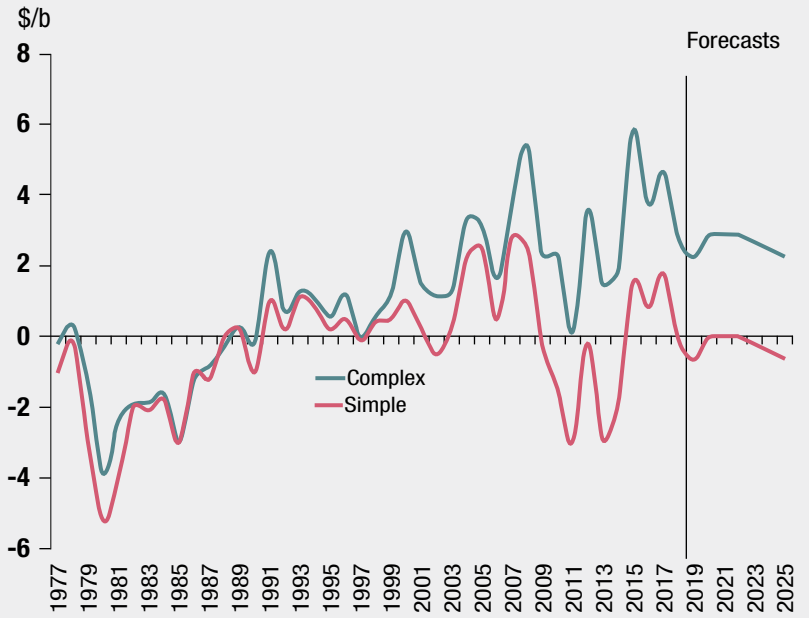
The growth in demand and the competitive advantage of the Middle East

Almost 50 years after the first attempts, the producing countries, in particular those in the Middle East, have certain advantages, starting from the simplest one, the growth in the market for petroleum products. Despite the sinister predictions of the end of petroleum and the advent of electric cars, consumption of petroleum, or rather petroleum products, continues to rise in a stable and unstoppable manner at a rate of approximately 1.5 million additional barrels per year. Compared to when the producing countries started refining, in the late 1970s, the demand rose by 50 percent, 35 million additional barrels per day, resulting in the construction of more than 200 new refineries. Middle Eastern countries' share of world refining has shifted from values around 6 percent in the early 1980s to a current rate of 10 percent, based on a growth in refining capacity from 4 to 10 million barrels per day.
In the next 20 years, demand for petroleum is expected to continue the same growth trend, with requirements for more sophisticated products as in the past. Every year, a minimum of three new refineries are required for new demand alone, as well as to compensate for the closure of old plants.
Middle Eastern countries are always those in the best position to enter downstream refining, with a share of the world total destined to rise to 12 percent. There are three fundamental reasons for this. The first is proximity to the markets where demand is growing the most, in Asia, especially China and India, but also domestically, where the population is rising by 4 million people per year, many of them young people seeking peace and improved living conditions.
The second reason is the most robust Middle Eastern countries can exploit the enormous competitive advantage of the lowest production costs in the world— under USD 10 per barrel—for the raw material to be refined. In the worst-case scenario, →

RESULTS ARE COMING

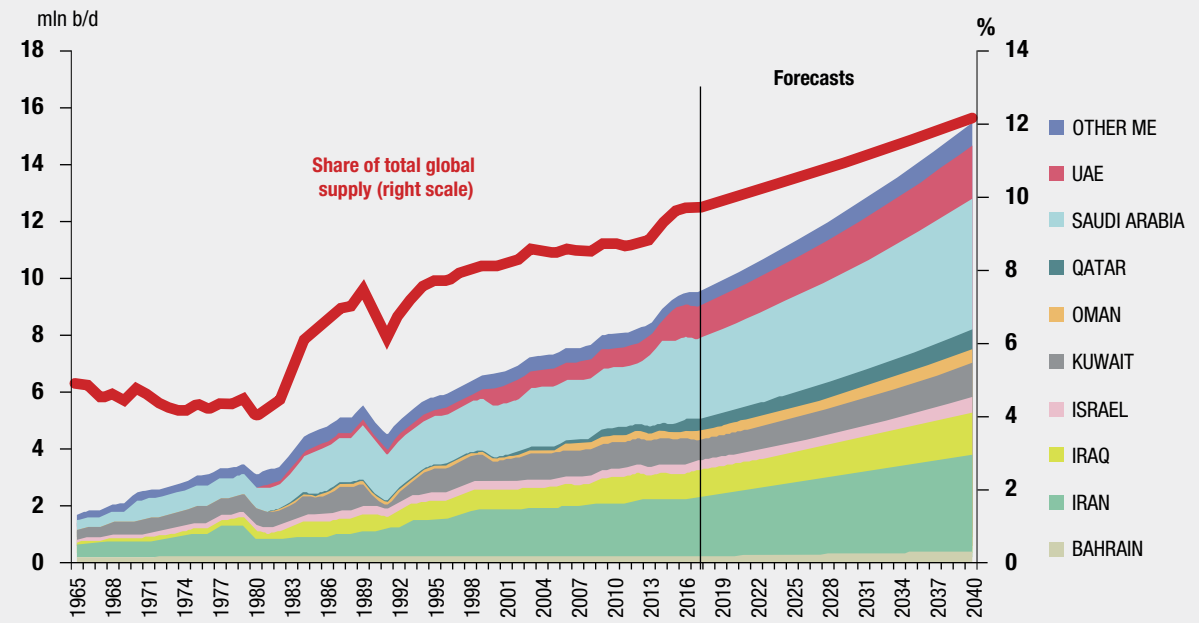
Middle Eastern countries first moved into refining in the 1970s, with disappointing results. The sector was entering a period of crisis, with margins that remained negative for almost twenty years, in particular for the simple refineries in which the producing countries had invested. Today, with growing demand, those same countries have a competitive advantage because they are close to consumer markets and rich in low cost raw materials.

AVERAGE OIL INDUSTRY REFINING MARGINS



Source: NE Nomisma Energia

MIDDLE EAST, REFINING CAPACITY AND SHARE OF WORLD TOTAL



Source: BP Statistical Review and data processed by NE Nomisma Energia

which cannot be completely ruled out, with a reversal in global demand or ever lower prices, the Middle East would continue to make money and would be the last to exit the industry. The third reason, the most important one for the future, is that the state-owned companies in the producing countries are putting to good use the lessons of decades of often-difficult attempts at this business with agreements and joint ventures supported by international oil companies.

There are positive examples, most of all Kuwait, one of the first countries to enter extensively into refining with investments abroad, particularly in Europe where it dominates with its Q8 brand and in its domestic plants, which are some of the most sophisticated in the world. Saudi Arabia, peerless in terms of volume of petroleum produced, can boast the success of Sabic in petrochemicals, while its refineries on the Red Sea have become stable suppliers of products for Europe via the Suez Canal. Not so much in terms of refining but in adding downstream value to its own mineral resources comes Qatar, which boasts an LNG industry with export capacity of over 100 billion cubic meters per year. This makes Qatar far and away the leading producer in the world, with new projects ready to capture the growing market in liquefied natural gas.

Future challenges, from climate to U.S. exports

The future for refineries in the Middle East will not be entirely smooth. Starting in January 2020, new rules will be introduced for the quality of bunker, the fuel for the engines of the huge ships that transport raw materials and containers around the world and make globalization a reality. The rules require a reduction in sulfur content from the current 4 percent to 0.5 percent, and they will result in the elimination from the market of approximately 2 million heavy waste products used in bunker, replacing them with gas oil, non-existent for the time being. In the complex dynamics of the world oil market, the other major change concerns the astonishing increase in crude oil extraction in the United States, exported in increasing volumes worldwide, including to Asia and Europe. The quality of the crude oil processed worldwide is changing rapidly, due to the fact that American crude is light, but fortunately also low in sulfur, which serves well for eliminating most of the high-sulfur bunker. However, paradoxically this creates a problem of a lack of crude oil high enough in quality to produce sufficient volumes of the medium and heavy products that are in constant demand on the market.

The major difficulties, however, will continue to arise from the increasing sophistication of final consumption that requires products that are more difficult to extract. Internal combustion engines, mainly used to cover a large part of the demand for transportation, will have to reduce their emissions of pollutants, in particular CO_2. To do this they will have to be more efficient and work in higher-pressure and higher-temperature conditions that require the use of higher-performance petrol and gas oil. The lubricants will need to be more resistant to higher pressures and to provide for the possibility of recycling to their initial production, a result of the now-obligatory logic of the circular economy. In petrochemicals, downstream in end markets, new materials must be produced. Fibers for textiles and plastics to build vehicles will require fuel oil to be designed in advance according to specific characteristics. The Middle Eastern countries will then face competition from the new consumer countries, China and India, which are constructing huge plants, not only for their domestic markets but also for the export of their products to overseas markets. Europe, which has rapidly closed much of its refining capacity, is structurally dependent on nearby refining centers other than in Russia, including in the Middle East and has also begun to import products on a regular basis from China and India.

The key to the success of the Middle East refineries will be compliance with the rule that has always dominated this industry, that vertical integration pays off, especially when combined with its horizontal counterpart. Alliances with the major international oil companies, those that have always led innovation in the technology that is an important part of horizontal integration and boosts the effects of vertical integration in refining.

The agreement Eni reached with Abu Dhabi in January 2019 is in line with this strategy and cements an alliance that will materialize in the direct control of the processes, thanks to the Internet of Things, with more exchanges of technicians, many of whom will arrive from Italian universities, perhaps partly because they originally came from the producing countries and return home after their studies. A future of solid growth is in the cards for refining in the Middle Eastern producing countries. This will be a fundamental contribution to the stable growth of the area, on which the rest of the world will continue to depend for many years.

DOWNSTREAM TIME

by MARIKA NOVAGLIA, SIMONA SERAFINI,
PIERLUIGI SPANO, and FRANCESCA VENDRAME - Eni

With challenges from new major producers like the U.S., Gulf countries are developing their refining and petrochemical sectors in an attempt to diversify their economies and reduce their dependence on crude oil. GCC countries have signed up to downstream investment plans for over 200 billion dollars by 2025

The new investment wave

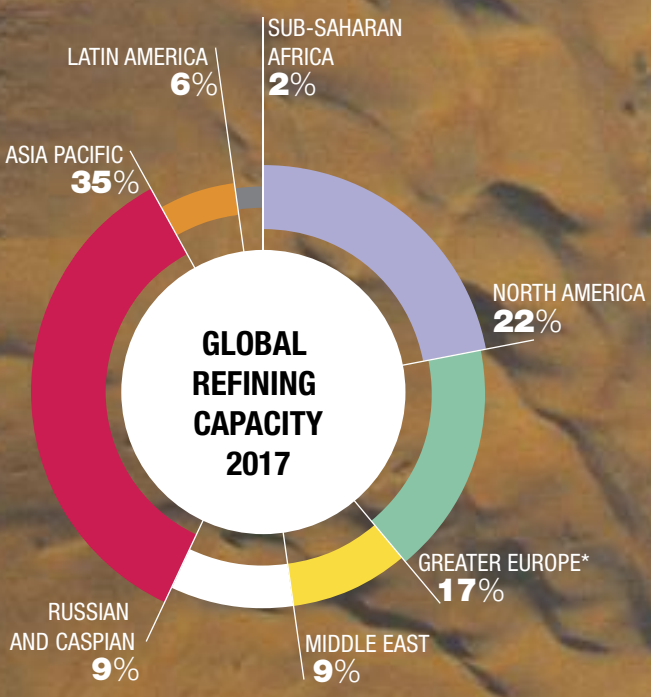
A boom in downstream investments that began last year is continuing. Global refining capacity continues to increase, particularly in Asia and the Middle East

In 2018, global refining capacity increased by more than 1 million barrels per day (Mb/d), driven by the launch of two new refineries: a 200 Kb/d plant in Nghi Son, Vietnam, and a 214 Kb/d plant in Aliaga, Turkey, as well as several expansions in China, India, Russia, Kuwait and Iran.

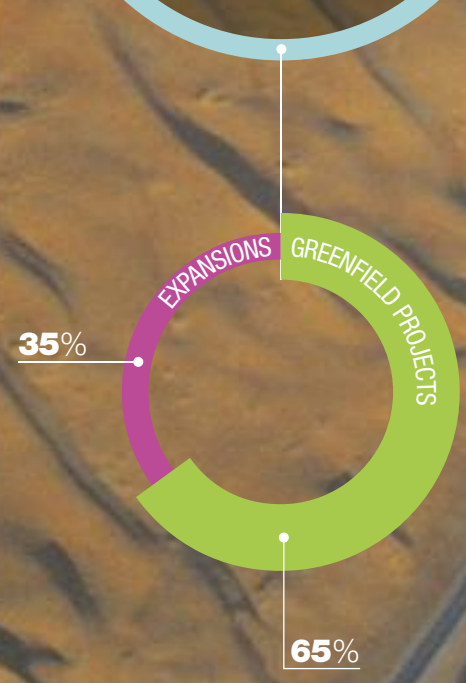
A new wave of investments is expected in 2019 that will generate an increase in refining capacity—exclusively from East of Suez—of almost 2 Mb/d. Over 65 percent of the expected increase in 2019 comes from greenfield projects or new refineries, while the rest is derived from existing capacity expansions. More than 800 Kb/d of new capacity will be added in the Middle East: 400 Kb/d at the Saudi Aramco Jazan refinery and the same amount from two expansions in Kuwait and Iran.

2018
+1Mb/d

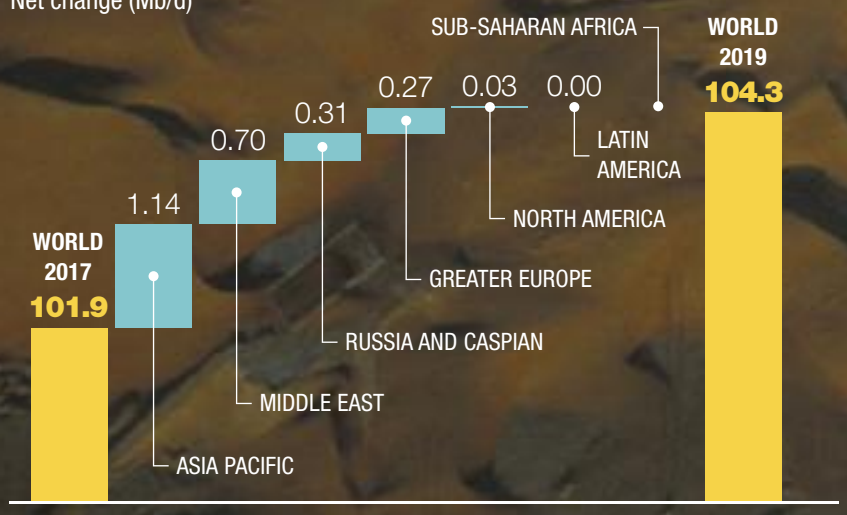
2019
+2Mb/d



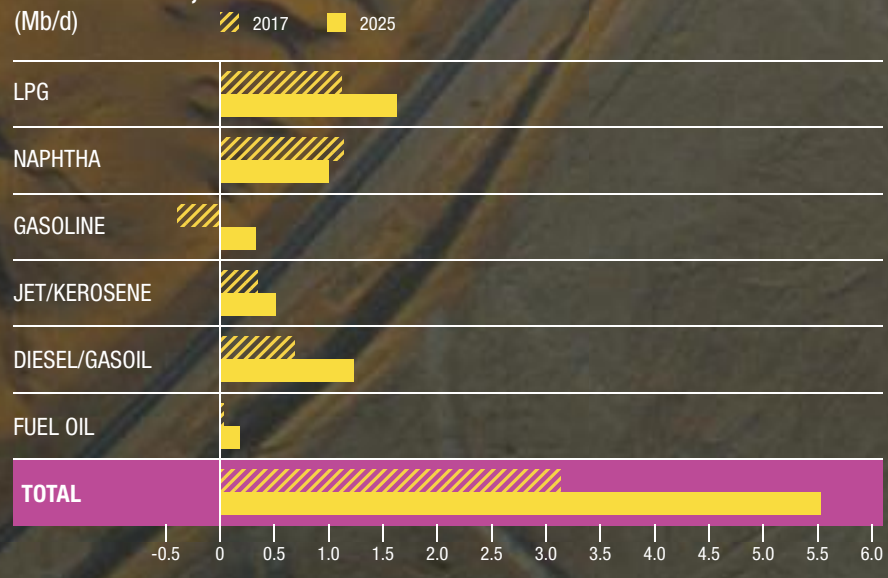
* Greater Europe means North West Europe, the Mediterranean and North Africa



GLOBAL REFINING CAPACITY
Net change (Mb/d)



MIDDLE EAST, BALANCE OF SUPPLY 2017-2025
(Mb/d)



In the medium term, global refining capacity will grow by over 7 Mb/d: 45 percent in Asia and around 30 percent in the Middle East. The Middle East's refining capacity, amounting to 9 Mb/d (48 refineries), over 30 percent of which is in Saudi Arabia, will grow by almost 2 Mb/d by 2025. 60 percent of this increase is due to new refineries with a high middle distillate conversion and sulfur removal treatment capacity. The Middle East is strengthening its status as a product exporter: while in the past it was a major exporter of LPG, naphtha and jet kerosene, in the future it will also become a diesel and gasoline exporter.

MEDIUM TERM

+7Mb/d

Gulf, Iran
480 Kb/d
2017-2024

Bandar Abbas, Iran
Clean Fuels
2019

Clean fuels, Kuwait
64 Kb/d
2019

Al-Zour, Kuwait
615 Kb/d
2020

Al-Zour, Kuwait
Phase 2 Upgrade
2025

Abadan, Iran - **New refinery train**
2022

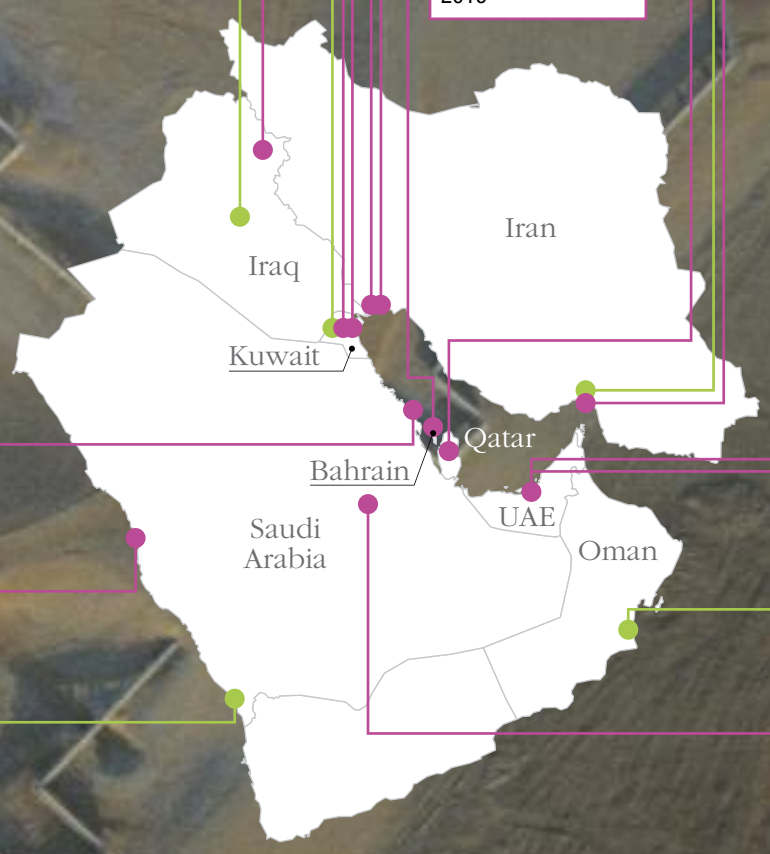
Bashrah, Iraq
70 Kb/d
2021

Bazian, Iraq
50 Kb/d
2020

Karbala, Iraq
110 Kb/d
2021

Bahrain, Bahrain
93 Kb/d
2023

Ras Laffan, Qatar
Zekreet Project
2019



INVESTMENTS IN GREENFIELD AND BROWNFIELD REFINERIES

GREENFIELD INVESTMENT
BROWNFIELD INVESTMENT

Ruwais, UAE
CIP Project
2023

Jebel Ali, UAE
Refinery upgrade
2020

Duqm, Oman
230 Kb/d
2023

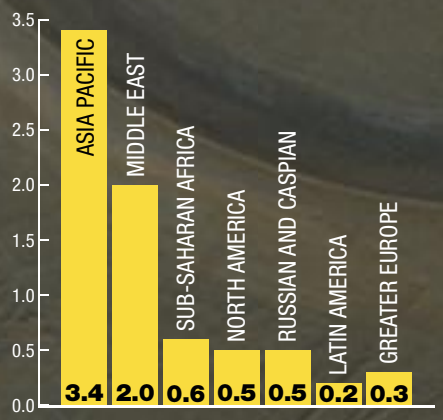
Riyadh, Saudi Arabia
Clean Fuels
2019

Ras Tanura, Saudi Arabia
Clean Fuels
2020

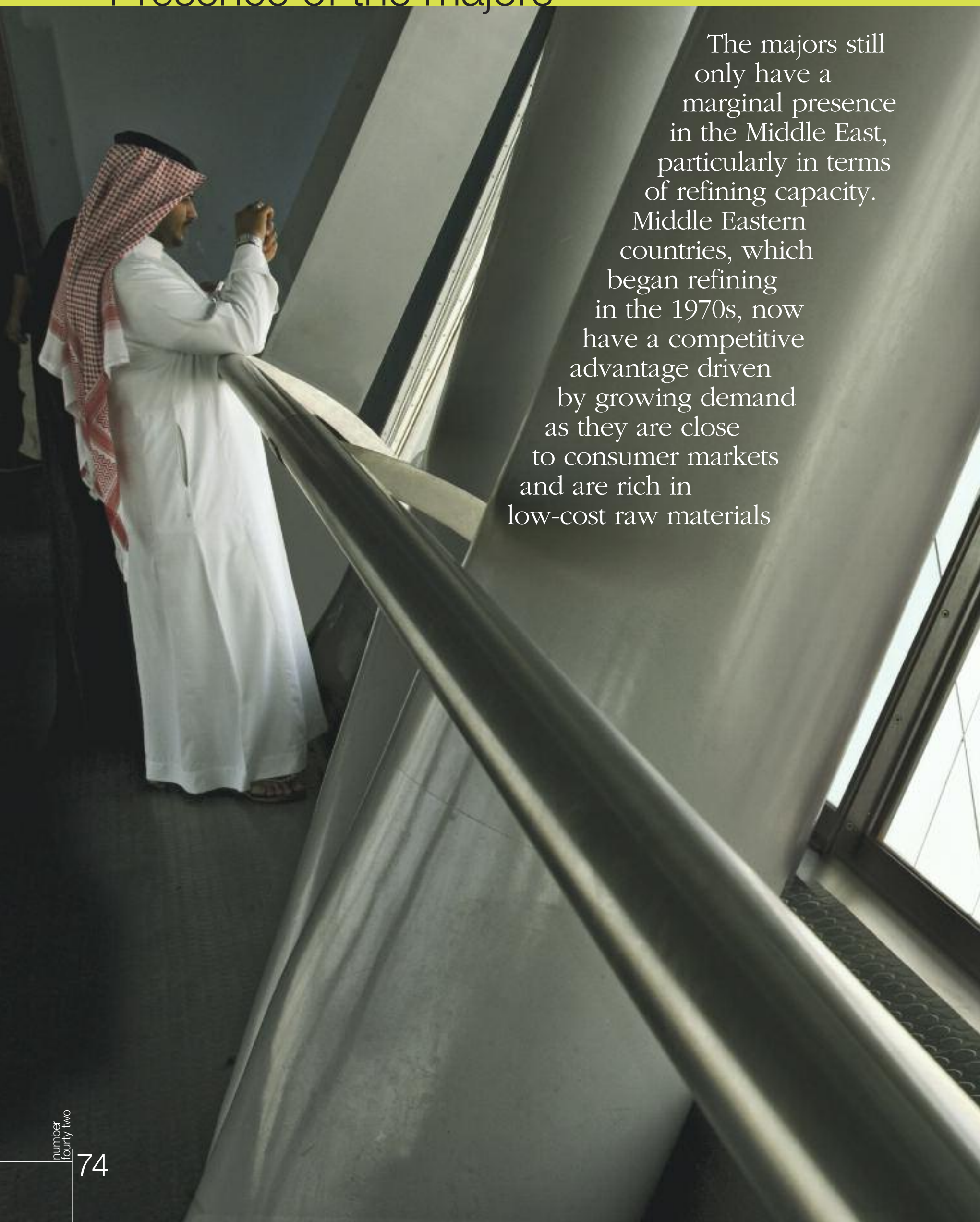
Rabigh, Saudi Arabia
Clean Fuels
2020

Jazan, Saudi Arabia
400 Kb/d
2019

NET INCREMENTAL REFINING CAPACITY 2018-2025
(Mb/d)

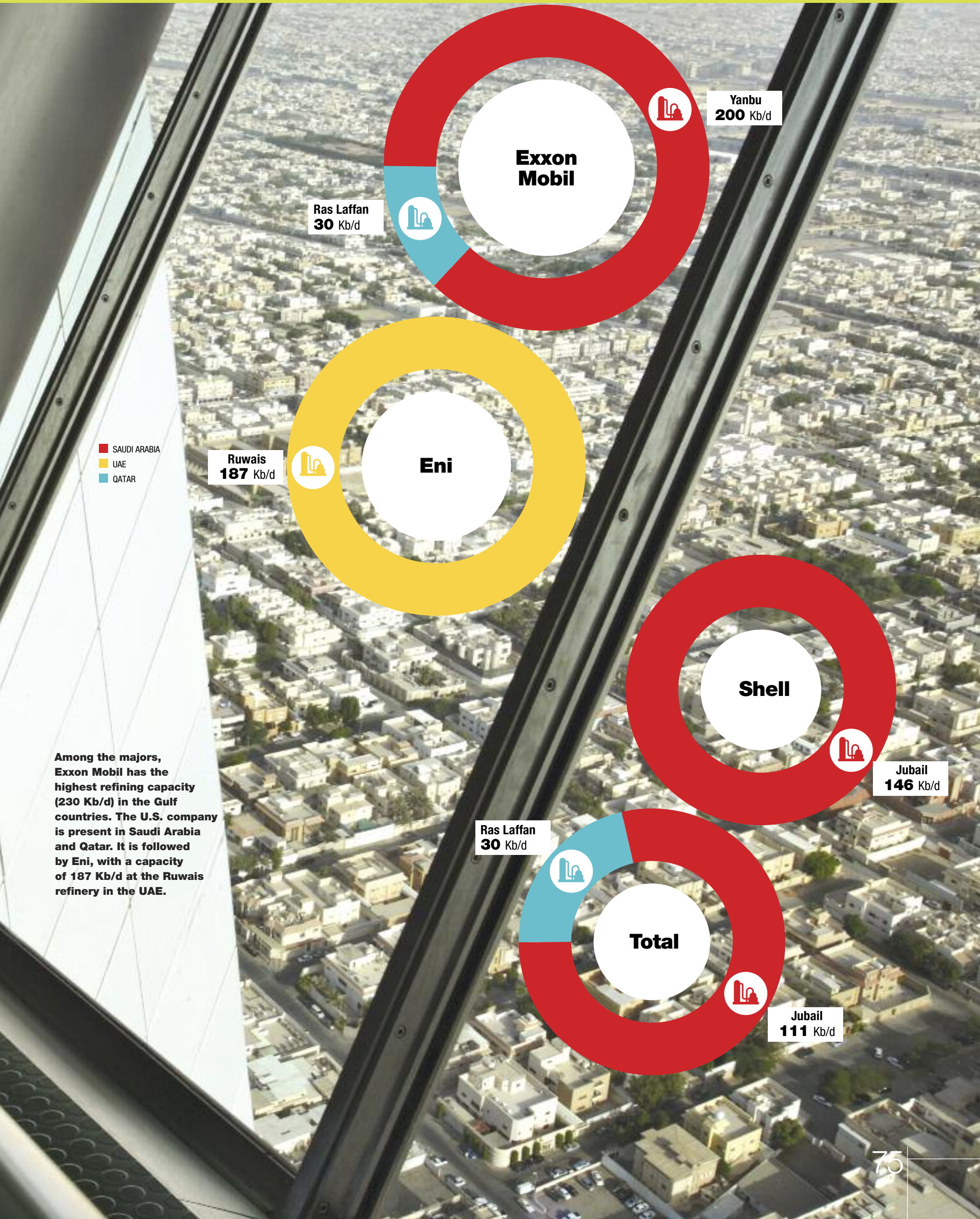


Presence of the majors



The majors still only have a marginal presence in the Middle East, particularly in terms of refining capacity. Middle Eastern countries, which began refining in the 1970s, now have a competitive advantage driven by growing demand as they are close to consumer markets and are rich in low-cost raw materials

REFINING CAPACITY (Kb/d)



Among the majors, Exxon Mobil has the highest refining capacity (230 Kb/d) in the Gulf countries. The U.S. company is present in Saudi Arabia and Qatar. It is followed by Eni, with a capacity of 187 Kb/d at the Ruwais refinery in the UAE.

NOCs, international partnerships

The blue circles on the map indicate the foreign investments made by Gulf country National Oil Companies (NOCs), while the orange ones refer to those investments made by foreign companies in Gulf countries.

QATAR, OPEN TO COLLABORATIONS

May 2018: **Qatar Petroleum** announced a plan to **build a new petrochemical complex in Ras Laffan** and **invited international companies to submit proposals for a JV.** The complex, which **is scheduled for start-up in 2025**, will include a cracker for the production of **1.6 million tons/year of polyethylene (the largest cracker in the Middle East).**

ADNOC, EXPANSION AT HOME

ADNOC is considering the expansion of the Ruwais complex (**+600 Kb/d by 2025**).
January 2019: **Eni** and **OMV have signed an agreement with ADNOC** to acquire 20 percent and 15 percent of ADNOC Refining respectively. ADNOC continues to own the remaining 65 percent.

SAUDI ARAMCO ENTERS THE DOWNSTREAM MARKET IN INDIA

April 2018: **Saudi Aramco** and a **consortium of Indian refiners** set up a **JV** (50/50) for the **management of 3 operating refineries** and the **construction** of a new **integrated refinery/petrochemical complex** (**Maharashtra**), with a **refining capacity of 1.2 million bbl/d and petrochemical capacity of 18 million tons/year**, involving an **investment of 44 billion dollars**.

Qatar

Saudi Arabia

UAE

India

SAUDI ARAMCO, TECHNOLOGY PURCHASES

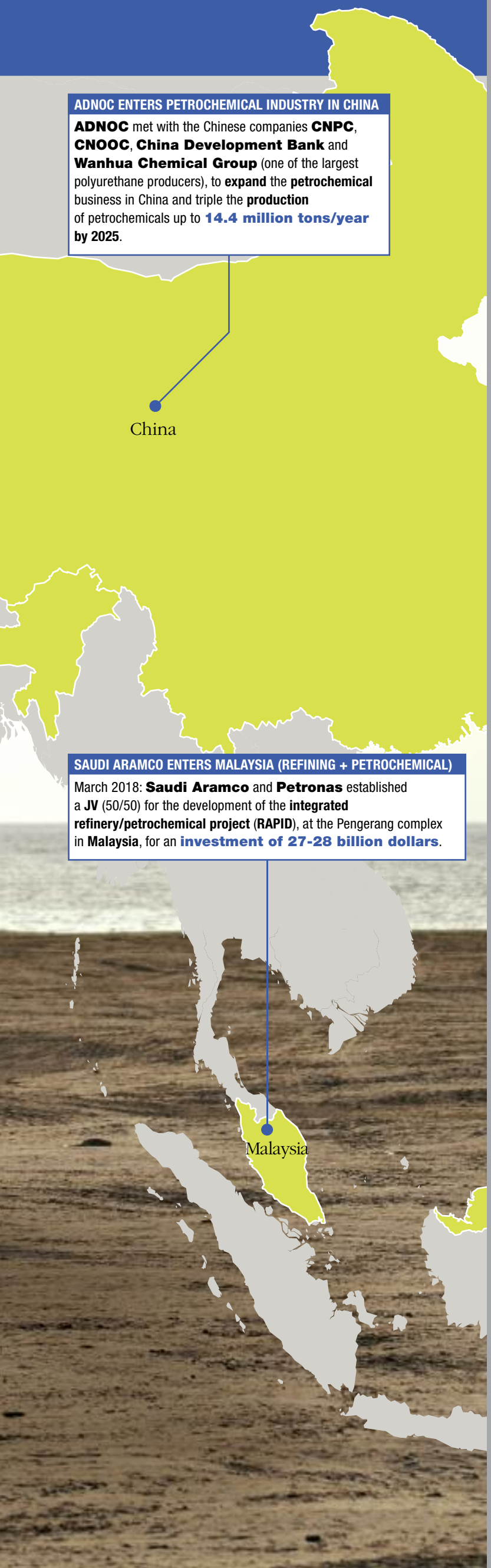
January 2018: **Saudi Aramco** signed an agreement with **Chevron** and **CB&I** for the **use** of Chevron Lummus Global hydroelectric treatment **technologies** and CB&I ethylene cracker technology to **increase chemical production in Saudi Arabia**.

SAUDI ARABIA, EXPANSION IN THE U.S.

- April 2018: **Saudi Aramco** signed an **MOU** with **Honeywell** and **TechnipFMC** to evaluate **potential petrochemical projects in the Gulf of Mexico involving billions of dollars of investment**.
- May 2018: **Saudi Basic Industries** and **ExxonMobil** formed a **JV to build a 10-billion-dollar petrochemical complex in Texas**.

Gulf state oil companies are entering into agreements and alliances with the majors to strengthen their petrochemical and refining capacity in the countries of origin and expand their presence abroad, especially in Asia

Majors vs NOCs, the global game



ADNOC ENTERS PETROCHEMICAL INDUSTRY IN CHINA

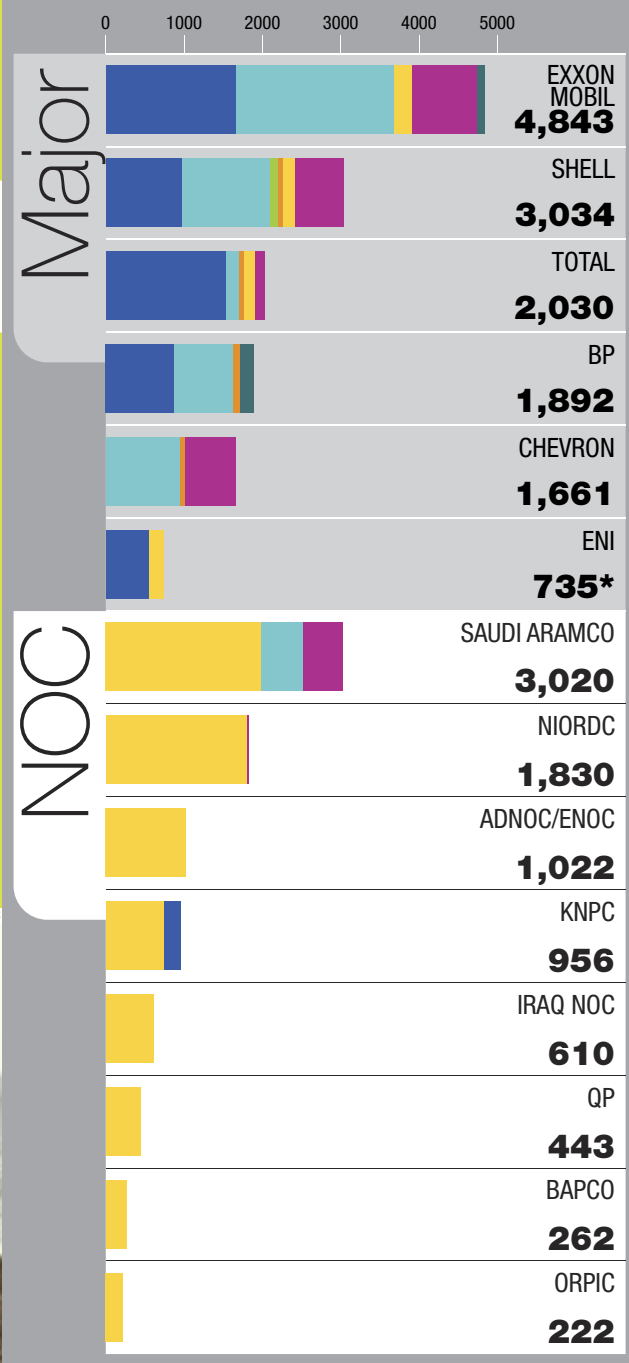
ADNOC met with the Chinese companies **CNPC**, **CNOOC**, **China Development Bank** and **Wanhua Chemical Group** (one of the largest polyurethane producers), to **expand** the **petrochemical** business in China and triple the **production** of petrochemicals up to **14.4 million tons/year by 2025**.

SAUDI ARAMCO ENTERS MALAYSIA (REFINING + PETROCHEMICAL)

March 2018: **Saudi Aramco** and **Petronas** established a **JV** (50/50) for the development of the **integrated refinery/petrochemical project** (**RAPID**), at the Pengerang complex in **Malaysia**, for an **investment of 27-28 billion dollars**.

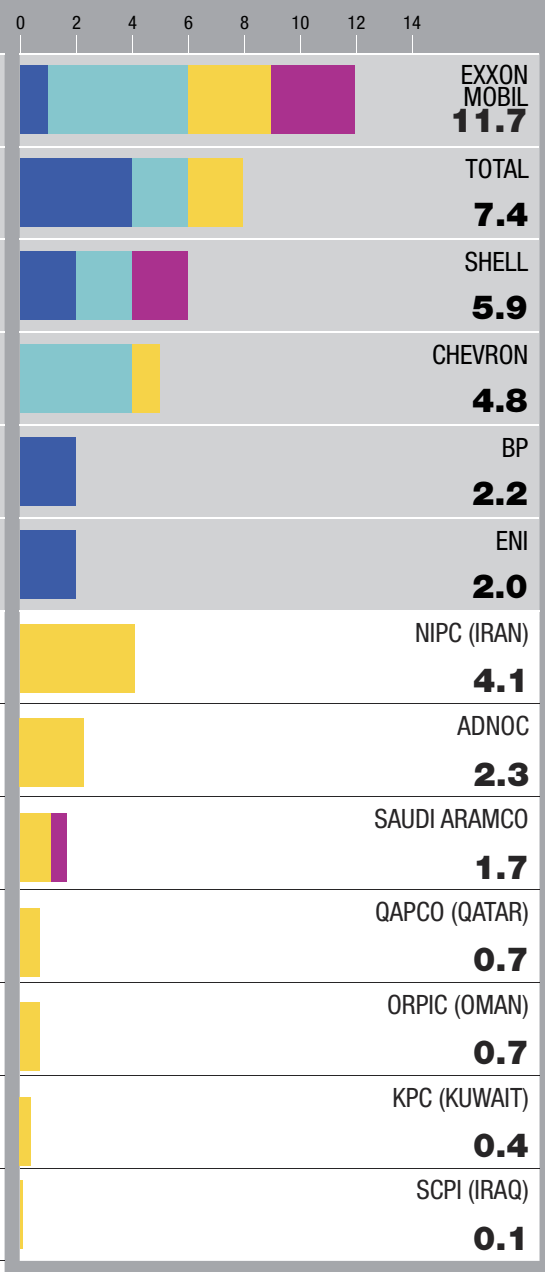
GLOBAL REFINING CAPACITY IN WORKING INTEREST

2017 (Kb/d)



GLOBAL PETROCHEMICAL CAPACITY IN WORKING INTEREST

2017 (mln ton/year)



* Last update: 01/28/2019

N.B.: Total does not provide data for ethylene capacity alone but also includes Propylene and Butadiene capacity, therefore the value is higher compared to its peers.

LEGEND

- EUROPE
- NORTH AMERICA
- CENTRAL AND SOUTH AMERICA
- AFRICA
- MIDDLE EAST
- FAR EAST
- AUSTRALIA AND OCEANIA

Middle Eastern NOCs currently have little exposure, globally, in the refining and petrochemical sectors. The most internationalized companies are Saudi Aramco, present in North America and the Far East, and Kuwait Petroleum, present in Europe

COUNTRY FOCUS

The following pages provide a detailed analysis of all the data relating to refining in the individual countries around the Gulf. The maps show the refineries, storage facilities and Oil&gas pipelines and the shareholdings in the plants, where despite substantial differences in terms of volume, there is a clear prevalence of state-owned companies throughout the area.

Saudi Arabia

With a refining capacity of almost 3 million barrels per day within its borders, in addition to 2.5 million globally, the state company, Saudi Aramco, is by far the leading player in the Gulf area, a position it is expected to maintain in future: the company is forecasting a refining capacity of 8-10 million by 2030

A LEADER IN REFINING

There are nine operating refineries in Saudi Arabia, with a total capacity of 2.9 Mb/d. Saudi Aramco manages four of them entirely, while the remaining five are joint ventures (JV) between Saudi Aramco and various international companies including ExxonMobil, Total, Shell, Sinopec, Sumitono and Free Float. In 2019, refining capacity is expected to increase by a further 400,000 b/d with the launch of a new 100 percent Saudi Aramco greenfield refinery in the port south of Jazan. Globally, Saudi Aramco has a refining capacity of 5.4 Mb/d, which, according to the company's plans, should become 8-10 Mb/d by 2030.

TOTAL CAPACITY

2.9 Mb/d

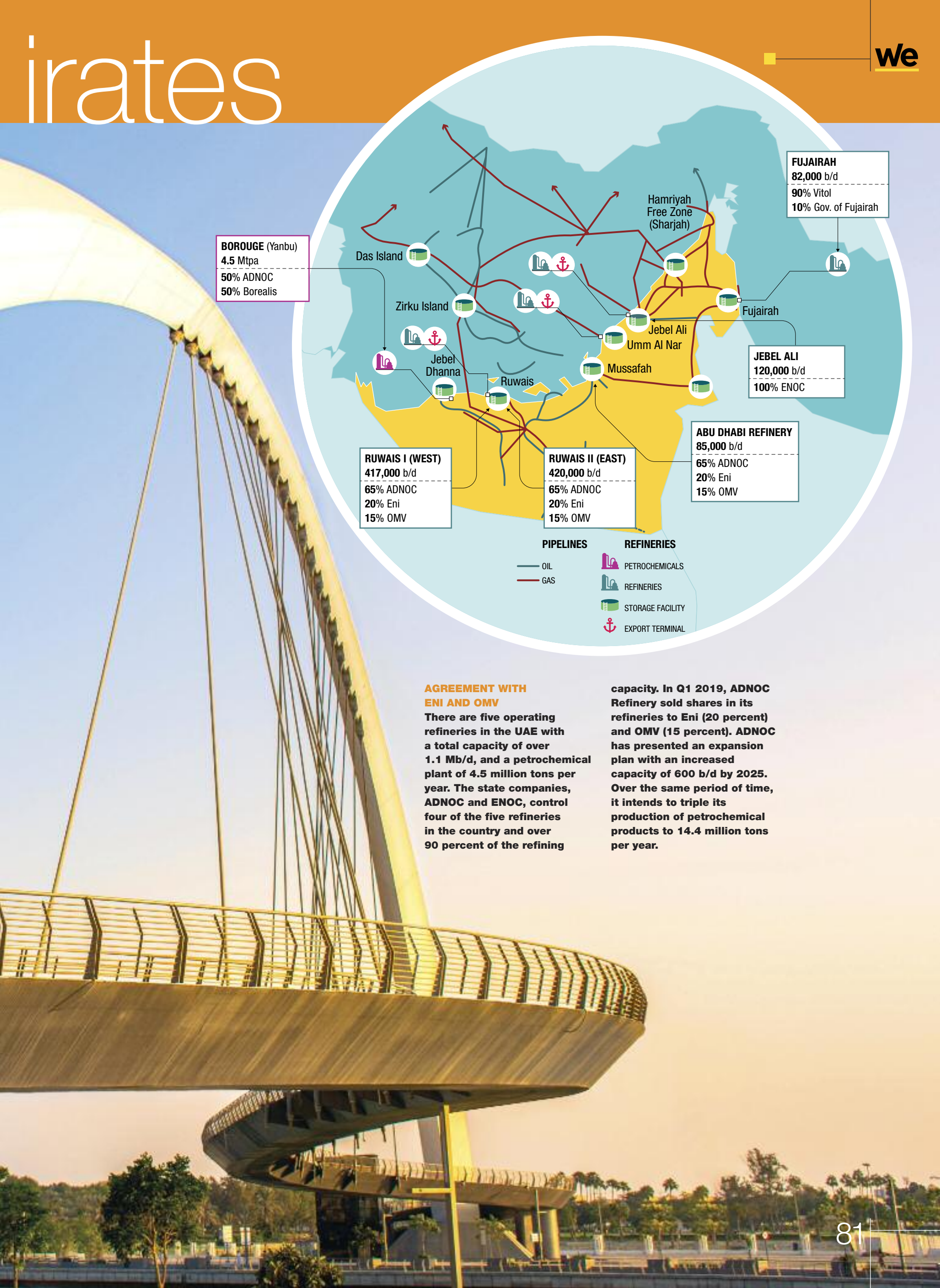
United Arab Em

The state companies, ADNOC, ENOC and EMARAT, control 90 percent of the country's refining capacity of over 1.1 Mb/d and 100 percent of the petrochemical and retail sectors. ADNOC has presented plans to expand the downstream sector and has started negotiations for energy cooperation with China

TOTAL CAPACITY

1.1 Mb/d

irates



AGREEMENT WITH ENI AND OMV

There are five operating refineries in the UAE with a total capacity of over 1.1 Mb/d, and a petrochemical plant of 4.5 million tons per year. The state companies, ADNOC and ENOC, control four of the five refineries in the country and over 90 percent of the refining capacity. In Q1 2019, ADNOC Refinery sold shares in its refineries to Eni (20 percent) and OMV (15 percent). ADNOC has presented an expansion plan with an increased capacity of 600 b/d by 2025. Over the same period of time, it intends to triple its production of petrochemical products to 14.4 million tons per year.

Qatar

The country has a total capacity of around 600,000 b/d and 0.84 million tons per year. Between 2000 and 2017, the output more than quadrupled, due to both an increase in refining capacity and the production of NGLs.

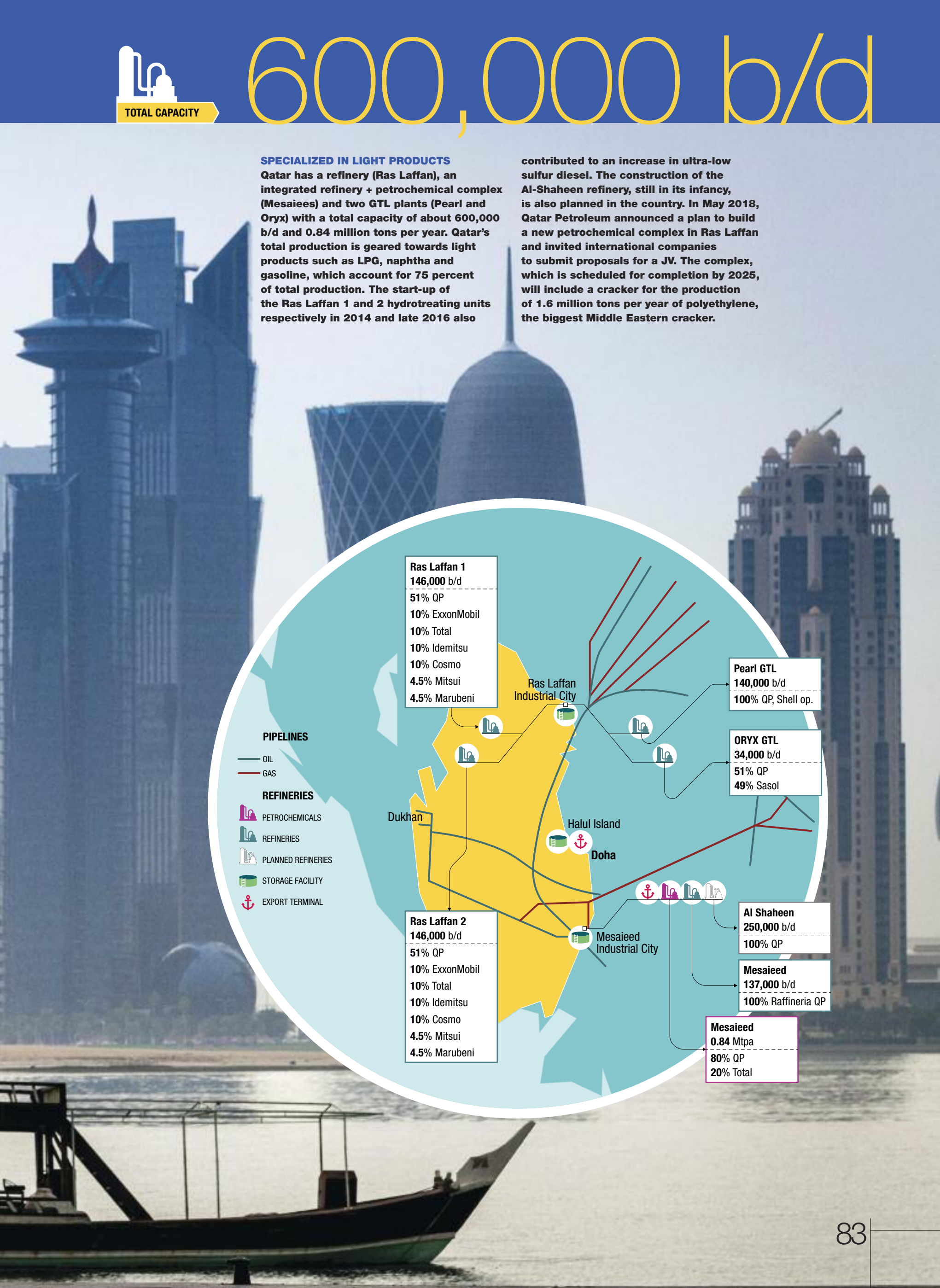
A new petrochemical complex will be built by 2025, which will host the largest Middle East cracker

TOTAL CAPACITY

600,000 b/d

SPECIALIZED IN LIGHT PRODUCTS

Qatar has a refinery (Ras Laffan), an integrated refinery + petrochemical complex (Mesaiees) and two GTL plants (Pearl and Oryx) with a total capacity of about 600,000 b/d and 0.84 million tons per year. Qatar's total production is geared towards light products such as LPG, naphtha and gasoline, which account for 75 percent of total production. The start-up of the Ras Laffan 1 and 2 hydrotreating units respectively in 2014 and late 2016 also contributed to an increase in ultra-low sulfur diesel. The construction of the Al-Shaheen refinery, still in its infancy, is also planned in the country. In May 2018, Qatar Petroleum announced a plan to build a new petrochemical complex in Ras Laffan and invited international companies to submit proposals for a JV. The complex, which is scheduled for completion by 2025, will include a cracker for the production of 1.6 million tons per year of polyethylene, the biggest Middle Eastern cracker.

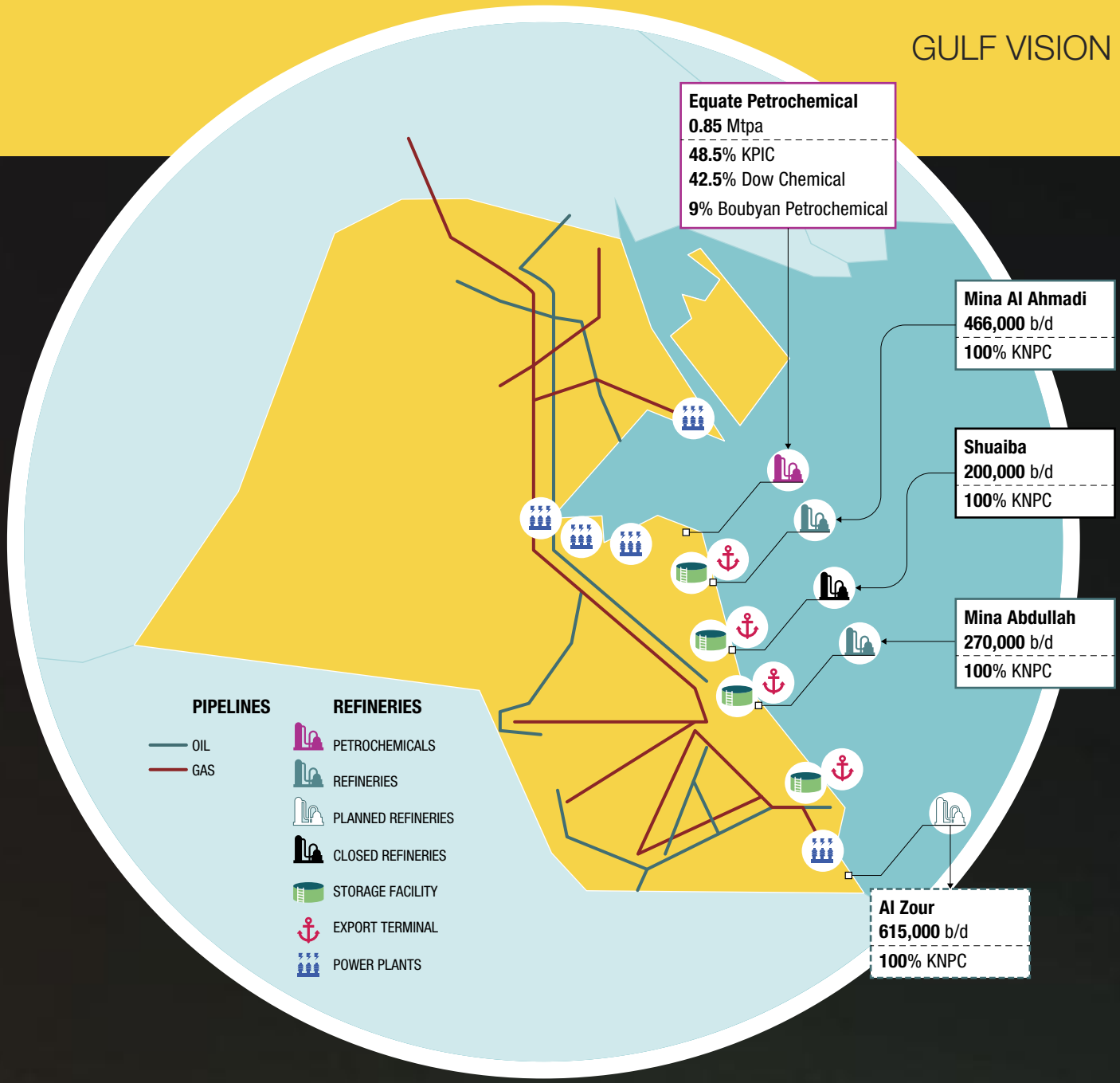


Kuwait

Kuwait National Petroleum Company (KNPC) has a monopoly over refining and marketing. Total current capacity is 736,000 b/d, but should reach 800,000 b/d thanks to a project to upgrade the country's two refineries

THE KNPC MONOPOLY

There are two operating refineries in Kuwait, both 100 percent owned by the state company KNPC, with a total capacity of 736,000 b/d. KNPC is implementing the Clean Fuels project, which aims to strengthen the Mina Abdullah and Mina Al-Ahmadi refineries to achieve a total capacity of 800,000 b/d. The country also has a petrochemical plant producing 0.85 million tons per year managed by the state company Kuwait Petrochemical Industries (KPIC) and Dow Chemical. The Al Zour refinery, which will have a refining capacity of 615,000 b/d, is currently under construction. The estimated cost is 14.5 billion dollars and production is expected to start by the end of 2019.

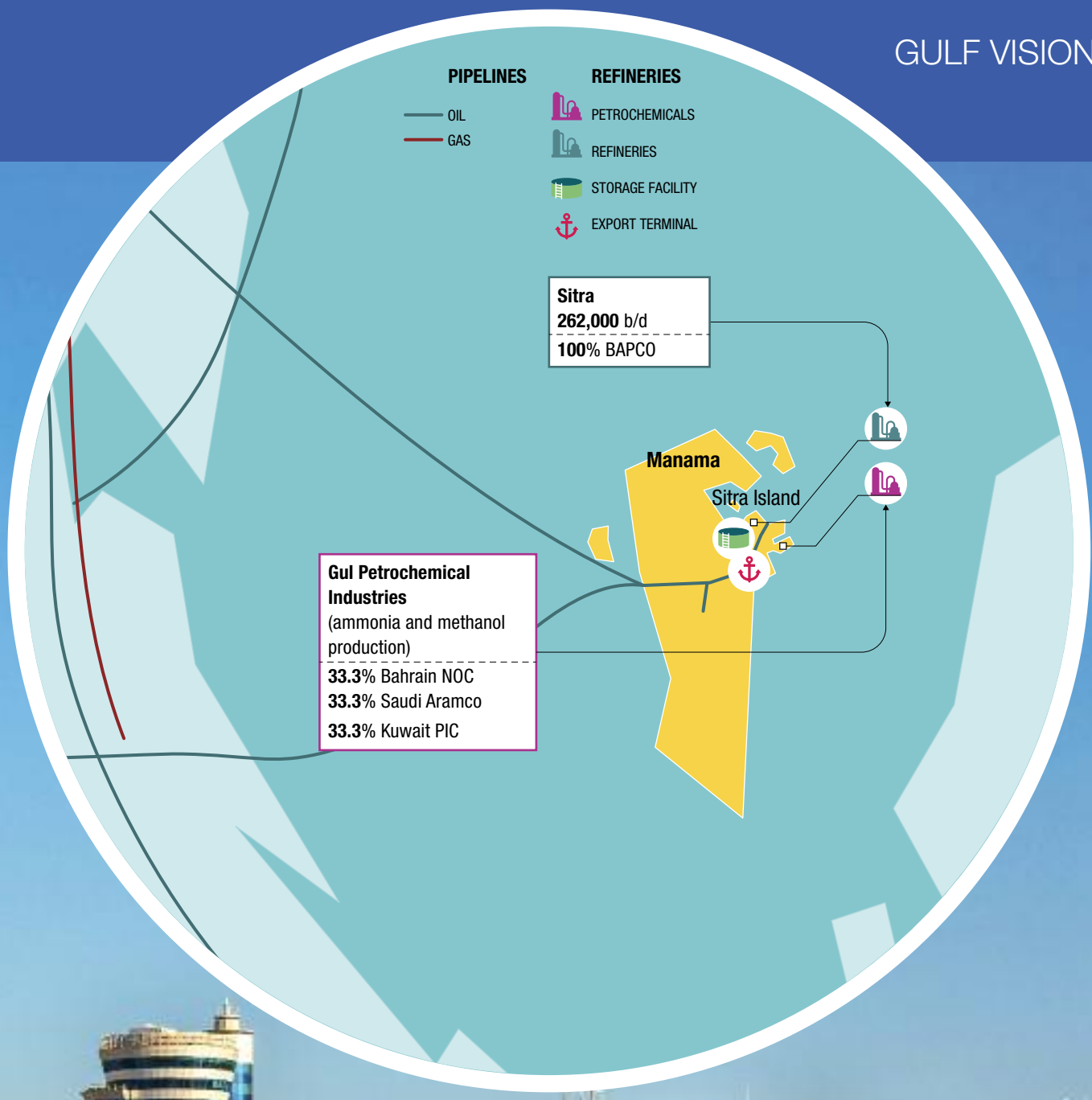


736,000 b/d

TOTAL CAPACITY

Bahrain

The country currently has a total refining capacity of 262,000 b/d, with a planned increase of almost 50 percent over the next three years. The state-owned company, BAPCO, has a monopoly on refining, distributing and exporting national petroleum products



INVESTMENTS OF 6 BILLION DOLLARS

The country's only operating refinery is the one in Sitra, which has a capacity of 262,000 b/d and is owned by the Bahrain Petroleum Company (BAPCO). The Sitra refinery expansion project has been delayed, but BAPCO has recently re-launched the project, which should increase its refining capacity to 386,000 b/d, with a start-up planned for 2022. During 2018-2019, Bahrain expects to spend 6 billion dollars on oil and gas projects to meet growing local demand and to increase revenue for the state. There are 3 main projects:

- **Construction of an LNG import terminal;**
- **Expansion of the Sitra refinery;**
- **Construction of an oil pipeline with Saudi Arabia.**

There are no petrochemical industries suitable for the production of ethylene in Bahrain, but one that produces ammonia and methanol.

TOTAL CAPACITY

262,000 b/d

Oman

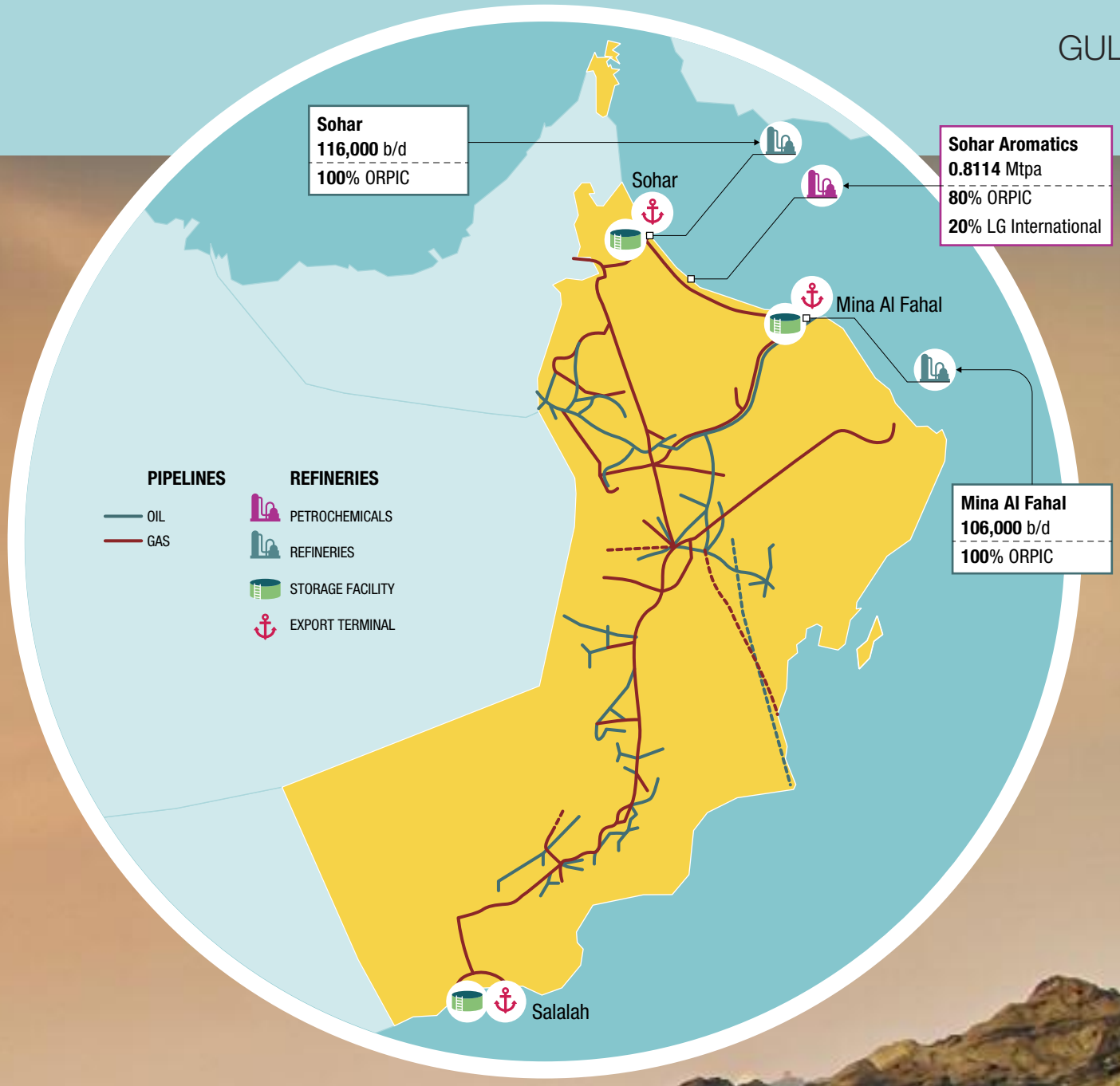
The sultanate's two refineries, which are connected by a 266 km oil pipeline, have a production capacity of 222,000 barrels per day. Both are managed by the Oman Oil Refineries and Petroleum Industries Company (ORPIC)

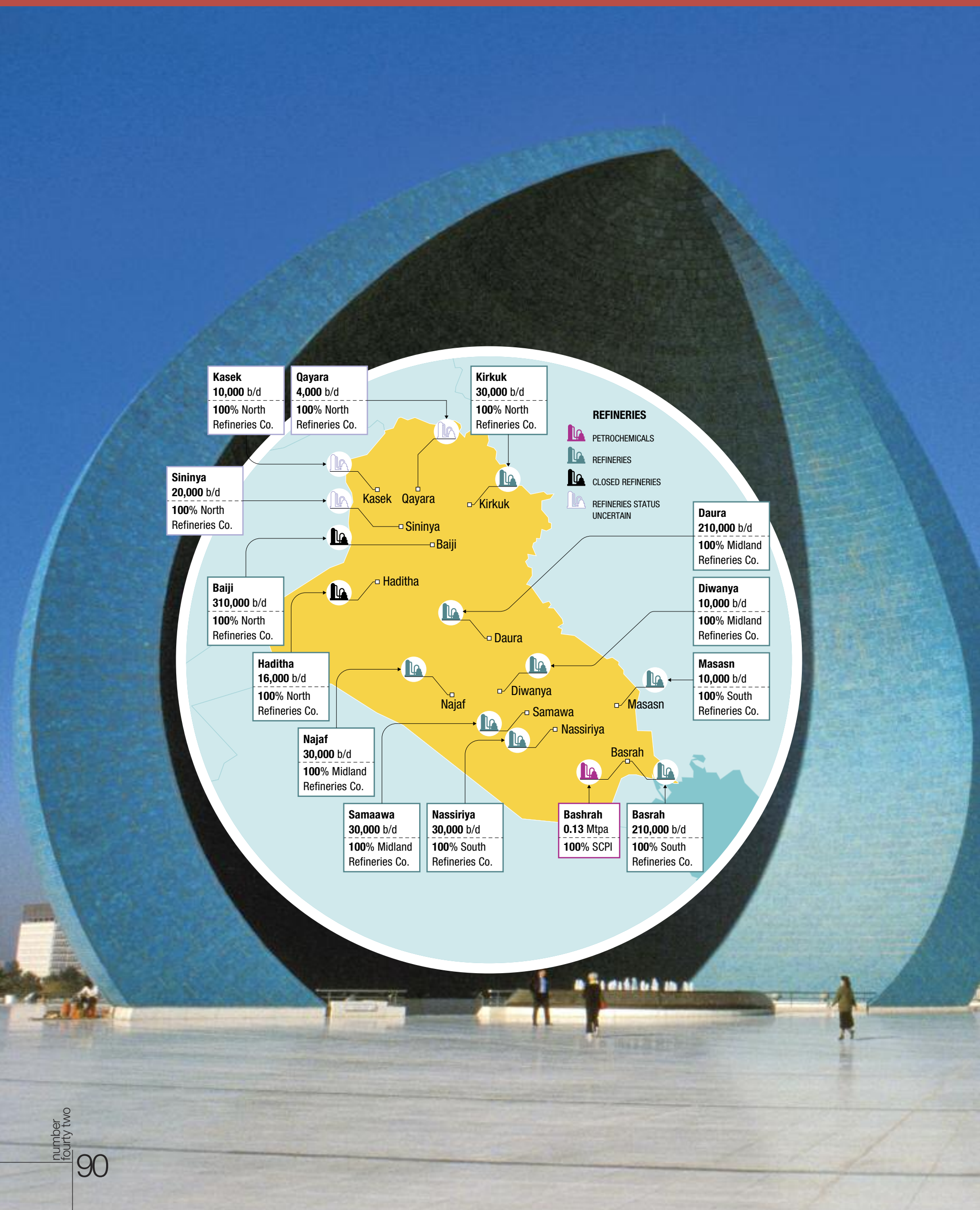
TWO CONNECTED PLANTS

There are two active refineries in Oman: Mina Al Fahal and Sohar, with a total production capacity of 222,000 b/d. Both refineries are operated by the Oman Oil Refineries and Petroleum Industries Company (ORPIC), the country's refining monopoly. The two plants are connected by a 266 km oil pipeline, which carries the residues from the Mina Al Fahal refinery to the Sohar refinery, where they are used as raw material to produce fuels, naphtha and propylene. Near the Sohar refinery there is also a 0.8 million ton/year petrochemical plant, which is 80 percent owned by the state company and 20 percent owned by LG International.

TOTAL CAPACITY

222,000 b/d


Sohar
116,000 b/d
100% ORPIC
Sohar Aromatics
0.8114 Mtpa
80% ORPIC
20% LG International
Sohar
Mina Al Fahal
Mina Al Fahal
106,000 b/d
100% ORPIC
PIPELINES
OIL
GAS
REFINERIES
PETROCHEMICALS
REFINERIES
STORAGE FACILITY
EXPORT TERMINAL
Salalah


Kasek
10,000 b/d
100% North Refineries Co.
Qayara
4,000 b/d
100% North Refineries Co.
Kirkuk
30,000 b/d
100% North Refineries Co.
Sininya
20,000 b/d
100% North Refineries Co.
Baiji
310,000 b/d
100% North Refineries Co.
Haditha
16,000 b/d
100% North Refineries Co.
Najaf
30,000 b/d
100% Midland Refineries Co.
Samaawa
30,000 b/d
100% Midland Refineries Co.
Nassiriya
30,000 b/d
100% South Refineries Co.
Bashrah
0.13 Mtpa
100% SCPI
Basrah
210,000 b/d
100% South Refineries Co.
Masasn
10,000 b/d
100% South Refineries Co.
Diwanya
10,000 b/d
100% Midland Refineries Co.
Daura
210,000 b/d
100% Midland Refineries Co.
REFINERIES
PETROCHEMICALS
REFINERIES
CLOSED REFINERIES
REFINERIES STATUS UNCERTAIN
Kasek
Qayara
Kirkuk
Sininya
Baiji
Haditha
Daura
Najaf
Diwanya
Masasn
Samawa
Nassiriya
Basrah

Iraq

The country's potential refining capacity is almost one million barrels per day, but, given the poor condition of many of the 13 plants, the actual refining capacity is much lower. The refineries are controlled by three state entities: North Refineries Company, Midland Refineries Company and South Refineries Company

TOTAL CAPACITY

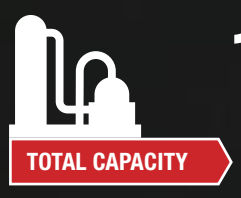
920,000 b/d

GREAT POTENTIAL

Excluding Kurdistan, Iraq has 13 refineries, with a potential capacity of 920,000 b/d. However, the actual operating capacity is considerably lower as many plants are in poor condition: many are no longer operational and the condition of others is uncertain. The country also has a petrochemical complex in Basra with a capacity of 0.13 million tons/year of ethylene. The refineries are controlled by three state entities: North Refineries Company, Midland Refineries Company and South Refineries Company. The petrochemical plant is owned by the state company State Company For Petrochemical Industries (SCPI). Since 2014-15, after Daesh militants damaged Iraq's largest oil refinery (Baiji with a capacity of 310,000 b/d), the Kirkuk district has suffered from a severe fuel shortage, necessitating imports from Turkey and Iran. The Iraqi state has therefore reached an agreement with Ranya International, a company operating in Kurdistan, to build a refinery in Kirkuk with a capacity of 70,000 b/d.

Iran

The Islamic republic has a refining capacity of almost 2 Mb/d, second only to that of Saudi Arabia. The Government plans to increase this capacity to 2.4 Mb/d by 2040. The country has nine petrochemical plants, with a capacity of 6.3 million tons/year. The retail sector is all in the hands of the state company



1.9 mln b/d

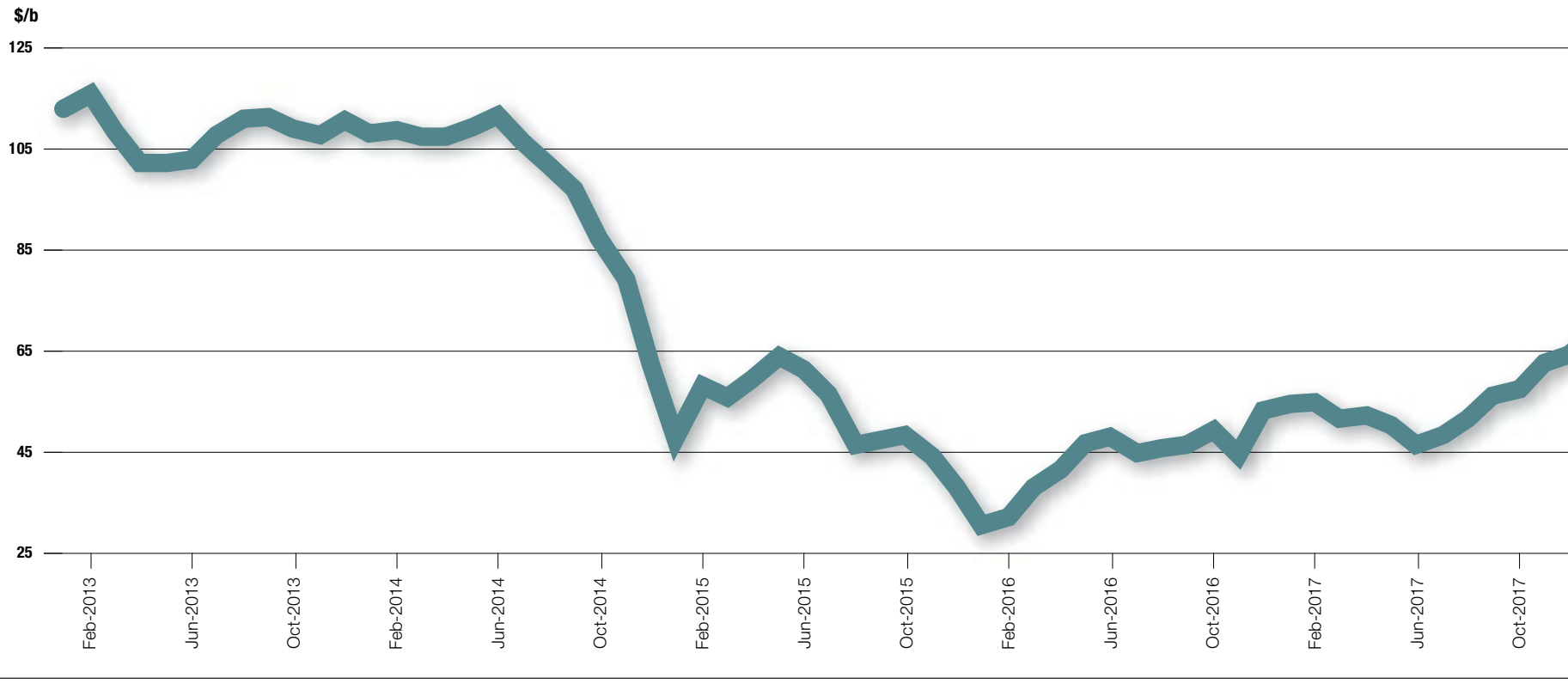
AN EXPANDING SECTOR

Iran has nine refineries, with a total capacity exceeding 1.9 Mb/d, all owned by the state-owned National Iranian Oil Refining & Distribution Company (NIORDC). In 2017, the Bandar Abbas Ph.1 refinery (also known as Gulf Star) was launched. By 2040, production of petroleum products is expected to exceed 2.4 Mb/d, thanks also to the completion of some upgrade projects. The Iranian government is considering the development of other refineries (Siraf, Hormoz - Bahman Ganou and Anahita), but their construction remains uncertain. The country has 9 operating petrochemical complexes, with a total capacity of 6.3 million tons/year of ethylene. The state company National Iranian Petrochemical Company (NIPC) has full ownership of two of the plants, while the others are partially owned by investment funds or private companies.


PIPELINES
OIL
GAS
REFINERIES
PETROCHEMICALS
REFINERIES
Tehran
250,000 b/d
Shahid Tondgouyan Oil Refining Co. Of Tehran
100% NIORDC
Tabriz Petrochemical
0.14 Mtpa
22% NIPC
49% Tabriz Oil
29% Others
Tabriz
112,000 b/d
Tabriz Oil Refining Co.
100% NIORDC
Arak
250,000 b/d
Imam Khomeini Oil Refining Co.
100% NIORDC
Amir Kabir Petrochemical
0.52 Mtpa
50% NIPC
20% Navid Zar Shimi
11% Civil Pension Fund
20% Others
Jam Petrochemical
1.32 Mtpa
38% NIPC
22.7% Tamin Investment
23.3% Civil Pension Fund
16% Others
Shazand (Arak) Petrochemical
0.3 Mtpa
67% NIPC
18% Tamin Investment
15% Others
Isfahan
370,000 b/d
Isfahan Oil Refining Co.
100% NIORDC
Kermanshah
25,000 b/d
Kermanshah Oil Refining Co.
100% NIORDC
Shiraz
50,000 b/d
Shiraz Oil Refining Co.
100% NIORDC
Bandar Abbas
320,000 b/d
Bandar Abbas Oil Refining Co.
100% NIORDC
Kavian Petrochemical
1 Mtpa
100% NIPC
Abadan
360,000 b/d
Abadan Oil Refining Co.
100% NIORDC
Bandar Imam Petrochemical
0,411 Mtpa
100% NIPC
Marun Petrochemical
1.1 Mtpa
47.6% NIPC
23.5% Shasta
28.9% Others
Arya Sasol Polymer
1 Mtpa
100% NIPC
Morvarid Petrochemical
0.34 Mtpa
50% NIPC
17% Tamin Investment
33% Others

data

BRENT PRICE



Betting Continues among Bluffs and Aces

MARKET PERFORMANCE

Prepared by
ANNA CAPALBO, SIMONA SERAFINI
and FRANCESCA VENDRAME - Eni

OPEC and U.S. strategies and the risk of instability

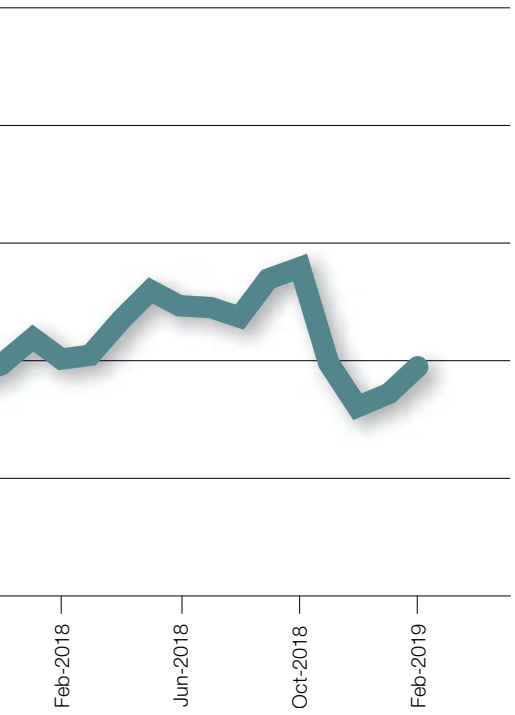
2018 ended with an average Brent price of USD 72/b, +30 percent on 2017. A year largely on the rise, driven by the sustained growth in consumption, the firm discipline shown by OPEC and non-OPEC allies, the re-absorption of surplus stock and the return of geopolitical risk with sanctions against Iran. However, the rebalancing of fundamentals did not always prevail over the rising price trend. The historic return of OPEC from 2016, in favor of rebalancing the market and a "sustainable" price, had to deal with another major player, the U.S., a short cycle producer, but also an important player in the international trade. Washington's strategies, now that the country has gained energy independence, are a factor of instability and volatility. Trump's tweets against OPEC's bullish actions, post-Kashoggi pressure on Saudi Arabia, and the trade war with China, have generated downward pressure, while the sanctions against Iran and Venezuela, a historic U.S. supplier, have pushed prices up. At the end of 2018, the reappearance of a supply surplus convinced financial operators to pull out of the risky oil commodity, which is also affected by the long-term, albeit uncertain and complex, threats of low carbon transition.
The IMF downward forecasts for global growth reignited the risk of a slowdown in the economy and the price at the end of December returned to its level eighteen months earlier of USD 50/b.
At the beginning of 2019, the price started to rise again and gained USD 15/b in two months, once again with the support of OPEC. Saudi Arabia is showing muscle as a swing producer. In January, it cut production on its own by 0.8 Mb/d, compared to the peak in November 2018, and is promising a further reduction of 0.4 Mb/d in March. New sanctions against Venezuela are amplifying the OPEC cuts. However, there are still obstacles along the way. U.S. production is expected to slow down but currently stands at 12 Mb/d, an "absolute" level never reached by any producer, and the danger of recession is keeping investors away as they fear negative effects on demand. Analysts' forecasts for 2019? Also swinging between USD 60 and 70/b.

DEMAND In 2018, global demand for oil grew by 1.3 Mb/d, a slowdown compared to 2017 (+1.5 Mb/d) because the price was over 30 percent higher and economic growth was slightly down (+3/2 percent vs +3/3 percent in 2017). OECD countries continued to grow robustly, while the contribution of non-OECD countries fell with decreasing consumption in the Middle East and Latin America. Global demand is expected to grow in 2019 in line with 2018. The expected prices in 2019 will be lower than in 2018 and will support demand unless the macroeconomic picture deteriorates.

- **China and India** accounted for 56 percent of global growth in 2018. In China (+0.5 Mb/d), consumption of LPG/ethane, naphtha and jet-kerosene in particular is driving the demand for oil, while diesel consumption is falling due to the economic slowdown and environmental policies introduced for a more sustainable economic development. Gasoline consumption is also weak, due to lower sales of conventional cars and less use. In India, consumption increased (+0.2 Mb/d) thanks to the boom in the air transport sector and the growing number of cars. China and India will continue to account for 50 percent of the global growth in oil consumption in 2019.
- In **North America**, unlike Europa and Asia, demand grew strongly in the second half of 2018, driven by LPG/ethane and diesel in the U.S. The start-up of several ethane crackers is supporting the consumption of LPG/ethane, while commercial transport due to the growth in e-commerce and the boom in industrial production are supporting diesel. The production of shale oil in particular requires trucks to move materials and equipment used in the fracking process. Additional petrochemical capacity and upstream activities for the production of shale oil will sustain consumption in 2019 as well.

SUPPLY In 2018, the oil supply hit 100 Mb/d for the first time. Supply grew by 2.6 Mb/d overall, 85 percent of which was due to the increase in

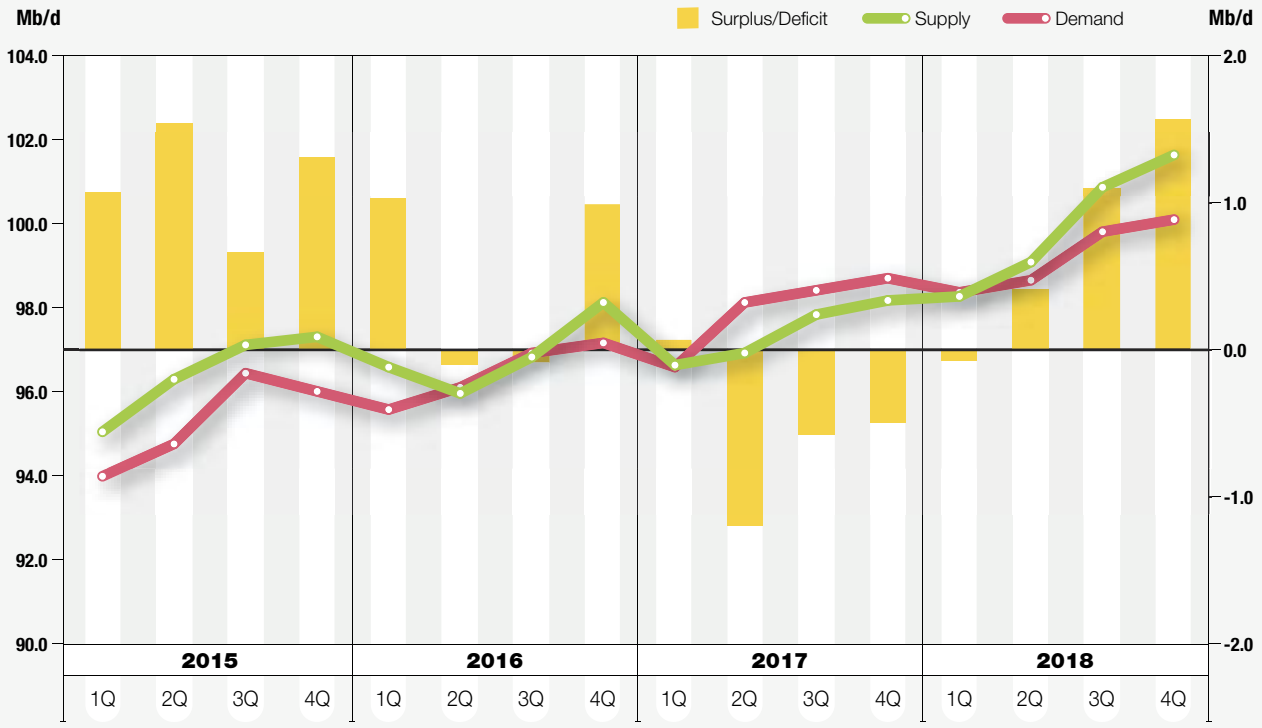
Source: EIA-DOE, Europe Brent Monthly Spot Price FOB



U.S. production. OPEC crude recorded zero growth, however, adding geopolitical losses to the production cuts. The balance sheet closed with a surplus of 0.8 Mb/d, accumulated particularly in the last months of the year when, due to the fear of shortages resulting from U.S. sanctions, Russia and Saudi Arabia hit record production levels. The OPEC and non-OPEC agreement in December 2018 established further cuts for 6 months from January 2019.
2019 will be a year of rebalancing (?!) In which OPEC and its allies will try to navigate the waters troubled by Washington in order to maintain a commitment to control the market.
Initial data for January:

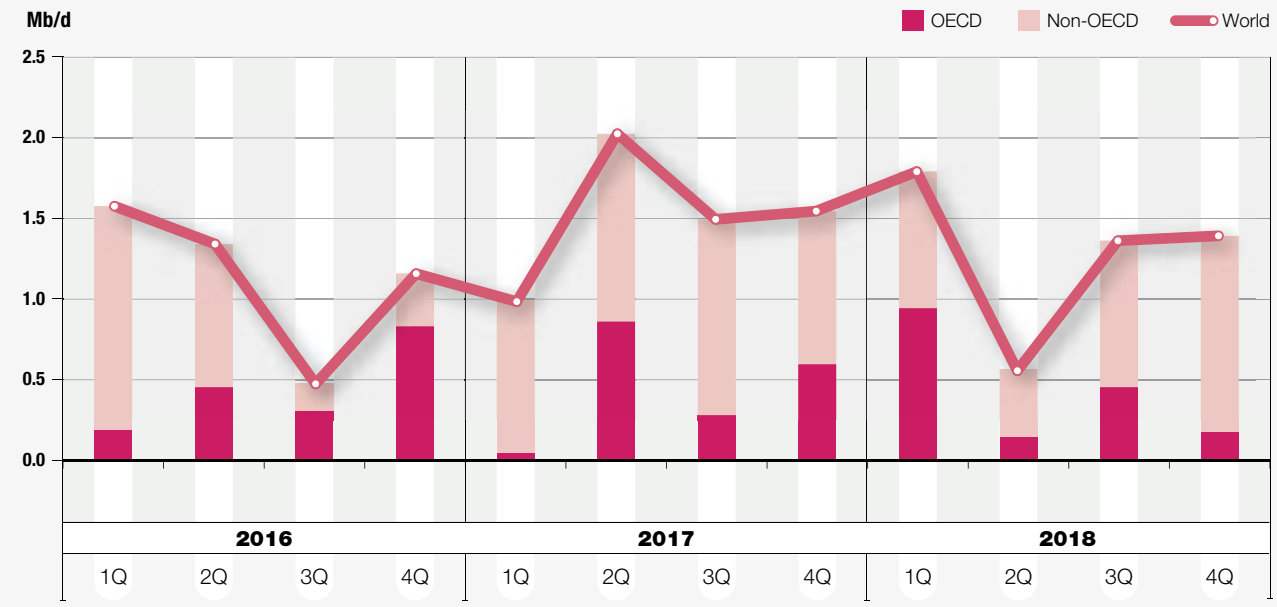
- **OPEC** production down by 1 Mb/d on December, with Saudi Arabia, UAE and Kuwait achieving over 100 percent compliance. Geopolitics has contributed to bringing OPEC production to the minimum levels recorded over the last four years. Renewed disruption in Libya is maintaining production under 1.0 Mb/d. Iranian production has fallen by a further 0.1 Mb/d, recording an overall loss of over 1 Mb/d in the last six months, and the situation in Venezuela is worsening, with production at a historic minimum (1.3 Mb/d).
- **NON-OPEC** countries suffered a production setback in January, particularly due to a fall in Canadian production (-0.3 Mb/d) in line with the cuts introduced by the government of Alberta. U.S. crude stable at 11.9 Mb/d and Russia down slightly (-0.1 Mb/d), although still above the target agreed due to technical limitations, but has confirmed gradual cuts in accordance with the agreement.

SUPPLY/DEMAND BALANCE



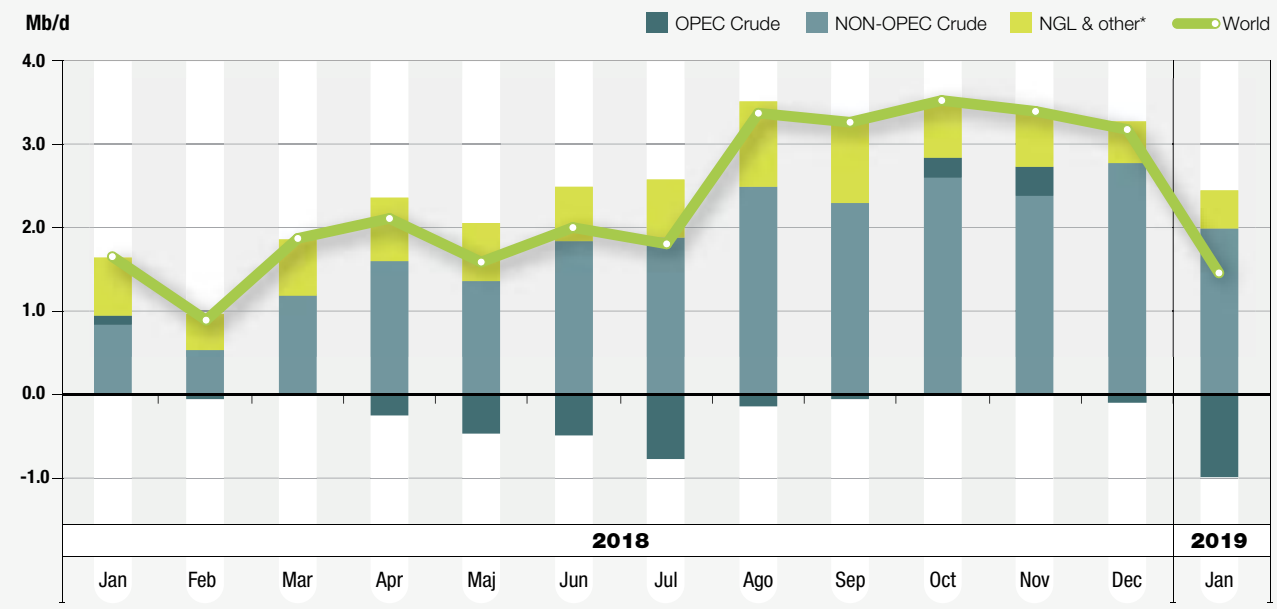
Source: Eni's elaboration on IEA data

ANNUAL CHANGE IN GLOBAL DEMAND AND BY AREA



Source: Eni's elaboration on IEA data, annual change

ANNUAL CHANGE IN OIL SUPPLY



*Other includes biofuels and processing gains

Source: Eni's elaboration on IEA data, annual change

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