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Guangzhou, China. Cover story on China's new oil trading platform by Robin Mills.

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Qamar Energy is a leading consultancy based in Dubai, which expedites understanding the energy dynamics of the Middle East and North Africa.

The QAMAR NEWSLETTER is a monthly publication that provides critical appraisal and focussed assessments of the month's energy developments across the MENA region.

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CHINA'S NEW OIL TRADING PLATFORM COMES WITH SOME RISK

Robin Mills • *A version of this article appeared in The National, April 01, '18* • **COVER STORY**

The launch of China's oil futures contract last Monday marks the biggest shake-up in pricing crude for years. Grandiose claims have been made for it – that it will entirely transform oil price determination, or even lead to dethroning the dollar as the world's reserve currency. However these scenarios turn out, this new contract does create concern for the Middle East countries and their premier export.

World oil pricing has long been based on two benchmarks: Brent crude from the North Sea, quoted on the Intercontinental Exchange, and West Texas Intermediate (WTI) in the US, on the Chicago Mercantile Exchange. Both are light, sweet (low-sulphur) oils, freely traded in dollars, and available from a wide range of producers. Deep and liquid futures markets allow participants to hedge their risk – whether an oil producer seeking to lock in higher prices, or a refiner ensuring its feedstock cost does not escalate. This activity is helped by the much-maligned "speculators", who provide liquidity, and may themselves be seeking to lay off macroeconomic risks correlated to oil.

Both markers have problems. WTI is a land-locked crude with constrained pipelines to reach world markets, while US output increasingly comprises very light oils from shale that do not easily suit refineries. Brent production from the North Sea has long been declining, requiring more and more grades from other fields, some very different in composition, to be added to the physical basket that underpins it. And local accidents to ageing infrastructure – such as December's shutdown of the cracked Forties pipeline – disturb global prices.

The third major benchmark, Dubai-Oman, is for sour (high-sulphur), medium-gravity crude, much more typical of Middle East production and of the grades sought in Asia, the centre of world demand growth. The Dubai Mercantile Exchange (DME) is the venue for trading Oman crude futures. These closely track the physical Dubai crude (which, confusingly, can also be substituted with Omani crude or Abu Dhabi's Upper Zakum), whose price is assessed by specialist agencies and is the basis for most Middle East oil sales to Asia.

Since its launch in 2007, DME Oman has grown to be the world's largest physically-delivered oil futures contract, but the quantity of financial trading still lags well behind Brent and WTI.

The new Chinese contract is distinctly different. Trading on the Shanghai International Energy Exchange (INE), it is denominated in yuan, and based in what is now the world's biggest oil importer. Seven crude oils are deliverable against the contract, specific grades from Dubai, Abu Dhabi, Oman, Qatar, Yemen, Iraq and China's own Shengli.
Notably, Saudi Arabia's Arab Light is not on the list, despite its good fit for the specifications. Neither, even though Russia is China's largest supplier, is East Siberian pipeline oil, too light and sweet to match the other crudes.

Why would the Chinese want to launch such a contract? It should better reflect the crude quality and supply-demand dynamics in the East Asian market than do the distant Brent and WTI. And it is part of China's drive to trade more in its own currency, the yuan, as it has also been pushing with its Belt and Road infrastructure initiative throughout Asia.

Oil makes up some 10 per cent of world merchandise trade, but ideas that this contract will dethrone the dollar as the world's premier currency are overstated. Major shifts in global reserve currencies take time and often require dramatic political and economic realignments, as in the post-Second World War changeover from the pound sterling to the dollar. The dollar is losing ground to the yuan (and euro) but the yuan is still not freely convertible.

For now, INE's higher fees, higher margin requirements, restrictions on crude imports into China, the need to hedge the yuan against the dollar, mismatched trading times and closure during Chinese public holidays are all deterrents to its wider take-up by outside traders.

On its first few days, the Shanghai contract has traded about four times the volumes of the DME, but its open interest, a measure of hedging, is still much lower. If this persists beyond its infancy, it would point to INE's use for speculation rather than by commercial players seeking to avoid risk.

DME signed a cooperation agreement with INE in 2014. In principle, as they are based on similar underlying crudes, their two contracts should trade very similarly, the difference between them reflecting just freight costs from the Arabian Gulf to Asia. Based on very limited data, this is borne out so far, with INE above Oman and below Brent.

In this case, Middle East oil producers have nothing to fear, and INE may become an acceptable way for them to price their crude sales to Asia, even boosting its value by allowing easy hedging. Iraq has begun selling some of its crude by auction through the DME, but other than from Oman, most Middle East oil sales remain heavily restricted on permitted destinations and resale, limiting its value to traders.

But the Chinese government may interfere more heavily in the INE contract, to subdue volatility, dampen price spikes or simply move the market in ways it desires. Then the Middle East oil exporters may come to regret having lost control of the pricing of their key commodity.

BURNING OF FOSSIL FUELS NEEDS TO BE SCALED BACK

Robin Mills • *A version of this article appeared in The National, Mar. 25, '18*

Imagine an event so cataclysmic that 96 per cent of all species on Earth become extinct. That was the mass extinction at the end of the Permian period, 252 million years ago. As this year's Earth Hour passed on Saturday, new evidence linking the Permian catastrophe to climate change triggered by burning coal is a warning to modern civilisation.

The end-Permian extinction was the worst ever to befall the planet, "when life nearly died", as British palaeontologist Michael Benton's book title expresses. It was much worse than the more familiar disaster that wiped out the dinosaurs and killed some 75 per cent of species 65 million years ago. Atmospheric carbon dioxide rose sharply to five times today's level, global temperatures climbed by 8°C, the ocean became more acidic and low in oxygen and the climate dried up. The iconic trilobites disappeared forever, for a time forests vanished from the face of the Earth and many corals, shellfish, insects, amphibians and reptiles died off. It took some 10 million years for ecosystems to recover, during which a few hardy species, such as the pig-like reptile Lystrosaurus, scratched a living among the corpses and detritus.

The death of the dinosaurs has been understood since 1980 to have been caused by the impact of an asteroid in modern-day Mexico. The Permian event has long been more mysterious, with no sign of an extra-terrestrial origin. But from about 2000, scientists have been piecing together clues that point to something very wrong in the late Permian world – an environmental disaster. Coinciding with the extinction is the massive volcanic outpouring that formed the Siberian Traps lava flows, in modern Russia. New research by geologist Ben Burger in Utah, finding high levels of lead and mercury in sediments from the time, fingerprints the burning of coal. Of course, there was no advanced species to burn coal deliberately at that time – but the volcanoes in Siberia appear to have ignited enormous coal beds, spreading ash clouds around the world, releasing carbon dioxide and causing global warming. This coal could have released some 11 trillion tonnes of carbon dioxide, equivalent of more than 300 years of the current world economy's emissions.

Higher sea temperatures may then have destabilised methane hydrates, ice-like substances found in Polar Regions and under the sea-floor, which led to further warming. The sulphur pumped out by the volcanoes would have caused acid rain and, exacerbated by elevated levels of carbon dioxide, acidic water would dissolve the shells of sea-creatures. Oxygen-depleted oceans would release toxic hydrogen sulphide gas, which might then have weakened the planet's ozone layer, exposing plants to destructive levels of ultraviolet rays.

It is a compelling story that accords increasingly well with the geological evidence. And it is a worrying portent for our current situation. We are burning coal, oil and gas and adding carbon to the atmosphere much faster, if not on quite the same scale as at the end of the Permian. We are already seeing signs of dangerous climate disturbance: the Arctic was unprecedentedly warm this winter. Greenland and the North Pole have been above freezing, a remarkable occurrence in the middle of 24-hour darkness. As Arctic ice melts, the darker sea-water absorbs more summer sunlight, accelerating the melting. Conversely, cold air of the polar jet stream has turned south, bringing freezing spells to North America and Europe. The threat of feedback mechanisms that cause further warming is growing more acute.

Deniers or minimisers of the threat of climate change may say that life has coped with higher global temperatures before, even if not of the extremes of the post-Permian world. Indeed, fish, plants and reptiles, would survive, but low-lying areas such as Bangladesh and Florida, not to speak of industrial civilisation, may not. Or, they may say that such projections are extreme cases and that the likely warming is much less. That may be true, but it discounts the small but worrying possibility of disastrous upsets, that economist Martin Weitzman has shown to be the most compelling reason to mitigate climate change. Even small

climatic shifts, such as a drought in a vulnerable region, can trigger conflicts and migrations with worldwide repercussions.

Of course, things probably won't get as bad as an 8°C rise in temperature, because the global economy would collapse and greenhouse gas emissions drop long before. But that is not a very comforting prospect. Even if we can keep to the 2°C rise foreseen by 2016's Paris Agreement that is damaging and risky enough. Staying below 2°C requires global emissions to peak around 2020. But, although greenhouse gas emissions stayed flat during 2014-16, they rose 1.4 per cent last year as the world economy boomed.

The portrait of climatic disasters brings on a sense of hopelessness and fatalism in some, and a compulsion to denial in others. But we should instead see it as a warning and a call to action. We have most, if not yet all, of the tools we need to build a strong global economy and society compatible with a liveable climate. While some politicians and pressure groups blunder in fruitless debates, other countries, companies and individuals get on with the hard work of creating and building low-carbon systems. We are not turning out the lights for Earth Hour, not hazarding the extinction of our civilisation, but instead building a cleaner, richer, fairer planet.

TILLERSON'S DEPARTURE THREATENS A BUMPY RIDE FOR GLOBAL ENERGY

Robin Mills • *A version of this article appeared in The National, Mar. 18, '18*

Geopolitical risks to energy markets used to emanate mainly from Moscow, Baghdad, Tehran or Caracas. The latest upheaval in the US administration, with Rex Tillerson's departure as Secretary of State, threatens to add Washington to that list of capitals. And major energy producers are in the firing line.

The State Department's new head Mike Pompeo, previously of the CIA, has, like Donald Trump, been notably hostile towards the Iran nuclear deal, and conspiratorial on Russia. Rumours continue to swirl over the possible replacement of National Security Advisor H.R. McMaster, potentially by the uber-hawkish John Bolton, a prominent promoter of the 2003 invasion of Iraq.

Mr Tillerson's tenure as Secretary of State was an odd contrast to his time at ExxonMobil. Cocooned in the "God pod" at the oil company's headquarters outside Dallas, its senior executives can sometimes be aloof. His ability to manage a large organisation should not have been in doubt, but he leaves behind a legacy of organisational chaos, downsizing and plummeting morale at the State Department. But while he made some major strategic missteps as ExxonMobil's chief executive – in Russia, Iraq and buying the US shale company XTO – his attempted policies as Secretary of State were, in comparison, generally sound and conventional. Mr Pompeo promises a much more volatile ride.

There are four clear global trouble spots which might significantly affect oil and gas markets, and will test the mettle of Mr Pompeo. First up, Venezuela's slow-motion collapse is now accelerating, with production down more than 50,000 barrels per day from January to February, according to independent observers. Tougher sanctions on Caracas to prevent it sending crude to the US, the refinancing of its debts, or a renewed push for a change of government could cut current exports of crude from about 1 million barrels per day to near-zero. Russia and China, which have lent the Maduro regime huge sums, may then get involved in a phenomenally messy default, while attempting to preserve a foothold in the western hemisphere. Second, Russia itself is still under western sanctions that hamper its development of Arctic and shale resources. After Mr Tillerson's condemnation of Russia's alleged chemical weapons attack in the UK, the White House's support for its British ally has been muddled. Disputes over Ukrainian gas transit add further risk. Thirdly, a Russian state company, Zarubezhneft, has just signed the second post-sanctions petroleum development contract with Iran, after July's agreement with Total of France and the China National Petroleum Corporation.

Meanwhile, European attempts to find an acceptable "fix" for Iran's nuclear deal seem doomed. New proposals from the deal's opponents are clearly intended to be an ultimatum beyond anything Iran could accept, especially as Tehran feels it is already not receiving the promised economic benefits from the 2015 accord.

Despite suggestions that re-imposed US sanctions could again cut Iranian oil exports by 1 million barrels per day, the actual immediate impact is likely to be minimal. The EU, and even more China and Russia, the other deal signatories, still consider Iran to be in compliance, and will try to shield their companies from American interference. Nevertheless, future investment in the Iranian energy sector would be severely constrained. More seriously, Messrs Pompeo and Bolton might push for a military end to Iran's nuclear activities, which could suck in neighbouring petroleum producers and lead to unpredictable wider damage.

The final venue of threat, North Korea, again draws in China and to an extent Russia in opposition to the US. Not a notable energy consumer or producer itself, Pyongyang's nuclear weapons raise the spectre of a wider conflict that could devastate South Korea, draw in Japan and disrupt oil and gas transit and demand across north-east Asia. Even if Mr Trump's reshaped team identifies the right policies, it is doubtful that the State Department's eviscerated diplomatic corps can deliver the complex manoeuvres required for a deal in Korea, a consensus with the Europeans on a modified Iran deal, a Latin American push for peaceful political change in Venezuela, or a united western front against Russia.

But energy producers and investors should not treat the Washington reshuffle as a one-way ticket to higher revenues. A loss of Venezuelan or Iranian oil exports would presumably be made up by spare capacity from other OPEC producers, who would suspend or greatly revise the ongoing production cut agreement. A sharp spike in prices followed by a global recession would be inadvisable. Similarly, a west-Russia showdown would cast doubt on Moscow's continuing adherence to its pact with OPEC.

The critical mass of great power rivalry, massive conventional arms and nuclear weapons makes the Korean situation the most critical. It may be far from the Arabian Gulf, but even a contained conflict here would severely hit demand for oil and, even more, liquefied natural gas.

While our eyes are on the obvious hotspots, it is possible the next shock may emerge from an entirely unexpected area – a tariff-triggered trade war, China, a new economic crisis, a massive cyberattack - testing an understaffed and chaotic US

administration. With old alliances under strain and new ones nascent or paradoxical, energy producers are set for another testing year.

OIL MAJORS GET SERIOUS ON 'NEW ENERGY' INVESTMENTS

Robin Mills • *A version of this article appeared in The National, Mar. 04, '18*

In the late 1990s, international oil companies all wanted to be like Enron. The flashy Texas firm had shaken up the staid energy world with its ventures into gas and electricity trading, broadband, solar power, and the US's then largest wind turbine developer. That desire faded somewhat after Enron's ignominious 2001 collapse. But almost two decades later, new energy is again on the agenda for the world's oil supermajors.

The context of the investments of the late 1990s into new energies is in some ways similar to what's happening today, but different in others. A decade of low prices had left the major oil companies searching for elusive profit growth. After a false start in the 1970s, European and American governments had begun backing green energy with enthusiasm. The growing power and influence of environmentalist movements put oil companies under pressure following the 1989 Exxon Valdez oil spill in Alaska, Shell's plans in 1995 to sink the disused Brent Spar oil platform in the North Atlantic, and its record on human rights and land degradation in Nigeria.

In 2000, BP, under the PR-savvy leadership of John Browne, rebranded itself as "Beyond Petroleum" and changed its logo to a sunflower, derided by some as "Big Petunia". It bought out Enron, its partner in a solar power venture, and became involved in wind and hydrogen power. Chevron invested in geothermal, Shell in wind, biofuels and solar, with Total committing to nuclear power. But as oil prices recovered, the super-majors increasingly came to see renewables as a small, low-return business dependent on government subsidies, and were slow to innovate. The rise of China-made solar panels made manufacturing highly competitive, and Shell sold off its solar interests in 2006. BP Solar, meanwhile, was wound up in 2011.

Fast forward to the present day, and a new spell of low oil prices, combined with environmental policy pressure, has again driven a search for other businesses. But things seem different this time around. BP's latest Energy Outlook – released late last month – showed that oil companies are increasingly willing to contemplate a peak in oil demand, though the estimated date ranges from the mid-2020s to the 2040s or beyond. Renewables meanwhile are a much larger and more competitive industry than a decade ago.

Total has been an early mover in the latest renewables surge. Just as BP was getting out of solar, the French firm got in, buying 60 per cent of US-based SunPower in 2011. It is also a partner in Abu Dhabi's Shams 1 solar thermal power plant. The sums being committed to new energies now are larger than in the early 2000s: $1 billion annually for Shell by 2020, equivalent to 3-4 per cent of its total capital spending, while Total paid $1bn for French battery maker Saft in 2016. Over the past five years, large oil companies have spent more than $3bn on solar acquisitions.

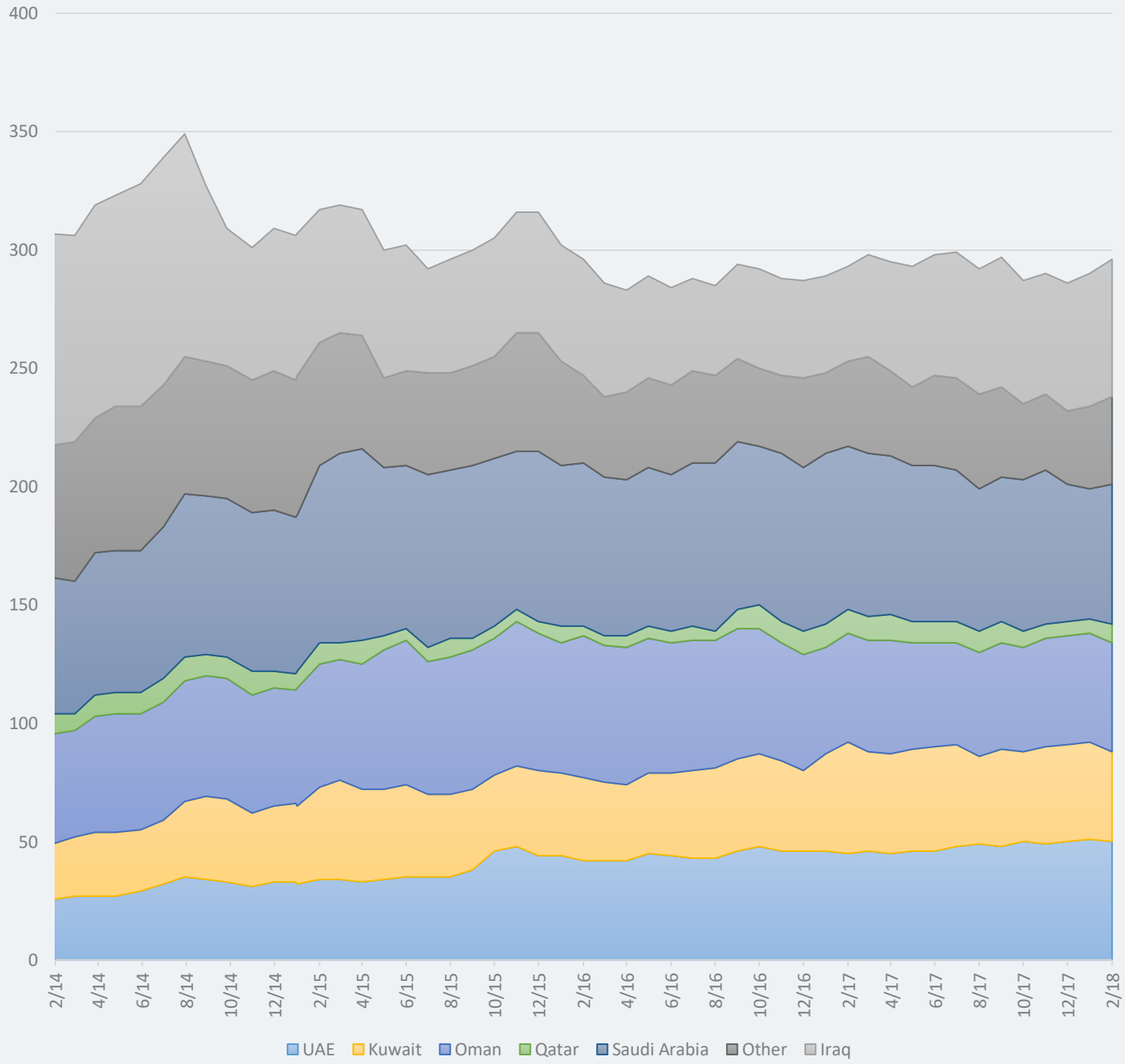
Oxford University professor Dieter Helm has questioned whether most renewable energy really fits within oil companies' business models. Such firms have traditionally been built to brave high levels of geological and political risk to find or acquire resources in remote areas, and then deploy vast amounts of capital over several years to build complicated infrastructure to bring them to market. Such business models did not fit well with small-scale renewable manufacturing ventures in the early 2000s. But today's strategy seems better thought-out and more integrated with the super-majors' legacy businesses, moving from gas to electricity and powering battery vehicles. Some deals for example have concentrated on securing outlets for gas, a relatively clean fuel on which all the oil companies are increasingly betting.

Biofuels have been part of the core business of supplying transport fuels for years now, as they are mandatorily blended into petrol and diesel. Hydrogen, which might eventually be a fuel for ships, planes, home heating, small-scale power, and industry, is typically made from gas and seems like a natural fit. Carbon capture and storage relies on skills in chemical engineering, pipelines and understanding geology and fluids underground, all core competencies. Statoil has been developing floating wind turbines, outstepping its skills in offshore structures in harsh northern seas.

The question for European majors is whether they will ever incorporate non-hydrocarbon technologies into their DNA, and find a way to generate synergies between them and their traditional businesses. If not, they might as well return capital to shareholders, who can then redeploy it into renewables. This is the philosophy of the American super-majors, ExxonMobil and Chevron, who have stayed firmly wedded to fossil fuels. Their stance reflects less political pressure over the environment in the Trump era than a decision to concentrate on shale oil and gas resources, and their philosophy of staying close to their core business. The big national oil companies – Saudi Aramco, ADNOC, Rosneft, China National Petroleum Corporation – have likewise concentrated on hydrocarbons. Their main areas for growth and diversification are gas, refining and petrochemicals, while the rise of renewable energy in the Middle East has been led by utilities and specialist units such as Masdar. But the large state-owned firms have at least to think about the impact on their businesses of electrified mobility, competition to sign up gas end-users, and the synergy or struggle between renewables and gas power.

And the Middle East countries need to keep a close eye on the strategies of Shell, Statoil, Total and BP. If their ventures into new energies are successful, it will be a valuable pointer to how to diversify today's oil-dependent economies. Failure, though, will be an early-warning signal of the challenges of the great energy transformation.

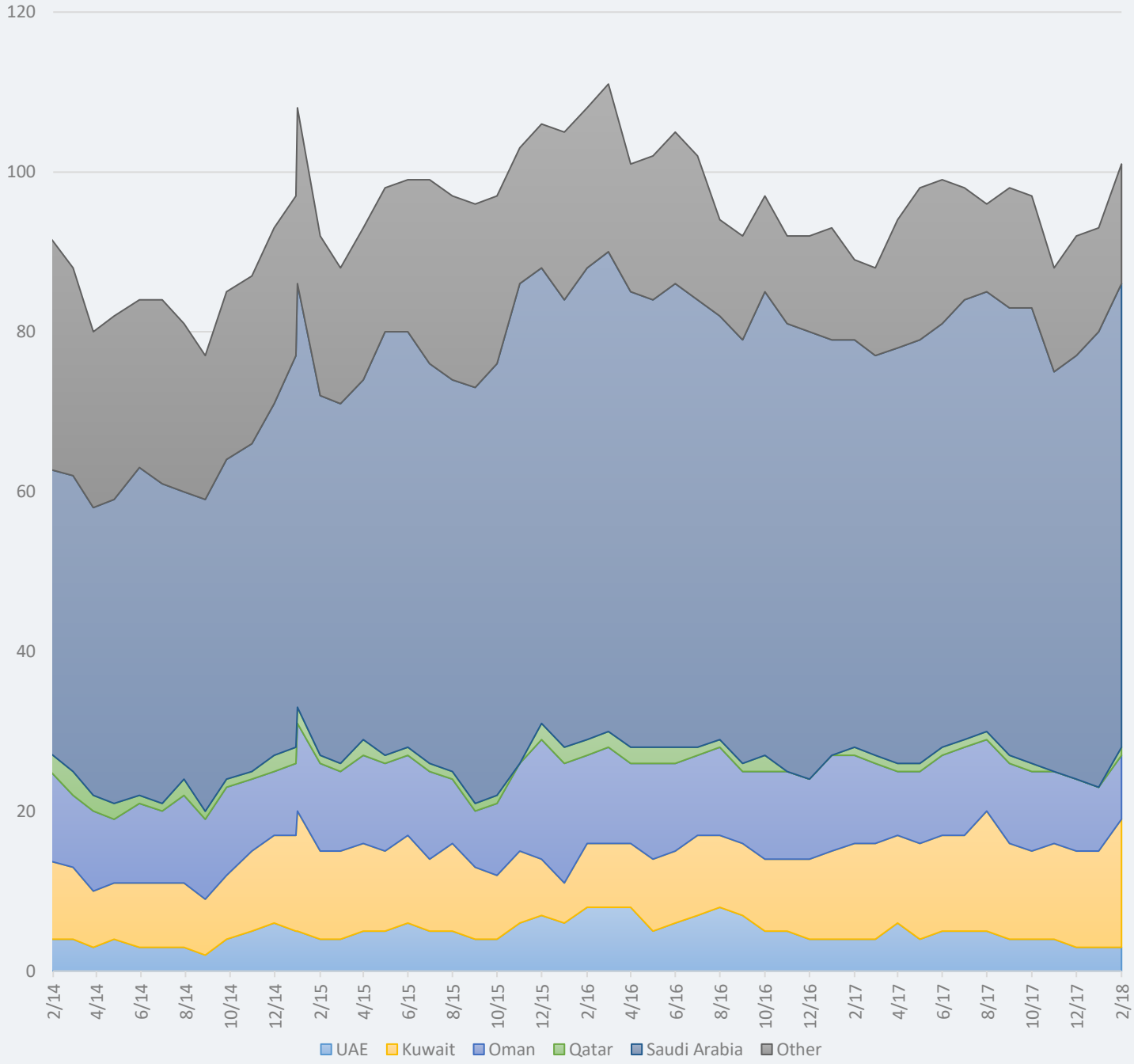
RIG COUNT SNAPSHOT: **OIL**



- The Middle East's oil rig count in February increased by +6, excluding Iran.
- Iran 's rig count is not included in Baker Hughes; however, OPEC reports total (oil and gas) rig count in Iran increased by 2 in 2017 from the previous year.
- The GCC's rig count gained by 2 and drilling remained steady at near-record levels.
- Iraq witnessed another increase of +2 in February as Weatherford announced the resumption of drilling operations in Majnoon. The field is undergoing expansion to double its output capacity to 400 kbpd from the current 235 kbpd.
- Kuwait's rig counts fell back to their October 2017 levels (38) once again, after having stayed steady at 41 since November 2017.
- Saudi Arabia's count gained by +4 in February, as it tries to squash speculations that the US will overtake the Kingdom in crude output early this year; this is being challenged by Saudi Arabia as it increased its production in February by 23 kbpd.
- The Middle East's oil rig count averaged 293 in 2017, and has averaged 316 the last four years. The region's count has however stayed consistently under 300 over the last 24 months.

Source: Baker Hughes

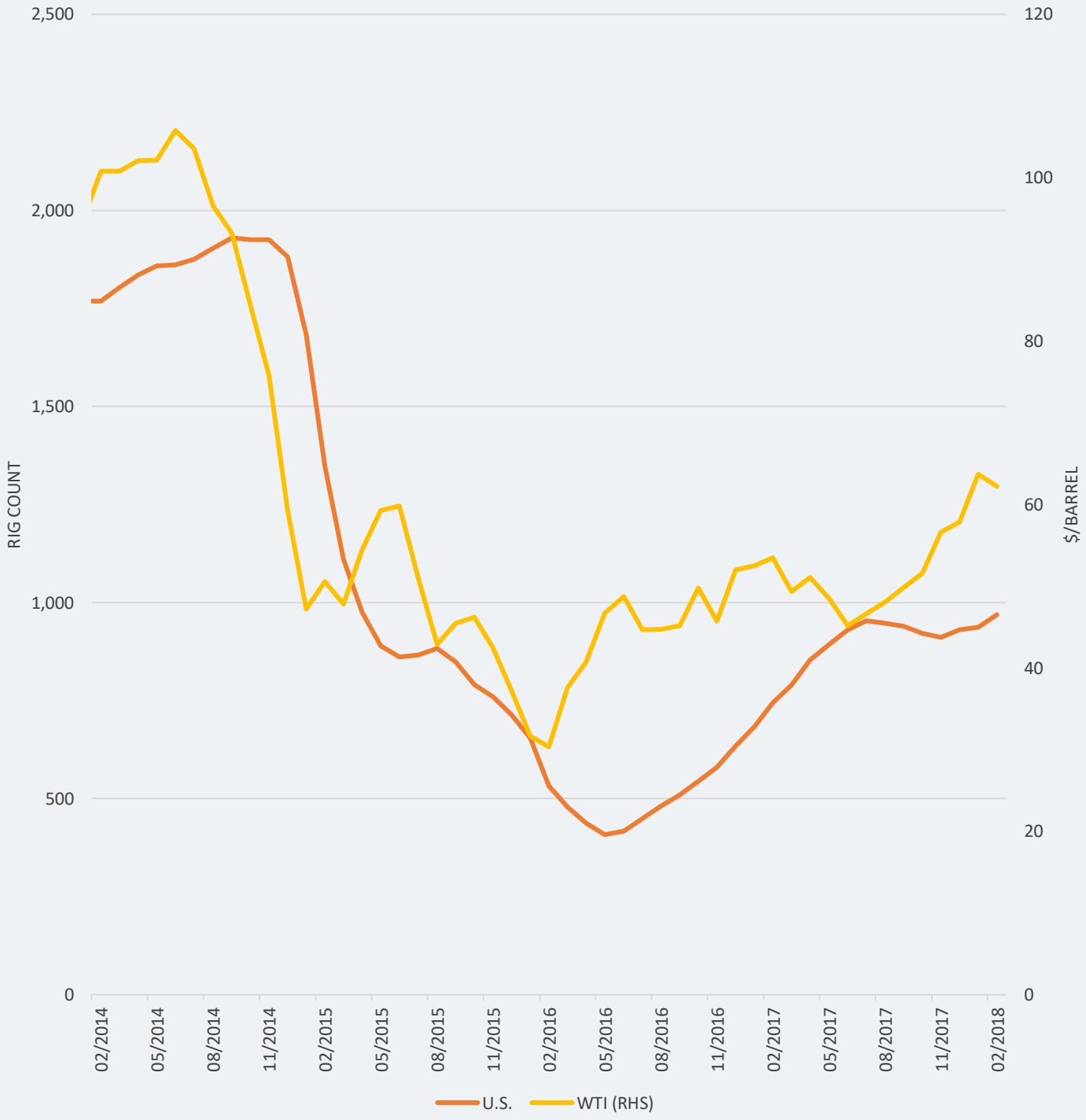
RIG COUNT SNAPSHOT: **GAS**



- The Middle East's gas rig count averaged 94 in 2017. Its highest level reached was in January 2014 at 123 gas rigs. While there wasn't much change in the rig count for January (+1), February saw a rise of +7.
- Qatar finally gained 1 in its gas rig count that had been at zero since November 2017, down from 1 rig in October with the North Field expansion ongoing.
- The UAE witnessed no change in its rig count from December; on March 18 ADNOC awarded Total two concessions in its offshore ultra-sour gas fields – Umm Shaif and Nasr, and Lower Zakum – to ramp up domestic production, indicating a future increase in rig counts.
- Kuwait gained by +4 in gas rigs, after having stayed steady since November 2017 with 12 gas rigs, beating its previous year-high count of 15 in August 2017. The Kuwait Oil Company plans to increase Jurassic gas production from 170 MMcf/d to 520 MMcf/d in 2018.
- Saudi Arabia continues to stay steady, averaging 53 rigs in 2017, gaining by +5 combined (January and February), due to higher production from Wasit, and plans to increase production from Midyan, Fadhil, and Turaif.

Source: Baker Hughes

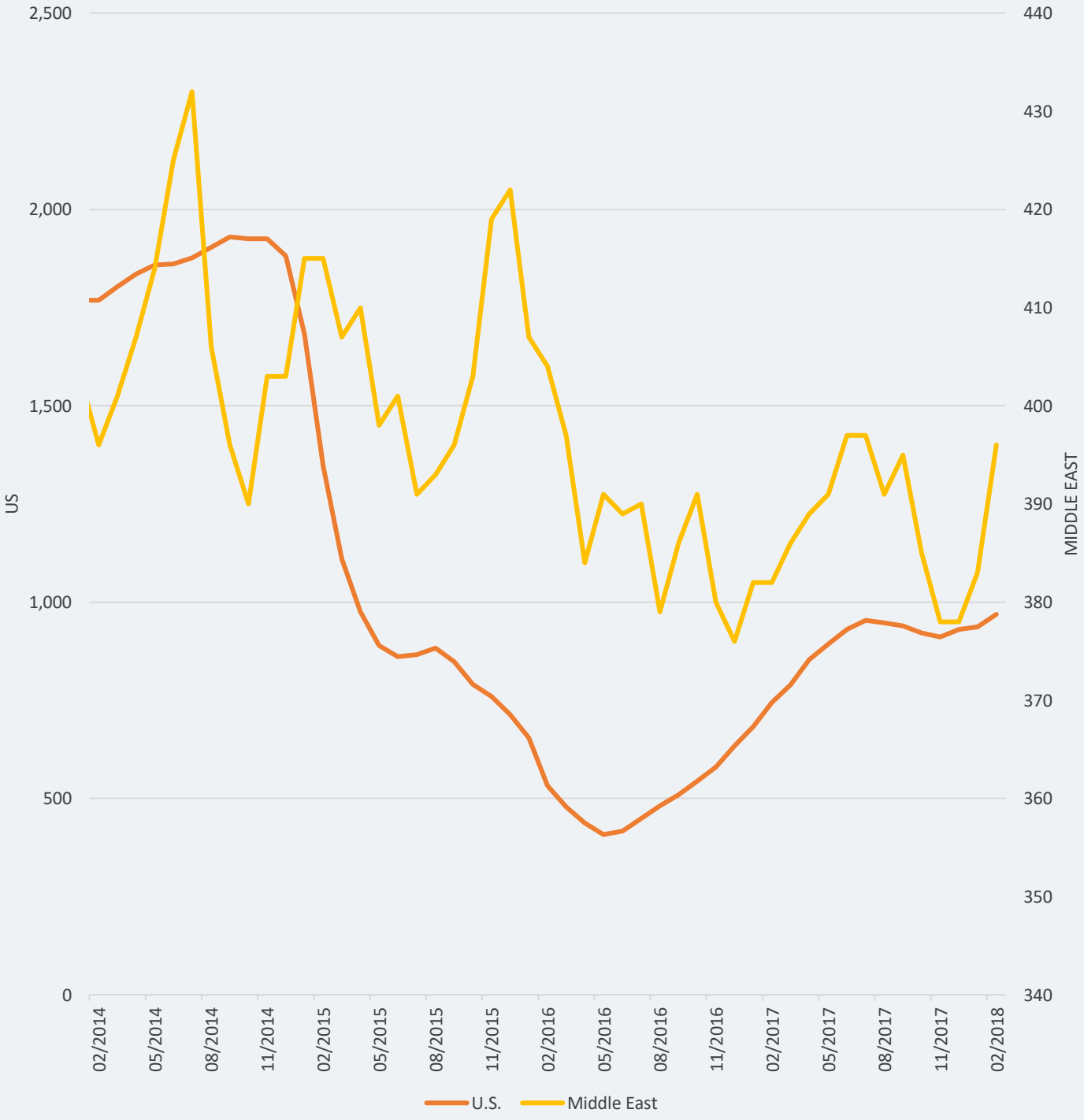
RIGS VERSUS OIL PRICES: US RIGS & WTI



- US rig count jumped by 31% in February y-o-y, a rise of 190 rigs. The US is looking to take over Saudi Arabia in crude output this year.
- Total US rig count has been in decline since August due to producers trimming spending plans citing softer oil prices; however at 969 for February, the country has made a quick recovery, passing 2017's high of 953 rigs.

Source: Baker Hughes, EIA

RIG COUNT: US & MIDDLE EAST



- While the US's onshore rig count has surged over the course of 2017, the country witnessed a fall of -5 in its offshore count, owing mainly to Hurricane Harvey and other natural disasters last year. The US fell by an additional -6 in its onshore rig count last week.
- Total Middle East's rig count witnessed a rise of +13 in February, even as OPEC members continue to maintain relatively positive compliance rates; for example, UAE reached a compliance of 134% compliance in February, and Kuwait at 104%.
- The region's rig count has averaged 392 for the last two years.

Source: Baker Hughes, EIA

FUEL PRICES & SUBSIDY REFORMS

FEBRUARY 2018

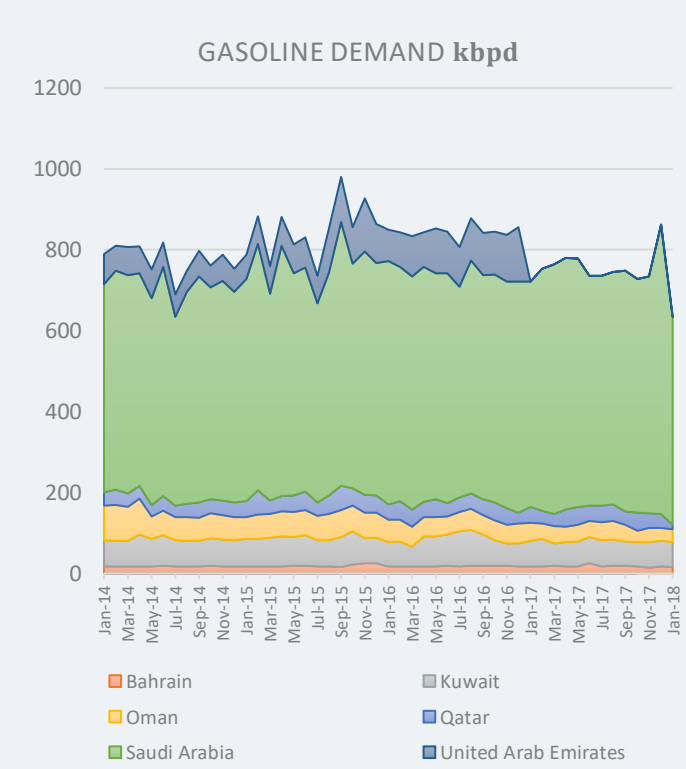
- The UAE was the first GCC country to remove fuel subsidies in August 2015; gasoline prices rose 6.1% in February. Fuel prices have been announced to be revised marginally downward in March.
- In Qatar, diesel prices for February increased by 88.8% from 2013, the highest ever since Qatar started pegging its fuel prices to the international market. In Saudi Arabia, gasoline prices have increased by 126% in the New Year, and diesel by 14%.
- Meanwhile in Kuwait, the Parliament's Financial and Economic committee has approved the cancellation of the decision enforced in September 2016 to raise fuel prices to 'reduce financial burdens on citizens'. Similarly in Bahrain the Council of Representatives urged the government to rethink its fuel price hike merely a day after it was approved, finding the change 'too sudden', especially for citizens with a limited income.
- In Oman, the Ministry of Oil & Gas increased the prices for Gasoline 91, 95 and diesel in February by 4%, 2.3%, and 6% respectively from January's fuel prices, making demand for M-95 and diesel drop by ~25% and ~36% respectively.

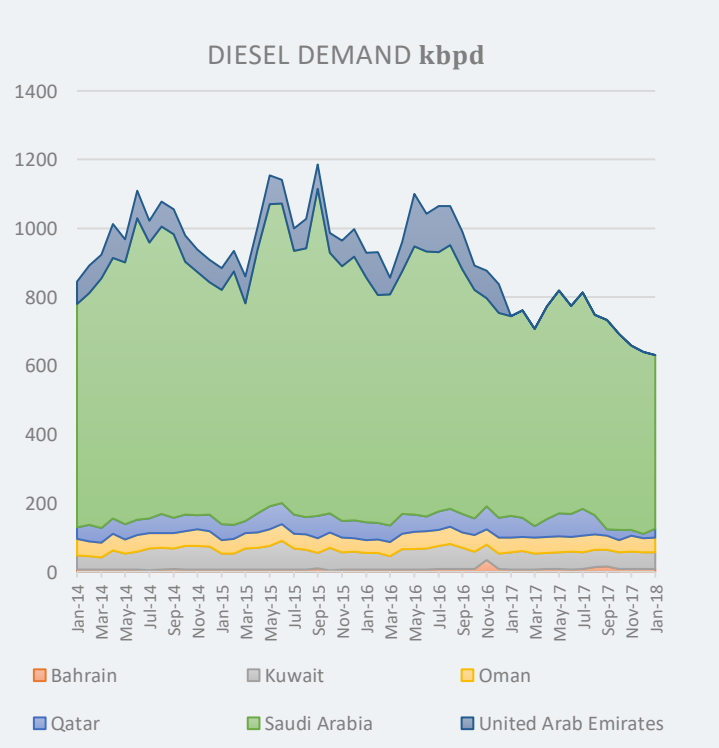
The following table represents the prices of gasoline 95 and diesel ($/litre) for February 2018 in the GCC countries.

GCC Country	PAST US $ PER LITRE		CURRENT US $ PER LITRE	
	Gasoline 95	Diesel	Gasoline 95	Diesel
Saudi Arabia	0.16	0.07	0.54	0.13
UAE	0.46	0.63	0.61	0.68
Qatar	0.27	0.27	0.52	0.51
Bahrain	0.27	0.42	0.53	0.42
Kuwait	0.21	0.36	0.35	0.38
Oman	0.46	0.39	0.57	0.63
US - PRE TAX	0.52	0.57	0.58*	0.66

**US Gasoline 95 values are calculated for Premium Grade.*

Source: EIA, Qamar Energy





vailable. Prior to 2017, UAE figures cover ADNOC sales only.

Source: EIA, Qamar Energy

AS EUROPE SEEKS GAS ALTERNATIVES, CAN NORTH AFRICA FIT THE BILL?

Robin Mills & Maryam Salman • *The Italian version of this article appears in the April issue of Formiche, Italy's leading civil society and politics magazine*

Energy insecurity in Europe, broadly speaking, stems from a lack of integration of its southern and eastern energy markets, declining gas production resulting in a higher share of imported gas, and a high reliance on Russia for supplies. North Africa has been seen as the critical "third corridor" alongside Russia and Norway for European gas imports. But is the commercial resource base and political stability enough for it to really play a role in diversifying the continent's supplies?

The northern African countries boast of considerable gas reserves: Algeria and Libya export up to 40 billion cubic metres (BCM) of gas combined to the EU each year. Egypt was formerly a significant liquefied natural gas (LNG) exporter and may again become a hub for Eastern Mediterranean supplies. For players like Morocco and Tunisia, production has remained small, and investment into local exploration and perhaps shale gas looks likely to address domestic demand. The practicality of increasing supplies from the big three (Algeria, Libya, and Egypt) for Europe remains, however, contingent on regulatory and political clarity, and geopolitical rivalry from the East Mediterranean. The new North African wild-cards are the giant deep-water discoveries off Mauritania and Senegal, which are initially to be developed with LNG export plants, potentially supplying a pipeline to Morocco in the future that would tie-in to the European system.

Most action recently has been in the Eastern Mediterranean. Israel agreed to sell 64 BCM of its Leviathan gas to Cairo late last month, bolstering Egypt's ambition of becoming the East Mediterranean's leading natural gas hub for Europe. Under the agreement, Egypt is to become an importer of Israeli gas. The reversal of the Egypt-Israel pipeline will send Leviathan gas to the two largely idle liquefaction plants at Idku and Damietta. This could be combined with imports from Cyprus, with the discovery of the Calypso field, rumoured to be geologically similar to Egypt's giant Zohr, and holding between 170-230 BCM of gas. Potential Cypriot demand is minor at about 1 BCM annually, meaning that most of its production has to find export markets.

An alternative is a deep-sea pipeline direct to Greece and Italy which, if constructed for the quoted price, could carry 1.6 billion cubic feet of gas per day to Europe, at a delivery cost of some $1.5/MMBtu, cheap enough to be competitive. Yet, Cypriot's energy minister was quick to announce that it would most likely sell its LNG to Idku and Damietta. Cypriot advances have upset Turkey, which used naval forces to warn off an ENI-chartered rig seeking to drill off eastern Cyprus in February 2018. The use of either the Egyptian or Greek routes rules out Turkish participation as a transit route for the region's gas, as a pipeline from Israel cannot go via Lebanon and would have to traverse Cyprus' waters en route to Turkey.

Despite its political upheaval, Libya has managed to keep up supply to Europe via Sicily, at 4.4 BCM in 2016. Yet the announcement by ENI earlier this week of reducing oil production in the country by 120 thousand barrels a day could also indicate the company's worries over a potential production slowdown at the Western Libya Gas Project (WGLP) which is supplied by production at the Bahr Essalam and Wafa fields. The project the only gas export project for the country. Libya put off maintenance at its gas fields in February due to continuing cold weather in Europe, but with maintenance now scheduled for April, gas exports from the fields through the Greenstream pipeline to Italy will go offline.

Under better security conditions, Libya's reserves of 1.5 trillion cubic metres (TCM) could allow it to boost its gas output significantly, by at least 4 BCM by 2022 with future developments at the ENI operated WGLP (supply from 11 new wells are expected to come online in 2018) and higher production from Libya's National Oil Company (NOC) operated fields. But supply disruptions from energy infrastructure attacks remain a recurrent feature of the Libyan market.

Algeria has been eyeing the Galsi pipeline that is expected to connect it to mainland Italy via Sardinia, but sentiment in the Italian camp is mixed. Italy had announced in 2017 that it would stop importing Algerian gas via pipelines from 2019, foreseeing a deficit in supply by almost 14 BCM which it aims to balance through a long-term contract with the Netherlands in 2020, then with Norway in 2026, followed by Russia in the long-term. The Trans-Adriatic Pipeline from Azerbaijan via Turkey will also add 10 BCM to Italian supplies from 2020.

Algeria also remains challenged with domestic demand that is stipulated to increase to 50 BCM by 2020 from 40 BCM in 2016, and has been vying to attract investment into the Ahnet, Bechar, Berkine and Illizi basins which form a part of its 4.5 TCM of recoverable gas reserves. Algeria had restarted its controversial shale gas exploration last year, but has faced local protests against hydraulic fracturing, with fears of polluting its scarce water resources. The country exported 55 BCM of gas to Europe in 2017, yet to maintain that level of output while meeting fast-growing domestic demand is no ordinary challenge. Subsidised domestic prices encourage consumption, and tough fiscal terms with grindingly slow bureaucracy discourage international investment in new output.

For smaller players like Morocco, ambitious projects like the $4.6 billion Jorf Lasfar LNG-to-power project are essential to diversifying away from its energy dependence on Algeria, yet political hurdles and continuous delays in putting out a tender have slowed down its progress. Morocco has continued to diversify its energy supply as a leading installer of renewable energy (solar thermal, solar photovoltaic and wind-power) as well as coal. Egypt and Tunisia, somewhat haltingly, are following its example. If Algeria were to join in a renewables boom too, this could help slow down domestic gas demand growth and give more hope of sustaining supplies to Europe.

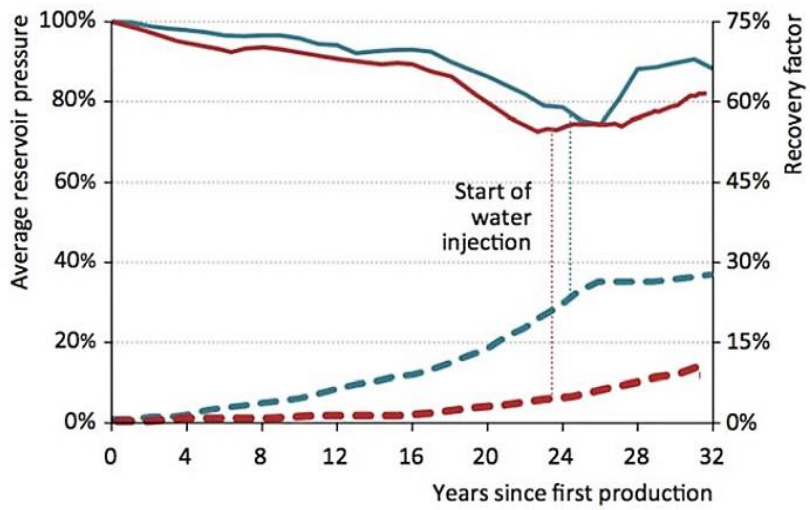
Overall, the North African region has the resource base to increase supplies to Europe, but its own political struggles, barriers to international investment and rising domestic demand hold it back. In both volumes and reliability, it is very much third in the "three corridors". Though very important for Italy and Iberia, it plays only a supporting role in diversifying European reliance on Russia. Changing that demands four EU actions: political engagement in resolving the East Mediterranean tangle and bringing stability to Libya; supporting the new producers in north-west Africa to make the most of their resources; trying to find a more business-friendly path to work with Algiers; and supporting renewables development along the North African shore.

MUDDY WATERS: IRAQ'S WATER INJECTION NEEDS

*This is a **preview** of **Robin Mills'** report for the **Iraq Energy Institute**, published in January '18. To view the full version, follow the **link** under the excerpt.*

Iraq has a long history of using water injection on a relatively small scale, dating back to 1961. Water injection is the most appropriate recovery mechanism for most of the reservoirs in its central and southern regions, giving the highest recovery factors and is technically relatively straightforward. Modern water injection following the fall of the Saddam Hussein regime has been applied by international oil companies developing fields in southern Iraq under technical service contracts. But widespread use of river water for injection has been discouraged because of the competing uses for agriculture and potable water, a continuing severe drought, and the reduction in water flow due to upstream dam construction in Turkey and Iran.

Extensions may be needed to cover water requirements of smaller fields, some which (such as Kifl, West Kifl and Marjan between Najaf and Karbala) are a long way from the sea and from other parts of Iraq's planned water system. Additional fields are also being discovered, such as Faihaa in Block 9 between the Majnoon and Nahr bin Umar fields (2014), and the Eridu discovery made in Block 10 by Lukoil in February 2017, south-west of Nassiriya. The Common Seawater Supply Project plan as released by the BOC has two phases. Phase-1 includes the main fields around Basrah, with an eastern line up to Majnoon, Halfaya, and the Maysan group, and a western extension to Nassiriya. Its total capacity is 7.5 Mbbl of water per day, delivered in three-month intervals.



Reservoir Pressure & Recovery Factor due to water injection at Rumaila and Kirkuk

However the CSSP has been repeatedly rethought and delayed and could not now be in operation before 2020 at the earliest. The original CSSP was accosted at $12 B, later increased to $18 B, while Phase-1 was estimated by the Ministry of Oil to cost $5.6 B.

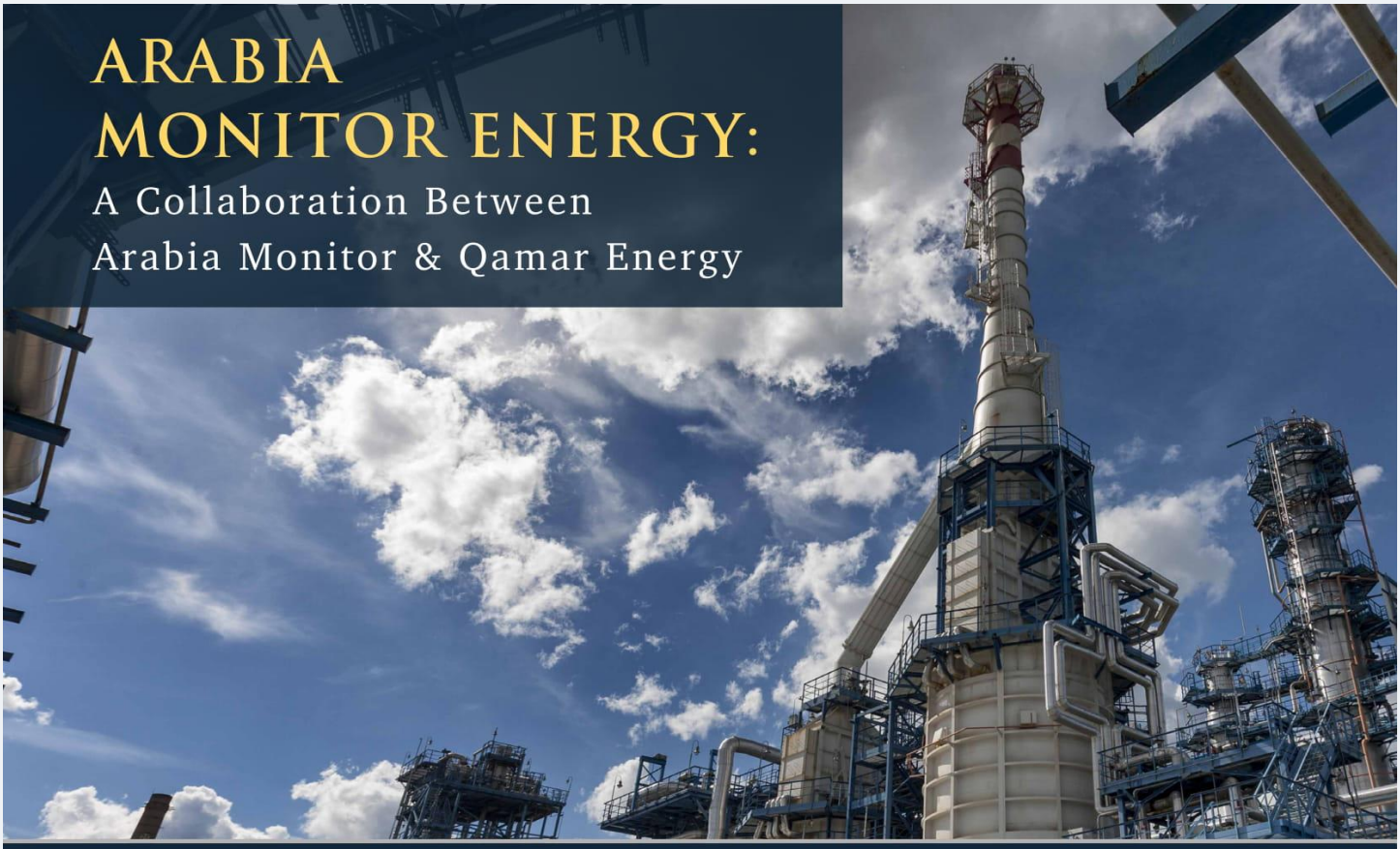
The CSSP is economically attractive and delivers water (and therefore incremental oil production) at very moderate costs. Every year of delay, and the consequent loss of possible oil production, causes large losses to the Iraqi budget. The two main problems with the implementation of the CSSP so far are...

Full Report:

Muddy Waters: Iraq's Water Injection Needs, *Robin Mills*, Iraq Energy Institute, January 2018

ARABIA MONITOR ENERGY:

A Collaboration Between Arabia Monitor & Qamar Energy



ARABIA MONITOR ENERGY

Oil and gas tensions in the Middle East continue to influence the volatility of the world's energy markets. The Arabia Monitor Energy, a novel collaborative effort by Qamar Energy and Arabia Monitor, combines macroeconomics, geopolitics and energy intelligence to explain what the region's energy geo-economics mean for business.

WHAT SETS IT APART?

1. INSIDE OPEC

Focussed assessment of the month's OPEC developments, policy advancements and strategies.

2. NOC & IOC ANALYSES

Examination of factors affecting NOC and IOC policies, and their impact on regional diversification schemes.

3. SPOTLIGHT THIS MONTH

Targeted reading of the geopolitical, macroeconomic and energy landscape of a MENA country utilising our specialised energy intel.

4. SCENARIOS TO WATCH

Detailed forecast of global oil developments and their impact on the risks and opportunities for MENA's oil production.

5. STRATEGIC IMPLICATIONS

Concise summary of major oil trends and their effect on investment strategies under bearish, bullish, and wobble scenarios.

6. OUTLOOK FOR THE YEAR

Cohesive outlook of the oil production, gas production, renewable energy projects, and geopolitics of key MENA countries.

WHO BENEFITS?

ENERGY TRADERS

- What factors will contribute to oil and gas price fluctuations?
- What is the outlook for oil and gas pricing?
- What is the outlook for OPEC's production and export strategy?
- How are NOCs adapting their oil marketing strategies?

INVESTMENT AND RISK ANALYSIS

- What are the operational risks and investment opportunities in MENA?
- How do economics, politics, government policy changes, production and export bottlenecks contribute to risk mitigation?

UPSTREAM FIRMS

- What are the chief economic, political and fiscal regime factors driving/limiting upstream investment decisions and progress?
- What are the oil supply outlooks for the countries by project?

DOWNSTREAM FIRMS

- What are the demand challenges, patterns, and trends for oil and oil products?

NATIONAL OIL COMPANIES

- What are future oil and gas pricing trends?
- What developments will intensify or weaken demand?
- What are IOCs' incentives and drawbacks in operating in the country?

ALTERNATIVE / RENEWABLE ENERGY ORGANISATIONS

- What are the challenges to renewable energy targets?
- What is the progress of major renewable energy projects?
- Are there opportunities for more entrants?

THE DELIVERABLES

8 MONTHLIES

- Oil Price Scorecard
- Headline Developments
- Spotlight this Month
- Scenarios to Watch
- Projects in the News
- Macro Dashboard for Oil Exporters/Importers
- Outlook for the year

4 QUARTERLIES

- MENA Map as per Political Grouping
- Map of New Licensing Rounds
- Political & Regional Security Issues
- Oil & Gas Prices Outlook
- Global Barriers to Oil & Gas Production
- Deep Dive into OPEC & NOPEC
- MENA Energy Investments
- MENA Energy Fiscal System
- MENA Energy Upstream Bidding map
- MENA Economic Outlook
- Probability Scorecard for Bearish & Bullish Oil Supply/Demand
- Investor Implication Scenarios (Under 3 Oil Price Dynamics)

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Arabia Monitor
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OPEC WATCH

AVERAGE CRUDE PRODUCTION FOR FEBRUARY 2018

32.19 Mbpd

- 77.0 kbpd

From January 2018

Non-OPEC Oil Supply

59.53 Mbpd

+ 0.45 Mbpd

from Jan. '18

Non-OPEC Crude Output

United States

Norway

Brunei

LATEST ORGANISATIONAL CHANGES

- UAE Minister of Energy Suhail Al Mazrouei has been elected as president of the OPEC Conference for one year, with effect from January 1 2018.
- Major General Manuel Quevedo, the Minister of Petroleum and Energy of Venezuela, has been elected as alternate president for the same period.

OPEC & Non-OPEC COMPLIANCE

- Non-OPEC compliance for February averaged 127%, led by Mexico, whose compliance averaged 212%, and Russia, whose compliance touched 92%. Among the FSU countries, Kazakhstan is expected to lead output growth in 2018 ahead of Russia.
- OPEC compliance reached a new high of 149% in February, marginally up from 145% from January, due to higher compliance from the UAE and large cuts in production from Venezuela due to its political crisis.
- UAE is currently leading in OPEC compliance (second to Venezuela) with 134% compliance for February. Iran had a compliance of 114% for the same period and averaged at 105% for 2017 even as it expands its export capacity.
- Oman's compliance for February was 107%, up from January's 79%, as it tries to balance its 1 Mbpd production target while maintaining its promised 45 kbpd cutback.

PRODUCTION LIMITS

- While exempt from the original OPEC deal, Nigeria and Libya received production quotas to cap output from their 2017 high of 2.8 Mbpd combined: Libya at 1 Mbpd, and Nigeria at 1.8 Mbpd.
- Both Nigeria and Libya's outputs rose in February by 35 kbpd combined. Nigeria's production crossed its cap of 1.8 Mbpd (~1.806 Mbpd), and Libya's production reached almost 1 Mbpd, at 0.99 Mbpd.
- Iraq's production fell by 25.5 kbpd in February reaching 4.42 Mbpd as Weatherford halted its operations in Majnoon (the field's production fell by 12 kbpd, but resumed production by the end of February).
- Saudi Arabia had a rise of 5.6 kbpd, keeping production barely under 10 Mbpd; Angola gained by 17.1 kbpd, pushing its production to 1.61 Mbpd.
- Algeria's production increased by 4.8 kbpd, raising questions over its compliance that has consistently averaged over 138% for the last 5 months.

NEXT OPEC MEETING: 22.06.2018

174th (Ordinary) OPEC Meeting in Vienna, Austria

Joint Ministerial Monitoring Committee: 14.04.2018

KEY MENA ENERGY SCORECARD

MARCH 2018

QATAR CRISIS

Qatar's economy performed better in 2017 than in 2016 despite the ongoing crisis as foreign deposits rose in Qatari banks for the first time since June 2017 by $606M; Rex Tillerson's departure from the US State Department may delay any American intervention to broker a resolution between Qatar, Saudi and the UAE; Oman and Qatar have reaffirmed their 'strategic ties' and have signed a MoU for bilateral trade; Qatar is set to continue supplying the UAE with 1.8 Bcfd of natural gas through the Dolphin gas pipeline and renewed the contract for the Al-Bunduq oilfield it shares with Abu Dhabi with Japanese investors on the 13th; Qatar's LNG exports remained steady at 77 million tonnes end-2017, despite the embargo, and expansion plans are in progress.

MENA ENERGY PRICE REFORM

UAE considering gradually scrapping subsidies on electricity and gas sold to power generators to reflect 'real' prices by 2030; Kuwait Parliament's Financial and Economic Committee has approved the proposal of MP Waleed Al-Tabtabaie to cancel the decision to increase fuel prices (enforced in September 2016); Egypt's fuel subsidy costs jumped 34% in H1 2017-2018 fiscal year to $2.9 B after the government announced last June that it would be allocating $8 B to fuel subsidies for the 2017-2018 fiscal year; Saudi Arabia has introduced the Citizen's Account Program, a cash handout scheme for low- and middle-income Saudi citizens impacted by rising fuel prices, electricity tariffs, and the introduction of VAT.

FEDERAL IRAQ DEVELOPMENTS

CNPC has awarded Petrofac a $30M project management consultancy to oversee development of Halfaya's expansion to 400 kbpd by end-2018; BOC is in the process of finalising service contracts with US KBR ($128 M) and China's Anton Oil ($120 M) to ramp up Majnoon production from 235 kbpd to 400 kbpd and cut production cost by 30% per bbl; China's Zhenhua Oil Company is awaiting the cabinet's approval of its contract with the Midland Oil Company to develop the 8 billion bbl East Baghdad field; the Ministry of Oil is considering a new tender for the Common Seawater Supply Project (CSSP) after talks with ExxonMobil broke down due to higher production rates at Nahr bin Umar and Ratawi.

MENA NUCLEAR POWER

Saudi Arabia assessing two potential sites – Umm Huwayd and Khor Duweihin – for its first nuclear power plant project near UAE and Qatari borders: tendering to start by end-2018 - delays likely due to technical plans, and commercially due to negotiating nuclear agreement with the US; Egypt and Rosatom signed contract to develop $21B Dabba nuclear plant, raising rhetoric in Israel that Sisi is resorting to former President Gamal Nasser's Pan-Arab policy to overtake Israel's nuclear superiority; UAE finished building Unit-1 (out of 4) of the Barakah Nuclear Reactor with help from Korea Electric Power Corp. and plans to begin loading fuel in May 2018.

KEY MENA ENERGY SCORECARD

MARCH 2018

ENERGY INFRASTRUCTURE SECURITY

On February 7, Iraqi Security Forces and the KRG's Peshmerga launched military operations against remnants of ISIS in eastern parts of Kirkuk to secure Iraq-Iran oil transit route and oil fields of Hamrin, Ajeel, and Alas; Israel's IDF has warned Hezbollah that it risks starting another Lebanon War if it fires rockets at its offshore natural gas platforms in Mediterranean which Lebanon claims fall within its own economic zone; on February 24, Libya's National Oil Corporation (NOC) declared force majeure and shut down production at its 70 kbpd El Feel oil field, following withdrawal of field guards due to wage disputes.

KUWAIT DEVELOPMENTS

Kuwait will invest $22.4 B each year for the next five years to increase the country's output from 3.2 Mbpd to 4 Mbpd by 2020; Jurassic gas planned to reach 500 Mcf/d by mid-2018 and 1 Bcf/d by 2020; KOC has announced launch of operations at Al-Sabriya and the West Al Raudhatain early production facility (EPF) to produce Jurassic oil and gas to help meet domestic demand and limit imports; Kuwait is also expanding refinery capacity with a 615 kbpd facility under construction at al-Zour, with two new refinery ventures underway in Vietnam (which was said to have begun operations end-February) and Duqm (to be launched mid-2018); Kuwait has also begun importing 100 MMcf/d of gas from Iraq.

No Change ⇔ Very Positive
Deterioration in the last month ⇩ Positive
Improvement in the last month ⇧ Negative
Very Negative

IRAN DEVELOPMENTS

NIOC signed an IPC with Dana Energy and Zarubezhneft for the Aban and West Paydar fields, an IPC with Pasargad for the Sepehr and Jufair fields, and an IPC with Pertamina for the Mansouri will be signed May; on January 12 Trump waived nuclear sanctions but issued ultimatum demanding changes to JCPOA; Italy's Carlo Maresca signed a $100 M contract with the Iran's Industrial Development and Renovation Organization (IDRO) to construct a 100 MW solar power plant and recently launched Phase-1 of a 10 MW solar power plant in Hormuzgan – Iran's government targeting installation of >5GW renewable capacity by 2022; ONGC Videsh has backed out of Iran after receiving exploratory rights in Israel's Block 32 and stake in ADMA's Lower-Zakum field amid Indian fears of being side-lined by Iran in deference to Russian companies; Schlumberger is only American company in 29 companies that have qualified for bidding in NIOC's oil and gas tender.

ABU DHABI DEVELOPMENTS

ADNOC awarded Total a 20% interest in the Umm Shaif and Nasr concession and a 5% interest in the Lower Zakum concession on a 40-year term; ADNOC also awarded Spanish oil firm Cepsa a 20% stake at the SARB and Umm Lulu fields to double production to reach 215 kbpd; Japan's INPEX signed an agreement with ADNOC for a 10% interest in the Lower Zakum concession; Al Reyadah to expand CO_2 capture beyond the Emirates Global Aluminium facilities to the Taweelah power facilities from 2030.

KEY MENA ENERGY SCORECARD

FEBRUARY 2018

MENA RENEWABLE ENERGY

ACWA Power won Saudi Arabia's Sakaka IPP PV solar project in line with the kingdom's aim of producing 9.5 GW of renewable energy by 2023; IFC (World Bank Group) has provided $653M for the development of Egypt's 752 MW Nubian Suns solar project; Oman has received 28 bids for its 500 MW Ibri solar PV plant including Lightsource BP, ACWA Power, NTPC, and Marubeni Corporation; Lightsource BP is also bidding for an EPC for the 100 MW solar project of Petroleum Development Oman; Morocco closed bidding RFPs for MASEN's Noor Midelt Solar Hybrid Complex; Vestas, Siemens, Enercon and Ray Power prequalified for 250MW Gulf of Suez Wind Farm; Morocco also expects the Noor III Solar Tower to deliver power to Morocco's electricity grid by October 2018; Bahrain has launched the tender for a 100 MW solar PV plant to be built on a remediated landfill site based on an IPP Model assessed by Italy's CESI.

EAST MEDITERRANEAN GAS COMMERCIALISATION

ENI and Total are considering exploring beyond on Block 6 and 11 offshore Cyprus for new discoveries raising tensions between Cyprus and Turkey; ExxonMobil planning at least two wells in H2 2018 on Block 10 offshore southwest Cyprus with Qatar Petroleum; Egypt's EGAS will hold an international bid round for gas exploration in 11 concession areas by mid-2018, including 8 sea areas and 3 land areas; Turkey recently commissioned its second FSRU and the world's largest, having an LNG storage capacity of 1.65 Mbbl as it tries to reduce its dependency on pipeline gas and minimise investment costs for transmission and distribution lines; Egypt signed the $15 B gas-import deal announced on February 19 to import up to 32 BCM of Israeli gas over 10 years as a part of its ambition to become Europe's leading natural gas hub; Tarek el-Molla has announced that the Zohr concession will produce up to 700 Mcf/d of gas by May 2018, up from the current 350 Mcf/d, and will reach 2.9 Bcf/d by mid-2019.

ABOUT US

Qamar Energy provides leading-edge strategy, commercial and economic consulting across the energy spectrum to governments, international oil companies (IOCs), national oil companies (NOCs), investors, and oil traders.

ROBIN MILLS • CEO

Robin is an expert on Middle East energy strategy and economics, described by Foreign Policy as "one of the energy world's great minds". He is the author of two books, *The Myth of the Oil Crisis* and *Capturing Carbon*, columnist on energy and environmental issues for Bloomberg and The National, and comments widely on energy issues in the media, including the Financial Times, Foreign Policy, Atlantic, CNN, BBC, Sky News and others. He is a Senior Fellow with the Iraq Energy Institute. He holds a first-class degree in Geology from the University of Cambridge, and speaks five languages including Farsi and Arabic.

RECENT APPEARANCES & TALKS

Iraq Energy Forum 2018, Baghdad • *Presentation on* ***Iraq's Solar Energy Potential***

Platts 5th Annual Middle East Crude Oil Summit, Dubai • *Presentation on* **Special Session: Iraq – Production, Compliance, & Political Status**

Petroleum Economist Energy Strategy Forum, Kuwait • *Presentation on* ***Long-Term Investment Scenarios for Energy Majors in MENA***

QAMAR NEWSLETTER ARCHIVES

May 2017 • June 2017 • July 2017 • August 2017 • October 2017 December 2017 • January 2018 • February 2018

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