

Energy Outlook

FIRST QUARTER 2016



Down, But Not Out...?

***Panic Over Oil Glut Appears to Ease as
Concerns Emerge Over Future Oil Supplies***



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A new dawn, or a trick of light?

BY SEAN EVERS

Managing Partner, Gulf Intelligence

The tales of economic woes that have bled endlessly from the oil glut and monopolized global headlines for twenty months have found a new narrative. Oil prices have climbed over 40% since dipping to a 12-year low in January, with energy companies' graying accountants eagerly watching Brent inch up to the \$40/bl ballpark in March. Nearly two years of bearish noise has blasted at weary energy stakeholders; charts seemingly drawn in crayon by hyperactive children illustrate how the oversupply hurled prices off a cliff at the start of 2016.

Now, the loudest voices are ones of tentative optimism. A potentially fortuitous and unusual blend of geopolitics and economics means the tide of excess supply could start receding. Has a new bottom been reached? Possibly.

A tentative deal between OPEC linchpin Saudi Arabia, Qatar, Russia and Venezuela to 'freeze' production at January levels in a bid to push oil prices up to \$50-\$60/bl as soon as possible initially suggested an empty alliance – little more than political peacocking for the world's press. Yet, the unlikely cooperation is beginning to grow rather sharp teeth. In late-February, the four countries' 'secret' gathering in Doha – ink detailing the meeting drenched newspapers – led to another ten or so producers' support, with the whole group accounting for 73% of global oil output.

The angst that followed a sanctions-free Iran's initial rebuffal of fellow oil producers' request to trim its production diminished when Tehran said it would consider reducing any output above its 4mn b/d production target. Adding to the bullish flutter is the market's acceptance that Iran's Oil Minister Bijan Namdar Zanganeh's pledge to bring 1mn b/d of oil supply to market this year was overzealous



– half a million barrels is more realistic. Equally, Iran has the capacity to surprise; under the shroud of sanctions, Tehran slashed its inflation rate from 45% in mid-2013 to less than 10% in 2015...

The cracks in the US shale behemoth's outlook are deepening and, as per OPEC's plan, curbing some of the oversupply. The number of US' oil rigs fell by 57% from 922 during the same week in 2015 – a low last seen in 2009 – according to Baker Hughes in early March. But, ignore the influence of shale producers at your peril as they are a permanent fixture in the global energy fabric. Around 4mn b/d of fresh supply is lingering in US producers' taps, as 5,000 drilled and unfracked wells can be kick started once oil climbs above \$55/bl. Oil producers' surprise cooperation could trigger another dark chapter, as stronger oil prices in late-2016 would unleash the beast lurking under US soil.

Such forecasts are just educated assumptions as geopolitics has a habit of muddying sensible theory. But it is looking more likely that energy players are stepping into a new dawn after a very long and fiscally-agonizing chapter... ■



Tricky timing for the US' renewed crude exports

BY DAVE ERNSBERGER

Global Head of Oil Content, Platts

Timing is the biggest question mark surrounding the US' decision to lift four-decades of restrictions on crude exports on December 18, 2015 as energy economics and geopolitics struggle to emerge from the oil glut that depressed prices to a 12-year low in January. Washington lawmakers' surprise move enables domestic producers to lock in supply contracts with foreign clients without restrictions for the first time since the Arab oil embargoes in the 1970s.

A legal green light that allows the US to ramp up its crude exports will have global ramifications. The US, which produces 9.22 million barrels a day (b/d) of oil, will likely jostle with Saudi Arabia and Iran, the vying energy hegemony in the Middle East, for European and Asian market share over the coming five years. Iran's appetite to regain market share has intensified following the lifting of sanctions on January 17 and Saudi Arabia is safeguarding its markets to protect the Kingdom's strained budget against low oil prices and the rising expense of the war in Yemen.

OPEC's strategy, spearheaded by linchpin Saudi Arabia, to push the US' shale oil companies and other high-cost producers out of the market is working after twenty months of fiscal pain and sweeping job cuts. US production is likely to slide to 8.3m b/d by late-2016 as producers crumble under burgeoning debt piles – oil prices below \$40/bl are proving too painful.

The Achilles' heel of OPEC, a cartel characterized by internal bickering, is underestimating the power of shale oil on global oil dynamics and the US has often demonstrated the ability to surprise. The country's oil output has climbed nearly 50% from 2011 and around 4m b/d of additional output from 5,000 drilled wells is waiting in the wings for when and if oil prices rise above \$50/bl.

Speculation that the US is eyeing European market share rang true when the country's first crude export arrived at the French port of Marseille on January 20, just three weeks after the ban was lifted. Fresh competition from the US may calm Russia's tempestuous relationship with its European clients, with the latter frequently threatening and failing to diversify its supplier base.

Meanwhile, African exporters have begun turning away from US shores – Nigeria, Algeria and Angola, primarily – to focus on the regional demand that is being fuelled by Africa's booming middle class population and industrial growth. Still, West African exporters will continue to supply the US' east coast to a degree as with current shipping rates, it is cheaper than transporting domestic crude across the continental US.

While there were restrictions on crude exports, US refiners were free to supply millions of barrels per day of refined products such as diesel, gasoline, LPG and lightly treated condensates to customers abroad for



several years, plus 500,000 b/d of crude oil that is mostly destined for Canada. Combined, the US already exports more than most non-OPEC nations.

But this does not mean that the country's relatively embryonic export market has the leverage to eat into Iran, Saudi Arabia or Russia's market share for a long while, even though Switzerland, Spain, Italy, France and Turkey have expressed interest. Still, feeding Italy's demand could provide a small boost to the US' entry into Europe, as the Libyan barrels that typically supply Italy have been derailed by civil war.

The US' unpredictable mix of blends may also scare off Asian customers for now, as many prefer knowing the specifics of the import blend. A company could make, or equally lose, millions depending on the batch that is delivered. The more exploratory South Korean refiners may import test batches, while China and the bulk of the region wait to see how European importers fare. Iran will try to snatch up some of China's import appetite, leveraging the rejuvenation of the historic Sino-Iran trade link and the countries' newly signed 10-year deal that increases trade to \$600 billion (bn).

“ Fresh competition from the US may calm Russia's tempestuous relationship with its European clients.”

The US' export ambitions mark a transformational chapter for the West Texas Intermediate (WTI) benchmark, which has largely been driven into the wilderness over the last decade as it only served US oil refiners with access to US crude. Now, the spread between the WTI and Brent oil price – the benchmark outside of the US – is set to narrow, eroding the discounts that US refiners have long enjoyed.

It must be noted that the lifting of export restrictions can be reversed in three years and export licensing requirements can be introduced for up to a year under certain conditions, such as national emergencies, sanctions, supply shortages, or an elongated period of high domestic oil prices. Setting such political uncertainty aside, US exporters look set to slowly carve out market share over the coming years and become an invaluable spoke in the country's economic wheel. ■



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Iran: Promise of riches, or a false awakening?

January 17 could mark a pivotal moment in Iran's economic history; the day Tehran shrugged off the shackles of Western-imposed sanctions and stepped back onto the global energy stage as a serious competitor. Or it may not.

BY GULF INTELLIGENCE

A group of world powers comprising of the five permanent UN Security Council members Britain, France, Russia, China and the US plus Germany (P5+1) lifted sanctions on Iran in January following a comprehensive deal that was negotiated at a typically bureaucratic pace.

Iran's new economic freedom could reverse the fortunes of its struggling economy and open the biggest bonanza for international energy companies since the ouster of Iraqi President Saddam Hussein in 2003, especially as the Islamic republic is arguably a safer political and economic bet than Iraq.

International energy firms' appetite has already been well illustrated by foreign delegations flocking to Tehran; a city crossed off many companies' travel list during the sanctions era. While all are treading gingerly, there can be little doubt that interest amongst international firms in developing Iran's hydrocarbon resources is enormous.

TRICKY TERRITORY

Iran is re-emerging into a volatile market – oil prices have collapsed by around 75% since June 2014 and dipped below \$30 a barrel (bl) in January, marking a 12-year low. Energy companies' accountants have curbed millions of dollars worth of oil and gas expenditure and tens of thousands of job cuts have dramatically shortened payrolls over the last six months. Total, Shell, BP and Lukoil are a small selection of some of the world's major energy companies eyeing new investment opportunities in Iran; the country is home to the world's second largest natural gas reserves and the fourth largest oil reserves. Change is on the way for Iran's domestic sector, which is dominated by state-run NIOC and its multiple subsidiaries, among the most important of which are National Iranian Drilling Company (NIDC), Iranian Offshore Oil Company (IOOC) and Pars Oil & Gas Company (POGC).

A tentative agreement was made between

OPEC linchpin Saudi Arabia, Russia, Qatar and Venezuela in Doha on February 16 to 'freeze' production at January levels in a bid to address the global oil glut and boost the price to \$50-\$60/bl. The deal – noteworthy for the rare cooperation between OPEC and non-OPEC producers – gained unexpected traction, with Ecuador and other South American producers holding similar meetings shortly after. Iran's Oil Minister Bijan Namdar Zanganeh said that Iran will consider joining the negotiations once it recovers from sanctions and hits 4 million barrels a day (b/d) of oil production – roughly a 35% increase on today's 2.93m b/d.

LOFTY AMBITIONS?

Zanganeh maintains that the country can bring 1mn b/d of new oil supply per day to the market now that sanctions have been lifted – a confidence that triggered a 6.7% drop in WTI Brent prices on January 20. But it seems unlikely that Iran's energy infrastructure and current pot of cash is able to support the minister's plans – just yet.

Political eyes are focused on how the Sino-Iran ties – two major powers along the New Silk Road – will evolve. Following the first visit to Iran by a Chinese leader in fourteen years, the two countries agreed in January to expand trade to \$600bn over the next decade – the historic Sino-Iran relationship is back on. A small collection of Chinese oil companies in particular were unwilling to pull out from Iran during the sanctions to retain a prime position for when the country's energy economy was revived.

Japan's Prime Minister plans to step on Iranian soil for the first time this year in nearly four decades, while Tehran and Indonesia are negotiating a short-term 120,000 b/d supply deal of Iranian crude, alongside a memorandum of understanding (MOU) to expand cooperation in the oil, gas and petrochemical sectors. Iran is also pursuing gas supply MOUs with Turkey, Oman and Europe, amongst others. While MOUs are often tools of political posturing, any public ties to Tehran

“ It is likely that Pakistan will be the immediate beneficiary of Iran's gas long before India.”

are noteworthy following the country's exile from the global economic scene.

Within Central Asia, a sanctions-free Iran means that the 2,700km Iran-Pakistan-India gas pipeline – first touted in 2002 – could finally gain traction. Indian and Pakistani energy officials say the obvious economic and societal benefits of the gas pipeline through their lands could override their fractious relationship. However, given Pakistan's proximity to Iran, it is likely that Pakistan will be the immediate beneficiary of Iran's gas long before India. Such energy infrastructure



A 115 year history and counting...

Iran's oil and gas industry is the oldest in the Middle East, stretching back to exploration in 1901 by a wealthy English adventurer and petroleum entrepreneur William Knox D'Arcy. D'Arcy won an oil concession from the Iranian government and subsequently struck oil at the Masjid-e Soleiman field in the country's southwest in 1908.

A year after first production at Masjid-e Soleiman started, Anglo-Persian Oil Company (APOC)—which has since become BP—was formed and tasked with extracting and marketing the oil produced in the southwestern region. The field would remain Iran's main crude source for some time, producing some 100,000 b/d by 1930. It is still pumping today - such resilience bodes well for Tehran's bold plans going forward.

plans are complex and demand significant investments – all of which will take time.

Political and economic clarity surrounding Iran's gas MOUs and pipeline projects is likely in 2016 and the country will not be a contender for Qatar's crown as the world's largest LNG exporter for a long while yet. Looking westwards, 1mn b/d of crude landed in Europe on the Monte Toledo oil tanker on March 6 – the first delivery of Iranian crude since mid-2012.

Closer to home, the escalating discord between the Middle East's vying hegemon, Saudi Arabia and Iran, will add another element of geopolitics into what is already a convoluted picture. The ongoing wars and security unrest in Syria, Libya, Iraq and Yemen have had a manageable impact on global oil supply. However, the significance of the long-running power struggle between Riyadh and Tehran gained momentum in January, following Saudi Arabia's execution of prominent Shia cleric Sheikh Nimr al-Nimr and the lifting of the P5+1 sanctions on Iran. Have accusations of proxy wars and economic angst set a potentially treacherous tone for 2016?

REVIVING STRAINED ECONOMICS

Iran's economy was hit hard by the United Nations (UN) and international bilateral sanctions imposed in 2006 and 2010. But it was the particularly stringent measures enacted by the US and the European Union (EU) in late 2011 and 2012 that had the most devastating impact on the local economy.

Fiscal challenges persist on the back of collapsing oil prices, multifarious geopolitics and non-performing bank assets. Economic performance has stalled in recent months with key sectors – notably manufacturing and construction – contracting and GDP growth expected to decelerate from 3% in 2014/2015 to around 0.5% in 2015/16, the International Monetary Fund (IMF) said.

Tehran may see GDP growth jump to 4-5.5% in 2016/17, as domestic energy production increases and the country's foreign assets flow back into the country. Still, to join other

“ Competitive edges will need fine tuning, as Iran's tenacious appetite to push to the front of the global jostle for Asian and European clients remains unabated.”

top emerging market economies – China and India, for example – Iran must continue to diversify its hydrocarbon economy and address unemployment amongst youth and women. Repeating the economic health check carried out in 2015 and strengthening communication linkages between government and suppliers and curbing public debt to banks would be good steps going forward.

The outlook is not as woeful as the figures suggest, as Iran has a wealth of cost-cutting acumen developed during the sanctions. Iran reduced its inflation rate from 45% in mid-2013 to less than 10% in 2015 – a move that helps reinvigorate investors' appetite and is in stark contrast to the overspending in other parts of the Middle East.

Iran will have to spend billions on upgrading and expanding its oil and gas sector if it is to meet domestic requirements on the one hand and to meet its goal of becoming a growing oil and LNG exporter on the other. Latest estimates put Iran's cash needs at \$185 billion (bn) through to 2020; \$85bn for upstream oil and gas, \$80bn for petrochemicals and \$10bn each for downstream oil and gas. Navigating around nery investors – especially those with US-links – could prove tricky.

Despite the challenges, global energy investors should not be fooled; Iran's reemergence will translate into a wake-up call for the Gulf, especially. Competitive edges will need fine tuning, as Iran's tenacious appetite to push to the front of the global jostle for Asian and European clients remains unabated. ■

In Numbers

77%

The approximate reduction in Iran's inflation rate between mid-2013 to late-2015

\$185bn

Cash that Iran requires for its oil, gas and petrochemical industries up to 2020

‘New Silk Road’ oil refining dominance

EMERGING

BY MANAN GOEL

Group Director, Gulf Petrochem

The might of oil refiners along the New Silk Road – stretching from Beijing to Lagos – is gaining influence, especially as European suppliers shrink back after more than a century of dominance. China is by far the refining behemoth along the New Silk Road, closely followed by a highly competitive India and an increasingly well-equipped Gulf. The vast majority of the 7.1 million barrels a day (b/d) of new distillation capacity expected in 2015-2020 will be coming from the Middle East, China and the wider Asia-Pacific, according to OPEC’s 2015 World Oil Outlook.

China’s refining capacity is expected to reach 14.4m b/d this year, rising by 1.3% on last year, thanks to ‘teapot’ refiners in China’s eastern

provinces. A wave of excess refined products – notably diesel, kerosene and gasoline – is piling pressure on Asian refining margins, especially since the second half of 2015. China is now allowed to export 1.8m b/d of diesel – double the 2015 figure. China’s influence on exports could deepen if domestic demand weakens and storage becomes limited, enabling Beijing to offer highly competitive pricing and rival exports from the Gulf and India, for example.

Meanwhile, India is competing to climb the chain of power along the New Silk Road and aims to become a refining superpower by 2025 – sharpening the country’s competitive edge on the global energy stage. India’s state-owned refiners are taking advantage of oil prices at

“ India is competing to climb the chain of power along the New Silk Road and aims to become a refining superpower by 2025.”

sub \$40 a barrel (bl) as they negotiate purchase deals with OPEC members for the first time. Talks are still underway between Gulf producers – notably Saudi Arabia, Kuwait and the UAE – with Bharat Petroleum, Hindustan Petroleum, Indian Oil and Mangalore Refinery and Petrochemicals, which collectively represent 60% of India's 4.6m b/d capacity.

Ramping up refining supply in the Gulf, which sits in the heart of the New Silk Road, is increasingly front and centre of countries' oil playbook and investment strategies. Traders at refining companies have fixed their attention on locking in Asian and European clients, while appetite for East African opportunities is also growing.

Gulf refiners are widening their meet-and-greet efforts in Europe as Russia – historically Europe's dominant supplier – tries to elbow its way into Asia. European sales are a growing portion of OPEC members Saudi Arabia and Iraq's portfolio – Poland and Sweden are on the hit list – as well as Kuwait, which already has the Q8 marketing and retail arm in Europe.

Kuwait's refining supply will be supported by state-owned oil firm KPC's downstream domestic subsidiary KNPC's new \$15 billion (bn) Al Zour refinery on the outskirts of Kuwait City. The 615,000 b/d facility is set to be one of the largest in the region when it starts up in late-2019 and will boost Kuwait's marketing efforts abroad. In Asia, KPC is deepening Kuwait's refining footprint in Vietnam, China and Indonesia through joint

ventures with the countries' state-owned energy firms. For example, KPC's downstream foreign arm KPI is heavily involved in the \$9bn Nghi Son complex refinery in north central Vietnam, with around 200,000 b/d a day of Kuwaiti crude exports expected to supply the project when it comes online in mid-2017.

On a wider note, the number of refining joint ventures and merger and acquisition (M&A) activities along the New Silk Road are expected to increase, as operators feeling pinched by low oil prices seek out financial buffers with new and better-endowed partners.

Oman is pushing ahead with a 230,000 b/d refinery at Duqm along its central-eastern Arabian Sea coastline. The \$6bn refinery is not particularly large when compared to others in the region – the UAE's 922,000 b/d Ruwais refinery, or Kuwait's 615,000 b/d Al Zour refinery, for example – but it could evolve into geostrategic gold when completed in the third quarter of 2020.

Another major player, Iran, could join the more established refiners along the New Silk Road after sanctions were lifted on January 17. Tehran has revealed plans to buy, or invest in foreign refineries in Europe, Asia and Latin America, as well as ramp up its domestic production. The country's refining infrastructure was well maintained during the sanctions, but Tehran needs a hefty cash injection to reach its downstream oil ambitions – more than \$10bn between 2016-2020.

Investors based in the Middle East are increasingly eyeing the significant refining opportunities along Africa's east coast, with Dar es Salaam and Nairobi heralded as emerging hot spots. Africa's annual appetite for gasoil and gasoline is expected to climb by as much as 8%, while demand for liquefied petroleum gas (LPG) has hit double digits. Refining activity will increase as East Africa quickly reacts to satisfy the demand of its thriving middle class.

With a continent-crossing array of new clients, the collective influence of emerging refiners along the New Silk Road could herald the world's new refining juggernaut. ■

Big data eases economic downturn impact on GCC petchems

BY GHASSAN BARGHOUTH

VP Middle East – Strategic Customers and Segments, Global Solutions, Schneider Electric

Since the first petrochemical joint-venture in the Middle East in 1981, the industry has rapidly expanded with mega projects still underway, especially in Saudi Arabia, the UAE and Kuwait. The GCC petrochemicals industry manufactured 136.2 million tons (m/t) of products in 2014 – 13% of global output – and generated \$87.4 billion (bn) in revenue, according to the Gulf Petrochemicals and Chemicals Association.

With oil prices sinking since mid-2014 to a 12-year low in early 2016 at just below \$30 a barrel (bl), the GCC's national oil companies (NOC) are following a wise strategy and redirecting their budgets into the more profitable downstream sector.

Growing competition from a sanctions-free Iran and a tightening economic outlook are refocusing Gulf petrochemical producers' attention on big data analytics. Companies are exploring how to integrate big data into their

daily operations in a way that can cushion the inevitable budget pitfalls and establish improved benchmarks of performance...but is that enough?

Big data is a term for data sets – structured, non-structured, relational, non-relational – that are so large or complex that traditional data processing applications are inadequate. Such data is usually generated from sensors and machine-to-machine (M2M) technologies within a facility.

The number of M2M technologies in use in the oil and gas sector could rise from the 423,000 in late-2013 to 1.12 million (m) by 2018, according to Berg Insights. Each 'dialogue' between the machines feeds into the wider Internet of Things (IoT). The greatest value of this data gathering lies in the compounding impact; building an organized portal of useful data today places a company at the forefront of innovation in five, or ten

years. These systems have evolved and matured to operate alongside today's IT systems and standards.

Looking ahead, the refining and petrochemical industry can benefit from technologies that are able to gather data from field devices and instruments and then integrate the information into the electrical distribution system and automation. Processing automation and safety systems on a single platform can manage and standardize the visualization of the data within an organization. On top of this data management, software applications have been developed to provide real-time simulation and optimization. These can then be integrated to create the necessary workflows for crude planning, production scheduling, yield accounting, dispatch billing and regulatory filing, for example.

However, while it is necessary to maximize

the performance within the process of a facility itself, producers can reach a saturation point, or technical bottlenecks that make further improvement a challenge. It is imperative that producers move to the next level of productivity in their supply chain, using marketing and distribution to maximize their profitability.

For example, refineries and petrochemical producers can now access energy market data from prominent international energy exchanges, along with a wide variety of spot and futures prices, historical data, news and weather information. This enables the operators to hedge their risk and initiate immediate trades to optimize the cost of their feedstock, or blending requirements.

Big data can also make a difference at terminals, as operators can have access to timely and accurate insight of terminal inventory positions after any product movement. Operators are then able to integrate the information into the corporate network. An aggregated and standardized inventory process gives operators a more accurate picture of daily product positions. This empowers supply teams to make optimal decisions on the finished products, prevent run outs and increase profits. Looking ahead, technology advancements, web application developments and increased collaboration platforms will also help significantly boost productivity.

To see the economic benefits, the petrochemicals industry must tread carefully around the temptation to curb their investment into such technologies and their application. Lower oil prices threaten to stymie energy companies' innovation plans, according to 76% of survey respondents to Lloyds Register Energy's 2015 Oil and Gas Technology Radar research report titled 'Innovating in a New Environment'.

As global competition grows, the adoption and application of big data analytics, IOT and cloud services across the supply chain and distribution networks is vital for the survival and streamlining of the GCC's petrochemical market. Big data gives producers the tools to shrug off the growing number of downward economic pressures. ■

In Numbers

1.12m

The number of M2M technologies expected in the oil and gas industry by 2018 – up from 423,000 in late-2013

Water-Food-Energy Nexus: KEY LESSONS FOR THE UAE?

The level of awareness for improving the UAE's increasingly strained water-energy-food nexus has rapidly climbed the country's agenda over the last five years, with significant chunks of capital allocated to boosting energy efficiency and renewable projects. The UAE, just 44 years old, has made vast inroads into research and development (R&D) of innovative green technologies that could provide a blueprint for the wider Middle East. Gulf leaders' attendance at the Cop 21 global climate change talks in Paris last December marked an unprecedented appetite for change.

Business opportunities for collaboration with foreign entities are also gaining traction as the UAE demonstrates a willingness to learn from those that hold unique expertise, like the Netherlands. The impetus for economic diversification by shedding a long-held reliance on hydrocarbon revenues is well illustrated by the 12-year low in oil prices in January 2016.

But, the outlook for both the Gulf and world's water-food-energy nexus remains sobering and the UAE has little choice but to adopt a holistic strategy to find cost-efficient solutions – and quickly. Over the next two decades, the world will need up to 40% more water to meet rising demand and agricultural production will increase by 70% by 2050. Such increases drastically reshape the land and water resources that we know today.

Excess consumption is a serious issue in the UAE and beyond. The GCC is rated as

the world's most water-stressed region, with the least available water per capita. On a per capita basis, Saudi Arabia and the UAE consume 91% and 83% more water than the global average and about six times more water than the UK, according to research by Booz & Company.

Equally, it is worth remembering that Gulf countries have literally built their towns and cities from scratch in very recent history – this inevitably takes a heavy toll on natural energy resources and the environment. The UAE's food and water security are particularly concerning, as the country imports more than 90% of its food. Imports are set to double by 2030.

In response to the worrying outlook, the UAE aims to have 24% of its total energy mix be attributable to low-carbon sources by 2021 – up from 0.2% in 2014. The economic benefits for renewable energy are already clear. The UAE could save \$1.9 billion (bn) a year by 2030 if it hits its target to have just a 10% share of renewable energy in the total energy mix. Accounting for the health and environmental benefits, the additional net savings could reach \$1bn-\$3.7bn within the same period. Again, savings are particularly attractive as low oil prices remind regional governments of their economic Achilles' heel.

The UAE can offer a regional beacon of green insight, but it must equally learn from other countries that have fought and won the battles against water and resource management that it now faces.

The Netherlands, which lacks enough hinterland to accommodate its needs, has become an expert in water management since the 1953 North Sea Flood, in which 1,800 people died. Meanwhile, Singapore has achieved what the UAE are aspiring to; Singapore has closed the loop between resources and usage, recycling 100% of its water.

SHIFTING PERSPECTIVES

The UAE has imported a lifestyle that does not correspond to its natural resources. Residents own multiple cars per household, which are often petrol-guzzling 4X4s, and live in air-conditioned villas with gardens that require constant irrigation. Historically, homes were designed without gardens and indigenous trees supplied residents with fruits. Arabs used to live on less than 20 liters a day of water per capita – today, it is 500 liters. The UAE, like most countries, still suffers from a gap in awareness.

Reams of statistics about how to better the UAE’s water-food-energy nexus do little to shift mindsets, especially as people often rely on technology to resolve issues arising from limited natural resources. But technology will be useless when the natural resources inevitably run dry.

The UAE, which anticipates a 30% growth in water demand by 2030, requires ten times more energy for seawater desalination than fresh surface water production. Related costs could soar by 300%, according to Masdar Institute, Abu Dhabi’s renewable energy company with a strong focus on research. Accordingly, Masdar is carrying out a two-stage desalination programme, with the first stage from 2013-2016 including four pilot desalination plants in Ghantoot in Abu Dhabi to gauge performance. The second stage runs from 2016 with a focus on implementation, targeting a commercial scale desalination facility by 2020.

Plus, steps have been taken in the UAE to boost residents’ energy awareness, notably the first round of petrol and diesel subsidy



cuts in August 2015 – saving up to Dhs9.1bn (\$2.5bn) a year. The cuts marked a significant social shift in a region where subsidized energy is ingrained in the population’s psyche as a national right. Plus, Abu Dhabi’s Water and Electricity Company (ADWEC), which forecasts water supplies and demand, introduced a tariff in 2015. The UAE is the first country in the region to build a complete water budget.

CIRCULAR ENERGY ECONOMY

A circular energy economy, which focuses on the reuse of resources and materials, is emerging – a shift that is good for the economy and the environment. The amount of water that is within the UAE’s food – 90%

“The exhaustive list of steps that the UAE must take to improve its water-food-energy nexus must not dilute how much the country has achieved in less than half a century.”

of which is imported – is not incorporated into the country’s wider data set about water supply and wastage, for example.

Greater efforts to develop a circular energy economy would see the entities and data sets for these two parts of the UAE’s essential resource portfolio merging to complement each other. A better understanding today leads to a smarter strategy tomorrow.

Often, the bridge connecting business and government disconnect and there is a communication gap – efforts to tackle the water-food-energy nexus are not immune. Who should take the first step? Businesses tend to wait for governments to take action and provide regulatory guidelines on the emerging renewables sector, while governments expect businesses to take the initiative and suggest green capital strategies. A stalemate ensues and costs soar.

The appetite for a holistic green economy within the UAE is rising, which will support the national growth of renewables, energy efficiency and social change. But the government and businesses must be made accountable to ensure that the management strategy outlined on paper is realized – isolated efforts are costly and time-consuming.

Ideas that the government and private sector could immediately work on include expanding storage for power from renewable energy; solar and wind, predominately. There are unique applications for solar power in the UAE via clever planning and greater efforts to pin down demand forecasts. For example, solar power could supply daytime exhibition events – held daily in Abu Dhabi and Dubai –

as events are planned far in advance and the power demand can be estimated using data from the previous event.

The next ambitious step – one that may require years to evolve – is to carve out a GCC-wide circular energy economy, which collectively invests in renewable technologies, water and energy management and green policy. Such a goal would heavily rely on developing a region-wide manufacturing capability, which could in turn create innovative technologies for export.

BUILDING BLOCKS: TECHNOLOGY AND DATA

Abu Dhabi’s Masdar is a living lab, acting as a hub where technologies and ideas can be tested with the view of being implemented out in the field on a larger scale. The logjam in the UAE and the wider Middle East occurs when completed technologies do not receive the proper marketing and distribution support from governments and the private sector. It can take up to two years for a technology to hit the market, which is far too long considering the UAE’s 2021 target of having 24% of its total energy from low-carbon sources.

Smart data will also help the UAE both improve its energy efficiency and map out business opportunities that arise from streamlining its water-food-energy nexus. The UAE’s predominant view is that the wrong data is just as worthless as no data. Efficient use of big and simple data can be applied to water management, as clarifying the key components of day-to-day use help build a critical database of insight that can be referred back to for decades. How much rain does the UAE get and how much of this evaporates, or percolates? How much desalination does the UAE need and what percentage of desalinated water is going back into the system?

Abu Dhabi’s smart meter, which provides residents with real-time feedback on their water and electricity usage, has the potential to gather reams of data. What is being done with this data; is it being examined and analyzed in the right way and being used to inform future decisions?

In Numbers

90%

of UAE’s food is imported

10X

The UAE requires ten times more energy for seawater desalination than fresh surface water production

“The excitement that galvanized world leaders to flock to Paris for Cop 21 has settled and all eyes are on the most crucial stage – carving out actionable steps to boost energy security in 2016 and beyond.”

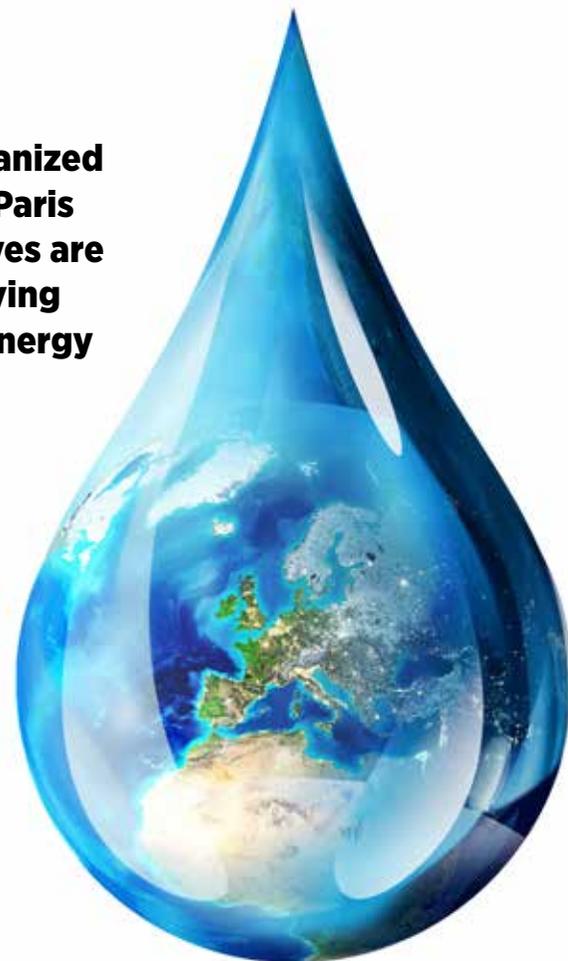
STEP-BY-STEP

The exhaustive list of steps that the UAE must take to improve its water-food-energy nexus must not dilute how much the country has achieved in less than half a century. The Mohammed bin Rashid Al Maktoum Solar Park will have 1 GW of operational capacity by 2019 and 3 GW by 2030, with plans to source 7% of Dubai's total power output from renewable energy sources by 2020 and 15% by 2030.

On a smaller level, the UAE is reusing water, such as polluted water coming from shrimp farms, to irrigate local algae. This in turn generates biofuel, which means water can be cleaned and energy produced simultaneously. Plus, algae can be fed with carbon dioxide. The process reflects a small and successful local example of an efficient water-food-energy nexus.

The outlook on managing agriculture in the UAE has also evolved now that the social component of having to stabilize a population within a certain area is not as prominent. The focus is now on the analytical component of improving the energy and economic efficiency of the sector. Which crop should the UAE produce versus imported foods, for example? It is a gradual process, but the integration of the economic, social and technological aspects are underway.

The excitement that galvanized world leaders to flock to Paris for Cop 21 has settled and all eyes are on the most crucial stage – carving out actionable steps to boost energy security in 2016 and beyond. The UAE will be front and centre of the Gulf's push for sustainability as public and private leaders' awareness of the stressed water-food-energy nexus evolves. ■



Gulf Intelligence Knowledge Session:

Background: The 2016 World Future Energy Summit (WFES) Gulf Intelligence Knowledge Session for the Embassy of the Netherlands took place on January 19 in Abu Dhabi. The one-hour session focused on pinning down key lessons for the UAE – both local and global – as it works to improve its strained water-food-energy nexus.

Panel Speakers:

Henk Ovink, Special Envoy on International Water Affairs, Kingdom of the Netherlands

Dr. Taha Ouarda, Head of the Institute Center for Water and Environment, Masdar Institute

Mohammad Al-Hajjiri, Head of Water Section, Planning and Studies Directorate, ADWEC

Gus Schellekens, Partner, EY Clean Energy and Sustainability Services



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Green energy needs smart economics

IFC Roundtable: Special guests Mouayed Makhoulouf, Director Middle East and North Africa, IFC and Daniel Calderon, CEO, Alcazar Energy

Climate-smart investment potential in renewable energy generation, power infrastructure and consumer, commercial and industrial processes in the Middle East and North Africa (MENA) is increasing exponentially - estimated at \$45 billion (bn) through to 2020. Since 2009, the IFC has raised more than \$450 million (m) in capital investment for renewable projects in solar, wind and hydro power in the region - all aimed at helping the transition to lower carbon economies.

The data surrounding the economic impact of climate change is sobering. Excessive warming has the potential to trim \$72 trillion from the world's GDP, according to a Citibank report, while Cambridge University's research suggests equity portfolios could fall by 45%.

The unprecedented appetite demonstrated by Gulf countries at the Cop 21 climate change conference in Paris last December heralded the start of a new and greener chapter for the Gulf - home to some of the world's biggest polluters. Independent water and power projects in the Gulf present \$14bn of investment potential alone, which could be aimed at improving the region's weak water-food-energy nexus.

For example, the UAE is aiming to have clean energy account for 24% of its total energy mix by 2021, while Oman is building one of the world's largest solar plants by 2017.

Tackling climate change is not cheap and the push for renewable energy technologies comes against an unusually challenging backdrop; low oil prices are squeezing budgets and triggering tens of thousands of redundancies across the world's energy companies.

Still, CEOs and other top officials from the private sector were more committed than ever to carving out cost-effective strategies to tackle climate change at Cop 21. Representatives from a diverse collection of industries flew to Paris, including leaders in mining, technology, aviation and manufacturing.

Regulatory and financial cooperation will be vital in buoying public and private companies' cash flows, as the price tag associated with managing and adapting to climate change inevitably rises. Developing countries could bear a \$100bn bill for climate-related investments per year over the next 40 years, while mitigation costs could swell to \$175bn per year by 2030.

The private sector has long grumbled about

“A clear rule book is a fundamental building block on which companies can base their budgets, as well as a confidence boost for the investors and lenders supporting their vision.”

the cost implications of tackling climate change. But, the price equation for renewable projects has evolved; the UAE recently had a 200MW solar PV auction that yielded the lowest cost of power generation via solar to date at less than six cents/kWh. Oman's solar power plans are also leveraging a 40% drop in solar plant prices since 2010. Still, the private sector urgently needs clear and government-led regulatory structures. A clear rule book is a fundamental building block on which companies can base their budgets, as well as a confidence boost for the investors and lenders supporting their vision.

The good news is that aside from entities like the IFC, which has long been involved in climate-related finance, a wider array of funding options for the private sector are on the rise. South Africa's Sasfin Bank is an example of a commercial bank in a developing country that has established a credit line to help small businesses become more energy efficient and sustainable. Plus, there is a global increase in the number of government-issued green bonds and micro-loans, as investments in hydro, solar, wind and even tidal power climb higher on investors' wish-list.

Alternative investment firms are gaining traction, as illustrated by London-based Bainbridge Partners' move to provide \$20m to Dubai-based independent developer and power producer Alcazar's Renewables Generation Trading Strategy - an energy futures trading strategy that monetizes opportunities created by the sustained expansion of renewable energy markets. The IFC has invested \$25m in Alcazar Energy for clean energy projects to support a series of renewable energy projects in the Middle East, Turkey and Africa, with solar and wind projects as the main focus.

The IFC has also signed a \$208m debt package to fund the construction of seven solar photovoltaic plants in Jordan - the largest ever private sector-led solar project in MENA.

The long-term benefits and cost savings of green buildings have also galvanized investors' appetite and a similar strategy could be applied to the construction sector in the Gulf. The IFC is spearheading a building-design tool called Excellence in Design for Greater Efficiencies (EDGE) across East Asia and the Pacific. The programme adds 2% to construction costs to boost energy efficiency, which then slashes monthly energy bills by at least 20%. Over the next seven years, EDGE could cut enough carbon emissions to equate to taking 3.5m cars off the roads and save \$2.4bn between 2014-2030 across East Asia and the Pacific.

MENA has illustrated a fundamental appetite to steer its economies and populations towards a greener future and the world's investors are eager to feed the region's next step - so, what's next? ■

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**THE 3RD ORYX GTL
STUDENT
AWARDS
for the Advancement
of Post-Graduate
Education in Qatar**



The 3rd ORYX GTL Student Awards will be presented at The Gulf Intelligence Qatar Industry Water Security Forum at Qatar University's Research Complex on April 25th.

The Awards will recognize post-graduate Qatari students' commitment and contribution to enhancing Qatar's energy sector and knowledge economy, as per the country's National Vision 2030.

Qatar's quest to become a global research and development (R&D) hub for the energy industry dates back to 2006 when the government announced that it would allocate 2.8% of its GDP every year to promote research, technology and innovation via the Qatar National Research Fund (QNRF).

"At ORYX GTL, we are passionate about education and we truly believe that investing in education today is essential to our country's future"

Abdulahadi Bakhit Barqan,
Chief Administration Officer, ORYX GTL

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- Dr. Hamid Parsaei, Dean, Academic Affairs & Professor of Mechanical Engineering, Texas A&M University at Qatar



Why Uniper?

We're well positioned to play a key role in ensuring supply security. We have:

- a broad geographic footprint with positions in Europe's main generation markets and in Russia
- comprehensive capabilities in the operation and management of individual generation assets and optimization of generation fleets
- profound technical knowledge gained in the development and use of energy technologies
- the market access of a proven trading and optimization platform at Europe's key trading points and on global markets along with a significant position in the midstream gas business
- a detailed picture of the interrelationships between market participants, technologies, and energy systems
- deep expertise in regulatory regimes and market designs

TWO ENERGY WORLDS

The energy landscape has shifted. Changing customer behavior, new technology, and increasingly global markets are creating two distinct energy worlds.

The classic energy world has the indispensable task of ensuring supply security. Alongside it is emerging the new world of distributed energy solutions. Uniper's portfolio will combine large-scale power generation and the effective management of global and regional energy supply chains. E.ON will focus on the new energy world with renewables, distribution networks, and customer solutions. Both worlds require distinctive business models and capabilities. Both worlds present challenges and opportunities. Both worlds are needed to meet the world's energy needs in the decades ahead.

A strong energy company

Uniper has the right assets, knowledge, and skills to succeed in the classic energy world. We have a deep understanding of global and regional energy markets, regulatory regimes, and market designs. We have a wide range of capabilities in the construction, management, and operation of large-scale energy assets as well as the optimization and risk management of assets and contracts. And we have long-standing relationships with industrial customers, municipal utilities, system operators, and our suppliers. These strengths and networks reinforce one another.

There are three main areas in which we deploy our strengths:

- We help ensure security of supply in Europe as it transitions to a low-carbon future

The growth of intermittent renewable generation increases the need for flexible power plants that can meet fluctuating demand at short notice; our generation portfolio is well suited to this task. In addition, our midstream gas business helps ensure supply security through a diverse portfolio of long-term gas contracts along with gas storage, transport, and regasification capacity.

- Our trading activities connect global commodity markets
- Global trading in commodities like natural gas and coal is bringing energy markets from America to Asia closer together. As markets become more interconnected and dynamic, they create more opportunities for

companies that can build bridges between regional markets, respond swiftly to changes in supply and demand, and use their knowledge of supply chains to better manage commodity risk. Uniper has a flexible portfolio of long-term gas import contracts, coal, and LNG. This portfolio not only enables us to meet our own fuel needs but also to provide our customers with bespoke products and services.

- We support the development of power markets outside Europe with our own generation activities and our services for third parties

Uniper has a significant platform of technologically advanced generation assets across Europe and in Russia. As the demand for dispatchable generation capacities is growing in a number of markets, we're well positioned to market our capabilities in building and

operating assets and in supplying fuel to third parties.

From gas fields and power stations to customers: Uniper helps keep energy reliable

We offer a broad range of energy products, services, and solutions. Our business portfolio encompasses most of the stages of the energy value chain. We have a stake in a gas production business in Russia and procure climate-friendly natural gas under long-term supply contracts and at trading venues. With LNG becoming a more prevalent source of gas, we're active in sourcing, transport, and regasification. In addition, our hydro, coal and gas power stations play an important role on the upstream end of the electricity value chain.

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