Testing the Waters

Linh Austin, the VP of Middle East and Caspian operations at McDermott, reveals that the offshore EPC contractor is planning to venture into the renewable energy domain.
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- Video: Quick chat with Rory O’Donnell of SNC-Lavalin

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EDITOR’S LETTER

Oil and gas being asked to revamp image

With calls for adopting environment-friendly practices growing louder by the day, the industry needs to rethink its role

I will admit that I do tend to take my eyes off reports that malign the oil and gas industry with regards to carbon emissions, and studies that highlight the damaging impact upstream operations have on the environment. As someone intimately linked to the oil and gas sector, I feel it has become sort of cool to negatively portray anything that has to do with fossil fuels.

After all, oil, gas or minerals emanate out of land or sea, and ultimately power the globe, so to disregard their importance is unfair. But there is no denying that certain conventional oil and gas techniques have languished, in the context of technical advancements (fracking comes to mind), causing significant environmental damage. I have to share with you one such report from BMI Research I’ve come across, which details that certain upstream operations in the current form are unsustainable, and will perish as the clamour for a low-carbon economy grows globally.

In the backdrop of a target to limit climate change to 2°C worldwide, BMI sees the oil and gas sector posing considerable risks to nature, but also observes that, given its high emissions intensity and dominant role in the global energy mix, the industry has a central part to play in the 2°C transition. In a sector where the core business is the exploration, production and sale of hydrocarbons, BMI sees three possible responses by an oil and gas company to contain climate change: adaption, disruption or managed decline.

‘Adaption’ involves the company decoupling its revenue growth from emissions growth, gradually shifting its asset base away from oil and gas to alternative energies. ‘Disruption’ involves the company deploying a technology which allows for the broadly carbon-neutral production and consumption of hydrocarbons. ‘Managed decline’ involves the company taking a more-or-less ‘business as usual’ approach. Investments are focussed towards minimising cost and maximising recovery, and the asset base will remain unchanged.

All three responses demand a significant shift in corporate strategy. The three are not entirely mutually exclusive and the appropriate response will vary by company, BMI maintains. It is encouraging to note, however, that the Gulf states and their NOCs have taken the lead in initiating clean energy practices and are dedicated to bringing about change to traditional ways and means.

Indrajit Sen
Deputy Editor, Oil & Gas Middle East
indrajit.sen@itp.com

Stranded assets a growing concern
Assets at risk under IEA 4 50 scenario, USDbn

- Coal-4
- Oil-130
- Gas-50
- Power-120

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Changing the game for Bahrain

In 2019, as Bahrain prepares for another long, hot summer, the kingdom will import natural gas for the first time, through a new terminal built to meet peak power demand.

The Kingdom of Bahrain is constructing a permanent liquefied natural gas (LNG) import terminal, which is due for commissioning in 2019. The 4.1 billion cubic metres per year (bcm/a) facility is a microcosm of the shifting trends in gas supply and demand dynamics, particularly in the Middle East, demonstrating the region's commitment to tackling energy security at a time when supplies are struggling to keep pace with growing demand.

Consisting of a floating storage unit (FSU), the new terminal offers the kingdom the flexibility to cater to seasonal demand, as well as the option to re-export to regional demand centres.

Bahrain LNG is to be developed on a public-private partnership (PPP) basis, which includes a combination of equity and debt through a consortium of regional and international banks. This represents a shift away from traditional government funding methods, and the decision to develop the project on a PPP basis will enable Bahrain LNG to utilise the expertise of the private sector and secure the financing needed to carry out the project.

The project is owned jointly by Bahrain’s oil and gas investment arm, Nogaholding, and a consortium consisting of Teekay LNG, Gulf Investment Corporation (GIC), and Samsung C&T. A syndicate of nine international and regional banks is participating in the $741mn loan, including the Arab Petroleum Investments Corporation (API-CORP), with Korea Trade Insurance Corporation (K-Sure) providing commercial and political risk cover for approximately 80% of the financing.
### SHAREHOLDERS

- **Nogaholding (30%)**
- **Samsung C&T (16%)**
- **Gulf Investment Corporation (24%)**
- **Teekay LNG Partners (30%)**

**GS Engineering and Construction**

EPC contractor

**Bahrain LNG WLL**

- Terminal use agreement
- O&M agreement and guarantor

- **Teekay LNG**

**FINANCING**

- **ECA Facility (k-Sure) (80%)**
- **Commercial Facility (20%)**

**Syndicate of Banks**

**Pathfinder Banks**

- **Ahli United Bank**
- **Société Générale**
- **Natixis**
- **ING Bank**
- **Banco Santander**
- **Credit Agricole Corporate and Investment Bank**

- **Arab Petroleum Investments Corporation**
- **Standard Chartered Bank**
- **Korea Development Bank**
Dow, DuPont complete merger to form global major

The newly created entity, formed on 1 September, is operating as a holding company under the name DowDuPont, with three divisions responsible for agriculture, materials science, and specialty products.

On 1 September, the completion of the merger of equals between The Dow Chemical Company (Dow) and EI du Pont de Nemours & Company (DuPont) was announced, effective from 31 August. The combined entity, DowDuPont, is operating as a holding company, with three divisions responsible for agriculture, materials science, and specialty products.

“The true value of this merger lies in the intended creation of three industry powerhouses that will define their markets and drive growth for the benefit of all stakeholders,” said Andrew Liveris, executive chairman, DowDuPont.

“With the merger now complete, our focus is on finalising the organisational structures that will be the foundations of these three intended strong companies, and capturing the synergies to unlock value,” he added.

The board of directors of DowDuPont comprises 16 members – eight directors formerly on the DuPont board and eight directors formerly on the Dow board. There are two lead directors: Jeffrey Fettig, who previously served as the lead independent director for Dow; and Alexander Cutler, who previously served as the lead independent director for DuPont. Liveris serves as the executive chairman of the board and Breen also serves on the board.

Three advisory committees have been established by the DowDuPont board, chartered to oversee the establishment of each of the agriculture, materials (Dow), and specialty products divisions, in preparation for the separations.

Shareholders are expected to benefit from the stronger, focused investment profile of each intended company, as well as from long-term growth and sustainable value creation following the intended separations into three independent companies.

Maximising value

The merger is expected to result in run-rate cost synergies of approximately US $3bn, with potential for approximately US $1bn in growth synergies. The company expects to reach 100% run rate on the cost synergies within 24 months.

Quote:

“The true value of this merger lies in the intended creation of three industry powerhouses that will define their markets and drive growth for the benefit of all stakeholders.”
PDO awards contracts to Omani firms to boost local supply chain

Deals worth $253.1mn highlight PDO’s commitment to ICV, and to retaining more of the wealth of the oil and gas sector within the Sultanate

IN-COUNTRY VALUE  Omani oil major Petroleum Development Oman (PDO) has signed two deals worth $253.1mn to ‘Omanise’ the provision of upstream equipment in its supply chain. The company has signed contracts for the local manufacture and supply of transformers and valves that will be used in its operations.

PDO said the deals were part of its In-Country Value (ICV) programme, which aims to develop domestic supply chains. The company has struck deals with Voltamp Transformers Oman for the supply of power transformers, and with Al Jizzi Transformers and Switchgears for the supply of wellhead transformers. The companies employ almost 100 Omanis in total. It also penned an agreement with Muscat-based Techno Fit Trading.

$253BN  The value of the two deals signed by PDO.

SHOULD ARAB GULF NOCS LOOK TO TRANSFORM INTO GLOBALLY COMPETITIVE INTERNATIONAL OIL COMPANIES LIKE THEIR EUROPEAN AND ASIAN COUNTERPARTS HAVE DONE PREVIOUSLY?

73% Yes
27% No

*Source: Gulf Intelligence

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AROUND THE GULF
Latest developments across the region

1. BAHRAIN
The Bahrain Petroleum Company (Bapco) is using GE’s mobile water technology to convert seawater into a usable, highly pure water source at the Awali refinery.

2. IRAQ
Russian oil major Rosneft will invest in natural gas pipelines in Iraq’s semi-autonomous Kurdistan, expanding its commitment to the region.

3. KUWAIT
Honeywell is set to host the inaugural Honeywell Technology Summit in Kuwait next month. The event will take place from 3 to 4 October.

4. OMAN
Oman remains the largest oil and natural gas producer in the Middle East that is not a member of OPEC, the US Energy Information Administration has revealed.

5. SAUDI ARABIA
Aramco Asia has pledged to expand its engagement in the downstream business in China to support reciprocal investments between China and Saudi.

6. UAE
The UAE Ministry of Energy raised fuel prices for September by AED 0.12 ($0.03). This is the sixth time the cost of fuel has been increased this year.

Boom in Iranian gas exports

Iran’s gas exports have risen by more than 50% in the last five months compared to the same period last year, Reuters has reported, citing the Iranian Oil Ministry’s news agency, Shana.

In the five months since late March, the start of the Iranian year, exports have exceeded five billion cubic metres (bcm), compared with 3.2bcm last year, said the dispatching manager for the National Iranian Gas Company, Mehdi Jamshidi Dana, according to Shana.

Since late March, Iran exported 34.8 thousand cubic metres (mcm) of gas per day, compared with 21.3mcm per day during the same period last year, Dana said.

Flaring gas at Iran’s South Pars field had also been curbed, according to Gholamreza Manouchehri, vice president for engineering at the National Iranian Oil Company, Shana also reported. The rate of gas flaring at South Pars had dropped from 15mcm per week to 3mcm, he said, without giving a precise time period for the reduction.
Pearl Consortium and KRG reach ‘amicable’ dispute settlement

The Kurdistan Regional Government is to pay $1bn in compensation to the consortium, which is led by Sharjah-based Dana Gas and Crescent Petroleum.

The Kurdistan Regional Government (KRG) has reached a full and final settlement with the UAE-based Dana Gas and its consortium partners, over a legal dispute that amounted to $2.24bn in value. The semi-autonomous Iraqi region will pay the Pearl Consortium $1bn.

Dana Gas, its parent Crescent Petroleum, and its partners, filed a case against the KRG in the London Court of International Arbitration in 2013, citing violations of their contract with the KRG and accusing the latter of underpaying for gas liquids production. The KRG has argued that the dispute emerged at the height of its fight against militants and as its budget suffered from a steep drop in revenues as a result of lower oil prices, which it said forced it to postpone and restructure payments to some counter-parties.

Kurdistan is to immediately pay $600mn to the Pearl Consortium, in which Dana and Crescent own 70% and their partners, Austria’s OMV, Hungary’s MOL, and Germany’s RWE, each own 10%.

Kurdistan will also immediately pay $400mn towards Pearl's further development to increase production in its fields. The balance of $1.24bn will be reclassified from debt to outstanding costs, to be recovered by Pearl from future revenues.

The Pearl Consortium said it had produced over 150mn barrels equivalent of gas and petroleum liquids in Kurdistan, but that non-payment from the region had complicated its finances.

Settlement Terms

On its part, the Pearl Consortium has agreed to steeply raise gas production within two years.

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ADNOC holds forum to motivate its future leaders

The first ADNOC Future Leaders Forum was held on 10 September in Abu Dhabi

ADNOC’s CEO said the firm was evolving its leadership style.

Leadership: The Abu Dhabi National Oil Company (ADNOC) held a forum last month that aimed to help prepare younger employees within the organisation to assume leadership roles in the future, as part of its Vision 2030 goals. Dr Sultan Ahmed Al Jaber, UAE Minister of State and ADNOC group CEO, met with more than 450 young, high-performing ADNOC employees at the first ADNOC Future Leaders Forum.

At the event, Al Jaber discussed ADNOC’s strategy for the future. “As we continue to evolve into a high-performing organisation, we must develop talent with the right leadership skills to take the organisation forward,” he told the audience.

The company’s future leaders, Al Jaber said, should be prepared to create a foundation of trust and empower people to respond to future challenges. He added that transparent and open dialogue was fundamental to creating the ideas that drive growth.

During the forum, Al Jaber provided an update on ADNOC’s transformation into a more commercially-minded and performance-driven company. ADNOC has designed bespoke leadership programmes that address the group’s business needs. In addition, development programmes that will provide greater on-the-job training and mobility opportunities for new talent have been developed.

PLAY/PAUSE: Who’s moving up in the oil and gas world this month, and who’s falling away?

Sharara, Libya’s biggest field, which was producing more than 280,000 barrels per day, was forced to close after an armed group shut a valve at Rayaya, near the western town of Zintan, last month.

Although overall Chinese imports of crude oil jumped more than 10%, Kuwait has stated its exports to the second-largest economy remained stable. Kuwait produced 2.7 million barrels of oil per day in July.

Global oil producers will be able to decide next month whether to extend their agreement on output cuts further beyond March 2018, or begin to phase it out. OPEC is due to meet in November to discuss the issue.

Bahrain’s oil minister said he expects expansion contracts for Bahrain Petroleum Company (Bapco) to be signed before the end of the year. Bapco will choose the winning bid in the near future.

IN QUOTES

“We are committed to developing our Emirati talent to ensure we remain ahead of the curve and continue to be recognised as a leader in shaping Emirati talent.”
Dr Sultan Ahmed Al Jaber, ADNOC group CEO

“It was always going to take quite a while for stocks to come down. But for the OPEC and non-OPEC producer agreement, from everything we see, there is broadly compliance in place and stock levels are coming down.”
BP chief executive Bob Dudley

“There is no relation between the Kurdish referendum and the production of Iraq. We are interested in guarding our interest as a country.”
Iraq’s oil minister Jabar Al Luaibi
**AVEVA and Schneider Electric to merge**

On completion, the merger of AVEVA and the Schneider Electric industrial software business is set to result in a combined portfolio of solutions that will cover all aspects of digital asset management.

Schneider Electric SE has announced that its board of directors and the AVEVA Group’s board have reached an agreement on the terms and conditions of a merger between AVEVA and Schneider Electric’s industrial software business.

The combined entity will offer an extensive technology portfolio, with combined revenues and adjusted earnings before interest, taxes, and amortisation (EBITA) of approximately $893.56mn and $198.14mn, respectively, for the financial year ended 31 March, 2017.

The company will offer a combined product portfolio of digital asset management solutions, covering process simulation, design, construction and manufacturing operations management, and optimisation.

On completion, Schneider Electric will own 60% of the enlarged AVEVA Group on a fully diluted basis, while existing AVEVA shareholders and participants in the AVEVA share plans will retain 40% equity ownership on a fully diluted basis.

Schneider Electric will pay $747.51mn in cash to AVEVA, which – taken together with its contribution of the Schneider Electric Software Business – will mean that Schneider Electric will hold a majority of the enlarged AVEVA share capital. AVEVA will also distribute $135.91mn to shareholders (excluding Schneider Electric) at or around completion, which is expected to be around the end of 2017.

---

**$748MN**

The amount that Schneider Electric is set to pay to AVEVA.
As we step into the last quarter of 2017, it is a good time to reflect on what has changed for global energy markets in the last few months. Which trends have come and passed, which are here to stay with us for the upcoming year, and what does the future hold?

Shale oil continued to get much attention, with many experts predicting that shale oil production would not be a viable solution in current oil market conditions – many thought this source of energy should be put aside for a rainy day. However, shale oil production costs decreased over the past year by around US $5 per barrel per year, with the production process in many fields profitable at around US $50 per barrel. This trend of cost reduction is expected to continue for certain fields, so we can expect shale oil to continue to be an important element in the crude oil markets going forward.

Even if the prime cost reduction rate was expected to decrease between 2018 and 2024, in 2024 shale oil production would still be economically efficient, at an oil price of US $35 to $40 per barrel. This price level is thought possible in the medium term, due to potential global oversupply in crude oil, a reduction in demand for crude, and a constant and relatively rapid expansion in the adoption of electric vehicles.

The latter might seem improbable, but we are already seeing the ownership costs of electric cars becoming closer to those of petrol cars. In addition, OPEC re-evaluated its forecast for a global electric car fleet by 2040 to five times more than originally anticipated, to 266 million vehicles.

An additional reason for the wider adoption of electric cars is the introduction of updated regulatory requirements for the performance of motors, with regards to emissions, which will come into effect in four major automobile consumer markets – Europe, China, the US, and Japan. In Europe, France, Germany, the UK, and now Spain have all declared their intention to ban the sale and use of internal combustion engine-based cars by 2030 to 2040.

If we now turn our attention to gas markets, they have also been facing stronger competition – and it will be more of the same heading towards 2020, when additional supplies of liquefied natural gas (LNG) from the US, Australia, and other countries reach the market.

This surplus is not expected to be consumed by Asian countries, since Japan – the largest LNG consumer – is expected to restart its nuclear power plants in the near future, consequently limiting LNG imports.

Price levels are also an issue. European and Asian prices are almost the same – Japan buys LNG for around US $5.25 per one million British thermal units (MMBtu), and Europe for US $4.87.

A similar situation can be seen in China – presently the country relies on imported LNG volumes, primarily from Australia, as well as pipeline gas supplies from Turkmenistan, and an increasing production of unconventional gas in China itself. The country possesses large reserves of shale gas, which are expected to cover around 25% of local demand for gas by 2030.

In Europe, the LNG situation is also evolving. Around 75% of European regasification capacities are being stopped for the time being, due to the lack of internal pipeline connections that would transport gas from the terminals to remote areas. The necessary investment funds have been assigned to build these infrastructure systems, however.

Euro Petroleum Consultants examines some of the major developments that have taken place in the global energy market so far this year, and assesses the impact these changes have had on the dynamics of the oil and gas industry.

Have your say:
Contact indrajit.sen@itp.com

About the authors:
Colin Chapman is president of Euro Petroleum Consultants. Ekaterina Kalinenko is a project manager at the firm’s Moscow office.
Electricity generation through solar and wind power will continue to grow, although not at a rapid enough pace to affect the import of gas from countries such as Russia. For this reason, Russia is looking at large gas monetisation projects at home, including methanol production and material take-off.

In the US, gas will be substituted in part by renewable energy sources, and excess gas will be directed to export routes. Thus, we observe a strike to both the demand and supply sides, which will have an important impact on the market trends.

Analysing some of the key growth factors and challenges associated with the changing oil and gas markets, we can state that key demand growth factors and scenarios could include the following:

- Stronger oil demand recovery
- The development of the transportation sector in Asia
- Lower costs associated with exploration and production

On the other hand, we anticipate that some of the challenges and risks that the industry might face could include:

- An increase of unconventional oil production in North America, and
- The development of the transportation sector in Asia
- Lower costs associated with exploration and production

In conclusion, these are clearly very interesting times for the energy sector. Planning for future investments in upstream and downstream must take into account the possible major changes in the transportation sector over the next 20 years in key regions such as the US, China, and Europe because, at the end of the day, if we need less gasoline and diesel due to electrification, then refiners will need to find viable outlets for naphtha and diesel.

Future plans for both the upstream and downstream sectors must take into account the changes that are taking place within the field of transportation.

Ekaterina Kalinenko.
The oil and gas sector is an industry with a continuous operational cycle. Any break in production, however brief, can mean an enterprise suffers huge losses. Any computer-related incident, be it an attack by an unscrupulous competitor, or an attempt at industrial fraud, can result in a loss of continuity. This is even more relevant in the GCC region, as the oil and gas industry enjoys a prominent position as the sector responsible for the region’s abundant natural resource, and as the custodian of a key national assets.

Only a few years ago, the main concerns keeping company management awake at night were the cost of oil or gas, and the political situation in a particular country or region. In other words, traditional macroeconomic indicators that were easy to understand and follow. At best, cyber incidents might make it into the lower half of the top 20 risks.

Today, the situation has changed drastically. Cyber threats now rank as the third biggest concern for top managers – behind business downtime and legislative changes affecting company operations.

Any cyber incident that occurs inside a company can interrupt production processes because, in this context, it’s a question of a cyber-physical system rather than a conventional computer attack. In other words, the computing resources are integrated into the technological processes and come into contact with physical assets.

For years, Kaspersky Lab has been providing users with antivirus solutions as a kind of ‘pill’ to treat their systems against diseases. However, in the case of cyber incidents within the secure perimeter of an industrial enterprise, what we are dealing with is more like traumatology – and fractures cannot be treated with pills.

This is a figurative comparison, but if an attacker from an anonymous computer can disrupt or even break the operation of a cracking unit or a pump on a trestle for unloading oil products, the consequences are comparable to those of a fracture to the human body. The physical integrity of the company is violated: a cyberattack can result in the very real breakdown of equipment or a production line.

The cost of daily downtime at an oil refinery, according to our estimates, can be upwards of US $1mn. An incident may require the urgent shutdown of technology systems that will then have to be rebooted and may not resume normal operations for a couple of days.

To understand how best to deal with cyber incidents, we need to identify the principal areas where they occur.

The first area concerns incidents caused by human error. In one case that Kaspersky Lab specialists encountered at an enterprise the company supports, an employee launched the wrong version of an engineering software by mistake. It could have resulted in changes to the data formats and other serious repercussions for specific controlers working with physical processes. With the help of Kaspersky Lab’s specialised solutions, the situation was caught in time, however, and potentially catastrophic damage was prevented.

The second area, which is especially relevant for the oil and gas sector, is industrial fraud. A group of
people – sometimes including company insiders – that are well-versed in technological processes, realise that they can make certain adjustments to technological information and use it for financial gain.

For example, it’s possible to change the density of a shipped product and end up with a substantial surplus that the fraudsters can then dispose of at their own discretion. It is almost impossible to track this sort of interference using business applications. At our most recent annual conference dedicated to industrial control systems (ICS) cyber security, there were two reports of how vulnerabilities in infrastructure were leveraged to steal light oil products.

But today a much more serious threat than human errors or fraud has emerged – targeted computer attacks performed without any physical interference. Intruders gain control over all the equipment, while the attacks are invisible to ordinary controllers. In one of our projects, we demonstrated how attackers could gain access to a vacuum gas oil unloading system within 14 hours, and how the intrusion would go unnoticed. Another example was an attack on Saudi Aramco in 2014, in which 2,000 computers responsible for the company’s operations were infected. As a result, the company couldn’t ship its products for two weeks.

Another recent disturbing trend in modern cyber crime, which also affects the ICS field, is that of ransomware programmes. One of the first cases of cyber extortion involving an industrial enterprise was registered last year at a company that supplies water in the US state of Michigan. The attackers got access to the company management system, blocked its operation, and demanded a huge ransom. According to public sources, the losses amounted to US $1.9mn, including the cost of recovering from the incident.

The logical question here is what can be done to protect against these threats? After all, it’s impossible to ensure the safety of industrial facilities using traditional corporate security solutions. We have thoroughly investigated all these cases and, based on the results, developed our own solution to prevent similar incidents. Kaspersky Lab’s work in this sphere consists of several aspects.

The first thing to do is to train employees. Engineers may know all the nuances of production automation, but often they know nothing about cyber security. Even many developers of controllers and their software are unfamiliar with the term ‘zero-day vulnerability’. In the last six months alone, Kaspersky Lab has detected more than 80 zero-day vulnerabilities in industrial equipment. Each of those vulnerabilities could lead to a situation where control of the equipment could be seized by ‘dark forces’ and the company management and the head of ICS would be none the wiser.

The next step is monitoring abnormal activity in production processes and equipment. Today, there are practically no isolated ICSs, so any connection can become a ‘hole in the fence’, which the attackers will use to penetrate a corporate network.

However, successfully combating cyber threats requires more than just the efforts of individual enterprises; measures are needed at the regulatory and industry level as well. Regulatory authorities around the world understand the urgency of the industrial protection problem, which is why we are already seeing laws dedicated to the security of critical information infrastructure. Notable in the region is the Dubai Cyber Security Strategy, which brings together government, industry, and technology solutions with a view to providing a safe cyberspace to individuals and organisations, and making Dubai the safest electronic city in the world.

In addition, many state agencies and organisations concerned about cyber security have special structures that analyse computer incidents – so-called computer emergency response teams, or CERTs. There is also an industrial CERT at Kaspersky Lab that performs investigations and analytical activities that help to evaluate changes in the cyber-threat landscape.

Attacks on industrial enterprises are becoming an increasingly frequent occurrence, and it is more and more evident that we have entered a new phase of cyber warfare and cyber aggression. We must be ready for it.
As McDermott consolidates its grip over the regional oil and gas EPC market, it is seeking to improve its core competencies through the adoption of digitalisation, as well as exploring new opportunities in the wider energy landscape.

McDermott International is moving on to ‘greener pastures’, and I mean so quite literally. The American company, which has enjoyed a formidable presence in the Middle East’s oil and gas market as a top-tier engineering, procurement and construction (EPC) contractor, is now looking to diversify its business and venture into the renewable energy domain, its regional leader told me during an exclusive interview.

For a company that has thrived in the Middle East for more than 60 years now, on the back of its core strength in offshore oil and gas engineering, venturing into a space that would test its competencies, does seem ambitious however. It won’t be naïve to think that the decision to foray into the clean energy sphere was not taken overnight, but may have been the result of a larger thought process to secure McDermott’s future in a changing energy landscape.

“I think we did think about it (getting into the renewables sector) a couple of years back. We have come to a point, where we have done a lot of thinking and need to act now. Renewables themselves have gone through a transformation in the last 36 months, which has changed the story about why a company like McDermott would consider getting into that space,” Linh Austin, the vice president for McDermott in the
Middle East and Caspian regions, says.
“Over the years we entrenched ourselves into
the offshore EPCI market. We are looking at
energy from a broader perspective. Most people
would not expect McDermott to go into onshore
renewables, but we are taking a look at that,”
Austin reveals. “We are looking into the broader
ergy space, in terms of how to grow our foot-
print in the Middle East and the Caspian.”

The key question I felt an urge to ask then
was what led the management to be convinced
in favour of foraying into an energy domain
where operations are fundamentally differ-
ent to conventional upstream engineering, and
where projects McDermott has had no experi-
ence working on. Austin says the company does
have a plan to balance both, consolidating its
core business, and doing the groundwork for its
new venture.

“We are looking at how our skillset comple-
ments the renewables business. We perform
engineering and fabrication. In terms of onshore
renewables, there are elements that are the same
[as performing the logistics for an offshore EPCI
job]. Renewable projects are usually out in the
middle of the desert, so how you get the logistics
to support that and build that are important.
These are some of the functions which we
are really good at, and those are the [skills] that
we will take into the renewable energy space as
well.”

The prevailing downturn in the oil and gas
segment has harshly impacted every stakeholder
serving the sector, coercing industry players
across the board to experiment and take bold
steps to maintain profitability. Business diversifi-
cation has become more of a sustenance strategy
than a choice, and one wonders if McDermott de-
ciding to step into the clean energy space not proving
to be as profitable as it used to be any more.
Austin clarifies: “Actually, as you can see,
whether it’s Mubadala in Abu Dhabi, or (the
renewable energy initiatives) in Saudi, there is
a real push in the GCC on renewables. You have
to consider the announcements in terms of the
amount of investments in renewables. For us, we
don’t see oil and gas going away anytime soon,
but it’s about how we grow with both (upstream
oil and gas and clean energy).
I think our view in the long-term is that the oil
and gas offshore space is robust at $50 a barrel

$58.3MN
PROFIT GENERATED BY MCDERMOTT IN H1 2017, WHICH
CAN BE ATTRIBUTED IN PART TO EARNINGS FROM THE
DELIVERY OF THE LTA II PACKAGE TO SAUDI ARAMCO.
“OVER THE YEARS WE ENTRENCHED OURSELVES INTO THE OFFSHORE EPCI MARKET, BUT WE ARE LOOKING AT ENERGY FROM A BROADER PERSPECTIVE IN TERMS OF HOW TO GROW OUR FOOTPRINT IN THE MIDDLE EAST AND THE CASPIAN.”

The One McDermott Way is McDermott’s strategy to pool in the expertise required from across its global business, to deliver high-quality work to clients.

(oil price) in the Middle East. In the next five to six years, we see the Middle East offshore EPCI sector to be busy. But how do we diversify, because projects are very cyclical; and I think this is more about how do you underpin that cyclical with other work? In many ways, renewables are counter-cyclical as compared to oil and gas. It’s all about creating that long-term stability for clients.”

He continues: “The renewable energy sector is small. If you look into it, considering available data, renewables will account for a small percentage of the energy mix, up until 2050. But its share in the energy mix is growing. And, for us, either you get into it now and learn the lessons along the way, or you may be left behind.”

Operational excellence at the forefront

In an era when ‘doing more with less’ has become crucial to the very existence of oil and gas companies, consolidation of the business for achieving the larger goal of cost optimisation assumes paramount importance. If branching out to the renewable energy sector is McDermott’s plan to preserve profitability, then the ‘One McDermott Way’ is a well-devised operational excellence measure for integration of its global business.

So what is this strategy all about? Austin explains: “The ‘One McDermott Way’ is about us demonstrating to our clients that no matter where you meet McDermott globally, the execution that you see is going to be the same. Whether we do a job for a client in the Middle East, or if we are getting it fabricated at another McDermott facility, you are going to get the same schedule, cost and quality that you would expect if this were to be done at Jebel Ali (in Dubai, McDermott’s regional base).
“Recently we’d taken a client’s job and executed it from the Batam (Indonesia) facility, and I think the client was very impressed in terms of both delivery and schedule. So it’s all about creating the sense that we have a global reach, and that delivery is consistent and uniform.”

He continues saying: “At the end of the day, projects are won on the cost and schedule factor, in the Middle East. I think our track record of 60 years speaks for itself.”

Austin however concedes that there can’t be a one-size-fits-all approach to all oil and gas projects globally, and clarifies that the ‘One McDermott Way’ implies that the company is pooling in resources from its global network to deliver work for its customers, thereby making its supply chain efficient and economically viable.

“When we talk about the ‘One McDermott Way’, we refer to the back-end. How we engage with clients, how we do the actual work, is very specific and local. But the end-product that they receive is going to have a consistent standard of McDermott. For example, if you look at the jobs we are bidding for right now, the expertise might be at another McDermott location from the engineering standpoint. Say for instance, we are performing a job presently in the Caspian (region), for which we are drawing on resources from our London office due to a certain expertise that they have in order to execute the engineering. But in the end, what we build will have a uniform McDermott look.”

Digitalisation of operations has become imperative for oil and gas players, not just from the technological relevance perspective, but more importantly as a way of weeding out inefficiencies in operations and effectively utilising human resources. McDermott has thus been making earnest endeavours to adopt digitalisation and to constantly refine various aspects of its business to meet the needs of the modern day – a corporate policy that manifests in the Houston-based company’s recent clarion call ‘innovate or die’.

As part of this push towards digitalisation, McDermott has developed ‘Gemini’, a project lifecycle management system for its clients, which simplifies the rather complex work processes of an offshore project, into a software-based engineering platform. “Gemini” or digital twin, is an example of both innovation and technology.

“Today, when we build a facility for a client,
we perform all the tie-in and commissioning functions. As part of this work, we hand over the 3D model and walk away. What digital twin all about is, we are here for the lifecycle of the facility. All the data can be stored in one location, and we are able to support you for the lifecycle of the operations, that can be 25 years plus,” Austin mentions.

He further says: “I used to be on the operator’s side. A significant challenge for us [operators] used to be, that even though the EPCI contractor gave us the entire dataset, we couldn’t manage all that data for future use. We used to go to the EPCI contractor and say “we need that drawing that you did ten years ago.”

By way of ‘Gemini’ we are creating a platform for the end-user where all the data is available. You also have the option to update/upgrade it.”

‘Gemini’ was an in-house brainchild that was developed in collaboration with another software developer, although the digital effort is being led internally, Austin reveals, adding that ‘Gemini’ is not just another project visualisation software. “It’s about enabling ‘how do we give you an asset and and help you to make it better over time?’ As you upgrade, it gives you the option to make your operations more efficient,” he says.

It is evident that McDermott is quite ardently pursuing its digitalisation objective, as the implementation of artificial intelligence for corporate functions would suggest. “It is early days of us using artificial intelligence,” Austin says.

“This is a recognition that AI is out there and can help us do our work better. Are we exploring, testing and challenging ourselves with respect to the power of AI, that is what this adoption is all about. We are very much in the infant stages, and we want to test it and challenge ourselves in using it.”

“We are looking at AI for analytics to see if we can make better business decisions. We are using it more for the corporate aspect, but why can’t we use it for things like marine, engineering and fabrication. That’s a question that we are far from answering at this point, although I absolutely see the role of AI growing in the business.”

Incorporating digital elements into operations was only a matter of time for McDermott, according to Austin, who feels harnessing the power of digital technology has given wings to the enterprise’s ambitions. “Our technology goals reflect the reality of where we are (in the oil and gas industry). It’s like: ‘You either get on the digitalisation train, or get run over by it.’ Gemini is just an example of how we have embraced digitalisation.”
Professionals from the regional energy industry gathered in Dubai for an awards ceremony that recognised their achievements.

It was a day of revelry as stakeholders from the upstream to the downstream segments of the regional oil and gas industry converged in Dubai for the Oil & Gas Middle East and Refining & Petrochemicals Middle East Awards 2017.

The eighth edition of the awards this year took place at the Four Seasons Resort Dubai at Jumeirah Beach on Tuesday, 12 September, and saw senior industry professionals from all segments of the regional energy sector gather to witness the show. Several shortlisted companies and individuals were in contention for each of the 12 awards categories this year, and there was excitement among the winners and highly commended nominations, as their names were called out from the stage.

The Oil & Gas Middle East editorial team had a chance to speak to each the award winners after they received their trophies, and all of them were overwhelmed by the recognition that their hard work had earned, both for themselves and for their companies.
Saudi Aramco won the Health, Safety, and Environment (HSE) Initiative of the Year category for its ‘Predictive Personal Protective Equipment and Worksite Supervisory System (E-Factory)’. The entry was praised by the judging panel as innovative and visionary. Though the system is still in its early stages, the jury felt that it demonstrated the kind of creative thinking that will transform the industry for the better.

“Lots of hard work, patience, persistence, and passion have gone in to developing our Predictive Personal Protective Equipment & Worksite Supervisory System. We are extremely delighted to win the 2017 HSE Initiative of the Year award for this system,” commented Dr Samantha J Horseman, team lead, human energy management, leadership development division, M&PDD, Saudi Aramco. “We are always looking for ways to maximise value creation in our Innovation Lab.”

“We are witnessing sound accountability and awareness about health, safety, and environment issues in the Middle East oil and gas and refining and petrochemicals industry. Our [E-Factory] is innovative and cutting-edge. It is the future of the industry – it will be able to predict accidents and injuries before they happen,” she claimed.

“[Our E-Factory] is the future of the industry – it will be able to predict accidents and injuries before they happen.”
Saudi Aramco was awarded the Technical Innovation of the Year award for the second consecutive year. The energy giant received the award for its "Date Seed-based Sized Particulate LCM and Formation Strengthening Materials" nomination, which was described by one of the judges as "a novel solution to an identified problem". He added: "Technical innovations are more impressive when they serve a clear need and impact can be measured, and I felt that was the case on this occasion."

The product was successfully field tested by Aramco and is the first locally developed product derived from a local raw material to replace some costly, imported lost circulation material (LCM) products. Due to its technical and economic significance, it has been catalogued with a strong recommendation for routine use in oil and gas field drilling operations.

Mohammad Al-Abdrabbuh, network/application engineer from the Ras Tanura Refinery engineering support team, collected the award and said he was "very proud of the team" that was behind the development of the product.

"The contributions that [went] into this work were tremendous. The judges' comments reflect how innovative the solution is," he added. "The goal of Aramco is to remain a leading energy company, and part of that is to develop as many technologies as possible."
AGILITY

Global logistics major, Agility, fought off stiff competition to win the Logistics Services Provider of the Year award, a category that was new for the 2017 awards.

The company was recognised by one of the jury members as the “largest and most experienced of all logistics company nominees, instrumental in the realisation of oil and gas projects throughout the Middle East and the world”.

Speaking about the level of competitiveness that this new category witnessed, Arun Iyer, head of QHSE at Agility, said: “From the nominations for this award category, I can say that all the companies are equally good. However, we provide a comprehensive portfolio of solutions. We do business-to-business (B2B), door-to-door, third-party logistics (3PL), and fourth-party logistics (4PL) services – we cover the entire spectrum. That could be one of the reasons for us winning the award.”

He added that winning an award for the company’s work in the energy sector would motivate the Agility team. Iyer said that, despite the challenging low oil price environment, support from the firm’s board of directors and senior management helped Agility to compete and succeed in acquiring big projects, such as those in the oil and gas sector.

“We are able to customise our offering and to control our costs, and that is how we are able to offer a competitive pricing to our customers. This helps us [to] not just survive but also grow in this industry.”
“We are all living together on this planet, so whatever you do and wherever you operate, you have to consider your neighbourhood. Being nice to our neighbours is a prime objective for Orpic,” Shaima Ahmed Al Aufi, manager of corporate communications services at the Oman Refinery and Petrochemical Industries Company (Orpic), said backstage after receiving the Corporate Social Responsibility (CSR) Initiative of the Year trophy for her company.

The judging panel was unanimous in its choice of Orpic as the winner in this category, recognising the company for its participation in local social projects in Oman, where it contributes to and supports local communities via its External Relations Services. For example, Orpic recently approved the allocation of US $40mn to be invested in major educational, cultural, and recreational social projects, such as Al Falaj Modern Park, Liwa Central Park, Liwa Cultural Centre, and the Orpic Scholarship Programme.

“Orpic opened a CSR company that takes responsibility for social initiative projects (such as) building parks, recreation centres, women’s associations, and other such facilities,” Al Aufi explained.
A subsidiary company of Emirati energy giant, Abu Dhabi National Oil Company (ADNOC), Al Hosn Gas won the Sour Gas and Sulphur Management Project of the Year category for its Shah Gas Development Project in Abu Dhabi. Patricio V Rivera, the vice president of the health, safety, and environment (HSE) department of Al Hosn Gas said he believed it may have been the sheer size of the Shah gas project – and its future prospects – that convinced the judges to declare Al Hosn Gas the winner of the category, which was introduced to the awards this year.

“Our is one of the biggest sour gas projects in the world. We certainly have sulphur recovery tools that are among the best in the world. The gas that we produce is eventually used by families in Abu Dhabi and the UAE in general. We are helping ADNOC with its Vision 2030. We are producing sulphur as a product that is now being exported,” he said.

“We want to expand the plant further; it will be expanded by 20% in 2018 and by 2020, we should be able to process 1.5bn SCF of sour gas per day.”
Saudi major, Sadara Chemical Company, was recognised as having the best training initiative or programme of the year in 2017, for its flagship ‘Sadara Apprenticeship Programme’.

“Our initiatives are part of the Saudi government’s directives towards Saudisation,” said Faisal Algurouni, vice president for human resources and industrial relations, Sadara Chemical Company, explaining why he believed Sadara deserved the award. “In five years, we have […] achieved 63% Saudisation, and we will continue to work on our goals,” he added.

When the company was formed in 2011, Sadara put in place targets to “capitalise on the local [talent]”, and developed a programme of on-site job training and experience, Algurouni explained. “Our trainees were […] put on a two year programme where they studied mathematics, science, and English. After they graduated, we assigned them to work with our partners and shareholders, both within the kingdom and abroad. We also gave them on-the-job training at Sadara. We wanted to produce highly capable employees that would run our company [in the future],”

“USUALLY WE HAVE FRESH GRADUATES COMING INTO OUR COMPANY WITH NEW IDEAS. TIMES HAVE CHANGED AND WE NOW HAVE THE MILLENNIALS ENTERING THIS FIELD.”
The awards team was overwhelmed by the number of excellent entries it received for the Oil & Gas Woman of the Year category, nominating women whose work is making a difference to the industry and whose success in the sector may inspire more women to build careers in the oil and gas field.

Dr Abeer Al-Olayan, a senior research scientist at Saudi Aramco, scooped the award for her "high-level technical achievements" and for being "active throughout the GCC," according to members of the judging panel.

"I feel very proud to be receiving the Woman of the Year award for 2017," Al-Olayan, who could not attend the award ceremony in Dubai, said in an e-mailed statement.

"This outstanding recognition not only [acknowledges] me, but also every woman in Saudi Aramco who works hard alongside her fellow man to lead the company to success," she continued.

Her colleague from Saudi Aramco, Dr Samantha J Horseman, team lead, human energy management, leadership development division, M&PDD, collected the trophy on Al-Olayan’s behalf.

"I know the competition for this award [was tough] and this makes me even more proud of this achievement. Winning this award would not have been possible without the support I have received from the Saudi Aramco management," Al-Olayan concluded.
The world’s largest chemicals company, BASF, won this year’s new Water Management Solution of the Year category. The nomination from the German company impressed the judges, who thought the technology stood out for being “truly innovative”.

The downstream sector in the Middle East has made major steps towards efficient water use, thanks to new water management solutions that are now available in the sector, and the Water Management Solution of the Year award sought to recognise one such technology for its innovation and value creation.

BASF won the award for its patented Sokalan RO 3500 technology, a new, multi-functional anti-scalant for reverse osmosis membrane treatment, which was designed for water re-use applications and boasts proven performance on various scales, and different feed water compositions. Compared to phosphonate-based anti-scalants, Sokalan RO 3500 does not cause eutrophication to water bodies, BASF explained.
The Sadara Chemical Company – a joint venture between petrochemicals giants Saudi Aramco and Dow Chemical – set a new record, winning the Downstream Project of the Year title for the second time in a row. The sheer size and potential of the Sadara project, dubbed by the jury as “the largest in the world”, evidently determined the success of the project at this year’s awards.

Faisal Algurouni, vice president of human resources and industrial relations at Sadara Chemical Company, said: “I think it is the size and the complexities of the project [that impressed the jury]. We currently employ around 55,000 staff and contracted workers. It is a huge logistical exercise.”

He added: “I am very honoured to receive this award for the second consecutive year for Sadara. This proves that Sadara is a game-changer. [It] is a huge project and it comes with its complexities. We have had teams working diligently for the last six years to bring this project to fruition. This is the first project in the world that has been built in one phase. Now we have commissioned our plants and started production, and everybody has worked hard to [get us] to where we are with this project.”
Operational Excellence Strategy of the Year

Weatherford Middle East and Asia

Oilfield services major Weatherford’s Middle East and Asia division emerged victorious in the category of Operational Excellence Strategy of the Year. The winning entry from Weatherford, which detailed the conceptualisation, implementation, and achievements of its Lean Six Sigma programme, was praised by one of the judges for having “recognised a true problem for the industry and developed a practical solution that has already proven substantial tangible benefits.”

Naji Younes, general manager of Weatherford Oil Tool ME, who collected the trophy for the company, said: “We have been working on operational excellence goals for the last six years or so. This award is really a tribute to our efforts.”

Lean Six Sigma’s management philosophy aimed to “change the culture of waste elimination” while driving efficiency, Younes explained.

“It goes [to the heart] of how to generate more profits. At present, we have 98% of the workforce trained for Lean Six Sigma. That creates a culture of responsibility among all employees to be driving efficiency. Instead of having just one subject-matter expert, the entire company is trained to limit wastage and improve efficiency.”

“We have been working on operational excellence for the last six years or so. This award is really a tribute to our efforts.”
Of the many stellar nominations that the awards team received for the Young Oil & Gas Professional of the Year award, that of Dr Esra Younis Ahmed AlKhadhar AlHosani, an instrumentation and control engineer at ADNOC Group company, Abu Dhabi Company for Onshore Petroleum Operations (ADCO), stood out.

“I think what appealed to the judges was my research initiatives, which go beyond my job description as an instrumentation and control engineer. I have intensively researched field challenges related to multi-phase flow measurement and deposit detection, and addressed them in many highly accepted publications. However, I was not very confident of bagging this award, as I am very aware of the capabilities of my amazingly hard-working generation,” AlHosani said.

AlHosani successfully balanced her work for ADCO with her pursuit of higher education.

“Perhaps the [biggest challenge I have faced] was obtaining my PhD from the University of Bath, UK, in only three years, while working at ADCO full time. During my studies, I managed to publish 11 papers […], and I have also patented some of my work. My company sponsored my studies and allowed me to work and study at the same time,” she explained.

“I WAS NOT VERY CONFIDENT OF BAGGING THIS AWARD, AS I AM VERY AWARE OF THE CAPABILITIES OF MY AMAZINGLY HARD-WORKING GENERATION.”
Emerging victorious in the fiercely contested Oilfield Services Company of the Year category was AlMansoori Specialized Engineering. The Abu Dhabi-based company works with major NOCs and IOCs such as the ADNOC Group, Saudi Aramco, Shell, BP, and ExxonMobil, providing a wide range of oilfield products and services.

“We have won this award due to our team and our people, who continue to excel. Our people are what make the difference between us and our peers in the industry,” said the company’s deputy CEO, Ibrahim Al-Alawi.

He added that the downturn in the industry was “compelling” the company to optimise its operations and manpower deployment. “We feel that we are rising to meet the challenges. We are in survival mode and we hope we can continue surviving until the end of this lean period,” he said.

“WE HAVE WON THIS AWARD DUE TO OUR TEAM AND OUR PEOPLE, WHO CONTINUE TO EXCEL. OUR PEOPLE ARE WHAT MAKE THE DIFFERENCE BETWEEN US AND OUR PEERS.”
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Ali & Sons Marine Engineering Factory
P.O. Box 133393 | Abu Dhabi | United Arab Emirates
T +9712 551 2432 | F +9712 551 2431
asme@ali-sons.com | www.asme.ali-sons.com
ENHANCED OIL RECOVERY

With regional operators increasingly facing the challenge of having to deal with maturing assets, the concept of EOR has become crucial to oilfield operations. In such a scenario, we explore the opportunities that the segment offers to service providers.
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A comprehensive discussion

I had the privilege to moderate a roundtable event attended by experts deliberating on EOR

For months now, Oil & Gas Middle East has gone about doing market research for producing the Special Reports and approaching analysts to contribute to it. For the Special Report this month, we decided to tweak the format a bit and host an open discussion about the enhanced oil recovery segment of the market, its prospects, and the opportunities it offers to oilfield services providers.

A number of senior industry professionals expressed interest to participate in the roundtable, and personally for me, it was a pleasure to host these gentlemen and allow them an opportunity to express their views and subject matter expertise. (We will be publishing the video footage of the event on our YouTube channel soon.)

The discussion started with these experts trying to track the advent and growth of the concept of EOR in the regional industry, with some interesting episodes being narrated from the 1970s and 80s, where EOR pilot projects spanned years, and often ended in failure. However, the regional industry could afford to withstand such ‘trial and error’ projects back then, as there was ‘easy oil’ to extract, and those pilot experiments were more about operators preparing for an era when the easy reserves, recoverable through conventional drilling methods, would be gone.

Now, unfortunately, the industry does not have that luxury of affording such ‘hits and misses’ due to a variety of factors, chief among those being the reduced CAPEX budgets of operators, and the fact that EOR is now more of a necessity than an operational choice.

There were intense discussions on each of the EOR methods, namely thermal, chemical, gas-based, water-based, and now solar-powered-steam-based EOR.

While there was unanimity that chemical EOR is arguably the most preferred EOR methodology, other forms of "clean EOR" - such as the type of solar EOR being demonstrated by Glasspoint in its pilot project for PDO, are catching up soon due to their cost-effectiveness aspect.

One thing emerged clear though – enhanced oil recovery will to a great extent replace traditional upstream practices, so companies that already have an offering in that space, have much to gain from.
Regional EOR market awash with opportunities

Although it might be tricky to gauge the financial worth of the EOR sector, experts believe EOR is not a choice for regional operators any more, but a need.

WORDS: INDRAJIT SEN

Enhanced oil recovery, as a segment within the oil and gas industry, may be growing by leaps and bounds, although the grey area when it comes to defining what form of oilfield activity precisely constitutes as EOR, made experts gathered at the roundtable discussion organised by O&GME, shy away from putting a financial estimate to the magnitude of the market.

“No, I can’t offer an estimate, simply because the minute you start considering solar techniques and chemical methods, we are talking of all sorts of different things. But if you ask me in terms of what percentage is potentially being invested into EOR, I would say not even 10%,” Abhay Bhargava of Frost and Sullivan, said.

“I remember we did a five-year engagement with Aramco, where a huge focus was looking at chemicals. Certain aspects of those projects were also about looking at the EOR side. The interest is certainly there. From an analyst’s opinion, I’m sure there is a lot more to be done as there is no more easy oil,” Bhargava observed.

He continued, “Unfortunately, I can’t be putting a financial estimate to the EOR sphere – simply because we are not sure what we are counting; are we counting the services, are we counting the technologies. We haven’t tried to assess all of it. We do try and look at the individual components.”

“Just to complement what Abhay said, I agree that the answers is no,” Moin Muhammad of Schlumberger said. “At the same time, ‘No’ is not accepted. Today, globally we are producing 98-99bn barrels of oil per day, and the question is how much of that is associated with enhanced oil recovery. For that I’ll have to use Schlumberger’s definition of enhanced oil recovery, which is altering the fluid flow behaviour in the reservoir.”

“Based on that”, he continues, “our estimate is 5-6%, or under 10% for sure. So based on that 99bn barrels of estimate per day, only 4bn barrels are being produced as a result of EOR. $17-18 per barrel is the estimated [open literature] cost of EOR-extracted oil. So in simple terms,
The key idea that emerged from the discussion was that the EOR market would boom on the back of the fundamental need in the region — that of operators seeking to secure the future of their oil assets, and prevent depletion of reserves. “NOCs are very interested in securing the future [of their reserves] for the next 20-30 years. For that reason I am of the opinion that enhanced oil recovery is a very serious topic in the boardrooms of NOCs. This is happening and most of the regional operators are working on EOR projects. What’s slowing it down or not letting it grow exponentially, is the technology itself. The industry must come up with innovative, reliable technologies,” Muhammad says. “You’ve tapped in the primary, secondary and tertiary techniques, and you probably got 40% oil out from your reservoir. You still have 60-70% down there. Do you want to go and invest in new production or do you just want to extract more. So, that’s a basic business decision that’s being taken by the owners on this. There is no doubt that they will go ahead with EOR,” Bhargava said.

“Overall the market is going to grow. You look at the history of oil in the Middle East, there are depleting oilfields everywhere, and they have to do justice to those fields. It’s a no-brainer that this market is definitely going to grow,” Handa says.
TECHNICAL CAPABILITIES
KEY TO MASTERING EOR

Can you talk about EOR projects in two of the biggest markets in the region – Saudi Arabia and the UAE. Do you think, there are enough EOR projects in these two countries?

Yes. EOR projects are even more in these two countries than in Oman and Kuwait, because of the size of the markets they have. CO2 has multiple value drivers; one is the carbon capture, and second it’s a fantastic chemical recovery method. The recoveries are very good; in the range of 70-80%. And CO2-based EOR has been adopted in the regional oil and gas market.

If you look at the overall market distribution of EOR methods of thermal, CO2 and chemical – thermal takes the biggest share globally, followed closely by CO2, and chemical is catching up. Technology adoption is happening now and advances are also being made. One of the biggest challenge that we (at Schlumberger) felt in the EOR domain is how this is being applied. It is being segmented in such a way that it takes a long time for full EOR implementation.

As a leading oilfield services provider, could you outline the sort of product and services or overall portfolio that Schlumberger has for enhanced oil recovery?

Even though we have come up with fantastic technologies, the adoption curve is creeping up very slowly. It’s just been the whole concept of “can you prove it quickly?” So, what Schlumberger has developed is a full suite of technologies and that’s the advantage we have. We are a technology company and invest $1bn a year in R&D, probably now a little less due to the current downturn.

I mean if you look at Schlumberger, EOR is just not only one service – it’s not like “drill me a well”. This is a full field development, all the way from defining what the best EOR methodology is.

So we have developed a screening tool, we have developed reservoir simulation tool and then we go into the implementation. So about a year and half ago or so, we have taken the initiative as a company, because within this whole portfolio of technologies and services we offer, we are also segmented you know. So, what we did was we initiated integrated production services, that’s the product line that I represent.

So my job is to bring all the Schlumberger technologies and services under one project management. About two years ago, we made the Cameron acquisition, which brought into our portfolio their surface facilities part. Schlumberger has traditionally been a subsurface company, but now with Cameron as part of Schlumberger, we have an offering for water treatment. Then, we are the best when it comes to subsurface logging.

One of the key challenges of EOR was and still is surveillance and monitoring. You start pumping the steam, but if you don’t know where your steam is going, it’s not worth it. You need to understand the chemistry and the process you are applying, so that you can monitor and control that too, to efficiently recover your hydrocarbons. So we have devel-
oped a long list of technologies for that and the list goes on.

**Can we talk about a specific one that comes to mind?**

Like we have ‘MicroPilot’. This is all about, basically, doing the pilot in one year which is actually drilling the wells and injecting the polymers or the chemistries or steam, and waiting for the recovery. ‘MicroPilot’ is for the chemical EOR, and is our existing technology. We basically have chambers of chemistry which will take it downhole, in-situ, and we inject into the actual rock itself within the reservoir, and do the recovery estimate.

This is a technology that Schlumberger has developed that achieves swift results, that’s the advantage. Typically it takes a year, but by doing it through ‘MicroPilot’—we are going only a few feet or few meters into the formation and we are recovering the hydrocarbon. In contrast, in an actual pilot study, you are going into hundreds of metres into the reservoir. But this is one way to speed up.

The other method is the Cross-Well imaging measurement. Basically, you can have the cross-well electro-magnetic measurements, and then you can see where your injected fluid and hydrocarbon is going. Surface Seismic is yet another Schlumberger technology, where you can understand where the fluid flood front is moving. So there are many technologies.

And all these technologies apply to and are relevant for regional EOR projects.

**How intense is the competition in the EOR segment of the market?**

So there is going to be competition. The ultimate objective is to recover hydrocarbon, whether I do with solar or chemicals or polymers. So one of the projects we are working on is regarding downhole steam generation. One of the challenges with surface steam generation is the inefficiencies of moving the steam from the surface to where you want the heat, which is the downhole. You can lose a lot of heat from the surface, depending on the depth of the vertical, depth of the well.

So we are investing quite a bit in a technology, which is in a field testing phase that generate steam where you need it—downhole. I think, this will make an impact on the market. So there are competitive technologies out there.

One of the points I want to highlight here in the whole scheme of enhanced oil recovery, at least in the chemical part, is when we go to an operating company, they ask if Schlumberger is an EOR services company. To them we are not an EOR company, but an oilfield services provider. They consider EOR services companies to be Dow Chemicals, BASF and the likes. So, this is something we recognised, that we are not perceived as an EOR company but as an oilfield services company.

So what we did, this is again our initiative to complete the work flow, is we formed an alliance with Dow Chemicals. The idea is to again speed up the process of selecting chemistry. So, if the oil company wants to do the selection themselves, they will use Schlumberger or other service company to do the drilling, do the reservoir simulation, or surface facility, but they will sub-contract the work for chemistry selection to a third party which will take six months to a year.

**Is this a collaboration to cater to the EOR market? When was this alliance formed?**

Yes. This (alliance) was formed about a year ago. The objective is again that we work together. They [Dow Chemical] have a business unit for EOR, we have a business unit for the same, so we have a common interest.
Solar Power Fuels EOR Tech Progress

Glasspoint’s pilot EOR project for PDO in the Amal oilfield in Oman, has raised the bar when it comes to EOR technology, with its use of glass structures to generate steam.

American technology company GlassPoint first arrived in the Middle East in 2011 when it was awarded a pilot project with Petroleum Development Oman (PDO). GlassPoint completed the pilot project in Oman on time, on budget and exceeding performance targets. This success led to the $600mn-worth, 1,021MW-capacity solar thermal project, called ‘Miraah’, currently being built for PDO in southern Oman. It will be among the world’s largest solar projects, underscoring the major market opportunity for deploying solar power in the enhanced oil recover segment of the global oil and gas industry.

“We didn’t enter the Omani market at first, but rather found the interest coming out of Oman. If you look back in history, this was a PDO-driven effort.” Marwan Chaar, vice president of Project Development, at Glasspoint, said during the roundtable discussion on EOR that O&GME hosted.

“PDO started looking for solar technologies for thermal EOR before Glasspoint even knew what PDO was. Back then we were a very small company based in California, trying to get into the local market. Through PDO’s technology division there was a connection and an introduction, since our technology was significantly cheaper than all the other technologies available that PDO was looking at,” Chaar said.

“And that was drove us to Oman. We had no presence in Oman before that. From that initial discussion, PDO awarded the pilot project to us. From that pilot project we set up an office in Oman, strengthened our investments there with further expansions and started to grow our business in the Sultanate.”

GlassPoint’s focus on the Middle East stems from the challenges the region’s geography presents oil producers with, the large amounts of viscous oil reserves beneath its surface, and the abundant sunshine found in its deserts. Given the shortage of natural gas in the region, the company understands the Middle East is perfectly suited to adopt its technology, which has been purpose-built to survive in the harshest desert climates and deliver the lowest cost energy to power oilfield operations.

“So we built our pilot with PDO and it became operational after a sort of one-year testing period that started in February 2013. We signed a contract for 1GW project in mid–2015. So we basically did a year of testing and then you get into the negotiations and technical due diligence (process) to move on to,” Chaar explains.

“We took a year to test the technology and we looked at a date when independent engineers come in and review how to move forward. So that’s on the technology side. We are innovating very

“After PDO awarded the pilot project to us, we set up an office in Oman, strengthened our investments there with further expansions, and started to grow our business in the Sultanate.”

Marwan Chaar, VP of Project Development, GlassPoint.
The other thing that separated us is designing the actual system to withstand specific oilfield conditions. So we had to design in a way where everything is protected. So we built these greenhouses that protect the solar field. So these are really the two main ways we differentiated our technology. By doing so we manage to innovate on cost structure as well, and not just on performance. Since everything is enclosed now, our mirrors are of significantly lower cost, even significantly lower capex than regular solar technology.”

quickly, so we are constantly updating technologies that are coming to play, being tested in labs and on the fields.”

Offering an update on the progress of the ‘Miraah’ (Arabic for mirror) project, Chaar mentions: “Glasspoint develops the technology first, and it is built in independent blocks. So, now we are already starting to see some of these blocks coming online and we will be announcing soon in partnership with PDO, some of the results of that. As of the moment, we are still ahead of schedule and on budget for these first few blocks.”

When asked to elaborate on Glasspoint’s pioneering technologies, Chaar elaborates: “So let’s break this discussion into two. So one is what technology can our clients use to get steam, and really you have three main methods. One is the simple standard oilfield boilers, you have co-generation and then you have solar. The way they choose that, that really comes to the economics of gas.

But if you also look at co-generation, one of the big constraint is they may not need that much of power. On a remote oilfield, you may not use it. So, once you make that filtration, you come down to solar.”

“What differentiated us, and that’s why PDO selected us when we did the pilot,” Chaar continues, “is we designed (the technology) specifically for the oilfield. And, what does that really mean. There are a couple of things.

One means using the same equipment for oilfield uses. So we talk about boiler receiver pipes, boiler pumps, separators, and all that equipment is the same that the oilfield is used to – so that really separated us.

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DOING INTELLIGENT EOR

Andrew Dennant, Oil and Gas director – MEA, at Emerson Automation Solutions, believes operators need to rethink their approach to enhanced oil recovery and consider the digital path.

The term ‘EOR’ is typically understood to mean the same as tertiary recovery – changing the properties of the hydrocarbons to enhance production. Primary oil recovery is limited to hydrocarbons that rise to the surface naturally (e.g. naturally-flowing wells) or with artificial lift devices (e.g. ESPs or pump jacks). Secondary recovery uses water or gas injection, typically at the edges of the reservoir, to push the crude towards the producing wells. Tertiary recovery, also known as ‘enhanced oil recovery’, uses chemistry or heat to change the makeup of the reservoir. Most of the oilfield activity meant to boost oil production does not count as EOR activity.

We need look no further than Kuwait, Oman or the UAE to see that EOR on a gigantic scale is being performed in the region. Steam injection, water alternating gas injection, as well as CO2 Injection are all methods that are being used in the Middle East. The size of the steam injection projects in Kuwait and Oman are enormous, with the Kuwait Lower Fars heavy oil development project being publicised as costing $7bn.

Emerson perceives that companies that implement EOR will gain the best return on their investment if the EOR project pushes data to a digital oilfield and that data is analysed to understand the effectiveness of the operations. For instance, for a steam injection project, what is the volume and ratio of oil, gas and water produced from each well in real time? Is it what the model predicted? Is the [expensive] thermal energy being used in the best places to maximise production? For CO2 injection, has the CO2 broken through to the producer wells or is it still ‘pushing’ the hydrocarbons? These are just two examples of where instrumentation can be implemented at the wellhead to cost-effectively measure three-phase flow or provide gas chromatography with minimal manual intervention or maintenance. Without the insight that such instrumentation can yield, the return on the EOR investment cannot be measured, let alone maximised.

EOR is an area in which the operating costs of the oilfield are significantly higher than we have traditionally seen in this region. That is why the intelligent, or digital field is so important in these applications. Suites of workflows that take data from the wellhead need to be implemented to ensure that cross-functional expertise is brought to bear on the problems of working at higher temperatures, with corrosive chemicals, and more complex equipment. These workflows need to extend further into the mechanical, reliability and safety space than with a conventional oilfield. The uptime and efficiency of the thermal generators has a crucial impact on the economics of steam flooding; similarly with compressors for gas injection. When injected, CO2 mixes with reservoir fluids to create corrosive liquids, corrosion management becomes critical. The intelligent field is where these workflows come together to ensure that all of the right experts get their eyes on the relevant data in the context that they need it, and that all of the team members’ goals – uptime, production, profitability and integrity – are met and exceeded.

The intelligent field in EOR, just as it is in conventional plays, is about data and expertise put into context to make better holistic decisions. It’s just that in EOR projects the stakes are higher. The CapEx associated with the project is higher, as is the OpEx, and the risks associated with loss of containment are both higher and more varied, with greater consequences.

Emerson is passionate about providing the data and the expertise needed to complete the business case of the intelligent field. With a range of instrumentation, we can help you get the data you need, where you need it. Our approach to getting tangible returns from the Industrial Internet of Things ensures that EOR operators make the most of their investment.

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Wherever you are, we are always dedicated to exceeding your expectations.
ADIPEC 2017
Focus on the future

Every year, the Abu Dhabi International Petroleum Exhibition & Conference (ADIPEC) brings together industry stakeholders from around the world, and the 2017 edition of the show will be no exception, as key players gather to discuss how to ‘do more with less’ in the low oil price era.

An unprecedented number of opportunities for strategic dialogue between all levels of industry players, from ministers to global business leaders – as well as a record number of expert submissions on a wide range of industry challenges and trends – will see the world’s energy leaders converge on the UAE capital for the Abu Dhabi International Petroleum Exhibition and Conference (ADIPEC) 2017.

The event is held under the patronage of His Highness Sheikh Khalifa Bin Zayed Al Nahyan, President of the UAE; hosted by the Abu Dhabi National Oil Company (ADNOC); and supported by the UAE Ministry of Energy, the Abu Dhabi Chamber, and the Abu Dhabi Tourism and Culture Authority. It will

**ADIPEC In Numbers**

- **Date:** November 13–16, 2017
- **Venue:** The Abu Dhabi National Exhibition Centre (ADNEC)
- **96,374 VISITORS**
- **10,009 CONFERENCE DELEGATES**
- **135,000m² GROSS AREA**
- **752 CONFERENCE SPEAKERS**
- **2,034 EXHIBITING COMPANIES**
- **162 CONFERENCE SESSIONS**
- **25 INTERNATIONAL PAVILIONS**
- **135 COUNTRIES REPRESENTED**
OCTOBER 2017

ADIPEC PREVIEW

the world of energy, with all technical abstract submissions put through a rigorous evaluation process by the Technical Programme Committee. There have been more than 3,000 technical abstract submissions this year, with more than half submitted from outside the UAE.

Christopher Hudson, president – global energy at dmg events, the company responsible for organising ADIPEC, said: “Driving growth in a volatile industrial sector can be challenging at the best of times. ADIPEC 2017, the world’s most influential oil and gas exhibition and conference, is evolving to bring more event attendees fully into the realm of industry decision-making, from passive to active participation, and our new global downstream business leader sessions are testament to this progressive new approach to inclusion.”

ADIPEC 2017 will include conference sessions on Offshore and Marine, and Security. New this year will be the introduction of global downstream technical sessions, which the organiser claimed will drive the conversation on downstream expansion, diversification, technology innovation, and research and development (R&D). Key regular features of the event are the ADIPEC Awards, which celebrate excellence in energy; the Women in Industry Conference, which addresses gender balance in the energy sector; Young ADIPEC, a dedicated ‘edutainment’ programme designed to encourage students to choose a career in energy; and a VIP conference programme for members of the Middle East Petroleum Club.

More than 10,000 delegates, 2,200 exhibiting companies, 900 speakers, and 100,000 visitors from 135 countries are projected to gather in the UAE capital for ADIPEC 2017, breaking the event’s previous record for international participation, and bringing global decision-makers, industry leaders, and experts under one roof to address the most critical issues surrounding the evolving energy landscape.

take place from 13 to 16 November at the Abu Dhabi National Exhibition Centre (ADNEC).

The premier meeting place for energy ministers and C-level executives from the world’s oil and gas giants, ADIPEC 2017, will convene under the theme ‘Forging Ties, Driving Growth’. The event’s growing synonymy with the global oil and gas industry is evidenced by the increase in the number of ministerial and C-suite sessions and forums taking place this year - more than 45, compared to 25 in 2016.

“Abu Dhabi has always served as an international gathering place for the energy world’s best and brightest. But, this year, ADIPEC is shifting gears to facilitate additional ministerial and C-level executive networking. We believe that this annual event is where global energy strategies are proposed and agreed upon each year,” Ali Khalifa Al Shamsi, the CEO of Al Yasat Petroleum and ADIPEC chairman, stated.

The ADIPEC Conference Programme, which is organised in collaboration with the Society of Petroleum Engineers (SPE), sets the international standard for the exchange of best-practice and operational excellence in
Creating increased engagement among business leaders

In its 20th edition, ADIPEC is firmly established as the world’s most influential oil and gas industry event, and the ADIPEC Conference Programme sets the standard for the exchange of best practices and operational excellence. Delegates at this year’s ADIPEC will have more opportunities than ever to hear some of the oil and gas industry’s most powerful executives speak in open-invite conference sessions, as the event’s organiser has confirmed that it will increase the number of Global Business Leader panels for this year.

ADIPEC has a successful history of attracting the industry’s top chief executive officers as speakers. The separate Global Business Leader panels were launched in 2015 with two sessions. A positive response saw a third session added in 2016, and the organiser will include a fourth panel discussion for 2017.

As ADIPEC will expand to include downstream industries for the first time this year, an additional programme will include three Downstream Global Business Leader panels.

“ADIPEC is unique for its ability to attract such a broad group of industry seniors to an annual event, driven by the market power of the region’s NOCs and their IOC partners,” Al Shamsi commented. “Nowhere else will industry professionals get such an insight into the strategic thinking guiding the industry forward, from individuals whose decisions are critical to the future of oil and gas businesses.”

As the planning for ADIPEC entered its final weeks, its organiser confirmed the involvement of 13 CEOs for the Global Business Leader panels and was in talks with many more across the global industry. A further nine CEOs have been confirmed for the Downstream Global Business Leader programme. Beyond the conference programme, CEOs convene at ADIPEC to do business and sign deals, offering conference delegates an opportunity not only to learn from the best, but also to grow their businesses and discover new opportunities.

The confirmed CEO speakers include Bob Dudley, group chief executive at UK-headquartered multinational, BP; Datuk Zulkiflee W Ariffin, president and group CEO of Malaysian national oil company, Petronas; Patrick Pouyanné, chairman and CEO of France’s Total; Vagit Alekperov, president, member of the board of directors, and chairman of the management committee at Russia’s Lukoil; Musabbeh Al Kaabi, CEO of petroleum and petrochemicals, Mubadala Investment Company; Mario Mehren, chairman of the board of executive directors, Wintershall; Toshiaki Kitamura, president and CEO at Japan’s INPEX Corporation; and Claudio Descalzi, CEO at Italian multinational, Eni.

The individual perspectives of these industry experts include experience at some of the world’s largest vertically integrated oil and gas companies, including two of the industry’s ‘super-majors’, operating across a diverse range of international markets, both in terms of exploration and production, and in terms of sales.

CONFIRMED ATTENDEES FOR THE GLOBAL BUSINESS LEADERS SESSIONS THAT WILL BE HELD AT ADIPEC 2017:

- Bob Dudley, group chief executive of BP
- Datuk Zulkiflee W Ariffin, president and group CEO of Petronas
- Patrick Pouyanné, chairman and CEO of France’s Total
- Vagit Alekperov, president of Lukoil
- Musabbeh Al Kaabi, CEO of petroleum and petrochemicals, Mubadala Investment Company
- Mario Mehren, chairman of the board of executive directors, Wintershall
- Toshiaki Kitamura, president and CEO of INPEX Corporation/JODCO
- Claudio Descalzi, CEO of Eni
- David Dickson, president and chief executive officer at McDermott International
- Mark McCollum, CEO at Weatherford
- Lorenzo Simonelli, president and CEO at Baker Hughes, a GE company
- Mansour Al Mulla, chief financial officer – petroleum and petrochemicals, Mubadala Investment Company
- Brian Gilvary, group chief financial officer at BP
- Alexander Medvedev, deputy chairman – management committee, Gazprom
- Ogan Kose, managing director and global lead for trading, investments, and optimisation strategy, Accenture
- Dr Daniel Yergin, vice chairman of IHS Markit
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- All digital data
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These speakers will be joined by the heads of three of the biggest international oilfield services providers: David Dickson, president and chief executive officer at McDermott International; Mark McCollum, CEO at Weatherford; and Lorenzo Simonelli, president and CEO at Baker Hughes, a GE company. Offering a regional perspective on oil and gas investment will be Mansour Al Mulla, chief financial officer – petroleum and petrochemicals, Mubadala Investment Company, while Brian Gilvary, group chief financial officer at BP, will offer an international view.

“ADIPEC is the leading event for the global oil and gas industry, and that is reflected in the status of speakers we consistently attract for our conference programme,” Hudson said.

“The executives who have agreed to be part of our Global Business Leader panels are among those whose decisions shape the future of the industry, and who are most qualified to discuss the path forward for oil and gas in the coming years.”

With ADIPEC 2017 to be held under the theme of ‘Forging Ties, Driving Growth’, the four Global Business Leader panels will focus on strategies that can deliver continuing business success, with discussion of the most pressing topics facing the sector today. There will also be a highly focused session on energy finance, investment, consolidation, and diversification.

“The oil and gas industry continues to be a key driver for the global economy, but the market is changing, and industry leaders must respond,” said Hudson. “ADIPEC is a platform where businesses can share ideas that will help them evolve with the commercial environment. With our invited CEO speakers for 2017, we are placing greater emphasis on leaders with a truly global footprint. Their decisions will define the future for oil and gas, pioneering new ideas and breaking boundaries, fostering relationships, and building on momentum.”

**ADIPEC 2017’s technical conferences: a highlight of the event**

ADIPEC’s organiser has confirmed the event’s technical conference, already the world’s largest for oil and gas professionals, will see a significant increase in scope for 2017, to include the downstream industry for the first time, as well as including more sessions dedicated to specialised areas of the sector, such as offshore and marine exploration and production.

With approximately 900 speakers scheduled to participate in more than 200 sessions, the conference will bring together the industry’s most respected experts, global leaders, and top decision-makers, with around 10,000 delegates expected to attend during the course of the event’s four days.

The expanded technical programme will encompass all layers of the industry, including upstream and midstream sessions organised by the Society of Petroleum Engineers (SPE), while dmg events’ global energy division will oversee a new programme of downstream sessions. The organiser said that the change reflects the accelerating search for efficiency and integration in a challenging market.

“The key to growth for oil and gas companies will be to find new ideas, and to share information in the pursuit of best practice,” said Ali Al Rawahi, reservoir manager – studies (BUH/SE Asset), at the Abu Dhabi Company for Onshore Petroleum Operations (ADCO), and ADIPEC 2017 Technical Conference chairman. He continued: “ADIPEC is clearly established as the leading platform for knowledge exchange in oil and gas. What the conference offers has never been more important than it is today. Resource owners are getting better prices for their product, but nobody can rely on further rises to ensure their business. “The focus will continue to be on improving efficiency and reducing cost, which can only be achieved...
through sharing experience between companies
and across borders.”

The expansion to include the downstream sector
reflects one of the emerging industry trends in oil
and gas, as upstream and midstream companies
are increasingly looking towards integration, col-
laboration, and diversification across refining and
petrochemicals, processing, and end-product sales,
in order to boost overall profitability.

The ADIPEC Technical Conference programme
received 3,060 abstract submissions for presenta-
tions for this year’s event, a 10% increase from last
year, setting a new record for the number of sub-
mitted abstracts in the oil and gas industry for the
second consecutive year. Technical abstracts came
from 622 organisations located in 70 countries.
Underlining ADIPEC’s expanding international
reach, 59% of submissions were from outside the
Middle East. The ADIPEC 2017 technical commit-
tee, comprised 164 industry experts, selected 809
high-quality abstracts.

Conference sessions include exploration and
production geoscience; production facilities tech-
nologies; field development; operational excellence;
drilling and completion technology; health, safety,
and environment; projects engineering and manage-
ment; gas technology; unconventional resources;
improved and enhanced oil recovery; people and
talent; and petroleum advanced analytics.

The 2017 ADIPEC conference programme will
feature two ministerial sessions, four global business
leader sessions, and four downstream global business
leader sessions, eight panel sessions, three offshore
plenary panels, nine C-suite dialogue sessions, three
industry breakfasts, and three topical luncheons.

A full-day Women in Energy programme will
focus specifically on the opportunities for – and
achievements of – women working in the oil and
gas industry. The co-located Security in Energy
conference returns for a second year, recognising
the increasingly critical importance of cyber and
infrastructure security within oil and gas operations.

“At ADIPEC, we create one meeting place, in one
city, for one global industry, and the conference
programme represents that approach,” Hudson
said. “It is a complete platform for a complex global
industry, where we create value for every layer of
the most vertically integrated oil and gas business.

With CEO-level support from the industry’s most
influential corporations, ADIPEC is essential for
sharing knowledge, driving innovation, and generat-
ing business.”
Meeting of minds at ADIPEC 2017

As in previous years, the 2017 edition of ADIPEC will host a range of conferences, panel discussions, and knowledge-sharing conclaves during its four-day duration. We bring to you an overview of the key sessions that visitors can’t afford to miss, which will be taking place daily on the sidelines of the main trade show.

Ministerial and global business leader sessions:
13–14 November

Al Maared Hall, ADNEC
Global oil and gas ministers deliver industry and country updates during two days of panel discussions and interviews.

C-suite dialogues:
13–15 November

Hall B, ADNEC
Live on stage, interviews and interactive panels will bring the latest critical C-suite discussions to the forefront of the industry.

Global downstream business leader panels:
14–15 November

Al Maared Hall, ADNEC
For the first time, ADIPEC will feature global downstream plenary panels, to drive the conversation on downstream investment, expansion, diversification, and development. Downstream sector leaders worldwide will convene to talk about global crude and feedstock market outlook, production quotas, shifting crude demand and supply dynamics, and international fuel regulations.

Technical panel sessions:
14–16 November

Hall A, ADNEC
Discussions will explore emerging innovations in the capital project lifecycle and how large-scale application of existing and new solutions can bring greater capital efficiency to the industry, and what the impact on oil prices will be.

Technical programme:
13–16 November

Capital Suites, ADNEC
The four-day, multi-streamed conference reflects the business-critical needs of today’s industry, providing a comprehensive programme that will cover a total of 119 sessions featuring hundreds of speakers.

Offshore & marine conference:
13–16 November

Offshore & Marine Theatre Hall 15
Hear from authorities on pipeline infrastructure and transportation, shallow and deep water exploration, and offshore production as experts address driving growth and future expectations and challenges.

Security in energy conference:
14–15 November

Hall A, ADNEC
Cyber and critical infrastructure security experts and oil and gas executives discuss the real-life security threats and challenges that are now facing the oil and gas industry.

Women in energy conference:
16 November

Al Maared Hall, ADNEC
There are a number of women today who are in influential management positions, leading some of the world’s major oil and gas companies. Convene, connect, and engage in conversations with outstanding female professionals from the global oil and gas industry to inspire change and explore solutions that will help to build a more diverse and inclusive industry.
Stay one step ahead of your competitors with the DMS Projects Matrix.

A critical and essential business intelligence tool, updated daily to ensure you are constantly at the top of your commercial strategies, allowing you to maximise your returns in today’s ever growing global market.

REGIONS COVERED
- Asia Pacific
- Middle East
- Latin America
- North America
- Central America
- Russia & CIS
- East Africa
- North Africa
- West Africa
- India
- China
- Europe

SECTORS COVERED
- Oil
- Gas
- Petrochemicals
- Water
- Power
- Infrastructure
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PDO: Rabab Harweel Integrated Plant (Overview)

Rabab Harweel Integrated Project (RHIP) involves the construction of a new integrated oil and sour gas facility, utilising gas from the Rabab field to allow miscible gas injection within the Harweel oil reservoirs to maximise recovery. The Harweel field includes 240mn barrels of oil and 100mn barrels of condensate. It will export one trillion cubic feet of non-associated gas when production starts in 2019. When complete, the facility will deliver 6mn standard cubic feet per day (MMSCMD) of sweet gas, 60,000 bpd of oil, and 16MMSCMD of high-pressure sour injection.

PROJECT FINANCE

Petroleum Development Oman is the client. In June 2016, it obtained a $4bn loan from international banks, part of which would help finance the development of Rabab Harweel. The providers of the syndication loan included:
- Bank of China
- HSBC Bank
- ING Bank
- Intesa Sanpaolo
- JPMorgan
- National Bank of Abu Dhabi
- Natixis
- Societe Generale
- Standard Chartered Bank
- Sumitomo Mitsui Banking Corp

PROJECT SCHEDULE

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CONTRACTORS

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<td>WorleyParsons, AMEC</td>
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</table>
The scope of the scheme involves the construction of:

- High sour (about 6% H₂S) and high pressure injection
- Complex facilities with intake capacity of 15MMSm³/d
- Partial recycling in Rabab
- MGI in Harweel fields
- Wells hook-up; 69 wells (30 producers, 39 injectors)
- New gathering systems for Rabab, Rabab SE, and Ghafeer
- Oil field flows via existing gathering systems to Harweel 2AB
- Sour gas treatment
- 400T/d LPG production station
- Condensate production station
- Harweel oil production through Harweel 2AB
- Interconnection between Harweel 2AB and new station
- Power plant with waste heat recovery unit, heating system, and standby furnace
- Overhead power lines, control room, and power substations
- Wellpad piping and equipment
- GRE flowlines
- Remote gathering manifold stations
- CRA clad pipelines
- Condensate separation and stabilisation train
- One flash gas booster compression train
- Gas treatment including two to three GSU trains and mole sieve units
- LPG plant including two turbo expander trains and LPG loading area
- Two sweet gas export compression trains; two acid gas compression trains; and three gas injection compression trains including TEG units, MP, and HP compressors
- Gas injection distribution systems including high-pressure gas injection pipelines, gas injection remote manifold injection stations, and gas injection flow lines
- Gas export pipeline, and a condensate export pipeline to tie-in to existing Harweel–Mamul oil export pipeline
- Utilities including three flare systems, three to four drain systems, a fuel gas system, a water treatment system, an N₂ system, a breathing air system, and an instrument air system.
# Ongoing and Upcoming Projects

Information is supplied by DMS Projects

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**GCC OIL – SEPTEMBER 2017**

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<th>Budget</th>
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<td>DRPIC - Duqm Refinery &amp; Petrochemical Complex - Duqm Refinery - Main Process Units</td>
<td>Oman</td>
<td>Duqm</td>
<td>Refinery</td>
<td>4,000,000,000</td>
<td>Engineering &amp; Procurement</td>
<td>Q4 2019</td>
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<tr>
<td>DRPIC - Duqm Refinery &amp; Petrochemical Complex - Duqm Refinery - Offsites and Utilities</td>
<td>Oman</td>
<td>Duqm</td>
<td>Refinery</td>
<td>4,000,000,000</td>
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<td>Q4 2019</td>
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<tr>
<td>DRPIC - Duqm Refinery &amp; Petrochemical Complex - Duqm Refinery - Overview</td>
<td>Oman</td>
<td>Duqm</td>
<td>Refinery</td>
<td>6,000,000,000</td>
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<td>Q4 2019</td>
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<tr>
<td>DRPIC - Duqm Refinery &amp; Petrochemical Complex - Duqm Refinery - Package 3</td>
<td>Oman</td>
<td>Duqm</td>
<td>DII Storage Terminal</td>
<td>250,000,000</td>
<td>Engineering &amp; Procurement</td>
<td>Q4 2019</td>
</tr>
<tr>
<td>Duqm Petroleum Terminal Company - Duqm Liquid Jetty</td>
<td>Oman</td>
<td>Various</td>
<td>DII Storage Terminal</td>
<td>600,000,000</td>
<td>Engineering &amp; Procurement</td>
<td>Q4 2019</td>
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<tr>
<td>Fiereco International Investments - Biofuels Refinery</td>
<td>Oman</td>
<td>Sohar</td>
<td>Biofuels</td>
<td>800,000,000</td>
<td>Engineering &amp; Procurement</td>
<td>Q4 2020</td>
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<tr>
<td>Fujairah Oil Terminal (FOT) - Fujairah Oil Terminal Modifications</td>
<td>UAE</td>
<td>Fujairah</td>
<td>DII Storage Tanks</td>
<td>200,000,000</td>
<td>EPC/ITB</td>
<td>Q1 2020</td>
</tr>
<tr>
<td>GASCO - Integrated Gas Development (IGD) - Expansion (Dhohore/Pipeline)</td>
<td>UAE</td>
<td>Abu Dhabi</td>
<td>Gas Production</td>
<td>7,100,000,000</td>
<td>Construction</td>
<td>Q4 2017</td>
</tr>
<tr>
<td>GASCO - Yas - Minjazay Gas Pipeline</td>
<td>UAE</td>
<td>Abu Dhabi</td>
<td>Gas Processing</td>
<td>45,000,000</td>
<td>Construction</td>
<td>Q3 2019</td>
</tr>
<tr>
<td>GASCO - Integrated Gas Development - Expansion (42 inch Pipeline)</td>
<td>UAE</td>
<td>Abu Dhabi</td>
<td>Oil Field Development</td>
<td>4,500,000,000</td>
<td>Construction</td>
<td>Q4 2018</td>
</tr>
<tr>
<td>Gulf Petroleum - III Storage Terminal Facility at Fujairah - Phase 2</td>
<td>UAE</td>
<td>Fujairah</td>
<td>DII Storage Tanks</td>
<td>300,000,000</td>
<td>On Hold</td>
<td>Q1 2019</td>
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<tr>
<td>Hydrocarbon Finder - Block 7 Dhoohore Exploration and Production</td>
<td>Oman</td>
<td>Al Wusta</td>
<td>Exploration</td>
<td>50,000,000</td>
<td>Engineering &amp; Procurement</td>
<td>Q1 2019</td>
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<tr>
<td>IL&amp;FS Prime Terminals FZC - Fujairah Oil Terminals - Phase 2</td>
<td>UAE</td>
<td>Fujairah</td>
<td>DII Storage Terminal</td>
<td>80,000,000</td>
<td>EPC/ITB</td>
<td>Q2 2019</td>
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<tr>
<td>Kismat International - Petroleum Terminal (Phase 1)</td>
<td>UAE</td>
<td>Sharjah</td>
<td>DII Storage Tanks</td>
<td>50,000,000</td>
<td>On Hold</td>
<td>Q4 2019</td>
</tr>
<tr>
<td>KNPC - Ahmadi Depot Expansion</td>
<td>Kuwait</td>
<td>Ahmadi</td>
<td>DII Storage Tanks</td>
<td>250,000,000</td>
<td>Construction</td>
<td>Q2 2018</td>
</tr>
<tr>
<td>KNPC - Discharge Of Treated Effluent In MAA &amp; MAB Refineries</td>
<td>Kuwait</td>
<td>Various</td>
<td>Pipeline</td>
<td>100,000,000</td>
<td>On Hold</td>
<td>Q4 2018</td>
</tr>
<tr>
<td>KNPC - New Local Marketing Depot At Al Mawsa Area</td>
<td>Kuwait</td>
<td>Northern Kuwait</td>
<td>DII Storage Tanks</td>
<td>500,000,000</td>
<td>EPC/ITB</td>
<td>Q4 2019</td>
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<tr>
<td>KOC - ExxonMobil Corporation - Ratqa Lower Fans Heavy Oil Handling Facilities - Drilling Package</td>
<td>Kuwait</td>
<td>Jahra</td>
<td>DII Field Development</td>
<td>500,000,000</td>
<td>Construction</td>
<td>Q4 2018</td>
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<tr>
<td>KOC - Jurassic Non-Associated Gas Reserves</td>
<td>Kuwait</td>
<td>Northern Kuwait</td>
<td>DII &amp; Gas Field</td>
<td>1,300,000,000</td>
<td>Engineering &amp; Procurement</td>
<td>Q2 2018</td>
</tr>
<tr>
<td>KOC - Jurassic Production Facilities Off-Plot Works</td>
<td>Kuwait</td>
<td>Northern Kuwait</td>
<td>DII Field Development</td>
<td>300,000,000</td>
<td>Engineering &amp; Procurement</td>
<td>Q1 2019</td>
</tr>
<tr>
<td>KOC - Kuwait Bay and Divided Zone Offshore Exploration</td>
<td>Kuwait</td>
<td>Various</td>
<td>Exploration</td>
<td>1,000,000,000</td>
<td>Engineering &amp; Procurement</td>
<td>Q1 2019</td>
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<tr>
<td>KOC - Minagish Mahrain Water Injection/Project</td>
<td>Kuwait</td>
<td>Minagish</td>
<td>Water Injection</td>
<td>164,000,000</td>
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<td>Q1 2020</td>
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<tr>
<td>KOC - North Kuwait Jurassic Early Production Facility (EPF) - Phase 2</td>
<td>Kuwait</td>
<td>Northern Kuwait</td>
<td>DII Production</td>
<td>100,000,000</td>
<td>FEED</td>
<td>Q3 2023</td>
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<tr>
<td>KOC - Ratqa Lower Fans Heavy Oil Development - Phase 1</td>
<td>Kuwait</td>
<td>Northern Kuwait</td>
<td>Steam Injection</td>
<td>4,350,000,000</td>
<td>Construction</td>
<td>Q4 2018</td>
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<tr>
<td>KOC - Southern Kuwait Maintenance of Oil Production Facilities</td>
<td>Kuwait</td>
<td>Kuwait South</td>
<td>DII Production</td>
<td>150,000,000</td>
<td>Construction</td>
<td>Q3 2020</td>
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<tr>
<td>KOC - Wara Pressure Maintenance Project - Train 3</td>
<td>Kuwait</td>
<td>Southeast Kuwait</td>
<td>DII Field Development</td>
<td>500,000,000</td>
<td>Engineering &amp; Procurement</td>
<td>Q1 2020</td>
</tr>
<tr>
<td>Masirah Oil Ltd - Block 50 (Masirah Bay Offshore) - Exploration</td>
<td>Oman</td>
<td>Masirah Basin</td>
<td>Exploration</td>
<td>250,000,000</td>
<td>Construction</td>
<td>Q1 2020</td>
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<tr>
<td>Medco Arabia - Block 56 Onshore Exploration and Production</td>
<td>Oman</td>
<td>Adam Ad Dakhliya</td>
<td>Exploration</td>
<td>20,000,000</td>
<td>Engineering &amp; Procurement</td>
<td>Q4 2020</td>
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<td>MDG - Block 18 Offshore Exploration and Production</td>
<td>Oman</td>
<td>Batn ash</td>
<td>Exploration</td>
<td>30,000,000</td>
<td>On Hold</td>
<td>Q1 2021</td>
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<tr>
<td>MDG - Block 43A Offshore Exploration and Production</td>
<td>Oman</td>
<td>Adam Ad Dakhliya</td>
<td>Exploration</td>
<td>30,000,000</td>
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<td>Q4 2020</td>
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<tr>
<td>MDG - Block 51 Offshore Exploration and Production</td>
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<td>Northern Oman</td>
<td>Exploration</td>
<td>30,000,000</td>
<td>On Hold</td>
<td>Q4 2021</td>
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</table>

Note: The above information is the sole property of DMS Projects. Budget figures are shown as US $ values. Source: dmsprojects.net
How does Agility serve the oil and gas industry in Iraq?
As the fifth largest oil producer in the world, logistics in Iraq must be geared around its economy. Agility has operated in Iraq for a number of years, supporting international oil companies (IOCs) directly in field development, in addition to oil and gas service companies in their scope of work. This may range from general freight forwarding services, encompassing international transport, customs clearance, and local delivery for a variety of kit, from hand-carry airfreights to charter services including heavy lift modules.

What has Agility invested in this new Centre of Excellence training facility?
Agility has made a significant investment in Iraq, with its facility at Rumaila, where the Center of Excellence has been developed. Agility already operates a strong local content strategy in its people investment, running at around 91%. The strategy is to develop this further by way of training engagement and, over time, release expat trainers and bring locals onboard. At present, the centre offers courses such as driving education, lifting and hoisting, and first aid. We are also working with organisations like the Chartered Institute of Logistics and Transport to provide other courses that will be fully accredited to degree level.

How secure is it to operate in a country that is rife with violence and instability?
Security incidents remain reasonably isolated, especially in the southern part of Iraq, where the bulk of our operations are active. We assess daily security reports to determine whether moving shipments around the country is feasible and safe. Whilst the political instability, oil price crash, and security situation in Iraq are challenges, Iraq can still be a positive country to operate in.

Which oil and gas clients does Agility currently work with in Iraq?
Agility has a number of clients in Iraq working in the oil and gas sector, covering a wide scope of activities. We have been active in Majnoon for more than five years, offering door-to-door freight forwarding, customs clearance, and transport activities. But we have also worked with a number of other high-profile clients, including Shell Iraq, Kogas, Baker Hughes, Turkish Petroleum, and Petrochina.

Why did Agility decide to open a Center of Excellence?
Agility understands the importance of developing local content in Iraq. We believe that by having an international, accredited training provider that can offer industry-standard training, we can support – and reduce costs for – IOCs, and improve local Iraqi companies that may not have the resources for personnel to be sent abroad to obtain the required accreditation. The Centre of Excellence will also help companies to reduce their expat presence, with a greater focus on local development. The training transcends a number of industries, but the clear health, safety, and environment focus reflects our own basis for operation in the country.
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