

TECHNICAL REVIEW

النشرة التقنية - الشرق الأوسط

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Vol 33/Issue Four 2017

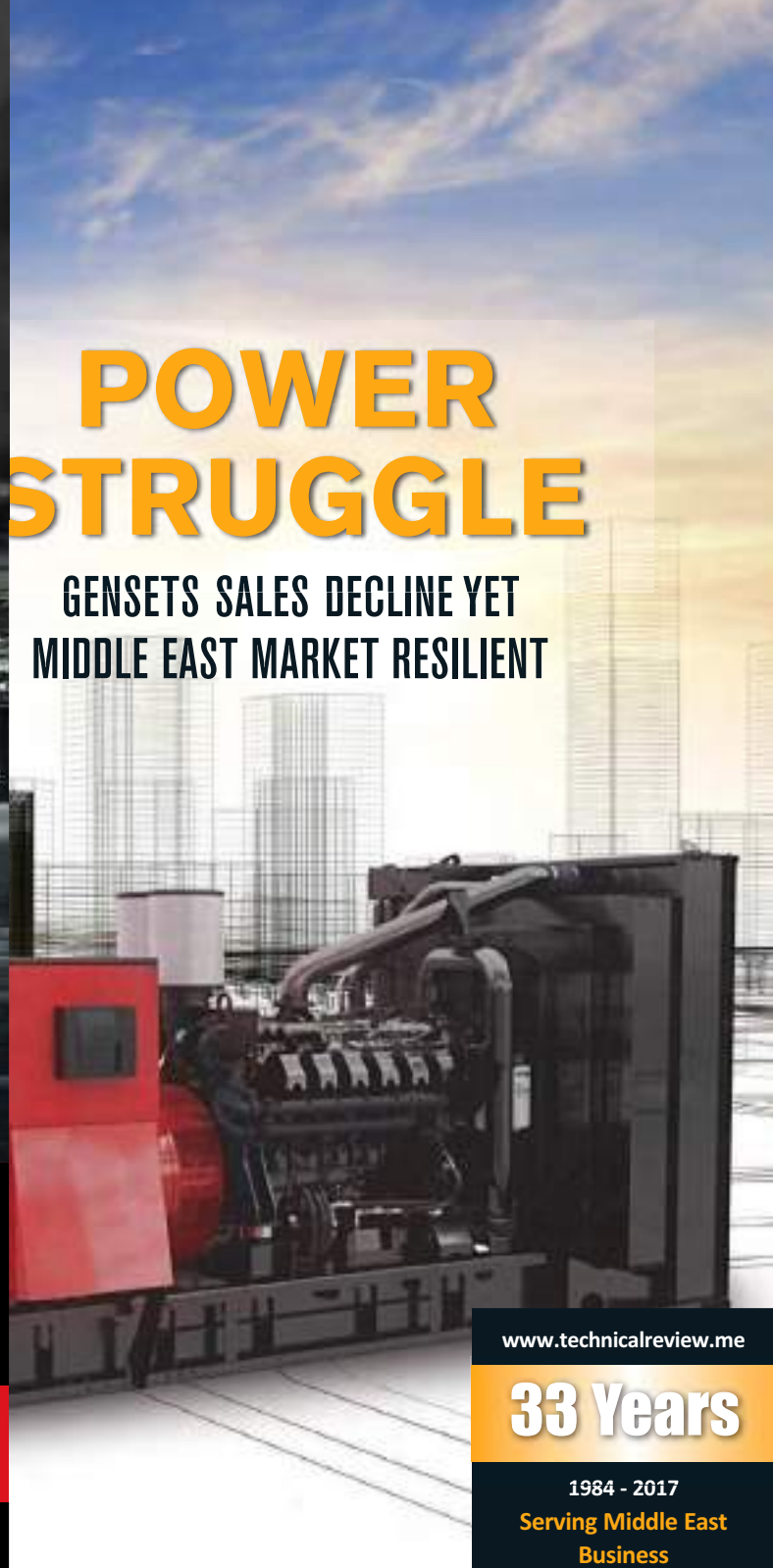
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Saudi strengthens

Reform policies rejuvenate
the kingdom's economy

Cool practices

Sustainable technologies push
GCC district cooling sector ahead

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EDITOR'S NOTE

SAUDI ARABIA IS slowly coming out of the economic shock that hit the kingdom after the 2014 oil price plunge. Efforts to push forward Saudi Vision 2030 and National Transformation Program (NTP) are in full swing as the country sees a fundamental policy shift. Construction and transportation projects are witnessing heavy spending once again, thereby raising hopes for investors. Its neighbours, UAE and Qatar, are not far behind in the race. With approaching deadlines on Expo 2020 Dubai and 2022 FIFA World Cup, rise in construction activities has led to notable growth in the genset industry. Our Annual Genset Review (p30) will encourage manufacturers and suppliers. As the district cooling market heats up, we debut our Annual District Cooling Review in this edition (p36). Meanwhile, read about latest industrial innovations in the Middle East on p60.

At Technical Review we always welcome readers' comments to trme@alaincharles.com

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TECHNICAL REVIEW

1981 م. خدمة شركات المنطقة منذ 1981

SERVING THE REGION'S BUSINESS SINCE 1981

النشرة التقنية - الشرق الأوسط

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Briefly

Iran to complete the construction of nuclear plant by 2025

IRAN HAS STATED that it expects to see a new nuclear power plant, which it is building in cooperation with Russia, to be launched before 2025. Behrouz Kamalvandi, spokesman for Iran's Atomic Energy Organization (AEOI), told domestic media that a second plant would be made operational two years later than the first one. He added that the projects could generate collective power of 2,100MW – 1,050MW each once fully operational. In September 2016, Iran said it had started a 10-year project to construct a new nuclear power plant with Russia's help. The country already runs one Russian-built nuclear reactor at Bushehr, its first nuclear energy project. Russia signed a deal with Iran in 2014 to build up to eight more reactors in the country. Kamalvandi further added that the construction of nuclear power plants required an investment of at least US\$5bn. The figure, he said, is at least three times higher than that required for the construction of regular plants.

Qatar's US\$4.7bn mega-reservoirs project right on track

THE CONSTRUCTION OF five mega-reservoirs that aim to boost Qatar's emergency water supply is 70 per cent complete, Kahramaa officials have announced.

According to *Doha News*, once finished, they will be among the world's largest reservoirs, each with a capacity of some 100mn gallons of water. They will have capacity to supply Qatar's population with a seven-day strategic reserve of freshwater. Currently, the nation has at best a two-day emergency supply, reports revealed.

Work on the US\$4.7bn Water Security Mega Reservoirs Project began in 2015, with the initial phases slated for completion next year.

The reservoirs are being built in Um Baraka, Um Salal, Rawdat Rashid, Abu Nakhla, and Al Thumama.

According to the *Qatar Tribune*, the facilities are now in the testing phase. Additionally, water pipelines work is 95 per cent complete and is now in testing phase.

Dubai Ruler announces contract worth US\$3.87bn for world's largest CSP plant

VICE-PRESIDENT AND PRIME Minister of the UAE and Ruler of Dubai, HH Sheikh Mohammed bin Rashid Al Maktoum, has announced the largest single-site concentrated solar power (CSP) project in the world, which will be built at a total cost of US\$3.87bn.

The CSP project, which represents the fourth phase of the Mohammed bin Rashid Al Maktoum Solar Park, will generate 700MW of clean energy to support Dubai's electricity grid. The project is considered an integral part of the emirate's Clean Energy Strategy 2050.

Sheikh Mohammed highlighted the UAE's model for sustaining a green economy based on environmental sustainability and clean energy. The UAE has a clear strategy for implementing and further developing this model to maximise its benefits, in addition to investing in infrastructure, building capabilities and developing specialised local talent.

"We have made steady progress in realising the goals of Dubai Clean Energy Strategy 2050 that was launched as part of our objective to transform Dubai into a global clean energy and green economy hub. The carbon footprint of Dubai will be the lowest in the world by 2030," said Sheikh Mohammed. "We are proud that by demonstrating their capabilities, our local talent have proved that they are ready to assume responsibility," the Ruler added.

His Highness' remarks came as the Dubai Electricity and Water Authority (DEWA) awarded the independent power producer (IPP) model-based contract for the CSP project. The contract was awarded to a consortium comprising of Saudi Arabia's ACWA Power and China's Shanghai Electric. The consortium bid the lowest levelised cost of electricity (LCOE) of US\$7.3 cents per kW/h.

The project will have the world's tallest solar



Vice-President and Prime Minister of the UAE and Ruler of Dubai, HH Sheikh Mohammed bin Rashid Al Maktoum, at the announcement ceremony. (Photo: DEWA)

tower, measuring 260 metres. The power purchase agreement and the financial close are due to be completed shortly.

Saeed Mohammed Al Tayer, MD & CEO of DEWA, stated, "This achievement boosts our objectives and positions us as one of the leading countries in the world in terms of clean and renewable energy. The Dubai Clean Energy Strategy 2050 aims to increase the share of clean energy in Dubai's total power output to seven per cent by 2020, 25 per cent by 2030, and 75 per cent by 2050."

The Mohammed bin Rashid Al Maktoum Solar Park is the largest single-site solar park in the world, based on the IPP model. It will generate 1,000MW by 2020 and 5,000MW by 2030. The 13MW photovoltaic first phase became operational in 2013. The 200MW photovoltaic second phase of the solar park was launched in March 2017. The 800MW PV third phase will be operational by 2020, and the first stage of the 700MW CSP fourth phase will be commissioned in Q4 2020.

Kuwait selects investor for waste-to-energy project

A CONSORTIUM comprising Constructions Industrielles de la Méditerranée (CNIM), Gulf Investment Corporation (GIC), and Al Mulla Group Holding Co (AMG) has been selected as preferred investor for its Kabd Municipal Solid Waste Project in Kuwait.

The project aims to address Kuwait's growing need for environment and land resources protection, and to generate alternative power sources. The plant will treat a nominal municipal solid waste capacity of 3,274 tonnes per day, which represents approximately 50 per cent of its municipal solid waste, as well as generate around 100MW of electricity.

Kuwait Authority for Partnerships Projects (KAPP) selected the CNIM-GIC-AMG consortium following a competitive tendering process.

The plant will utilise the latest technologies to treat waste. It will be developed on a build, operate and transfer (BOT) basis for a period of 25 years following completion of construction.

If the consortium is appointed as the successful investor, it will take up shares in the project company, which will be responsible for the design, construction and operation of the plant. The successful investor will be appointed by the higher committee after audit, among other things, by the state audit bureau.



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Briefly

Saudi's National Commercial Bank first to join SWIFT gpi

SAUDI ARABIA'S NATIONAL Commercial Bank (NCB) has signed up with SWIFT for its global payments innovation (gpi) service. The bank is the first in the country to join forces with over 100 leading global banks. SWIFT gpi dramatically improves the customer experience in cross-border payments by increasing the speed, transparency and end-to-end tracking of transactions through digital transformation.

The first phase focuses on business-to-business payments, helping corporates grow their international business, improve supplier relationships and achieve greater treasury efficiencies. Corporates receive an enhanced payments service from their banks while benefiting from key features such as same day and faster use of funds, transparency, end-to-end payments tracking and remittance information transfer.

Meanwhile SWIFT is already designing a second phase of gpi services that include the option to stop and recall a payment, enabling the transfer of rich payment data, and an international payments assistant service to help corporates initiate error-free payment instructions.

Masdar signs EPC contract to construct large-scale wind farm in Oman

ABU DHABI'S RENEWABLE energy company, Masdar, has signed an engineering, procurement and construction (EPC) contract with a global consortium comprising GE and Spain's TSK to build the Dhofar Wind Power Project, the first large-scale wind farm in Oman and the GCC.

The Dhofar Wind Power Project is a result of the joint development agreement that was established in 2014 between Masdar and the Rural Areas Electricity Company of Oman (RAECO). Funding for the wind farm is provided by the Abu Dhabi Fund for Development (ADFD).

The 50MW wind farm will electrify an estimated 16,000 homes and offset 110,000 tonnes of CO₂ emissions per year.

Mohamed Jameel Al Ramahi, Masdar CEO, said, "Oman has immense untapped potential in renewable energy, particularly in solar and wind. Masdar is proud to be supporting the historically close ties between the UAE and the sultanate by providing our experience and expertise from delivering cutting-edge renewable energy solutions across the world. The Dhofar Wind Power Project will play an important role in supporting the diversification of Oman's energy mix, while providing a reliable source of clean power to serve its growing population and economy."

Saleh Bin Nasser Al Rumhi, RAECO CEO, added that the project represents a fundamental shift in clean energy projects in the region and in the sultanate particularly. "The signing of this agreement signifies a major step in the development of the Dhofar Wind Power Project and is testimony to the strong relationship between the Sultanate of Oman and the UAE. We look forward to the signing of other associated agreements related to the project this October."

GE will lead the EPC consortium, and will provide the project's 13 wind turbines powered by the company's latest 3.8MW wind turbine generator solution. Built upon the technology of its predecessors, the turbine represents the latest development in GE's wind turbine platform, increasing both annual energy production and flexibility in operation. TSK will support the consortium partners with the construction of the balance of plant.



The Dhofar Wind Power Project will play an important role in supporting the diversification of Oman's energy mix. (Photo: Ben_Kerckx/Pixabay)

'Firms seeking tech bolt-ons to tackle energy market shift'

ENERGY TECHNOLOGY BOLT-ONS will underpin the future of the global energy industry as companies respond to the seismic shift in energy distribution and supply, consumer demand and to capitalise on the smart energy revolution, research by Pinsent Masons reveals.

The study, completed by 250 senior level executives at energy and energy investment companies from the Europe, Middle East and Africa (EMEA) and Asia-Pacific regions, showed that 90 per cent of energy companies are actively seeking a smart energy technology joint venture or acquisition. The appetite for JVs varies by region: almost half (49 per cent) of energy companies in Asia-Pacific are enthusiastic about partnerships, compared with a third (33 per cent) in EMEA.

Pinsent Masons says lucrative

opportunities in Europe and Asia could attract Middle Eastern investment with 85 per cent of respondents naming Germany, China and the UK the top three destinations for their next smart energy investment.

The findings indicate investors and energy companies are prioritising smart meters, new methods of harnessing surplus power and in-house development of data analytics technology within the next two years, while cloud management systems and virtual power plants will see a surge of investment over the next six years.

While the lack of competitive electricity markets is stifling innovation in the Middle East, Pinsent Masons states that Middle East-wide energy market collaboration and reform is crucial to the dismantling of government subsidies to kick start smart energy projects across the GCC sunbelt.

Sachin Kerur, partner and head of Pinsent Masons Middle East, sees opportunities opening up in the region. "We're seeing a clear steer from the government, with policies such as the Dubai Clean Energy Strategy 2050 leading the way.

Demographic drivers, growing demand for energy and the fiscal challenge of low oil prices will all contribute to a shift in gear for the Middle East's energy industry. For the region's investors and energy companies, the message is clear – innovation and dynamism will be the key to unlocking smart energy revolution in the region. While pursuing greenfield opportunities on the ground is crucial, cash-rich investors and acquisitive energy companies have an opportunity to reap the rewards of innovative new technologies across China, Germany and the UK," Kerur adds.

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ON THE WEB

A round up of the leading developments and innovations recently featured on *Technical Review Middle East's* online portal. To read more or to stay up to date with the latest industry news, visit www.technicalreview.me

Louvre Abu Dhabi to open on 11/11

A DECADE ON from the signing of the inter-governmental agreement between Abu Dhabi and France, Louvre Abu Dhabi will finally open to the public on 11 November 2017. Jean Nouvel, the French architect behind the project, has designed a museum city – Arab Medina, under a vast silver dome. Visitors will be able to walk along sea-facing promenades beneath the museum's 180 metres dome, comprised of 8,000 unique metal stars set in a complex geometric pattern, creating a moving 'rain of light' when sunlight filters through, according to *Ventures Middle East*.
www.technicalreview.me/construction



The project was launched on 7 March 2007. (Photo: derwiki/Pixabay)

Iran unveils reserve solar energy reactor in Qazvin

IRAN HAS UNVEILED a long-term reserve solar energy reactor, designed by an Iranian, in Qazvin's Science and Technology Park, with the aim of reserving and generating solar energy for domestic use. According to *Islamic Republic News Agency (IRNA)*, the reactor works through physical and chemical reactions to reserve long-term solar steam. The solar energy reactor is expected to add value to the country's goal of boosting domestic power generation capacity. With the increase in domestic energy consumption and limitation of fossil fuels, Iran continues to rely on the renewable energy sector.
www.technicalreview.me/power-a-water

EMC signs contract with Germany's TITAN

EMIRATES MOTOR COMPANY (EMC) has signed an exclusive contract with TITAN Spezialfahrzeugbau GmbH to represent the German company in the UAE market. EMC, the flagship company of ALFAHIM, will now be providing heavy-duty trucks, parts, and services to TITAN vehicles. TITAN Spezialfahrzeugbau GmbH is one of the leading manufacturers of heavy-duty and special purpose vehicles and supplies vehicles for operations on oilfields and mines throughout the MENA region.
www.technicalreview.me/logistics



The partnership agreement was signed at an official ceremony held at ALFAHIM headquarters. (Photo: EMC)

Zain Iraq to deploy Ericsson virtual EPC

ERICSSON HAS PARTNERED with telecom service provider Zain Iraq across the Middle East and Africa to upgrade its existing network through Ericsson's virtual Evolved Packet Core (vEPC) which addresses growing customer data usage. Under this collaboration, Ericsson will help modernise the current infrastructure of Zain's network by implementing a solution that focuses on enabling the operator to quickly introduce new services for customers, while maintaining high performance network requirements. In addition, Ericsson will also modernise Zain's existing infrastructure into Ericsson NFV infrastructure (NFVi) solution, which aims to provide a software-defined infrastructure through the hyperscale datacenter system 8000.
www.technicalreview.me/it

New desalination plant pegged for Casablanca

MOROCCO IS FINALISING a feasibility study and financial and institutional structures for a new seawater desalination plant project. According to *L'Economiste*, the plant will be located in the Casablanca-Settat region. Similar projects are also in the pipeline for Al Hoceima, Chtouka, El Jadida, Essaouira, Laayoune, Safi, Saidia and Tiznit-Sidi.
www.technicalreview.me/power-a-water



The plant will secure long-term water supply for Casablanca. (Photo: Michael Collot/sxc.hu)

CESI rolls out Phase Two of Oman's smart metering project

CESI, THE CONSULTING and engineering company, has been awarded the second phase of the automated meter reading (AMR) technology implementation project by Nama Group (NG) Oman. With the goal of enhancing the quality and speed of processing metering data, this AMR rollout will work towards improving billing accuracy, mitigating losses, lessening query related costs and reducing debtor days.

"Having worked with CESI on the first phase of this project, we are confident they have the expertise to continuously support NG with this project," explained Mansoor Al Hinai, V-P of distribution for Nama Group. "CESI has already developed the blueprint for the AMR implementation for high-value customers in Oman, and we are confident in their abilities to manage this complex project and ensure its successful rollout."
www.technicalreview.me/power-a-water

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Photo shows Skyland Istanbul:
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2-3	The Mining Show	DUBAI	www.terrapinn.com
8-9	3rd Annual Health, Safety & Security Forum	DUBAI	www.hse-forum.com
23-26	Saudi Build	RIYADH	www.saudibuild-expo.com
23-26	Project Iraq	ERBIL	www.project-iraq.com
23-25	WETEX	DUBAI	www.wetex.ae
23-26	Saudi Build	RIYADH	www.saudibuild-expo.com

NOVEMBER 2017

4-7	IranConMin	TEHRAN	www.iranconmin.de
26-29	The Big 5	DUBAI	www.thebig5.ae

DECEMBER 2017

3-5	Electricx	CAIRO	www.electricxegypt.com
3-5	Solar-Tec	CAIRO	www.solartecegypt.com
4-6	Gulf Traffic	DUBAI	www.gulftraffic.com
5-7	Saudi Transtec	DAMMAM	www.sauditranstec.com
10-11	Annual Refrigeration Conference	DUBAI	www.refrigeration-forum.com
12-14	Saudi Smart Grid	JEDDAH	www.saudi-sg.com

Readers should verify dates and location with sponsoring organisations, as this information may be subject to change.

3rd Annual HSE Forum – 'Realising the UAE's Vision 2021 safety goals'

A RAFT OF infrastructure and construction developments are underway in the UAE in the bid to make Expo 2020 Dubai one of the greatest shows on earth, with safety and sustainability at its heart.

With a focus on Expo 2020 Dubai, a vision to create a culture that brings safety-first behaviour to the forefront, and the proposed regulations for Safe Public and Fair Judiciary under the UAE Vision 2021, the 3rd Health, Safety & Security Forum will be held from 8-9 October in Dubai, with the theme of 'Realising the UAE's Vision 2021 safety goals'.

Continuing the highly acclaimed HSE event series, the forum, now in its third year, will provide a platform to promote discussions on critical issues ranging from fire safety to emergency response and the enforcement of the latest HSE regulations, notably the UAE Fire & Life Safety Code which was updated earlier this year.

One of the highlights will be a keynote presentation from Dr Rob Cooling, director of Health, Safety, Quality and Environment – Real Estate and Delivery, Expo 2020 Dubai, focusing on precautions and preparations to minimise the rate of lost time injuries.

Other eminent speakers include Engineer Redha H. Salman, director, Health and Safety Department, Dubai Municipality; Raed Mohammed Al-Marzouqi, head of Occupational Health And Safety, Dubai Municipality; Dr Huda Khaleefa Alsalmi, head of Environmental Health & Safety, Abu Dhabi City Municipality; and Waddah S. Ghanem, executive director, EHSQ Compliance & Corporate Affairs, Emirates National Oil Company Limited (ENOC) LLC.

"With feedback from our previous two events being extremely



Delegates and attendees at the 2016 HSE Forum. (Photo: Technical Review Middle East)

positive, we are delighted to provide a forum for continuing debate on critical issues as the UAE sharpens the focus on health and safety in the run-up to Expo 2020," says Tania Jadhav, conference producer. "Featuring keynote presentations, interactive panel discussions and a unique mock investigation process, which will be held for the first time in the UAE, the 3rd Health, Safety & Security Forum will provide attendees with a rich networking and learning experience and is not to be missed by anyone involved in the business of HSE."

For further information and to register, visit www.hse-forum.com

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The Yavuz Sultan Selim Bridge, a US\$3bn investment and the world's tallest suspension bridge, that carries eight lanes of cars and a two-way rail system across 2,164 metres of the Bosphorus Strait. (Photo: FG Wilson)

Bridging the power gap

FG Wilson in Turkey is a part of all the major infrastructure and state-of-the-art projects, thereby making its position stronger than ever before.

THROUGH CENTURIES, TURKEY'S position on the world map has always played a key role in its economic development, connecting Europe with Asia and making the country a focal point of trade and commerce. Home to Europe's largest city, Istanbul, with a population of almost 15mn and still growing rapidly, Turkey has recently seen some of the region's most exciting and ambitious infrastructure projects.

Demand for quality electrical power has increased dramatically in that time. FG Wilson, one of the world's longest established manufacturers of generator sets, has been part of the Turkish economic landscape right through with a presence in the country since the 1980s.

FG Wilson is represented by FGW Jenerator Turkey, initially as a sales office and since 2009, a locally managed dealer with offices in Istanbul, Ankara, Izmir and Erbil in northern Iraq, together with service centres throughout Turkey.

Koksal Er, CEO of FGW Jenerator Turkey, says, "We track urban transformation trends and we've been actively participating in many major power projects in Turkey, northern Iraq and increasingly with Turkish contractors working on projects globally. We work very closely with developers on power projects from initial concept design through to installation and commissioning of

generator sets. We have a dedicated team of specialist engineers for major projects, and we work seamlessly with the UK-based FG Wilson engineering team all the way through each project."

This co-operation between dealer and factory has produced some strong results. In 2016, FGW Jenerator Turkey achieved full IBC seismic certification as part of a project to install 19 x 1,700kVA and 2 x 800kVA generator sets at Skyland Istanbul, the second largest construction project in Turkey in 2016. The FG Wilson generator sets were manufactured in the UK, then tested and certified in Rome in July 2016 at the only shaker table test facility outside the USA to be able to accommodate machines of this size. This was the first time FG Wilson has achieved seismic certification for large generator sets and is believed to be the first time a generator set powered by a Perkins 4000 Series engine has achieved full seismic certification.

The list of projects completed by FGW Jenerator Turkey reads like a catalogue of the country's most prestigious construction and infrastructure projects. One is the Yavuz Sultan Selim Bridge, a US\$3bn investment and the world's tallest suspension bridge, carrying eight lanes of cars and a two-way rail system across 2,164 metres of the Bosphorus Strait. The bridge relies on four 605kVA generator sets

to power the bridge's towers, road lighting, tower escalators, service pumps, dehumidification units and architectural lighting.

In the last few months, FGW Jenerator Turkey has been working on standby power for one of Istanbul's most desirable new addresses – Pruva 34, developed by Doğa Madencilik, part of the Doğa Group, well known for projects that combine state-of-the-art technology products with contemporary architecture in safe, high-quality and durable buildings. Seven P900E1 generator sets were ordered to meet a requirement for 6,300kVA and were installed as two separate synchronised groups. FGW Jenerator Turkey provided installation design of the generator room in accordance with local fire code requirements, also managing the design of the synchronisation panel and providing consultancy service for sound isolation, seismic isolators and a daily fuel system.

Koksal adds, "It's an exciting time to be here and to see these amazing buildings and infrastructure projects take shape. And it's wonderful to be a part of it. As each project completes successfully, we take that great experience and move on to complete new challenges." ■

To find out more about FG Wilson in Turkey, visit www.fgwilson.com.tr



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When the Saudi Vision 2030 was announced last April, the blueprint said the government would work to 'salvage' and 'revamp' economic city projects executed over the past decade that 'did not realise their potential'. (Photo: Sarunas Vaitkus/ Adobe Stock)

Into the future



In this first part of the two-part feature on Saudi Arabia's move towards Vision 2030, economist Moin Siddiqi observes the steps the kingdom is taking to fulfil its goals.

Saudi Arabia plans to establish a US\$2 trillion sovereign wealth fund for post-oil era, which will open new opportunities for global firms.

SAUDI ARABIA IS at initial stages of a reform strategy known as 'Vision 2030'. It represents the most ambitious Saudisation project ever to foster a knowledge-based/industrial economy that attracts higher inward investment and where private businesses are pivotal in the country's long-term goal of becoming the world's powerhouse. The first phase of reforms is being rolled out via the five-year National Transformation Programme (NTP).

The strategy has generated strong global interest because it seeks to increase investment (both domestic and foreign) and enhance the competitiveness and diversification of the kingdom through development of the private sector. The International Monetary Fund (IMF) stated, "Saudi Arabia has begun a fundamental policy shift to respond to low oil prices. Diversifying the economy, creating jobs for nationals in the private sector and implementing a gradual but sizeable and sustained fiscal consolidation are key policy priorities."

It added, "Progress with reforms to improve the business environment are gaining momentum and a framework to increase the transparency and accountability of the government is largely in place."

Despite growth slowdown in the past two years, Saudi Arabia's finance minister Mohammed Al-Jadaan explained, "The fundamentals of the Saudi Arabian economy remain strong as the kingdom's balance sheet remains strong, with Saudi Arabian Monetary Agency (SAMA) forex assets estimated at 84 per cent of gross domestic product (GDP), the third-largest in GDP terms globally. General government assets are considerably above 100 per cent of GDP." Moody's Investors Service broadly agreed: "Although we see significant implementation risks, we think that even if Saudi Arabia implements part of the NTP, the plan will benefit the sovereign's credit quality by supporting its fiscal and economic strength."

Looking ahead, sizeable fiscal buffers, low debt, stable Saudi Rial-US dollar peg coupled with the continued strength of Saudi oil production and growth-enhancing structural reforms underpin investor confidence. But oil still remains a critical economic variable – with budget revenue projections based on oil price of US\$60/barrel by 2018. The banking sector remains strong – with adequate liquidity and non-performing loans estimated by IMF at only 1.4 per cent.

The kingdom has received net foreign



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direct investment (FDI) inflows of about US\$293.3bn over the decade, mostly into petrochemicals and oil refining sectors. Saudi Arabian General Investment Authority (SAGIA) aims to attract US\$18.7bn in annual FDI by 2020. Direct purchase of shares by foreign institutional investors on the equity market is permitted since 2015.

Investing for the future

Saudi Arabia over decades has executed a mammoth infrastructure development programme. Between 2003 and 2013, total investment (in nominal terms) totalled about US\$1.3 trillion – of which one-fifth was spent on economic infrastructure, double the previous decade. The largest share went into public utilities, but there was also heavy spending on transportation (roads, air and port facilities) and telecommunications – thereby improving regional and international connectivity. Saudi Arabia was ranked 52nd in 2016 Global Logistics Performance Index; the NTP aims to raise global rating to 25th by 2020.

The kingdom's faces demographic transition – with over half of indigenous population younger than 25 and by 2030 about 4.5mn new working-age Saudis could enter the labour market. The degree of urbanisation is larger than in some Western European countries; four-fifths of the total population live in cities.

"This demographic structure, with a young and growing population, could in the short term be a considerable asset and a generator of economic growth," stated Mckinsey Global Institute. Demographic pressures demand huge funding for physical and human infrastructures, which, in turn, require foreign and private investment and the creation of almost three-times as many jobs for Saudis as the country created in the last decade. The NTP targets 450,000 private sector jobs by 2020.

Overall, the government has awarded contracts worth over US\$370bn since 2010, of which three-fifths of the total are still under-construction. Among some of the largest civil projects included the US\$21bn expansion of the Grand Mosque in Mecca and the US\$7.2bn King Abdulaziz International Airport expansion in Jeddah. Presently, greenfield projects with an estimated value of US\$250bn are either at pre-development stages or tender phases.

Global audit consultancy KPMG noted, "Many of the government's projects will be run on a public-private-partnership basis and will involve the privatisation of existing government entities." The energy sector

The kingdom's key macroeconomic indicators (in US\$bn, unless otherwise indicated)

	2014	2015	2016	Proj. 2017
DOMESTIC ECONOMY				
Nominal gross domestic product (GDP) *	756	654	646	692
Non-hydrocarbon sector (%) of GDP	71.4	75.1	73.0	73.5
Real GDP growth (%) **	3.7	4.1	1.7	1.0
Private sector growth (%) **	5.4	3.4	2.1	–
Consumer price index (average)	2.7	2.2	3.5	1.7
Overall fiscal balance //	-3.4	-15.8	-17.2	-9.3
Total government gross debt //				
EXTERNAL SECTOR				
EXPORTS, FOB	342.5	203.5	182.3	208.2
o/w: Oil and refined products (%) of total exports	83.0	75.2	74.7	76.1
IMPORTS, FOB	158.5	159.3	123.9	127.6
Merchandise trade surplus	184.0	44.2	58.4	80.6
Current account balance	73.8	-56.7	-24.9	1.3
Foreign direct investment inflows (net) #	8.1	7.4	9.0	9.8
Gross official reserves	724.3	608.9	528.6	472.6
External debt stock	0.0	0.0	20.0	40.0
Saudi Riyals per US\$ (period average) ~	3.75	3.75	3.75	3.75

*Saudi Arabia is the biggest economy in the Middle East and the world's 19th largest; ** Annual percent change; // Per cent of GDP; # FDI inward stock [2016] US\$231.5bn; ~ Exchange rate is pegged to the U.S. dollar

Sources: SAMA, IMF estimates July 2017, and UNCTAD World Investment Report 2017

Area: 2.2mn sq km; Population [2016]: 32mn; GDP in (purchasing power parity): US\$1.7 trillion (2016). Sovereign Credit Rating: Moody's (A1); Standard & Poor's (A-); FitchRatings (AA-).

Dealing with construction permits *

	Saudi Arabia	MENA /	OECD // high income
Procedures (numbers)	13.0	15.1	12.1
Time (days)	106.0	129.5	152.1
Cost (% of warehouse value) #	0.5	3.3	1.6
Building quality control index (0-15)	12.0	10.0	11.3

* Saudi Arabia's 2017 ranking was 15 (out of 190 countries)

/ Middle East and North Africa

// Organisation for Economic Co-operation and Development

Estimated value of warehouse in Riyadh: SAR 3,933,818

Source: World Bank Doing Business Report 2017

comprises one-third of planned projects, followed by construction and transport at 29 and 27 per cent, respectively.

The Ministry of Housing estimates three million new homes will be needed by 2025 to cater for rising population. The Ministry of Health plans to build about 3,000 medical centres. Education is also high priority with 20 new universities built. Operators could be given a role in operating some of the public hospitals or schools. During the last decade, the kingdom built 81 hospitals at a cost of US\$6.93bn. The government has allocated funds for renewable energy, with a target of 3.4 and 9.5 GW of installed capacity by 2020 and 2030, respectively.

Strategic partnerships

The NTP seeks to increase the share of private sector activity from currently 40 to 65 per cent of GDP by 2020 through better

infrastructure, business friendly regulations and enhanced logistic solutions. Privatisation and public-private partnerships (PPPs) are central to a broader diversification strategy. Bernd van Linder, managing director of Saudi Hollandi Bank, told London-based Banker journal, "I expect PPPs to gain traction, especially in the energy and water sectors. Historically, projects in these sectors have been very successful, not just in financial terms for the entities running the associated facilities but also in terms of their effectiveness and efficiency."

Riyadh expects the sale of 146 state-owned enterprises to provide the treasury with US\$200bn in total. The three major assets are Saudi Electricity Company (SEC, the largest power utility in the Middle East), Saline Water Conversion Corp; and Saudi Post Corporation. Strategic partners are

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Looking ahead, sizeable fiscal buffers, low debt, stable Saudi Rial-US dollar peg coupled with the continued strength of Saudi oil production and growth-enhancing structural reforms underpin investor confidence. (Photo: panatfoto/Adobe Stock)



expected to account for 100 and 52 per cent, respectively, of power generation and desalination projects by 2020. Moreover, NTP envisages the private sector contribution to roads, railways and port projects at five, five, and 70 per cent, respectively, by 2020. This year, PPPs were awarded to develop airport projects at Yanbu, Taif, Qassim and Hail.

General Authority of Civil Aviation plans to privatise all airports by 2020.

The biggest asset for partial sale is the much-anticipated public share offering of five per cent of Saudi Aramco, which would be opened to foreign investors. The government estimates the value of Aramco at over US\$2 trillion – far exceeding market capitalisation of supermajors (ExxonMobil, Chevron, Shell, Total and BP). An investment banker remarked, “The Aramco initial public offering is a message to the rest of the world that Saudi Arabia is open for business.” But today’s low oil prices could delay its sale.

Industry clusters

The manufacturing sector is key to boosting non-oil growth; the number of factories is expected to reach 9,000 by 2018, according to Mutlaq Al-Qahtani, former head of the

The kingdom has received net FDI inflows of US\$293.3bn over 10 years, mostly into petrochemicals and oil refining sectors.

Jubail Industrial Chamber. Saudi Arabia aims to achieve more sophisticated industrial capacities. The NTP sets specific targets for the Royal Commission for Jubail and Yanbu (RCJY). They include expanding the number of value-added manufactured products from 432 to 516 items, expanding output capacity of RCJY cities from 252mn to 309mn tonnes and increasing private investments in Jubail-Yanbu areas by half from US\$181.59bn to US\$290bn.

New residential, educational, entertainment, logistics and commercial

complexes are being built to achieve these targets. The manufacturing sector is projected to comprise one-quarter of the GDP by 2020 – up from 12 per cent in 2015. The sector grew at robust 7.9 per cent annually during 2000-15 with manufacturing value added estimated at US\$79.4bn in 2015, according to the World Bank. Mining and petrochemicals are areas among where Saudi Arabia has an untapped competitive advantage and hence should play an important role in job creation.

The Ministry of Transport under a 10-year plan (2015-25) has allocated colossal financing for new metro lines and bus routes in Jeddah, Mecca, Medina and Riyadh. This offers opportunities for the manufacturing of buses, train carriages and spare parts as well as providing technical support services.

Saudi Arabia remains strategically the most important market in the region. It plans to establish a US\$2 trillion sovereign wealth fund for post-oil era, which will open new opportunities for global firms across wide sectors of the Saudi Arabian economy. And the non-oil growth should increase over the medium-term underpinned by reforms. ■



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Even as reports suggest a deterioration in the value of contracts in 2017 in Saudi Arabia, high levels of competition and construction still prevail. *Technical Review Middle East* touched base with consultants in the kingdom to understand the situation at 'Ground Zero'.

'Due diligence will pay off'

Haroon Niazi is a partner at HKA and is responsible for managing the business in Saudi Arabia. He specialises in all areas of dispute resolution and construction law at HKA, the new global brand that unites the former Construction Claims and Consulting Group of Hill International and associated subsidiaries.

Technical Review Middle East (TRME): What is the construction scenario in Saudi Arabia currently?

Haroon Niazi (HN): The construction market remains subdued within the kingdom. The first half of 2017 has been incredibly tough for everyone involved within the construction industry. In particular, the lack of liquidity within the market has slowed down projects and changes to fiscal policy have meant that many of the new projects that were meant to start in 2017 were unable to get off the ground. What we are seeing is that the demand for work has increased and as such, contractors and sub-contractors appear to be pricing projects on a more competitive basis in order to secure work to see them through the current climate. The key factor remains that end user demands within Saudi Arabia remains high and as such additional due diligence is being wisely undertaken by the government in order to ensure only those projects that will have a positive impact on society actually come to market. In my opinion, this is an

important policy change and we will soon see the long-term benefits as a result of such changes.

TRME: Can you shed some light on the current projects with regards to utilities, transportation and renewable energy too?

HN: The Riyadh Metro project remains the largest transportation project in the kingdom and is on track. In addition, we should soon be seeing the Haramain High Speed Railway Project (US\$20bn) come into operation. This will provide much needed assistance for pilgrims commuting between Makkah and Madina. The aviation sector remains active and we recently saw a new contractor appointed on the redevelopment of King Khalid Airport in Riyadh. At the same time, works remain on going in Jeddah on King Abdul Aziz International Airport where we recently saw the appointment of the airport operator. After the success of the Madina Airport PPP project, we have recently seen three further airports (Yanbu, Hail and Qassim) awarded on a PPP basis.

In terms of renewable energy, recent government announcements indicate that the kingdom is moving ahead with its plan to deliver 9.5 GW of renewable energy by 2023 in accordance with the objectives as set out in Saudi Vision 2030. A technical appraisal is currently being carried out in order to shortlist companies for some of the solar and wind projects planned to commence next year.



Haroon Niazi

TRME: Do you think public private partnership (PPP) is the way forward?

HN: PPP projects have been delivered both successfully and unsuccessfully in various countries throughout the world. There are numerous examples of projects failing where the end result has been that it has actually cost the government more to deliver a project than it would have done so under a traditional form of procurement. It is clear that the Saudi government is keen to learn from mistakes of others and is implementing measures to minimise the PPP delivery risk. However, PPP projects are not new to Saudi Arabia and, in addition to Madina Airport, we have seen other projects in the power and utility sector successfully delivered by the private sector.

I see PPPs as an important way to engage with the private sector in order to assist with the fiscal changes and overall diversification strategy as part of Vision 2030. It is important that the framework that surrounds any PPP transaction is robust and therefore project sponsors, investors, financiers, contractors and all other stakeholders involved in the delivery and operation of a project have confidence in the viability and legal security of any proposed scheme. As with any project, a PPP scheme is no different, and due diligence remains a fundamental element for the success of the project. Sometimes some of the best projects are the ones that you never do and, therefore, it is important that measures are



An artist's rendering of the Haramain High Speed Railway Project.

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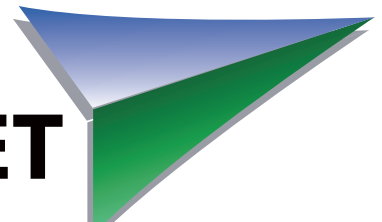
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implemented to ensure project due diligence is effectively carried out.

TRME: Do you see businesses aligning their strategies to Vision 2030 in terms of sustainability and development?

HN: Absolutely. I am now talking to clients who would never have thought about doing a project as a PPP or transforming their operation model. They understand the need to change and diversify in order to ensure they are not left behind. As I have said due diligence is key and what is important is that all stakeholders properly engage in the due diligence process of any project in order to ensure they are moving forward in line with Saudi Vision 2030. What is clear is that

changes surrounding Vision 2030 and the National Transformation Program (NTP) are happening and are proceeding at the required pace although we are expecting some changes in the overall NTP delivery programme. We have also recently heard that there may be some delays in the Aramco IPO. The private sector cannot afford to be left behind and therefore aligning business plans in line with government strategy is fundamental. Whilst this will be difficult, I do believe businesses in the kingdom can adapt to meet the challenges associated with the change. Historically businesses have focused efforts around government spend and initiatives. Making such changes is no different.

TRME: Your advice to local and international companies doing/wanting to do business in Saudi Arabia?

HN: It's very simple – the kingdom remains the largest country within the GCC and with the budget deficit shrinking, the future remains positive. There will be a number of investment opportunities for both local and international companies in Saudi Arabia and, provided one has carried out the due diligence, the reward remains significantly higher than may be obtained elsewhere. I cannot reiterate the importance of due diligence as I have mentioned this a few times, but with reward comes risk and as such it is important that risk is managed from day one.

'Saudi Arabia undergoing significant progress'

IN THE TWELVE months to Q1 2017 construction as a percentage of GDP contracted from seven per cent to 6.2 per cent as backlogs continued to fall and awards in late 2016 failed to fill the gaps. A good start to the year was followed by a slow second quarter, indicating the market is still in some flux. The committed major schemes from Saudi Arabia's Crown Prince for late 2017 need to flow through to stem the industry's falling level of work.

Within the GCC, political turmoil has weighed on the industry in general and construction has felt the effects as badly as other sectors. Q1 in the kingdom marked a surge of industry awards to US\$11bn, compared against a quiet Q4 2016. This has fallen back significantly in Q2 to an estimated US\$5bn, which reflects the region, with no GCC country performing as strongly as in Q1. Other factors weighing on the market have been Ramadan falling just prior to the traditional 'quiet' period of the summer holiday season, liquidity still moving its way into the industry and the oil price being range bound.

With alternative financing working its way through the government sector, we have seen significant moves to market in aviation, power and water. The General Authority of Civil Aviation of Saudi Arabia (GACA) has so far awarded five airports – King Khalid Riyadh terminals upgrades, Qassim, Hail, Taif and Yanbu – in 2017 at an estimated US\$4.9bn, making them the standout client in the kingdom in 2017 with nearly 30 per cent of awards by value year to date. Numerous other schemes are still to come to market or be awarded as GACA commences the process of privatising

several of its key assets. The growth in this sector is driven by solid commercial fundamentals.

Demand is expanding from a growing, young population that is increasingly demanding connectivity. The private sector was expected to start recovery in the construction industry in 2017. However, given the focus on real estate in the sector – even factoring in lower costs of construction – the headwinds faced in real estate have continued, with a near 10 per cent fall in sales prices compared to 2016. This has made the viability of numerous schemes challenging – even when factoring in the upcoming 'white land tax'. However, this should drive focus towards the affordable end of the market, which is very poorly supplied currently.

The effects of aligning the industry pipeline of projects and programmes to the country's requirements are becoming evident. Year-on-year (yoy) there have been more than a five per cent drop in schemes either in the pipeline or being constructed. Part of this is explained by the contract completion and lack of awards, although certain 'trophy' schemes have disappeared already from the pre-contract stages or have reduced in scale. This trend is expected to continue with PWC's reprioritisation/cancellation of schemes across ministries on behalf of the Ministry of Planning and Economy. However, the mid-term probability of schemes in the pipeline actually moving forward has increased.

The government sector is now starting to apply project management office (PMO) processes and procedures designed to

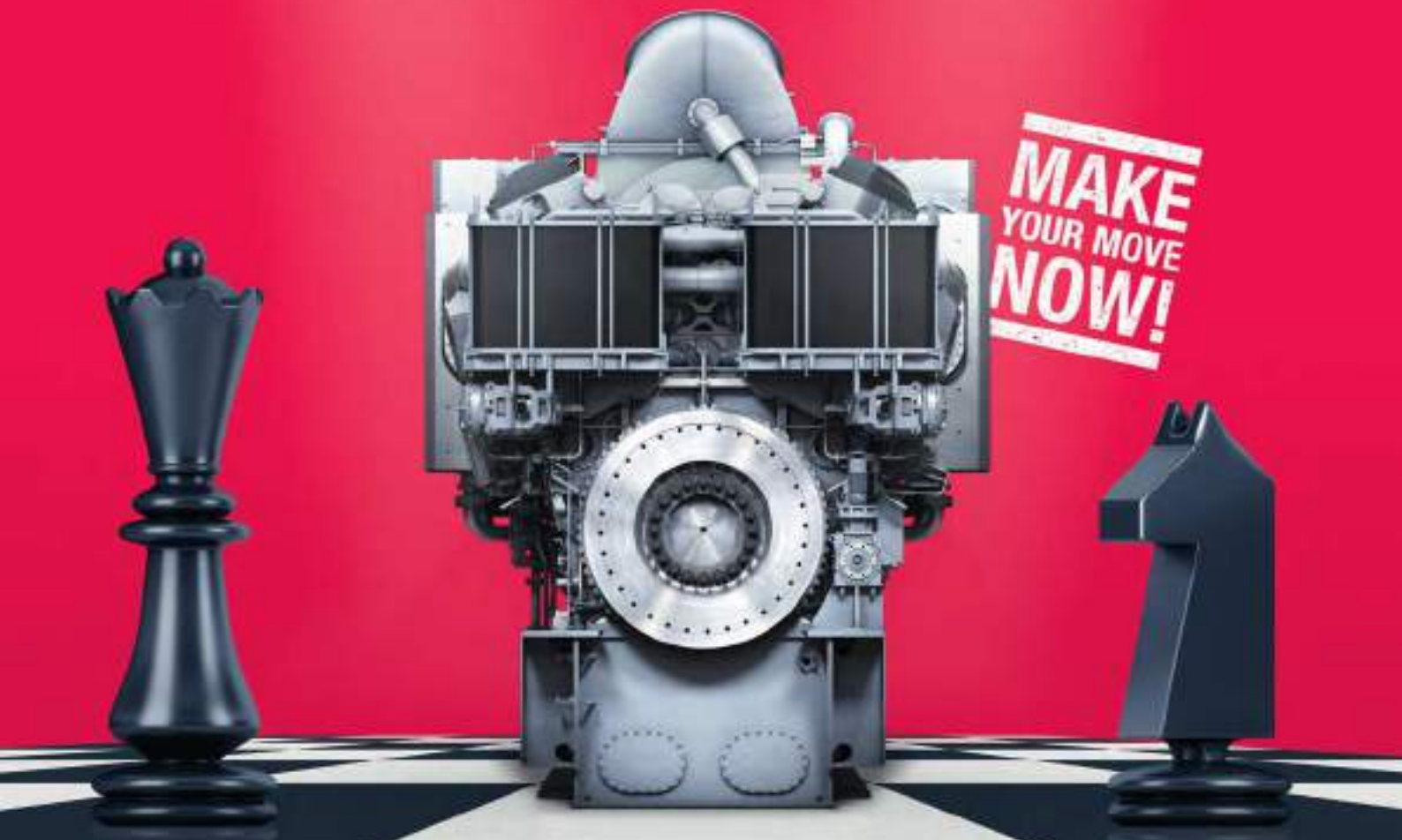
deliver best practice and transparency within the Ministries and government-owned organisations. Under the stewardship of the NPMO (Mashroat), several government entities are in the process of procuring or rolling out their own PMO, although this process has taken somewhat longer than originally expected. The effects of this rollout will only be felt during 2018 and beyond, so the need to prioritise projects by exception is critical if the industry is to survive at a suitable scale to deliver in the future. Mecca Metro has taken time to move forward and it is thought this scheme could be awarded prior to the end of 2017.

Tendering activity in H1 has been relatively subdued in terms of value. Numerous bids have been in the market from the private, semi-government and indeed some government entities, but most schemes haven't been of a size to support the quantum of workers or supply chain. As an industry, there is estimated to be a US\$60bn gap in backlogs across the region. This, in turn, has placed further pressures on the whole contracting supply chain. Although an upturn is expected and regionally, awards in H1 2017 have outperformed H1 2016 by 15 per cent, it should be noted that 2016 was the worst H1 for more than five years. Given US\$16bn of awards have occurred in Saudi Arabia in 2017 to date, our forecast for US\$27bn in the year may need to be revised upwards should the Crown Prince's commitment for major awards later this year occur.

— *By David Clifton. He is the regional development director at Faithful+Gould*

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Privatisation could appease cash-crunched KSA, reveals study

THE SAUDI ARABIAN government is gearing up to sell a state-owned power generation firm and a water desalination company by the end of this year, according to Mohammed Al Tuwaijri, the vice-minister for economy and planning, who said each would be a multi-billion-dollar deal.

The privatisation process is “in a very, very advanced stage”, he told the press recently, with “not only financial advisers hired, but we have appetite secured”.

The power generation firm is the first of four companies owned by state utilities provider Saudi Electricity Company (SEC) to be privatised over the next few years – one per year – under the country’s five-year development plan released in June 2016 – National Transformation Program.

The Saline Water Conversion Corporation (SWCC), meanwhile, announced in August that it had hired US-based management consultancy DuPont Sustainable Solutions to

help optimise its operations and risk management in preparation for a potential sale by year end. The SWCC currently supplies 70 per cent of the country’s desalinated water. The move dovetails with a government target for private partners to supply 52 per cent of the country’s desalinated water requirements by 2020.

The approaching sales are part of a broader government plan to raise some US\$200bn by selling state assets over the next few years under its overarching Saudi Vision 2030 blueprint for economic and social development. As for the utilities sector, late last year officials announced that SEC would be divided into four separate companies and transferred to the public investment fund ahead of privatisation. Each would have around one-quarter of the company’s current 60MW of generation capacity at the time of sale.

Last year the SEC said it would retain its

transmission and distribution operations after selling its generation assets, but was open to an expanded role for the private sector in downstream operations.

Demand for cost-effective utilities is set to rise as the government pushes for greater efficiency in public service delivery amid lower oil prices, including by cutting electricity subsidies. “In particular, the public sector will either move to transfer secondary activity to private operators or to co-invest in energy-efficient utilities solutions,” Kamal Pharran, CEO of Saudi Tabreed District Cooling Company, stated.

The increased investments called for in the NTP – in large-scale housing, infrastructure and industrial developments – will also drive demand for utilities expansion, Pharran said, as the country seeks to lift both output and efficiency in delivering water, power and district cooling services.

– Source: Oxford Business Group

2017 could be the record year for new Saudi hotel openings

WITH RIYADH BEING the busiest city followed by Jeddah, hotels and leisure construction contractor awards will reach a value of US\$ 2.5bn by the end of this year, according to Venture Onsite’s GCC *Hotels & Leisure Market* report.

The Saudi Vision 2030 is encouraging positive growth for the hotel and leisure industry. In April, the kingdom’s public investment fund announced plans to build the largest cultural, sports, and entertainment city in the world. By 2022, sports, cultural and recreational facilities will be developed along with a safari and a Six Flags theme park over a 334 sq km area south of Riyadh.

While expanding its capacity to accommodate religious visitors in Makkah and Madina, the kingdom is also broadening its hospitality market in a bid to diversify the national economy.

The positive trend is confirmed across the whole region. In the GCC, hotel and leisure construction contractor awards are expected to record a 13 per cent increase, from US\$11,237mn in 2016 to US\$12,716mn in 2017, according to the Ventures Onsite report. Among the Middle East countries, Saudi Arabia has the most number of rooms in construction at 40,020 across 89 projects; the UAE with 35,050 rooms in 121 projects and Qatar with



With sustainability becoming progressively important to Saudi Arabia, hotel and leisure facilities are increasing their green spaces. (Photo: Kzenon/Adobe Stock)

9,627 rooms in 41 projects, according to global hotel data from STR.

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Building up strength

The government's plans to meet the country's growing demand for power and increase focus on developing renewable energy sources will be the major drivers behind market expansion. (Photo: vencav/Adobe Stock)

Saudi Build has proved its value through the participation of decision makers that network with engineers, businessmen and specialists in the kingdom as well as by introducing latest trends of the development sector.

PREPARATIONS ARE under way for the 29th Saudi Build Exhibition that will be held between 23-26 October 2017 at the Riyadh International Convention and Exhibition Center, alongside Saudi Stone-Tech and Saudi Build PMV Series.

The National Transformation Program (NTP) 2020 and the Saudi Arabia Vision 2030 announced by Crown Prince and chairman of the Council of Economic and Development Affairs Mohammad bin Salman bin Abdulaziz Al-Saud, emphasised the kingdom's mission to achieve economic diversification and reduce reliance on oil through increasing support and investment in sectors such as healthcare, industry, transport, energy, education and real estate sector, to support sustainable economic growth.

The country's construction industry is expected to contract further in real terms in 2017 by 0.2 per cent, before regaining growth momentum. Growth over the forecast period (2017–2021) as a whole is expected to be supported by the government's focus on developing transport

infrastructure, energy and utilities facilities, and affordable housing across the country. The Saudi Arabian construction industry is expected to rise from US\$103.1bn in 2016 to US\$105.4bn in 2021.

There are key policies and investment programmes that should help to boost construction. The government plans to develop sea ports, railways, airports and manufacturing facilities.

Under the NTP 2020, the government

The Saudi Arabian construction industry is expected to rise from US\$103.1bn in 2016 to US\$105.4bn in 2021.

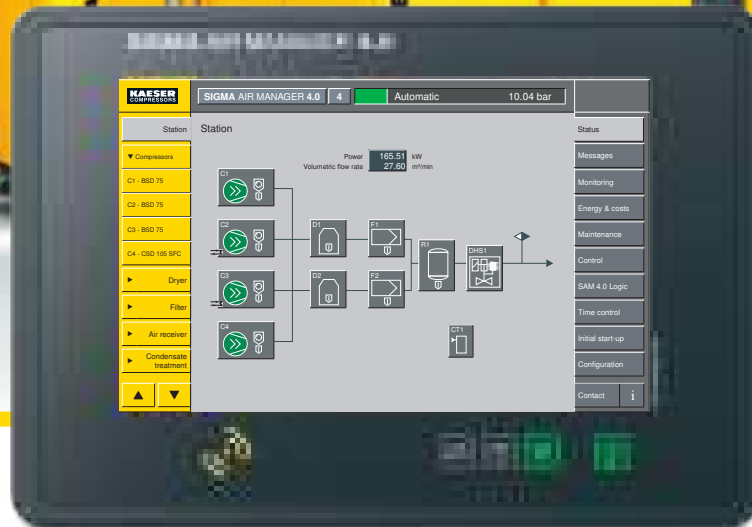
plans to invest US\$71.5bn to develop the country's transport and tourism infrastructure. Moreover, under Saudi Vision 2030, the government plans to increase the private sector's contribution from 40 per cent of the country's GDP in 2015 to 65 per cent by 2030.

The growth of these sectors must be accompanied by huge infrastructure development projects necessary for the establishment of educational and healthcare centres, industrial cities and housing projects, development of roads and transport network facilities will also have a direct impact on the growth of the construction and building sector in spite of the negative impact resulting from the decline in oil prices.

According to Riyadh Exhibitions Company (REC), the main mission of the Saudi Build Exhibition is to gather leading companies to showcase their services, capabilities, and projects to a specialised audience including consultants, engineers, businessmen and decision makers. ■

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The booming construction and telecom industries are driving growth in the diesel genset market in the region. (Photo: markobe/Adobe Stock)

Generating a better market

While several experts and reports maintain that 2016 has been a low year for diesel genset imports in the Middle East, the market is still within its historical range. The decline, which adds up to around 35 per cent, has been observed across all sectors. That said, the region's genset industry remains optimistic due to the burgeoning non-oil sector. Vani Venugopal reports.

The fall in oil prices, which has led to the cancellation of several oil and gas projects, has had a major impact on the genset market.

THE MIDDLE EAST has always had a high dependency on high power generators and the notable decline in the >375kVA range of diesel generators has been linked to a stop on major projects, following the oil price drop. While the other genset ranges have also seen a decline, they are relatively more stable. According to data by *PowerGen Statistics*, the >375kVA range recorder a 24 per cent drop in the year-on-year evolution, while the <75kVA and 75-375kVA ranges have seen a drop of 17 per cent and 12 per cent, respectively.

The fall in oil prices, which has led to the cancellation of several oil and gas projects, has had a major impact on the genset market. A *Frost and Sullivan* report reveals

that over the last two years almost US\$380bn worth of oil and gas projects have been cancelled. The report also reveals that genset manufacturers with a big focus on the oil and gas sector have witnessed a slump in their revenues and have diversified to other sectors.

While the outlook is still uncertain for now, the industry remains hopeful.

Speaking about the current market climate in the Middle East, Jalil Azdem, Middle East Asia and Pacific area manager at INMESOL, says that, at the moment, the market of power generating sets in general is steady in the GCC due to the difficulties of cash flow, low oil prices and some internal political instability.



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“This difficult economic situation in the region is temporary and we are very optimistic that we will see some signs of economic recovery soon to increase the power demand,” he stressed.

With the fall in crude oil prices, diversification strategies have been established in most Middle East countries leading to increased focus on non-oil sectors including construction, a strong contributor to the diesel genset market. The development of mega projects such as Dahiyat Al Fursan New City (Saudi Arabia), the Al Maktoum International Airport expansion (UAE) and Lusail City (Qatar) are driving the demand for diesel genset in the construction industry in the region. Iran is another potential market for diesel genset due to the removal of economic sanctions.

Construction and telecom sectors are driving demand for diesel gensets in the region. A recent report by *BMI Research* shows that the Middle East and North Africa (MENA) region will be the fastest growing construction market globally in 2017 with a six per cent year-on-year. This will have a positive impact on the genset market.

Azdem points out that fast growth of industrial and urbanisation sectors, which require continuous power; new legislation to use standby generators for important buildings such as hospitals, big hotels and residential projects; and the lack of stable grid network support are some of the other factors driving growth in this sector.

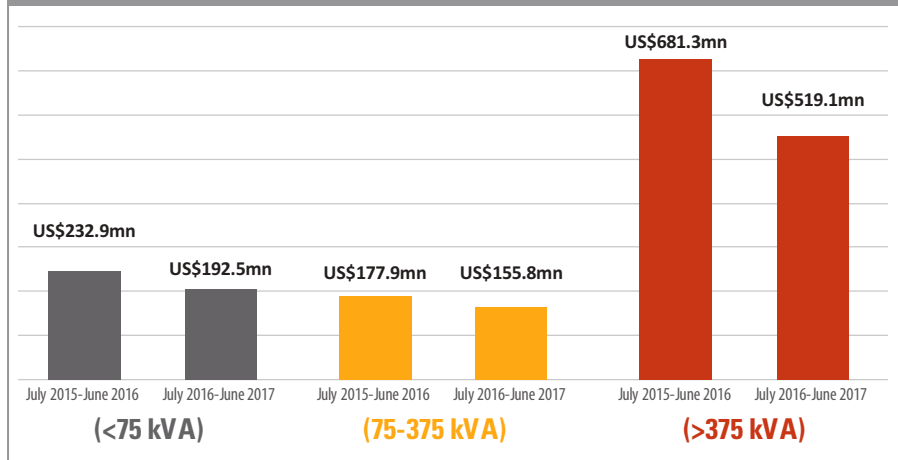
Mega events provide opportunity

The UAE leads the Middle East genset import market across all genset power ranges, followed by Saudi Arabia. Research data show that the genset import value in the UAE from July 2015 to June 2016 totalled US\$77.9mn, US\$60mn and a whopping US\$240.39mn for <75kVA, 75-375kVA and >375kVA ranges respectively.

Increasing construction activities,

More companies are considering the rental option due to the flexibility it gives them to control their CAPEX expenditure.

Decline in diesel genset sales in Middle East from July 2015 to June 2017



Diesel genset range	July 2015-June 2016	July 2016-June 2017	YoY decline
<75kVA	156,200	109,600	- 30%
75-375kVA	9,753	9,400	- 4%
>375kVA	6,500	4,600	- 29%

Units imported from July 2015 to June 2017

infrastructure development, establishment of new hotels, business hubs and industries in the country as it prepares for Expo 2020 Dubai have been attributed to the strong market for diesel gensets. The UAE diesel genset market is primarily driven by Dubai and Abu Dhabi.

Mahmoud El Zaafarany, chief commercial officer at Altaaqa Global, explains, “The demand for electricity has, over the years, increased in the UAE. The continued development of public and private infrastructure, together with an expanding population, has caused the country’s electricity requirement to surge in the last decade. And with the upcoming Expo 2020 Dubai, during when 25mn tourists are expected to visit the country, the demand for power is expected to maintain its rise.”

Saudi Arabia is the second-largest market for diesel genset import in the region, owing to its geographical size, increasing construction activities, expansion of public infrastructures, government policies to support establishment of new industries and need to supply power in off-grid and remote areas.

El Zaafarany points out that Saudi Arabia’s sustained investment in construction, industrial activities and public infrastructure are driving the requirement for temporary power plants. “In addition, with constantly increasing electricity demand from residents and businesses, more opportunities for cooperation between power utilities and supplemental power providers are opening up,” he adds.

A report by *6Wresearch* indicates that the Saudi Arabia diesel genset market is projected to grow at a CAGR of 2.24 per cent from 2016-2022. Saudi Arabia’s construction industry had witnessed sharp fall in 2015-16 with many major infrastructure projects cancelled, delayed or put on hold; a result of significant reduction in government spending due to low crude oil prices. This has consequently had an impact on the diesel genset market. However, with the expected recovery of crude oil prices, the market is expected to rebound, experts maintain.

Qatar, which is currently preparing for the upcoming 2022 FIFA World Cup is another major regional market. The development of related infrastructure and expansion of its transportation network are driving demand for additional power in the country.

“Qatar is a major market because of the high number of ongoing expansion and infrastructure projects. Most of the construction areas in the country do not have a supply of electricity coming from the mainland. This is driving demand for diesel gensets, which are in use in the vast majority of construction work sites in the country,” Edmer Gonzales, regional business line manager Middle East at Chicago Pneumatic, maintains.

Rental is beneficial

Power rental is a fast growing market in the MENA region. According to El Zaafarany, the power rental market in the region is driven by continuous economic growth, sustained industrial and infrastructure activities, rapid

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growth in population and improvement in the standards of living.

“Moreover, the region also sees occasional power shortages in key areas and has observed unreliable electricity connection in various cities and provinces, which also contribute to the increase in demand for multi-megawatt supplemental power sources,” he notes.

Alternative power sources can support the region’s existing power infrastructure in a wide range of situations. For instance, the intense industrial and construction activities, coupled with a significant residential electricity requirement especially during summer months, put a heavy load on the region’s utilities so that occasionally they are unable to supply the required power. This is where turning to supplemental power becomes beneficial, particularly in maintaining the productivity of industrial operations.

Chicago Pneumatic’s Gonzales reiterates that more companies are now establishing generator rental fleets. “In the short term, there will remain a degree of uncertainty about the growth in construction projects across the region. However, conversely, this has led to an increase in companies looking to rent gensets instead of buying them.”

More companies are considering renting because it allows them to control their capital expenditure (CAPEX). “For instance, the additional cost of repairing and maintaining their machines is no longer their responsibility as it is covered by the rental companies,” he states.

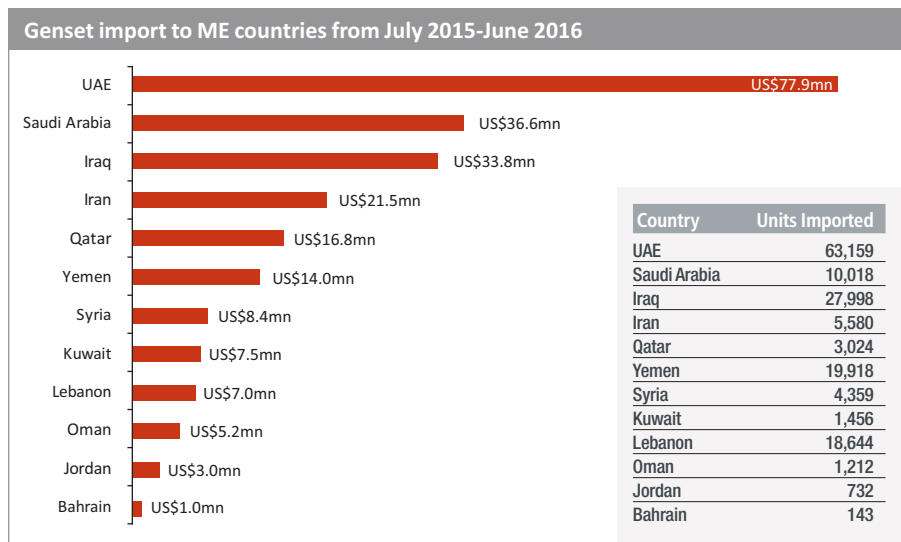
What’s new

Discussing the current trends in the equipment rental market in the Middle East, INMESOL’s Azdem points out that there is growing demand for equipment that generates less noise, has low gas emissions that meet regulations and with maximum reliability in terms of service provisioning. Azdem added that it has set the reduction of noise emissions as one of the objectives for developing new products in 2017. According to INMESOL, the regulations on gas emissions that affect internal combustion engines are increasingly demanding within the rental sector. Engine manufacturers are aiming to adapt the design with advanced control systems and with gas emissions below the limitations, to comply with the regulations.

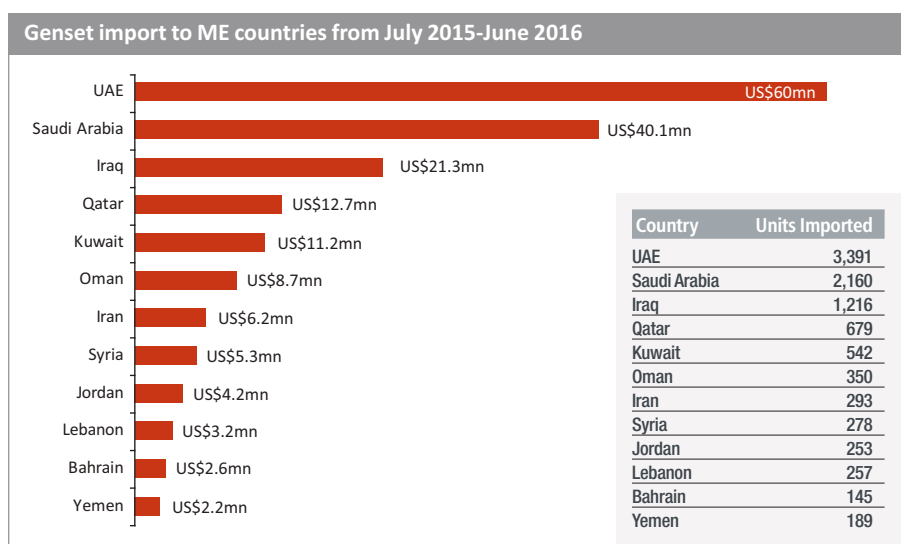
Transition to alternatives

Speaking about emerging opportunities in the sector, El Zaafarany reveals that there is

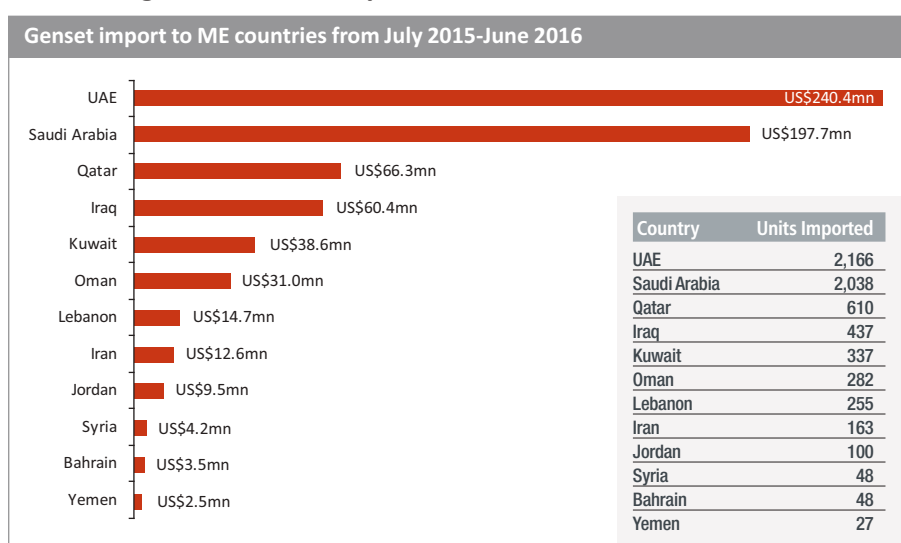
Generating sets, diesel, output <75kVA



Generating sets, diesel, output 75-375kVA



Generating sets, diesel, output >375kVA



growing demand for natural gas and dual-fuel power generation technologies, largely influenced by the increasing availability of fuel resources and government initiatives towards reducing carbon emissions.

“Gas is becoming increasingly available and gas generation technologies are progressively finding application in bigger and longer duration projects, making the upfront investment for gas infrastructure economically sensible. The availability of dual-fuel generators, which simplifies the transition from diesel-run to gas-run generators, is also facilitating wider acceptance for gas power generation technologies.”

Multi-megawatt supplemental power technologies are primed to work in tandem with renewable energy sources to help surmount issues of power supply unpredictability and intermittency, especially in power-intensive industries like oil and gas, construction, utility power generation, transmission and distribution.

Temporary power plants can also provide supplemental power to renewable energy facilities during planning, manufacturing,

In the Middle East, Turkey and Lebanon are the two prime locations for export of diesel gensets to other parts of the region as both countries have a strong local manufacturing base.

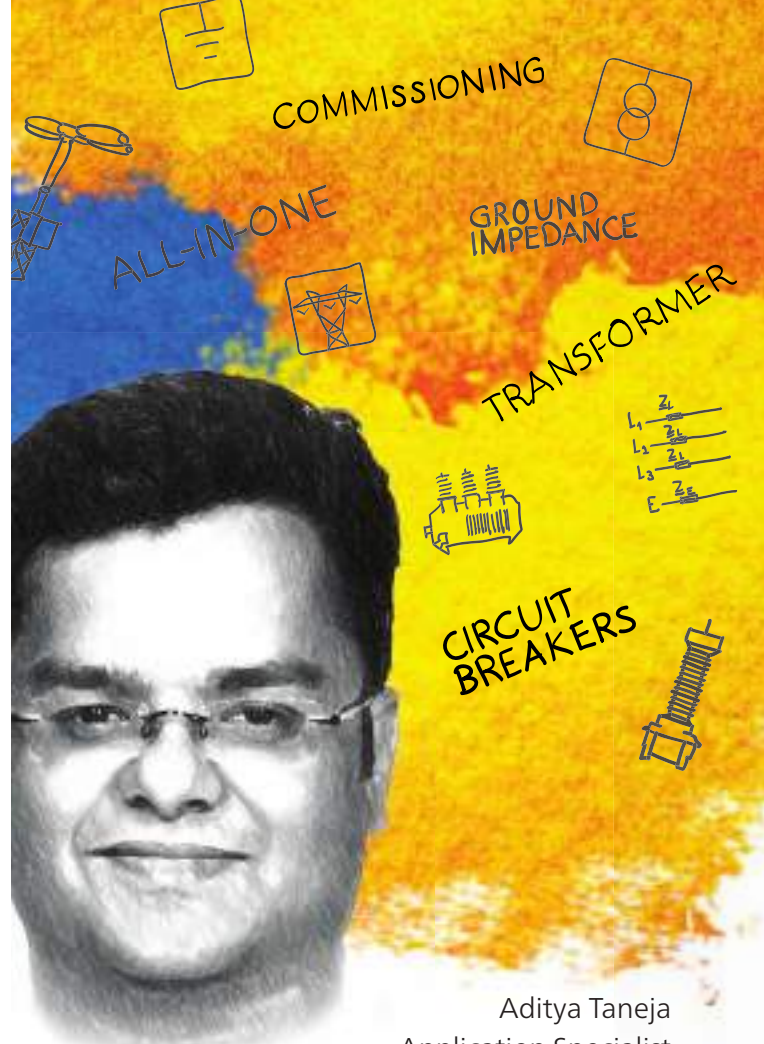
installation, commissioning, operations and maintenance. Temporary power plants can help ensure that renewable energy plants are constructed and delivered on time and as planned and that they remain efficient, reliable and in optimum condition at all times.

Romy Hocknell, marketing manager at JCB Power Products, reiterates that while the demand continues to rise in diesel generators, there is increasing interest in the company’s Intelli-Hybrid Generator and Battery Box. “Both the generators offer our customers an alternative power solution, which provides significant fuel and CO₂ savings, thereby overall making significant cost savings,” he adds.

JCB also recently announced its move into the gas power generation market. “JCB Power Products recognises a great opportunity and, whilst the focus is firmly on providing gas generators to the UK market, we would hope to rollout gas generators to others markets in the future,” Hocknell reveals.

Italy’s Visa SpA is also optimistic about the future of hybrid solutions in the Middle East. “Slowly, but surely, the trend is tilting towards hybrid solutions in telecommunication applications. It has been a slow start but the momentum may pick up in the future. Hybrid solutions, with the right technology, can go a long way in terms of power and efficiency,” says Visa SpA CEO Marco Barro. ■

– Graphs courtesy of PowerGen Statistics.
For details, visit www.powergen-statistics.com



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District cooling market heats up

Middle Eastern governments are working towards promoting energy-efficient and economical cooling solutions to stimulate sustainable product penetration. Two top experts talk to *Technical Review Middle East*.

THE SIZE OF the Middle East district cooling market will exceed US\$12bn by 2024, a new study has predicted. In its latest report, US-based analysis firm Global Market Insights says that increasing investments into infrastructure development across the GCC countries, coupled with growing demand for reliable and cost-efficient cooling systems, will drive the size of the district cooling market. Considering life cycle costs and not capital expenditure (CAPEX) alone, district cooling helps reduce costs and thereby CO₂ emission.

In addition, rapid urbanisation along with ongoing construction developments across government projects in prominent cities in Saudi Arabia, including Mecca and Riyadh, will stimulate product penetration into that market.

In the UAE, a flourishing construction sector coupled with ongoing government targets towards energy efficiency will fuel district cooling market growth.

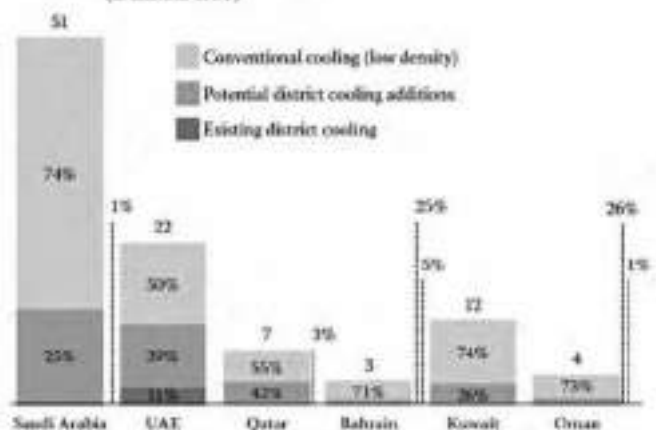
Speaking with *Technical Review Middle East*, experts maintain that district cooling is expanding rapidly in the Gulf Cooperation Council (GCC) and sustainable technologies rule the roost.

Ghaleb Abussa, engineer – arbitrator at Peer Review & Advisory Services, says, “District cooling, by default, is huge in size and it mostly comes as water-cooled systems, thereby reducing power consumption that is lower than individual air-cooled chillers or standalone systems. Some may say that district cooling will consume more water, a commodity that is scarce in the region, but the use of

treated sewage effluent (TSE) can help tackle this situation with the re-use of wastewater.”

According to American Society of Heating, Refrigerating and Air-Conditioning Engineers’ (ASHRAE) Dr Alaa Olama, the Middle East is experiencing increasing valuable interest in district cooling, especially in the GCC where it has grown exponentially since 1990s. The cooling capacity is expected to triple between 2010 and 2030.

GCC forecast cooling requirements, 2030
(in millions of RT)



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Tech talk

Commenting on new technologies at the forefront in the district cooling industry, Abusaa says that manufacturers are enhancing the main components of chillers to boost efficiency including control systems like the use of combine heat and power (CHP) and hybrid systems to reduce power consumption and CO₂ footprint; engine-driven compressors particularly when gas is available as fuel, thus utilising low grade heat for other applications mainly for heating and absorption chilling. He adds that the use of natural refrigerants and thermal storage to shave peak loads is on the rise.

Meanwhile, Olama notes that few new technologies exist in district cooling installations in the Middle East, except in the majority of projects in Egypt where natural gas fired absorption chiller are used because of the low price of locally produced natural gas and an advanced downstream network in the country.

“The majority of district cooling projects in the Middle East uses traditional high tonnage mechanical vapour compression chillers. However, this could change in the near future because of the two ongoing studies sponsored by the United Nations: UNIDO and UN Environmental agencies, addressing the use of Not-In-Kind or non-vapour compression district cooling technologies in Egypt and Kuwait. The studies, once finished, will provide technical and financial assistance for Not-In-Kind projects to four pilot projects, two in each country, to help implement new technologies.”

Energy efficiency

The Montreal Protocol is considered the most successful environment protection agreement. The protocol sets binding progressive phase-out obligations for developed and developing countries for all major ozone depleting substances, including CFCs, halons and less damaging transitional chemicals such as HCFCs.

Hydrofluorocarbons (HFCs) replaced CFCs – the original refrigerants – in the 1950s. The most dominant HCFC for refrigeration and air conditioning applications is R-22. Its also important to understand the global warming potential (GWP) of refrigerants like HCFCs used an alternatives to CFCs. The GWP of a gas is measures against how much heat or greenhouse gas the refrigerant traps in the atmosphere relative to a similar mass of CO₂. The higher a gas’ GWP the more it contributes to the Earth’s global warming.

A schedule for phasing out HCFCs was agreed between the parties and in 2007 Decision XIX/6 under the Montreal Protocol was taken to accelerate the planned phase out for HCFCs. This ensures faster protection of the ozone layer, assuming that alternatives can be innovated with low or no climate impact.

The accelerated phase-out schedule of HCFCs for non-Article 5 and Article 5 countries is shown in Table 4-2. It also shows that non-Article 5 countries will complete phase-out HCFCs by 2020, allowing 0.5 per cent for servicing purposes during 2020-30. Article 5

Table 4-2 shows that non-Article 5 countries will complete phase out of HCFCs by 2020

HCFC Phase-Out Dates (Article 5 countries)	Non-Article 5 Countries (Developing Countries)	Article 5 Countries (Developing Countries)
2015	None	Phase-out HCFCs for servicing purposes by the end of the 2020-2030 period.
2018	Reduce HCFCs by 90%	Reduce HCFCs by 10%
2020	Complete phase-out of HCFCs, allowing 0.5% for servicing purposes during 2020-2030.	Reduce HCFCs by 35%
2025	None	Reduce HCFCs by 65%
2030	None	Complete phase-out of HCFCs, allowing 0.5% for servicing purposes during 2020-2030.

(From the book, District Cooling: Theory and Practice, A. Olama, CRC Press, Taylor & Francis Group, USA, 2017.)

Flourishing construction sector, coupled with ongoing government targets towards energy efficiency, will fuel the UAE district cooling market growth.

countries will complete the phase-out by 2030 allowing 2.5 per cent for servicing during 2030-2060.

According to Abusaa, using water-cooled systems and natural refrigerants reduces the ozone depleting potential (ODP), greenhouse effect and total equivalent warming impact (TEWI) but, on the other hand, it affects the land and sea adversely because of bleed water high salinity. This adverse effect can be reduced via TSE by recycling wastewater. Releasing high temperature water to sea adversely affects the climate coral reef.

He also adds that the best way to reduce the adverse effects requires the joining of hands of consultants, society and governments. “Consultants should not exaggerate heat loads calculations and Delta T (temperature difference) between indoor and outdoor areas must be fixed. The current habits call for cooler indoors when higher outdoor temperatures prevail, causing adverse effect on human health. Finally, the concerned authorities need to apply penalties and incentives schemes for HVAC industry. Education and public awareness is very important.”

Growing GCC market

Abusaa maintains that the market for district cooling is merely 10 per cent of the global share, partly due to the limitation of financial feasibility except for markets with vertical expansion. “Vertical expansion is mostly seen in countries where land is limited and infrastructure growing. This is not the case in the GCC where spend is currently happening on the horizontal expansion. District cooling is not financially feasible nor attractive for villas and low-rise buildings whereas it is highly feasible and attractive when high-rise buildings are dominating the expansion.”

On country-wise growth Abusaa and Olama take different stands. For Abusaa, it is Saudi Arabia due to its size, ambitious plans like Saudi Vision 2030, availability of funds and the need for more development due to rapid growth of population. Olama reiterates that UAE is the biggest market for district cooling with the kingdom a close second whereas Egypt is the potential largest growth market.

According to a Global Market Insights report, in 2017, the government of Dubai increased its infrastructure spending by 27 per cent compared to its allocation for the previous year. In 2016, the UAE also set a budget of US\$4.62bn towards infrastructure development through to 2020.

In 2016, electric chillers accounted for over 50 per cent of the district cooling market. Convenient distribution networks coupled with feasible operational costs and low electricity prices are the key parameters that favour the technology adoption.

The district cooling market will witness strong growth owing to growing measures impacting the reduction of fossil fuel dependency. These systems involve direct extraction of cold water from water bodies including seas, lakes and other waterways. Ongoing development of high capacity projects including the Bahrain Bay district cooling plant, which aims to reduce GHG emissions by

utilising seawater as a cooling medium, will further complement the industry outlook.

The commercial district cooling market is predicted to exceed over eight million refrigeration tonnes (RT) by 2024. Increasing private investments in the development of energy efficient commercial building structures to facilitate the daily needs of growing urban population will fuel business growth. In 2015, Qatar Cool expanded its district cooling plant in Doha's West Bay neighbourhood, which is home to Qatar's tallest skyscrapers, high-end offices, housing luxury apartments and hotels.

The residential district cooling market will witness strong growth owing to escalating energy prices along with a growing urban population. In 2016, Emicool announced its plan to increase its district cooling plant capacity to 500,000 RT by 2020 as a part of its Dubai Investments Park expansion.

With 72 district cooling plants located throughout the region, the National Central Cooling Company (Tabreed) currently delivers more than a million RT to key developments in the region including iconic infrastructure projects such as Abu Dhabi's Al Maryah Island, Yas Island, Sheikh Zayed Grand Mosque, Dubai Metro, Dubai Parks and Resorts, and the Jabal Omar Development in Mecca, Saudi Arabia.

In 2016, Saudi Arabia's district cooling market was valued over US\$1.5bn. Rising demand for energy efficient cooling systems to facilitate green building standards will stimulate the industry size. Increasing commercial and residential construction activities across Mecca and Riyadh, coupled with favourable government initiatives for the deployment of district cooling systems, will further complement the industry landscape. In July 2015, Mitsubishi Heavy Industries received an order for a district cooling plant requirement for 80 centrifugal chiller units for a development project in Medina. The plant is likely to provide 200,000 RT to an area of 1.6mn sq m.

Stringent government norms covering the development of sustainable energy will enhance the UAE district cooling market. In 2015, the government of Dubai set a goal to achieve 40 per cent of cooling demand through district cooling systems by 2030. The target aims to reduce power consumption of the city's AC by 50 per cent.

Qatar's district cooling market will grow owing to ongoing infrastructure developments. The country has invested a significant amount over the last few years for the development of required infrastructure for hosting the FIFA World Cup 2022. Qatar has formulated plans to draw an amount of US\$222bn by the year 2022 for development of infrastructure projects including hotels, stadiums and other transport facilities. ■

Country	RT in million
Saudi Arabia	12.75
UAE	8.58
Qatar	2.94
Total	24.27

About the authors:



Alaa Olama

Dr Alaa Olama is ex-CEO of GasCool, the first district cooling company in Egypt. He has extensive experience working with the US Department of Energy and United Nations agencies and is the Head of the Permanent Committee writing the Egyptian District Cooling Code and the Member of the Committee writing the Unified Arab Code of Air Conditioning and Refrigeration. He is a member of an advisory panel assisting ASHRAE in the revision of its District Cooling Guide Design Guide and also the author of District Cooling Theory and Practice published by CRC Press.



Ghaleb Abusaa

Ghaleb Abusaa is an engineer and arbitrator. He has over 40 years of experience in training, design, installation, startup and commissioning and operation and maintenance of HVACR systems as well as more than 15 years of experience in the same for turbine inlet air cooling systems (TIAC). He is a certified instructor in HVACR by ASME (American Society of Mechanical Engineers). In addition to his former role as CEO of The Three Factors Company (en3), Abusaa is a licensed engineer of opinion by the government of Dubai in the UAE.

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'Challenges lead us to opportunities'

Delta District Cooling Services' director of business development Gary Hicks speaks with *Technical Review Middle East* on what it takes to be the preferred operator in the district cooling industry.

Technical Review Middle East (TRME): How did Delta District Cooling Services (DDCS) come into being?

Gary Hicks (GH): All my adult life I have worked in harsh maintenance environment with a background in weaponry. Ten years ago, we created DDCS, which started out as a maintenance company and soon we realised the gap the district cooling market has in terms of distributing and operating such a plant. In most cases, the district cooling plant owner was also the operator. However, for plants owned by individuals it was a complex process of replying on OEMs and dealing with multiple entities, which was a challenge in addition to the vacuum of responsibility for plant efficiency created from such an arrangement.

There was no commercial operator in the market per se. So we saw an opportunity here and decided to provide services for the district cooling plants in Dubai. We are the first company to independently provide district cooling plant operations and maintenance (O&M) services in the UAE.

TRME: So it was a move to make somebody accountable?

GH: Exactly. And also it keeps both parties – operator and maintenance provider – on their toes. The asset owner's responsibility is to see that the plant works properly and an operator's responsibility is to ensure that glitches do not happen in a running plant. Therefore, we also look at the testing and commissioning side of things. DDCS runs an efficient computerised maintenance management system inside the plant, which the client/asset owner has access to as well. They can log on to the DDCS system and check out what we are doing, what maintenance has been carried out, if and why there was a shutdown, how many spare parts have been used, etc.

Now one of the key things which is rarely seen in the district cooling industry is



Gary Hicks is director of business development at DDCS. (Photo: Delta District Cooling Services)

predictive maintenance. We are at the forefront of this. DDCS provides sophisticated tools to diagnose any potential risks and offer solutions. This is where our strength lies.

TRME: What is your competition like?

GH: As an independent DC operator we do not see any competition because our motivation and goals are completely different – that is to establish long-term partnership rather than short-term contracting. There are companies who provide O&M services at a much lower cost than us, but our take on it is that you get what you pay for. We cannot be suicidal by going low cost and offering services that will backfire on the assets in a year or two. Because of the market conditions, I have witnessed district cooling companies employing low cost services, but they forget that in the long run the asset is going to

suffer. Moreover, the service providers will not put in money to maintain the 'damaged' asset. And that needs to be understood because they own the asset.

TRME: What is DDCS' role in building the district cooling plant?

GH: After the plant has been commissioned to us, we look at the design and provide suggestions and a review. Once the design review is done then comes commissioning management. We have a project manager who is in place throughout the construction of that plant to help the consultant and contractor work on the installation and see that everything is built as per district cooling standards and specifications. Then we move on to testing and commissioning, after plant operation begins. Hence you can see that we cater to the operator from the word 'go'.

TRME: Is a district cooling plant concept different from chiller plant? If so, how?

GH: District cooling as a technology is the same as for a chiller plant. The difference is that the chiller plant is built as an individual property or facility while district cooling caters to multiple facilities. We are district cooling operators but we also look after chiller plants in certain areas of Dubai.

TRME: What are the energy efficiency goals undertaken by DDCS?

GH: The whole concept of having a district cooling plant or a chiller plant is to have an efficient use of electricity. If we do not stick to that, as our core value the purpose is defeated as a district cooling operator. Therefore, we concentrate on developing the skillset of engineers to come up with innovative ideas. One such innovation from our end is the Energy Valve.

Low 'Delta T' is a challenge that could drain away significant benefits of the district cooling application. Cracking the

low Delta T syndrome needs diligent effort and the know-how of every associated systems/ connected loads. We are working with a Swiss company to create an Energy Valve. This is basically a controlled valve, which is having a localised Delta T control. In district cooling, Delta T is referred to as the difference between the supply temperature and the cooling temperature. Picture this: In an apartment in Dubai, there are control valves to control the flow of air. If the sensors are faulty, the valves will suffer as well. Ideally, the Delta T should be around 9°C. Now, most of the buildings have faulty sensors or valves that reduce energy efficiency since the inflow and outflow of chilled water is not monitored. When the energy valve is installed in one of the water lines, it continuously monitors the temperature difference. At any time, if the temperature drops below 9°C, it will start reducing the amount of water flow to maintain the required temperature. We have already installed it in few buildings in Business Bay (in Dubai). The results look good.

TRME: Advice for someone looking at district cooling sector as a career?

GH: As a career in district cooling, I would say it's a comfortable job. But it also comes with its own dangers of being complacent. If you don't really pay attention to the updates and you don't keep yourself abreast with development or innovative ideas to operate or maintain the plant, then there is a problem. As an operator you have a well defined set of activities to execute. But if you are smart then you will always want to look at the efficiency of the plant, how it has to be improved. Also prepare to continuously research, do your own profile analysis so that it can help you grow as a district cooling plant operator or technician or engineer or whatever you want to be.

TRME: Can you talk about the vision of DDCS?

GH: We don't just want to be a district cooling operator. We want to be 'the' district cooling operator. We want to add value to the system. We want to be referred to as the standard in district cooling and that is where we want to see ourselves in the next five

years. Moreover, we don't want to be a company that only concentrates on making profits but be called a people-first organisation.

TRME: What is the motto of DDCS?

GH: To be different. Not just be different but we want to be 'Intelligently Different'. That is our tagline. Everything we do, we try to do differently – for clients, employees. All at DDCS work with the belief that they own the company rather than working for the company.

TRME: Journey through the last 10 years?

GH: DDCS has seen many ups and downs as a start-up company and being around big players who they have their own assets, it was a challenge to grow. But the good thing is that we have established a team now, which is robust, and can take on any challenge. Also, we are proud to be the service provider to other district cooling providers and consider us as a partner rather than a competitor. Down the line we may or may not own district cooling plants but the one thing we are sure of is to stick to being the preferred operator. ■

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Keep your cool

Johnson Controls Inc. on what considerations should be made when switching to alternatives in high ambient temperature (HAT) countries, such as the UAE.

THE PRESSURE IS on the refrigeration industry to reduce the use of refrigerants with high global warming potential (GWP). The Montreal Protocol originally signed in 1987 focussed on refrigerants affecting the ozone layer that protects our world. Without the ozone layer life, as we know it, would not be possible.

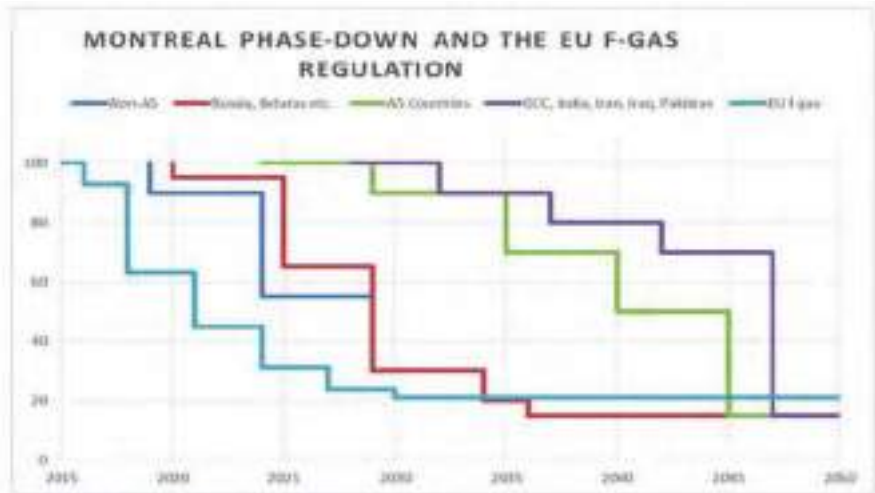
In 2009 and years following, the big issue had been the growing concerns about the climate change caused by emissions of carbon dioxide (CO₂) and a number of gases mentioned under the Kyoto Protocol as the basket of six gases, namely CO₂, methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆). The pathway from Dubai to Kigali on 15 October 2016, ended with an amendment to the Montreal Protocol so that HFCs are now part of the protocol.

For many countries, the phase-out of HCFC becomes a little more complex now that the new amendment includes some of the alternatives to HCFC-22 and introduces a phase down. The amendment is new in the sense that the phase down is calculated in CO₂ equivalents. What will this mean for industrial refrigeration systems?

Industrial refrigeration

Industrial refrigeration systems are characterised as large systems with capacities from 100kW up to many MW. In many cases industrial refrigeration plants are based on ammonia as the working fluid but there are also man-made systems originally based on HCFC-22. Industrial refrigeration systems are used in a wide evaporation temperature range from -80°C to 40°C and condensing temperatures from 10°C to 90°C, or in some special cases, much higher.

The latter are now being phased out due to the Montreal Protocol's requirements. An alternative to changing the system to a new system is to 'retrofit'. The term retrofit could indicate a simple solution to the problem when an owner of a HCFC-22 system wants to convert to another refrigerant. However, there are many things to consider and there are no true retrofit refrigerants. There are some things you have to consider and



Phase down of the consumption in % of the reference years

Figure 1: Montreal phase down and EU F-Gas regulation.

The phase down in the EU market and the AGWP as a function of the market growth (Note the EU average GWP is 2000)

Year	Phase down	Average GWP with an annual growth rate of								
		0%	1%	2%	10%	10%	15%	20%	25%	
2015	100%	2000	2000	2000	2000	2000	2000	2000	2000	2000
2016	93%	1860	1842	1824	1691	1691	1617	1550	1488	
2018	63%	1260	1223	1187	947	947	828	729	645	
2021	45%	900	848	799	508	508	389	301	236	
2024	31%	620	567	519	263	263	176	120	83	
2027	24%	480	426	378	153	153	90	54	33	
2030	21%	420	362	312	101	101	52	27	15	
2034	20%	400	331	275	65	65	28	13	6	
2036	15%	300	243	198	41	41	10	7	3	

Table 1: The phase down in the EU market.

Here are only selected Class A1 solutions, which can be used for retrofitting A1 systems without considering the flammability

	R-404A	R-448A	R-449A	R-452A
Molar mass (g mol ⁻¹)	97.6	86.3	87.2	103.5
ASHRAE safety class	A1	A1	A1	A1
AR4 GWP 100years	3922	1387	1397	2140
Critical temperature (C)	72.1	82.7	82.1	75.1
Critical pressure (kPa)	3729	4594	4499	4015
NB (C)	-46.5	-46.4	-46	-47.2
Cooling effect (kJ/kg-1)	104	144.7	142.4	105.4
Volumetric capacity (kJ/m ³)	905	897.2	889	878.1
Discharge temperature (C)	74	97.7	95.9	76.6
Coefficient of Performance	1.41	1.54	1.54	1.46

-35/35°C 2Csub/7°Csup 65%comp eff

Table 2: Selected Class A1 solutions for retrofitting.

evaluate such as the liquid lines and internal heat exchanger, which is not used in HCFC-22 systems but will benefit many systems using HFC.

According to the Kigali Agreement, the consumption of HFC in CO₂ equivalents must be reduced by up to 85 per cent by 2050 as provided in Figure 1.

When we know the consumption and the CO₂ equivalents we can also calculate the average GWP (AGWP). It is important to remember that the Kigali Agreement is not a phase out but a phase down measured in CO₂ equivalent. This also means that if we consume more, which is what is expected in the market, and that we have to lower the emissions in CO₂ equivalent then the AGWP has to come down. In some markets, we have seen a drastic increase on traditional refrigerants such as R422D and other so-called 'drop-in' blends. These blends have a relatively high GWP, but in systems with a relatively limited rest-operative expected years, it does not matter.

When it comes to new systems with an expected operational life of 25 years or more, it is a different story.

As shown in Table 1, you can see that with a high growth rate you will also end up with a lower AGWP. How low depends on the starting point. AGWP depends on the markets and the country. In the EU, the average GWP officially is 2,000. For a little island state like Maldives it is currently 2,446. This is mainly because a big part of the refrigerant consumption is in the fishing industry. In Dubai, it may be closer to 2,000 if the consumption of refrigerant is mainly driven by R-134a, which is very common in turbo systems used in AC chillers.

In order to retrofit it is a good idea to look at the age of the system. Old systems can be retrofitted to a look like a solution (e.g. R-448A or R-449A). In new systems you have to consider refrigerant blends or pure refrigerants with a GWP lower than 150 GWP.

Table 2 presents some alternatives to R-404A. Here we selected Class A1 solutions, which can be used for retrofitting A1 systems without considering the flammability.

Analyse and understand

In order to avoid multiple conversions of the

system from one refrigerant to another and to maintain the usual capacity and hopefully the same efficiency, you have to carefully analyse the system as if you were building a new system with the new refrigerant. From here you can see what has to be done to the old system to achieve the desired capacity.

There are new refrigerants and blends in the market to help the industry to move from HCFC to new solutions with lower or low GWP. Existing systems can be converted to lower GWP solutions while new systems ideally should be low GWP which here means lower than 150. ■

About the author: *Alexander Cohr Pachai is*



Alexander Cohr Pachai.

the technology manager at Sabroe factory in Denmark and works on different technologies that can help countries and industries to phase out of HCFC-22 and other 'banned' refrigerants.

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Iraq Container Terminal (ICT) has a dedicated scanner, providing an improved and professional handling of trucks to and from the terminal.

Braving the tides

An economy that is struggling to stabilise and, at the same time, expand trade ties, Gulftainer's CEO reveals what it takes to have that competitive edge to manage the challenging Iraqi ports.

IN JULY 2017, the largest container vessel was welcomed at Gulftainer's Iraq Container Terminal (ICT) facility. The UAE-headquartered port logistics provider expanded its reach in Iraq in 2008, making it the first international company to enter Iraqi port of Umm Qasr, the only large container handling port in the country. Today, the company operates three facilities in Umm Qasr; two container terminals – the Iraq Projects Terminal (IPT) and the Iraq Container Terminal (ICT) – and the Umm Qasr Logistics Centre (UQLC), managed by its third party logistics (3PL) company, Momentum Logistics.

Gulftainer's IPT, ICT and UQLC have direct access to the main Basra highway and to major oilfields in southern Iraq. The IPT, which was given under concession to Gulftainer in 2010, has seen sustained investments that have enhanced productivity and enabled it to develop into a first-class facility aimed at the general break bulk and project cargo segments. The ICT, which was commissioned to Gulftainer in 2012, is one of the country's most prominent container hubs and is the only terminal in Umm Qasr Port with a separate gate in and gate out of the port. The ICT also has a dedicated scanner, providing an improved professional handling of trucks through the terminal.

Umm Qasr Logistics Centre (UQLC)

UQLC, a fully integrated logistics services bonded facility, is one of Gulftainer's flagship projects in Iraq. Located close to Umm Qasr Port, the centre covers an area of 750,000 sq m and acts as a one-stop-shop for supply chain needs. UQLC offers a range of services from secure bonded warehousing and cold stores, to storage facilities, on-site customs clearance and the Iraq Port Authority clearance. It also includes value-added services such as the consolidation and deconsolidation of containers, and an inland container terminal that is connected by rail and road to the rest of Iraq. Today, UQLC is more than just a logistics base, it offers customers complete control and an end-to-end range of services.

UQLC is a prime example of Gulftainer's ability to combine its ports and logistics offering through its subsidiary company Momentum Logistics, 3PL provider, which has expanded its operations in Iraq and

is one of the country's leading 3PL player. Momentum's presence in Iraq has enabled Gulftainer to add considerable value to the services it offers its customers through integrated supply chain management solutions. For instance, cargo can move directly from ICT into UQLC without the need for port-side customs clearance.

Speaking with *Technical Review Middle East*, CEO Flemming Dalgaard states that Gulftainer is committed to providing Iraq with the best port, transport and logistics links necessary for its redevelopment. Despite the country's challenges, Gulftainer is cautiously optimistic about the market and continues to review new opportunities for growth in 2018. This is supported by the Iraqi government's commitment to investing in the transport sector, particularly in cargo.

Following an agreement on oil output cuts by OPEC members, Iraq's GDP growth is anticipated to reach 3.4 per cent at the end of 2017. Although this is a small number compared to the country's progress in recent years, it still reflects a strong growth in the region.

"In fact, Gulftainer's terminals at Umm Qasr Port alone witnessed a year-on-year growth of 13 per cent, which is a satisfactory achievement in the Middle East region this year. Due to its excellent operational capability Gulftainer has been able to achieve this growth by attracting new shipping lines to its facilities enabling them to serve the Iraqi market and increase their market share," Dalgaard adds.

The recovery of global oil prices, increased oil exports, reduced government expenditure and increased security are expected to support a positive outlook in 2018. Furthermore, the development of the southern oilfields, and efforts to boost the non-oil economy, are expected to increase the GDP growth rate to 4.2 per cent in 2018.

Gulftainer, world's largest, privately-owned, independent port operator, has a strong global presence and business interests across the Middle East, the Americas and Southeast Asia. ■



*Flemming Dalgaard is Gulftainer CEO.
(Photo: Gulftainer)*

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High hopes for FM sector

The facilities management industry is growing in the GCC although raising the bar on standards presents a challenge. Martin Clark reports.

*Mega-events such as Expo 2020 Dubai will propel future expansion of the FM sector in the region.
(Photo: Expo 2020 Dubai)*

FACILITIES MANAGEMENT (FM) and related services in the GCC are evolving on the back of the region's real estate and infrastructure spending over the last decade or so.

It now supports a large industry with thousands of cleaning and maintenance companies. The term can encompass many other areas though, in niches from reception, concierge services and landscaping through to pest control and even call centre activities.

While the bulk of spending has been concentrated in Saudi Arabia and the UAE, there is also sizeable business in other territories – and it is a market that appears to be growing fast.

According to previous research by wealth experts Credo, the total spend on FM across the GCC was US\$21.8bn five years ago, near the height of the oil boom.

A more recent report, by research firm Aranca, earlier this year, says that the market could be worth more than US\$50bn by 2020; other estimates reckon it could be closer to US\$66bn.

While oil prices are still a concern, it cites a rise in the number of construction projects, stricter regulations and technological

advancements that are encouraging the facilities management market's development.

And, with the exception of a more saturated (but still growing) UAE market, most of the GCC's other wealthier states seem ripe for FM growth and expansion. The market size of UAE's FM industry will hit an all-time high of US\$12.49bn in 2017, according to a research.

With the global FM industry said to be worth US\$1 trillion, the GCC is, in some ways at least, perhaps only in its infancy.

In Saudi Arabia, for instance, the FM market is poised for double digit growth over the next five years.

The Middle East Facilities Management Association (MEFMA) Report 'FM in Saudi Arabia – an Emerging Giant' released in May this year revealed that the kingdom continues to hold the largest share in GCC FM spending, accounting for about 55 per cent of total expenditure.

Although the Saudi Arabian market is currently valued at US\$20bn, it is still considered to be developing in terms of proportion to the country's building infrastructure development, and is characterised as dependent on manpower supply services and low-quality building maintenance. MEFMA has estimated that under one-third of the FM demand predominantly comes from the public sector which is relying heavily on outsourced services.

Jamal Abdullah Lootah, president of MEFMA, said, "Saudi Arabia's FM sector is rapidly developing as more properties go online in the kingdom. The regional industry has observed the different Saudi market dynamics, with the public sector relying heavily on outsourcing services while the private sector tends to experiment with in-house management using traditional manpower services,

With the global FM industry said to be worth US\$1 trillion, the GCC is, in some ways at least, perhaps only in its infancy.

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rather than procuring fully-integrated FM solutions.

“We are confident the time is ripe for established regional FM providers to further study the trends in the country.”

Indeed, the dynamism of this segment was reflected at a high level summit World Workplace Forum in Dubai, which attracted a host of FM experts from across the Middle East. Almost 200 participants from over 24 countries took part in the event that took place in May 2017.

One of the event’s prime sponsors, EFS Facilities Services, celebrated a milestone by securing more than US\$1bn worth of ongoing contracts globally for the first time in its history this year.

The company is a regional leader in delivering integrated FM services across the Middle East, as well as in Africa and south Asia.

The milestone was accomplished on the back of US\$200m worth of new project wins in 2017 from various key markets, including the UAE, Saudi Arabia and Qatar.

Despite the general economic slowdown and subdued oil sector, it has notched up a commendable 21 per cent annual growth in revenues over the last five years.

The company now manages over 350mn sq ft of built-up commercial and residential space for several Fortune 500 companies across the Middle East and other core regions. “We foresee sustained mid-term growth in our key markets of the UAE, Saudi Arabia, Qatar, Egypt, and India, driven by the rising demands of a growing population,” said its chief executive Tariq Chauhan.

Among the topics under discussion at the Dubai forum was the need for more standards, and to encourage global best practice

into the region, as the industry further expands.

This is a major theme being picked up by leading FM international agencies and training bodies.

In May, the International Facilities Management Association (IFMA) and the Royal Institution of Chartered Surveyors (RICS) – the two organisations behind the Dubai summit – announced a partnership to offer a combined suite of credentials and professional qualifications for FM in a single, convenient online academy platform. It’s also a key theme in the EFS strategy for the coming year, according to Chauhan. “2017 will also be the year where we reinvigorate the training and development of our employees to empower us to evolve and enable us to move ahead onto the next phase of growth,” he added.

With more multi-billion dollar construction projects in the pipeline over the next few years in the GCC, analysts at Aranca expect more growth ahead.

The ongoing transition is due to benchmarks set by multinational companies to bring the facilities at par with international standards,” it noted in its January 2017 report.

“Also the market is expected to witness demand for green building techniques, which involve professional maintenance of buildings, to focus on energy conservation.”

The report added, “With demand rising due to the lack of in-house expertise and infancy stage of the FM market in GCC, the scope of the FM market is expected to expand at a fast rate.”

Busy times ahead then for all those engaged in this fast-growing industry niche, both within the GCC and beyond, it seems. ■

Expo 2020 to drive UAE’s FM sector

- Millions of visitors are anticipated to visit the country for Expo 2020 Dubai. In order to bring the country to the forefront, the UAE government is continuously upgrading its commercial as well as tourism sectors.
- In 2016, construction projects worth US\$155bn were under execution in the country, and projects worth US\$629bn are slated for completion by 2021. Post completion, these projects are expected to boost demand for facility management services in the country.
- In order to host the mega-event, an estimated US\$9.40bn would be required for building multiple expo complexes across an area of 438 ha.

Smart weather forecasts

Facilities management (FM) company Farnek is the first facility manager to partner with hyper-local weather forecasting services provider, ArabiaWeather, to increase its efficiency and redirect resources across its FM projects to adapt to weather conditions.

ArabiaWeather’s value-adding system LandWatch, applies unique formulas and algorithms to generate accurate and hyper-local forecasts on developing weather patterns at any location globally.

By using a dashboard to access the data captured and processed by LandWatch, teams at Farnek will be trained to monitor conditions in certain areas on a daily basis and advise both building owners and management, of the best time to schedule work.

Markus Oberlin, CEO Farnek, said, “LandWatch allows us to make informed business decisions. Many FM professionals are well aware of the havoc that random and isolated weather conditions can have on building maintenance and cleaning schedules. This is often compounded by just how changeable and localised weather can be. Hyper-local forecasting is very important when forecasting weather, for example, one area can differ significantly compared with the adjacent area, hour by hour. The ability to monitor hyper-local weather around specific areas creates a win-win situation for both FM companies and building managers.”

With access to advanced data, meteorologists at ArabiaWeather will alert Farnek, during and after severe weather events. LandWatch can indicate when to recommence work as soon as the poor conditions pass rather than simply postponing until the next suitable day. On clear days, changes in wind speed and, humidity can all be monitored using the software.

Farnek will now be the first FM company in the region to be able to schedule weather-sensitive work such as façade and window cleaning, around adverse conditions, boosting efficiency as well as cutting costs for building owners.

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Modular universal formwork for the Midfield Terminal at Abu Dhabi airport. The foundation formwork/GE universal formwork is by PASCHAL. (Photo: PASCHAL)

PASCHAL show of strength at Saudi Build

AT THE SAUDI Build exhibition in Riyadh, from 23-26 October 2017, PASCHAL will present wall, column and shaft formwork as well as the H20 beam for high, horizontal concrete structures.

Given its long-standing presence in the Middle East construction market, PASCHAL is concentrating its exhibits on the primary applications in this region.

From its 40 sq m booth, PASCHAL will demonstrate the practical application options, the system diversity and compatibility of the systems and components for quick and easy use in reinforced concrete construction (Hall 3, Booth 217). Well-trained formwork experts with a great deal of practical experience will be present at the booth to show visitors the simple handling and also some of the numerous constructions and projects completed.

The following products will be presented and demonstrated at show:

Modular formwork: Modular universal formwork is designed for use in foundations, walls, columns, beams, shafts and pre-cast concrete components. As a result of the comprehensive range of elements, it can be used both as hand-set and large-size formwork. The modular design principle enables simple and quick handling, even by unskilled labour.

Modular column formwork: PASCHAL will

be exhibiting the adjustable Modular column formwork with which both square and rectangular reinforced concrete columns with external dimensions from 20 to 50cm in increments of five cm can be formed. The simple windmill principle allows the formation of a wide variety of different reinforced concrete columns from just a few individual panels of the adjustable Modular column formwork. Depending on availability and space constraints, the formwork systems can be moved by using a crane or dismantled into individual components and transported, assembled and dismantled manually.

LOGO.3: The LOGO.3 wall formwork system will be displayed in its steel and aluminium versions. The robust formwork elements with profiled flat frames stand for robustness and durability. The elements can be used both horizontally and vertically. Connection of the elements is performed using a light wedge clamp that weighs only 1.8kg, or by using a multi-clamp. The comprehensive range of elements also includes multi-elements for corners, columns and stop ends. Moreover, the LOGO.3 formwork system is a winner when it comes to large-scale concrete constructions with minimum tie points of just 0.62 tie points/sq m.

TTR: There is no alternative to the Trapezoidal girder formwork if precisely

rounded concrete constructions are planned. Pre-assembled and pre-curved formwork units fit exactly and are a guarantee for perfect curvatures.

The TTR Trapezoidal girder formwork, with its continuously adjustable diameter from two to five metres and from five metres to infinite, provides well-formed concrete curvatures that correspond exactly to the specifications and drawings when executed. System enhancements enable usage on sloping surfaces, and compatibility with all additional PASCHAL formwork systems enables creative and unique concrete forms to be implemented for aesthetic reasons and/or due to design requirements.

Pre-assembly carried out in the factory and the low proportion of tie points of just 0.28 to 0.55 tie points/sq m enable shortest possible forming times.

H20 beam: PASCHAL Deck is a versatile slab formwork for ceilings in residential and industrial buildings. The adaptability of the H20 beam is achieved by simple overlapping. Therefore, it is not important if the beam is functioning as main beam or cross beam. The H20 beam comes in lengths of 245cm to 600cm. The permitted shear force of the 20 cm high wooden beam is defined as $Q=11.0$ kN and the permitted bending moment as $M=5.0$ kNm. ■



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Keeping compressed air clean

Unlike compressed air applications where there are rigorous standards that dictate the quality and specification of air used during the process, there are no current standards in place for exhaust air quality from vacuum pumps. Gareth Topping, vacuum sales manager at Gardner Denver, discusses why the industry needs to tackle the impact of contaminated air that may be generated by an unsuitable vacuum pump.

ISO8573 IS THE group of international standards stipulating the quality of compressed air. Consisting of nine separate parts, part one highlights the amount of contamination allowed in each cubic metre of compressed air and the remaining eight specify the methods of testing for a range of contaminants. This ranges from oil aerosol content and humidity, to solid particle and oil vapour content.

Naturally, air quality is particularly important in a food and beverage manufacturing environment. Most sites will follow recognised hazard analysis critical control point (HACCP) principles to ensure they are complying with hygiene legislation, removing any potential hazards or reducing these to an acceptable level. Yet, while product manufacturing process are scrutinised in great detail, ancillary processes and utilities can often be omitted. Crucially, this can mean potential risks from equipment such as vacuum pumps are overlooked.

Identifying potential risks

With vacuum systems generally located around the production environment, a contaminated pump exhaust can be hazardous and, as a result, this equipment should be included within a facilities' HACCP assessment. The majority of vacuum pumps currently in use are oil-lubricated and many applications will operate without any problems arising. Nevertheless, there is the potential risk of oil discharging from the exhaust of this type of pump, which presents a particularly significant problem in a food and beverage manufacturing plant.

In addition to oil discharge from the exhaust, there are a number of other issues that operators need to be aware of.



Gareth Topping is the vacuum sales manager at Gardner Denver.

Operating at high temperatures and an open-ended inlet port could result in oil carrying over from the pump, while a separator element may fail due to misuse or through the use of non-genuine spare parts. For this reason, it is important to work with a trusted and experienced maintenance partner, who can help and offer support should these matters arise.

The potential risk of leaks from an oil-lubricated vacuum pump can be avoided through a range of measures. These include using a food grade lubricant, fitting a downstream exhaust filter or remotely piping the exhaust air.

Offering solutions

Gardner Denver offers a free six-year warranty called 'Assure' on all new and existing rotary vane vacuum pumps for complete peace of mind, as well as an extensive network of qualified engineers that can deal with any on-site repair and maintenance, should an issue arise. A professional service centre is also available, should a pump require a more comprehensive overhaul.

For those concerned about the risks of oil-lubricated vacuum pumps, Gardner Denver can help identify and reduce any risks through a free site survey, which may extend to working with the production team to ensure the equipment is included in the HACCP assessment. ■



Gardner Denver vacuum pump air quality.

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Landscape 'modelling' in fashion

For landscape architects, BIM may be unnerving but failing to accept the software runs the risk of falling behind technology that is clearly making things easier for architects. InSite's Christopher Smeaton explains how.

BIM IS A process involving the generation and management of digital representations of physical and functional characteristics of places. It starts with understanding what the client wants at the end of the project, how to achieve that data, streamline the process, and develop an execution plan. Whilst BIM for construction and MEP have today developed a noticeable architectural footprint in the Middle East and North Africa region, BIM for landscape hasn't.

It is yet to make a strong showing on the designer's stage with small pockets of landscape architects developing their own way of dealing with it. They tend to model what they can to sidestep technical barriers and end up producing watered down versions, instead of bespoke shapes that push design boundaries.

According to Christopher Smeaton, BIM manager of landscape and urban planning at InSite, part of KEO International Consultants, there are reasons why BIM for landscape is now ready to enjoy firmer terrain.

"BIM for landscape is not in its infancy, and has been flourishing behind the scenes for many years," says Smeaton.

"You do not have to go far before you start to see this but only in the last couple of years has it really grabbed attention from the

entire architecture, engineering and construction industry."

Resistance to change has typically been the reason why this discipline has not caught up as quickly, but there are those who argue that BIM lacks the proper architectural tools needed for robust landscape designs.

"In some respect, it's correct because we have to do a lot of work for the actual

modeling itself, but the process is quite established and the guidelines are there to achieve client goals," he notes.

The fact is, BIM for landscape has come a long way in the last few years, with software the likes of DynamoBIM, which is a visual programming tool for Revit – a BIM software containing features for architectural design, MEP and structural engineering, and construction – and Grasshopper and Rhino, which enable these complicated geometries, using scripting.

But why go through the hassles when traditional landscape architecture can achieve tailor-made designs almost to perfection? Smeaton argues in favor of BIM for landscape using the example of podium projects, where landscape sits on top of a structural or architectural element in a building, this being the case for a lot of projects here in the region.

"Working together in linked models is resulting in other disciplines having a much greater understanding of the challenges," said Smeaton, adding, "We have seen one of the biggest advantages with coordination on podium projects where having clear scopes and boundaries enables a closer working relationship with structural engineers and irrigation engineers to coordinate connections to pump rooms and add

Smeaton's top 5 BIM for landscape trends

- 3D laser scanning: Becoming cheaper and more assessible to landscape companies
- Drone monitoring: UAVs offer risk-free surveillance, mapping and monitoring for every construction application
- Augmented Reality: Bring BIM models to life on the job site
- Material Management on site: Models used where materials are to be stored and moved around site during the construction phase before site works begin
- Grade control for drones: Geometry information of the landscape models are used by the drone to grade the site

irrigation piping feeds into utility trays.”

The real takeaways come from managing processes quickly and more efficiently, having information in one swoop rather than across different fragmented documents and having information lost at different handover stages.

“We are able to develop schemes from master planning and in some projects, we have done our master planning designs using information models, wherein we capture not only the 3D geometry but also the land use, and the ground floor areas,” explains Smeaton.

“And once this gets sent out to architects, they can pull that information from the models, without starting from scratch to understand what the plot regulations are.”

Still, BIM for landscape offers its own set of challenges before it can deliver streamlined results. “We’re not in the same position as architects or MEP engineers. There is no off-the-shelf software enjoyed by these disciplines to help us build our information models. So, we use a wide range of different software.”



Christopher Smeaton.

Smeaton further explains that at InSite, all landscape architects use Revit, and enjoy live access to all information in one model.

“But Revit isn’t built for landscape. Building complex landform geometry is difficult for us. We have to create workarounds and plug-ins from smaller companies, such as CS Artisan, to help achieve our requirements.”

Technical challenges are one area, but there are bigger issues when looking at

implementing BIM within a company.

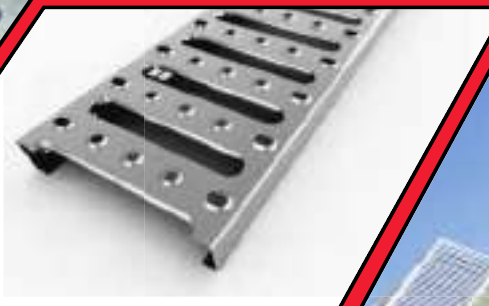
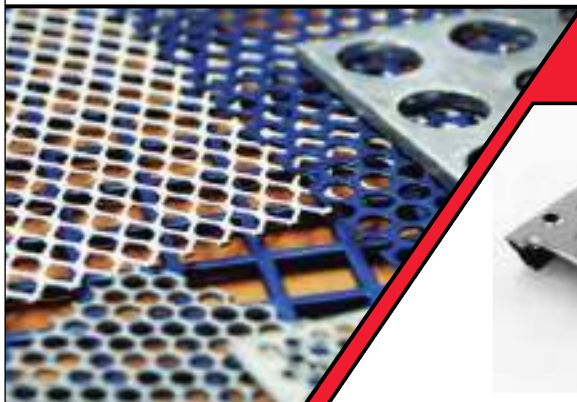
“One needs to look at costs, and I do not just mean software pricing but more importantly company-wide training and education expenses,” notes Smeaton. “Implementing BIM means change management that impacts all company aspects and which needs a clear and structured strategy and vision to gain traction,” he maintains.

This is a process that can take companies years before they are BIM-compliant and made more challenging in an ever-evolving industry. Regardless, failing to jump into BIM for landscape runs the risk of falling behind technology that is clearly making things easier for architects and other disciplines.

“You can model refuge areas for your water and solid waste recycling needs, or use modeling software like Irrigation F/X from Land FX to model the irrigation requirements, and be able to calculate flow rates, water sprays, program the sprinklers from the software, and generate order lists, length of pipes and connections required,” says Smeaton. ■



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Promoting sustainable partnerships

For the fourth consecutive year, WETEX 2017 will be held under the umbrella of Green Week with more than 80 international speakers addressing on the green economy, smart cities and innovation.

RENEWABLE AND CLEAN energy solutions and technologies are the top priorities of the 19th Water, Energy and Environment, Technology Exhibition (WETEX) 2017, organised by Dubai Electricity and Water Authority (DEWA) from 23-25 October. The exhibition is being held under the directive of HH Sheikh Mohammed bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai, and the patronage of HH Sheikh Hamdan bin Rashid Al Maktoum, Deputy Ruler of Dubai, minister of finance and chairman of DEWA, to achieve Dubai's vision of building a sustainable future for the emirate.

WETEX coincides with the second Dubai Solar Show, which highlights the latest innovations in the solar sector. The two exhibitions will highlight DEWA's Shams Dubai initiative, launched by HH Sheikh Mohammed bin Rashid Al Maktoum, to make Dubai the world's smartest and most successful city by encouraging homeowners to install PV panels connected to DEWA's network on the roofs of their buildings to produce electricity.

"WETEX 2017 and the second Dubai Solar Show are ideal platforms to showcase the latest developments, solutions and technologies in the field of renewable and clean energy. Shams Dubai contributes to the establishment of a sustainable energy model that promotes Dubai's economic growth without harming the environment or its resources. It supports the long term national initiative launched by HH Sheikh Mohammed bin Rashid Al Maktoum, under the theme 'Green Economy for Sustainable



Development', to build a green economy in the UAE, which contributes towards the optimal implementation of the UAE Vision 2021," said Saeed Mohammed Al Tayer, CEO of DEWA and chairman of WETEX.

"DEWA invests in innovation in the fields of clean and renewable energy technologies. In the words of HH Sheikh Mohammed: 'Every investment in the development of clean energy sources is at the same time an investment to protect the environment for future generations.' Shams Dubai is a key part of the Dubai Clean Energy 2050, which aims to transform the emirate into a global centre for clean energy and green economy and increase clean energy in Dubai to 75 per cent by 2050," added Al Tayer.

He also praised the efforts of institutions and individuals who have participated in the

Shams Dubai initiative and have already installed photovoltaic panels on 433 buildings with a total capacity of 14.6MW. The number of panels is expected to double in the future to eventually cover all buildings in the emirate by 2030. This clean energy capacity is enough to meet the demands of 30,000 homes, which is equivalent to a decrease of approximately 150,000 tonnes of carbon emissions per year, equivalent to planting 170,000 new trees annually.

WETEX includes a range of activities related to the consumption of water, energy, and environmental conservation, waste management, green buildings, as well as the latest cutting-edge solutions to lower CO₂ emissions.

The exhibition also provides a unique platform for businessmen, investors, government decision-makers, consumers and business partners interested in the public and private sectors. It focuses on promoting innovative green solutions and technologies in water, clean and renewable energy, environment, oil and gas, and environmental sustainability. ■

The exhibition is an opportunity for those specialising in energy, water and environment, to showcase their green solutions and products.

The rise and shine of solar power

The conference focuses on PV, PV production technologies and energy storage systems, with an aim to become the most important platform for manufacturers, suppliers, distributors, service providers and partners in the global solar industry.

RECENT DATA INDICATES that energy demand in the Middle East rose by between seven and eight per cent in recent years. Future demand is expected to rise at the same rate and, according to current estimates, demand will top 1,000 terawatts in 2017. As a result, energy supplies will need to double every decade. Over the next 10 years, the Gulf States will require 100 GW of additional energy.

At the Intersolar Middle East Conference which took place on 26-27 September in Dubai, 86 international speakers presented past, present and future PV market developments. A total of 408 attendees made the Intersolar conference the biggest standalone PV conference in the region.

With an aim to provide a unique platform for the region's solar power development, the conference enabled the stakeholders and decision makers to network and discuss strategies and collaborate to grow their businesses in the region.

In line with Dubai's aim to transform as a leader for the adoption of electric vehicles (EV), the conference organised a special session on EV where delegates learnt about recent and future EV market developments.

The special EV session addressed the possible expansion scenarios to be

A special session on electric vehicles (EV) was held, underlining its growing importance in the UAE and around the Middle East.



The Intersolar Middle East 2017 was organised by Solar Promotion International GmbH and Pforzheim and Freiburg Management and Marketing International GmbH (FMMI). (Photo: Intersolar)

examined, including domestic strategies to stimulate demand for electric vehicles, existing support schemes and legislative factors, said the organisers. The conference further discussed all the latest EV technology developments and anticipated regional trajectories have also been discussed with knowledge and purpose, according to the source.

"We are working on a road map to expedite a 15 per cent reduction by 2020 of carbon emissions," said UAE minister of energy Suhail Mohammad Faraj Al Mazroui in July, whose plan also includes 10 per cent and 20 per cent targets for EV adoption within the government's own fleet.

Intersolar Middle East also focused on the use of inverters in smart power systems and the innovative use of drones and robots to increase safety and efficiency. Additionally, the conference provided insights to develop

a path towards a clean, profitable and independent solar energy future.

"The solar market is booming in the GCC region and further afield. We wanted to provide the industry with a unique platform, and thus Intersolar started with summits and conferences in the Middle East in 2012," explained Daniel Strowitzki, CEO of FMMI, one of the organisers.

In 19 sessions, attendees received the latest technology and market updates in the MENA region, but also globally. PV Power Plants and energy storage were once again the blockbuster sessions. "This conference is different from others in the region," said Rakesh Shastri, communication manager at ABB MEA and one of the sponsors of the conference. "It covered many topics outside the box as e.g. African markets and the quality of the networking partners was very high-level," he added. ■

Powerhouse Iran?

The annual expo in November 2017 will be attended by prominent electrical companies, equipment manufacturers and vendors to enable participants to meet and discuss the future of electrical prospects in the country.

AS IRAN'S ELECTRICITY consumption continues to increase in recent years, the government is progressing towards achieving a powerful transmission and distribution network facilities all over the country in order to cope up with the growing power demand.

According to a recent report by Iran Power Grid Management Company, the country has increased its electricity generation capacity by 2.2 GW, reaching up to 76.3 GW, in the past Iranian calendar year 1395, which ended on 20 March 2017.

With the implementation of the Joint Comprehensive Plan of Action (JCPOA), Iran has recently been able to attract around US\$6bn foreign investment to construct new power plants, according to Mohsen Tarzatab, CEO of Thermal Power Plants Holding Company.

To boost up the electricity generation capacity, the Iranian government is focusing on developing combined cycled power



Iran's nominal electricity generation capacity is expected to reach 80 GW by summer 2018. (Photo: Chris Hunkeler/Flickr)

plants (CPP), hydroelectric power plants, distributed generation power plants and renewable energy power plants across the country, with a target to reach its nominal electricity generation capacity to 80 GW by

2018, reveals Houshang Falahatian, deputy energy minister in Iran.

This is the reason why the country is going to host the 17th Iran International Electricity Exhibition (IEE) that will take place at International Permanent Fairground in Tehran from 4-7 November 2017.

Organised by M&T Solutions, the exhibition will focus extensively on the electricity industry development and act as a comprehensive resource for the industry, its members, prospective business visitors and customers by providing in-depth information about the industry and the latest trends influencing its progress.

The exhibition will include generation of electrical energy, electrical substation, power distribution and control, process control products, electricity measuring, metering and control, automation system and equipment, lightings and lighting systems, maintenance and services and renewable energy, etc.

The expo will be attended by major electrical companies, equipment manufacturers and vendors from across the globe, thus providing opportunities for the participants to network, learn about new technologies, exchange ideas and build relationship with prominent electrical professionals to enhance market spread. The IEE also provides a platform for business collaboration and deals with world's reputed manufacturing companies. ■

Iran has exported electricity to eight Middle East countries from 2010 to 2016. The biggest buyer of Iran's electric power was Iraq with around 5,000MW to 8,000MW of electricity imports annually.

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Saudi Arabia colours

Caparol Paint's ambitions

The Germany-headquartered firm is looking to expand ties beyond Saudi Arabia now.

CAPAROL, A PART of DAW SE – a German paint company headquartered in Ober-Ramstadt, was founded in 1895. Caparol develops, produces and distributes a wide range of innovative coating for buildings and thermal insulations systems and has grown to become the third largest private manufacturer of building paints in Europe as an independent family business in its fifth generation.

Caparol Paints was established in Dubai in 1998 and, over the years, has brought the best of its German technology and service to the growing market of the Middle East region. Over this time, Caparol has built a reputation for delivering high quality and innovative solutions, accompanied by excellent service, enabling Caparol to secure high profile projects such as Palm Jumeirah Villas, Ritz Carlton DIFC, Sofitel Hotel JBR, Canadian Specialist Hospital, Shorooq Mirdif, Jumeirah Village Triangle Villas, and Khalidiya Mall in Abu Dhabi, among many others.

Sari Tahleh, national sales manager, Caparol Paints KSA, said, "Our business took a significant step forward when, in 2007, Caparol joined forces with a regional giant, Emaar Industries & Investments. With Emaar becoming a shareholder in Caparol, a merger between Germany's paint technology and regional construction market understanding was created and launched, announcing the presence of a completely unique painting and insulation experience."

In 2015, the company made a strategic decision to get into partnership with Rabiah & Nassar Group (RANCO) to expand its presence in Saudi Arabia. Since that time, according to Tahleh, Caparol gained the customers' trust as a German brand with high-quality paints and supplying a wide range of products to many projects such as King Abdullah Project (KAP4), Technical and Vocational Training Corporation (TVTC), Diplomatic Studies and



Sari Tahleh is the national sales manager at Caparol Paints KSA. (Photo: Caparol Paints)

Consular Affairs building, Correctional Facilities, Al-Ma'ali 76 villas, and Kayan 19 villas, along with other projects.

Entering the paint market of Saudi Arabia was the result of our understanding of how important the market is. The Saudi market is growing quickly and with the vision 2030, we see a big growth and a great potential in the market.

Caparol Paints provides variety of solutions for living spaces. One of its popular products is CapaStone, which is a crack-bridging and weather-resistance exterior paint with a natural-like finish; Caparol stands at the forefront of technological advancements in decorative coatings and can achieve these benefits via new Nano-Quartz Matrix Technology. The inclusion of this technology in Caparol Capastone NanoClear creates a hard surface that prevents the adhesion of all

types of particles, leaving a clean finish that endures. The multitude of benefits also included protection against the climate and a durable finish that is both reliable and high impact. Another popular product is CleanStar, a premium quality pure acrylic water based paint with stain removal properties. It is also highly washable and weather-resistance with excellent resistance to dirt pick up and aggressive air pollutants.

In 2012, with the increase in demand for Caparol's paints, a new factory was opened in Dubai Industrial City to serve the entire GCC region more efficiently. "You can always be confident and assured of excellent results, whatever the project or design challenge. What's more, working in partnership with you, our team of highly trained professionals can even advise you on the most appropriate products to suit your requirements so you can maximise both the aesthetics and the functionality of your project on every different scale." ■

With 100+ successful projects, Mosdorfer continues to energise the Middle East

AUSTRIAN COMPANY

MOSDORFER specialises in the development and manufacturing of power network fittings and damping protection systems for overhead transmission lines up to 1,200kV.

With products and solutions developed and produced for more than 1,000 projects across the globe, Mosdorfer has proved its competence as a global partner. Mosdorfer takes an active role in every project, providing long-standing expertise and focusing on the customers' requirements. The company's product range comprises of fittings for overhead transmission lines, damping systems, insulators and end fittings as well as fittings for high temperature conductors up to 240°C precisely suited to the Middle East.

Depending on the project, Mosdorfer also offers complete turnkey systems and customised components that are adapted to local conditions. The latest high-tech simulation, based on broad experience, allows for the development of safer products in the shortest amount of time.

In the Middle East, the company has more than 100 reference



For more than 65 years, Mosdorfer's technological know-how and experience have contributed to a safe, efficient and reliable worldwide energy supply. (Photo: Mosdorfer)

services make Mosdorfer a reliable and future-oriented partner for the energy industry not only in the Middle East but also worldwide, according to the company.

For more than 65 years, Mosdorfer's technological know-how and experience has contributed to a safe, efficient and reliable worldwide energy supply.

Today, Mosdorfer is active in more than 70 countries and the strategic partner for global energy industry, utilities, grid companies and contractors. This global presence is supported by its company locations in Austria, Italy, Slovakia, UK, USA, India and Thailand.

MESC roped in for major transportation projects in Saudi Arabia

DESPITE FLUCTUATIONS IN oil prices, the GCC countries have allocated significant budget to improve their respective transportation infrastructure as it is vital to their economies. For the cable manufacturers in the transportation sector, there is a reason to be optimistic now as the region's spending is back on track especially in countries such as Saudi Arabia. According to a *Ventures Onsite* report, the railway infrastructure spending market in Saudi Arabia is expected to grow at a compound annual growth rate (CAGR) of 7.88 per cent from 2016 to 2020. The Ministry of Transport will increase private sector contribution to developing and operating railways by 50 per cent. The railway contractor awards are expected to increase from US\$200mn in 2017 to US\$1.500bn in 2018. As of July 2017, the total value of rail projects is estimated to be worth US\$110.7bn. And local players like Middle East Specialized Cables (MESC) are at an advantage here due to intensive domestic spending and 'Saudisation' policy of the kingdom.



Aiman Al-Masri is the CEO of MESC.

As manufacturers of specialised industrial cables, MESC has been involved in several major projects across the GCC. At Middle East Electricity (MEE) that happened in February this year, Aiman Al-Masri, CEO of MESC, spoke about how the organisation was re-strategising its future plans in view of decreased oil prices that impacted Saudi Arabia. In talks with *Technical Review Middle East* in September 2017, Al-Masri reveals that the market looks to stabilise in Q1 or Q2 of 2018 since the oil prices have slightly

improved given the reduction in oil exports as well as major construction projects are underway in Saudi Arabia. As the company that produces cables for the transportation sector, he says that MESC has been involved in projects such as Riyadh Metro and in the process of studying and bidding for the US\$16.5bn Makkah Metro project in the kingdom. "Transportation projects like railways and metros also need a variety of cables ranging from power to supply and network and communication. Besides these,

there are the signalling cables. For now, Saudi Arabia is importing the signalling cable but MESC is on its way to fulfil the local demand as it is the only manufacturer of such cables in Saudi Arabia." Reflecting on the growth market for cables in the GCC, Al-Masri states that the bigger portion of the market is made up for the transportation sector such as power cables, communication cables, control cables and building wires. "With the ongoing railways and metro projects, there is potentially a good market here."

Perkins launches world's first SmartCap engine monitor

PERKINS RECENTLY LAUNCHED the world's first low cost engine level connectivity device – Perkins SmartCap – at Peterborough, its UK facility.

The company, which is celebrating its 85th anniversary, proudly unveiled its latest innovation, a 'smart' oil cap, which can be used on new and existing Perkins mechanical and electronic engines.

Designed to replace the oil filler cap, Perkins SmartCap is a low cost connectivity solution that allows end users to connect their mobile device to their engine via the free Perkins My Engine App on their smartphone. The cap monitors the Perkins engine and sends data direct to the Perkins My Engine App. The free app can be downloaded from Apple and Google stores.

When combined, the Perkins SmartCap and Perkins My Engine App will give Perkins' customers useful engine information including:

- Engine running hours



- Engine location
- Service reminders and service log
- Start/stop data
- Parts book and consumables information

“The low cost Perkins SmartCap in conjunction with the Perkins My Engine App will, for the first time, enable Perkins customers to easily track use of their engine and servicing requirements, locate their local Perkins distributor, see parts information and receive service updates, all in one place,” said Michael Wright, general manager – Aftermarket.

“The app was launched at ConExpo in March 2017 and is already proving popular with end customers, as it allows them to register their Perkins engine, access their OMM (operating maintenance manual) and parts book. A service record can also be kept, while the user can easily make contact with their local Perkins distributor, through the Distributor Locator feature.

“The fact the cap can be fitted to any Perkins mechanical or electronic engine in a matter of minutes and instantly provide engine telematics will be appreciated by millions of Perkins end users both in the USA and around the world.”

The Perkins My Engine App and Perkins SmartCap are ideally suited to owners and operators of Perkins powered machines.

Priced at an introductory offer of US\$54.21, the Perkins SmartCap, which has no ongoing costs, will be available from the local Perkins distributor – perkins.com/distributor. Production release is October 2017.

Megger releases fourth generation of its battery discharge tester

THE TORDEL 900 is Megger's latest battery discharge tester, which gives the most comprehensive results when testing battery capacity. The TORDEL 900 series is the fourth generation product, and a new way to regulate the discharge current has been introduced with the benefit of a world-leading dynamic power/voltage range. Furthermore, the new design has enhanced safety features including spark-free connection and emergency safety fuse.

The TORDEL concept was released in 1980s as the first portable battery discharge tester that had automated resistance regulation to be able to keep constant current. Stationary back-up batteries are present in substations and also many other areas. The TORDEL 900 series is used to perform load tests or discharge tests, which is the only way to determine a battery system's actual capacity. Tests can be conducted at constant current, constant power, constant resistance or in accordance with a pre-selected load profile. Together with the cell voltage logger, BVM, now connected directly to the TORDEL 900, it becomes a complete stand-alone discharge test system.

The TORDEL is connected to the battery, the discharge current and the alarm levels (voltage, capacity, time) are set. After starting the discharge TORDEL keeps the current constant at the preset level. When the voltage drops to a level slightly above the final voltage, TORDEL issues an alarm. If the voltage drops so low that there is a risk for deep discharging of the battery, TORDEL shuts down the test. All values are stored in TORDEL and can easily be transferred via a USB stick to a PC for evaluation.

Testing can be carried out without disconnecting the battery from the equipment it serves. Via a DC clamp-on ammeter, TORDEL measures total battery current while regulating it at a constant level.

Furthermore, the high discharge capacity of TORDEL gives the opportunity to shorten the test time. Discharging can take place at up to 220A, and if higher current is needed, two or more TORDEL units or extra load units (TXL) can be linked together.

Hadley Industries strengthens steel base in Middle East

HADLEY INDUSTRIES (MIDDLE EAST) FZE, part of UK-based Hadley Group, has been manufacturing in Dubai since 1993 and has steadily grown to become one of its most important facilities. The company moved to purpose-built premises in 2001 and added 30 per cent more factory space in January 2011. Located in the strategically important Jebel Ali Free Zone area, it serves markets as far afield as Australia and South Africa as well as the Middle East.

The 4,500 sq metre facility includes its rollforming lines, which produce a full portfolio of construction products – from large structural steel framing sections to small precision sections for use in a wide range of applications. The facility also operates a dedicated decoiling and slitting line that can handle steel coil width of up to 1,550mm and thicknesses of up to three mm.

According to Hadley Industries, the factory is well-placed for the manufacture and supply of the portfolio of steel profiles accredited for use in the construction of Abu Dhabi's Masdar City – the world's first carbon-zero city enterprise.

Recognising the sustainability credentials and performance advantages of Hadley Group's pioneering UltraSTEEL® process, products selected for use to build Masdar City include cable management steel profiles (cable tray and cable trunking), ceiling furring sections and UltraGRID™ profiles, dry wall framing profiles (studs and tracks), Hi Strut support channels, UltraSTRUT™ support channels and Hadley steel framing.



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13 years on, HIMOINSA continues to electrify Middle East

HIMOINSA MIDDLE EAST celebrates its 13th anniversary in 2017 and over this period, has been steadily increasing its volume of sales in the GCC region. The specialist genset manufacturer has been chosen for major construction projects in the Middle East that include supply of generator sets for power along several stretches of the Mecca-Medina High-Speed Rail construction project in Saudi Arabia.

At Doha Festival City in Qatar, five HIMOINSA gensets supply a total of 8.7MVA of stand-by power and respond within seven seconds after any power failure inside the mall. The gensets are also built to work in an ambient temperature of up to 55°C. For Dubai Festival City, HIMOINSA supplies units that provides 5.2MVA of power for the IMAGINE show.

The company currently counts major companies like Famco and Gulf Equipment, and rental companies such as Byrne Rental, among its key customers in the Middle East – a market that requires equipment with specific characteristics due to high temperatures. Recently, HIMOINSA lighting towers also illuminated challenging outdoor Dubai events such as Desert Warrior



HIMOINSA's new fleet comes with cloud technology, geo-location and anti-theft alert. (Photo: HIMOINSA)

Challenge and the Half Marathon organised by Johnson Arabia Dubai Creek Striders.

Other highlight of HIMOINSA's activities in the Middle East has been its development in the telecoms sector. The company has just been voted as one of the Top 6 technology providers in the telecoms sector globally. In Middle East it has been selected to deliver generator sets for international telecom company Ooredoo. The complete telecom

range offers longer service intervals of 500 or 1,000 hours and even up to 10,000 hours for some gas genset models, compared to the standard 250 hours. Recently, the company developed a new fleet manager with C2Cloud technology, geo-location and anti-theft alert. This device, specifically designed for the rental and telecommunications sectors, allows the generator sets to be monitored 24 hours a day, remotely from any device with an Internet connection.

Coping under extreme conditions

HIMOINSA gensets for desert climates are designed with tropicalised radiators with double varnish and anti-condensation heaters. The alternator air filters are specially treated to prevent dust from entering the sets and to ensure uninterrupted power supply.

"We are prepared to work in the extreme conditions of the Middle East; and equipment for desert areas demands special attention. Apart from the heat, other factors such as humidity can cause problems if not given due consideration and dust can clog filters and accumulate in the machines and affect their performance," says Keith Webb, general manager of HIMOINSA Middle East.

Tiger Profiles certified with FM Approvals, passes NFPA 285 tests

TIGER PROFILES HAS secured FM Approvals for its entire range of roofing and cladding panels.

The certification includes Class A classification as per the following standards — walls and ceilings (FM Approval Class Numbers 4411, 4651, 4880, 4881, 4882) and interior and exterior use (Class Number 4881).

Tiger Profiles approved products now include:

- TR 45/150 and TR 45/250 insulated roof and wall panels with both steel and aluminum facing, which may be the only roof panels that are approved with aluminum outer skin in this class; insulation options include PIR and mineral wool
- Concealed fix wall panels known for their hidden fastenings, which ensure a clean and aesthetically superior look and feel. These panels have successfully passed NFPA 285
- Cold store panels
- Tongue and groove (partition) panels

The recently secured FM Approvals are now the second FM certification earned by



The NFPA 285 tests performed on panels. (Photo: Tiger Profiles)

Tiger Profiles, the first being the FM Approval for T-Seam® standing seam roofing and cladding system, achieved in 2009 as Class 1 as per the Standard 4471.

Passing NFPA 285 test requirements

NFPA 285 is the standard fire test method for evaluation of fire propagation characteristics of exterior non-load-bearing wall assemblies containing combustible components. This standard provides a standardised fire test procedure for evaluating the suitability of exterior, non-load bearing wall assemblies and panels used as components of curtain wall assemblies that are constructed using combustible materials or that incorporate

combustible components for installation on buildings where the exterior walls are required to be non-combustible.

The NFPA 285 test on Tiger Profiles' panels was conducted for the determination of fire propagation characteristics of a PIR insulated concealed fix wall panel system. Tiger Profiles' concealed fix wall panels and façade insulated panels have both passed the stringent NFPA test requirements. Its façade panels are able to successfully pass the criteria for the NFPA tests used both in horizontal and vertical orientation, thus proving that the products are premium and ideally used in many iconic projects.

ASTM E84:

Tiger Profiles' products also underwent multiple testing in late 2016 and early 2017 on naked foam cores and double skin panels (two metal facings). The exposed core, concealed fix and faced panels are now classified as Class 1 or A. This fire-test response standard for comparative surface burning behaviour of building materials is applicable to exposed surfaces such as walls and ceilings.

One hundred years of heritage, countless reasons to choose Baudouin

For a century, there has been one name in the world of marine engines known for reliability, durability and unbeatable service. And that name is Baudouin.

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Baudouin's 100-year heritage began in the demanding world of marine engines. And in the unforgiving environment at sea, there is no room for unreliable generators. So even when used on land-based applications, you can rest assured that every PowerKit product is crafted to the exacting standards demanded of the harsh ocean-going environment. Durable, robust, and built to last.



Baudouin's full range of PowerKit products spans 30 to 1,400 kVA typical generator output.

As the designers and manufacturers of high-specification diesel engines since 1918, their experts have the experience to really deliver. In today's demanding market, Baudouin are at the forefront of modern industry trends, always improving and innovating. This is clear in their latest line up of PowerKit generator drive engines, already recognised as 'best in class'.

Best of all? Baudouin's excellence does not end with the purchase. Every product is backed by one of the best warranties in the industry. It is a guarantee that continues for two years (and unlimited hours) for prime power, and four years (or 600 hours) for standby power. So you'll stay up and running, no matter what challenges you may face.

When it comes to maintenance and servicing, Baudouin have it covered too, thanks once again to their marine expertise. In that world, easy to obtain and serviceable parts are essential. So too is maintenance that is quick and efficient. With a PowerKit engine, these are additional benefits you can rely on, whatever application you're using it for.

As the range is crafted with the same components as the company's renowned marine engines, you can also expect the same high levels of durability.

In fact, Baudouin are happy to deliver some of the longest intervals between servicing and overhauls in the industry. This, combined with excellent fuel economy, gives their engines one of the best and most competitive 'total cost of ownership' in the industry. Their reliability and value that you simply won't find elsewhere.

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OMICRON mobile HV source for dry-type transformers

A DRY-TYPE TRANSFORMER (DDT) is a safe, low maintenance and environmental-friendly solution suitable for indoor and outdoor applications. It is also compact in size compared to a liquid-filled transformer, making it suitable for hard-to-access areas or those with limited space such as wind turbines, offshore platforms, indoor and underground substations, industrial plants and even high-rise buildings.

Dry-type transformer

Unlike liquid-filled transformers, where the electrical core and coils are cooled with oil, silicone or another liquid dielectric, dry type transformers are air-cooled. The dry-type transformer's case is ventilated to allow air to flow and cool the coils.

Alternative method used for assessing insulation condition

The primary concern with all types of transformers, and also the key indicator of their life expectancy, is the condition of the transformer's insulation system.

For dry-type transformers, the insulation system consists of cast resin winding, the core insulation and the termination system insulation. The structural strength and insulating properties of materials used for these insulation systems degrade over time through normal ageing. They can also degrade prematurely as a result of overheating as well as mechanical and electrical stresses.

Dissolved gas analysis (DGA) is the most commonly used method for determining winding insulation condition in oil-type transformers, but is not possible for dry-type transformers.

Compared with other possible diagnostic measurements, including a dissipation/power factor measurement, partial discharge (PD) testing can most effectively detect the presence and location of PD activity and resulting insulation defects in a dry-type transformer. Analysis of the PD measurements gathered can be used as a guide to the condition of the insulation and for determining the need for

repair or replacement before a failure and costly outage occurs. The results can be trended to chart the rate of insulation degradation between consecutive tests.



Dry-type transformer.

High-voltage source required for off-line tests

To determine the insulation condition of a dry-type transformer, a high-voltage (HV) source is required in order to perform off-line partial discharge (PD) measurements or AC voltage withstand tests. However, such an HV source is often not conveniently available, especially for field testing. In this case, the induced voltage test can be performed as an alternative to build up the required voltage level.

The induced voltage test requires the transformer core to be energised in order to induce the test voltage on the HV side. To accomplish this, the external voltage source is connected to the low-voltage (LV) side of the transformer under test to induce the test voltage on the HV side.

A lightweight and portable HV source for on-site testing

In addition to availability issues, the traditional type of HV sources used for off-site testing are also very large, cumbersome and expensive to transport. They are also often impractical for testing in areas with limited space.

As an alternative, OMICRON's modular and mobile CPC 100 testing system can be

used as an HV source for induced voltage tests on dry-type transformers. Configurable matching transformers enable you to achieve different voltage levels on the LV side of a dry-type transformer. Each matching transformer can output a maximum power of five kVA. This applies to a frequency range from 15 Hz to 400 Hz.

The CPC 100 unit itself weighs only 29kg and comes in a transport case with wheels. The compact design and low weight of not only the CPC 100, but also the matching transformer makes the entire setup easy to transport and use for on-site testing in areas that are difficult to access or have limited space.

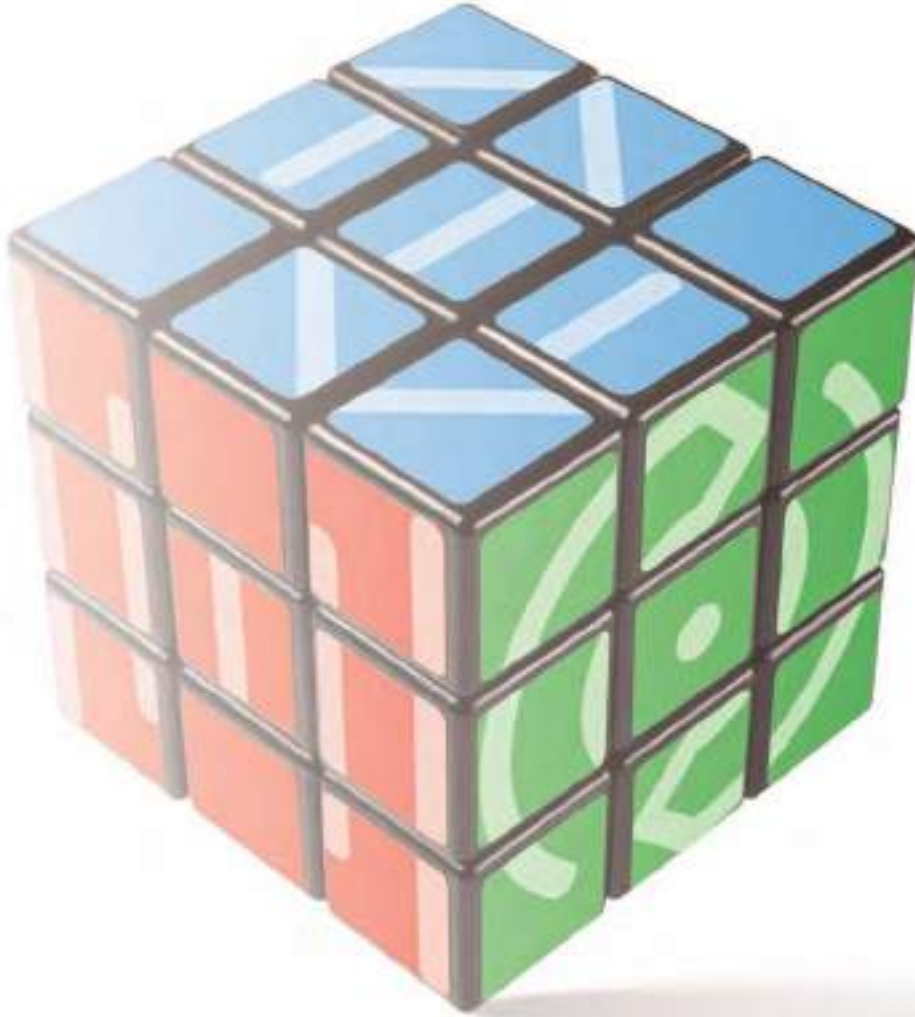


Figure 2: Light-weight and compact HV source with CPC 100 and matching transformers.

Multi-functional testing for substations and industrial plants

In addition to serving as a mobile HV source for on-site testing, the CPC 100 can also be used to perform a variety of standard and advanced diagnostic tests for commissioning and maintenance on primary assets such as power transformers, current and voltage transformers, circuit breakers and switchgear, rotating machines, grounding systems, as well as cables and transmission lines. It can replace several individual test devices, which also saves you time and makes it a viable economical alternative.

For a combined induced voltage test and PD measurement, the CPC 100 unit and a matching transformer are connected to the LV side of the transformer under test to energise one winding at a time. PD activity is evaluated by recording the induced charges with the PD measurement system, such as OMICRON's MPD 600 system, via coupling



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capacitors, which are connected to the transformer's HV terminals. The end of the tested winding is grounded.



Figure 3: PD test setup using CPC 100 as HV source and the MPD 600 PD Analysis System.

When more power is needed

As in the case of dry-type transformers, the power required to energise the test object itself can often exceed the power ratings of only one CPC 100. The number of CPC 100 devices, needed to energise the transformer and induce the test voltage depend on the core losses and reactive power intake.

This situation can be resolved in that the power output can be easily multiplied in order to have a sufficient HV source for induced voltage testing. This is accomplished using the Sync function of the CPC 100, which allows synchronisation of up to three CPC 100 devices with matching transformers to create an HV source with up to 15kVA.

Using the CPC 100 Sync function, the measurement setup previously described remains unchanged except for the configuration of the voltage source on the LV side.

By connecting several matching transformers in series, the overall output voltage can be increased, resulting in a three-fold increase in test voltage. Connecting multiple CPC 100 devices can be done either by a serial or parallel connection of the matching transformers. The first option will increase the maximum output voltage while the latter will increase the output current of the system.



Figure 4: Synchronising up to three CPC 100 to create a HV source with up to 15kVA.

Low disturbance levels

The challenge with the PD measurement on transformers is that PD signals are of low magnitude, and getting the basic noise level down in the field to where you can see PD activity is not so simple.

To solve this, the CPC 100 comes with a frequency-variable amplifier. This allows you to tune the frequency in order to bring down the reactive power intake to a minimum so that it does not interfere with PD measurements. OMICRON's MPD 600 PD measurement system also features various advanced tools, such as 3PARD (3-phase amplitude relation diagram), that effectively separate various PD sources from noise for more reliable analysis of PD activity.

A practical example

A manufacturer of dry-type transformers recently received a request from a customer to conduct on-site PD testing at an indoor hydroelectric power station built into the side of a mountain. The customer at the power station wanted verification of the insulation condition after its dry-type transformers were put into operation for a period of time. Since a gas-in-oil analysis is not possible in these transformers, off-line PD measurement was the only other diagnostic tool most appropriate to assess the insulation state.

All of the dry-type transformers were taken out of service for the test and energised using the CPC 100 and matching transformer as a voltage source, but the dry-type transformers were all so large that the required power to energise them exceeded the power ratings of just one CPC 100 device. To solve this, the CPC Sync function was used to create a powerful and scalable HV source.

Flexible and modular setup

Three CPC 100 units with the CPC Sync function and three matching transformers were used to excite each of the dry-type transformers. The PD measurement was then carried out phase by phase with a one-channel MPD 600 system.

The test setup used on site consisted of comparatively little equipment. The

alternative would have been to bring a large and bulky HV source in on a truck, which would have been very difficult to bring into the indoor power plant. Instead, only the three small and transportable CPC 100 units, the matching transformers, the PD measurement system and a few PD measurement accessories were needed. It was easy to ship to the location, transport to the measurement site and to set up in the limited workable space available.

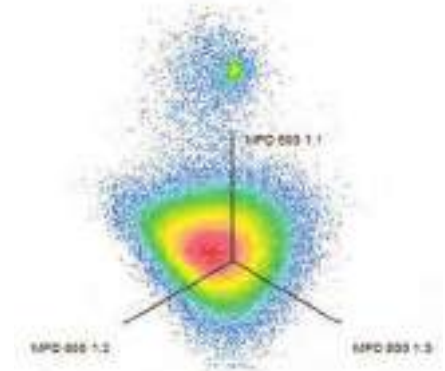


Figure 5: The MPD 600 uses advanced techniques to separate various PD sources from noise for more reliable analysis of PD activity.

Efficient testing procedure

Only two and a half days were required for setup and PD testing on all of the dry-type transformers. Before starting the test, the PD detection system had to be calibrated. Therefore, a voltage and a charge calibration were performed using the two kV output of the CPC 100 to obtain the voltage divider factor of the PD measuring system. After everything was set up and the adjustments were made to minimise interference, the measurements could be performed quickly and efficiently.

The PD data was reviewed directly after each measurement and data streams were recorded for reporting. All of the transformers were in good condition with no noticeable PD activity. ■

About the author:

Moritz Pikisch joined OMICRON in 2010. He is currently product manager for the company's CPC product family including the CPC 100, CPC Sync and related accessories. In addition to his product management responsibilities, he is the application expert at OMICRON for line impedance and grounding system testing. He studied electrical engineering at Karlsruhe University in Germany and received his engineering and teaching degrees in 2008.



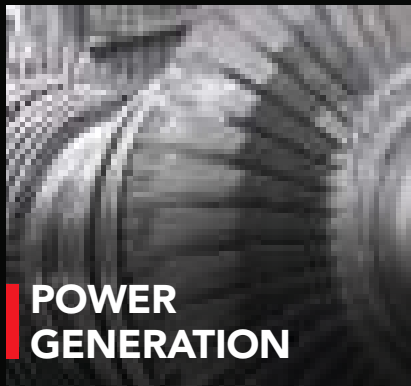
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Market fluctuations fail to shake HMEC

Piet van Bakergem, general manager at Hitachi Construction Machinery Middle East Corporation FZE, speaks to *Technical Review Middle East* about the region's construction market.

“**A**S WE ALL know, the Middle East market has been affected by the drop in oil prices, political situations and for some, even by sanctions,” said Piet van Bakergem, general manager at Hitachi Construction Machinery Middle East Corporation (HMEC) when asked about the outlook for the Middle East construction market. However, he pointed out that, despite these market fluctuations, HMEC is expecting a small growth in demand in the next year.

One of the leading construction companies in the market, HMEC provides a variety of equipment to cover all functions including digging, loading, carrying, breaking, grabbing, cutting, crushing and screening. The company and its consolidated subsidiaries (HCM Group) use their extensive experience and advanced technological capabilities to develop and manufacture a wide range of leading-edge construction machinery for the region.

“Project profitability is the target of all

contractors and, because of that, investors are willing to invest in Hitachi's construction machinery, which delivers this expectation,” van Bakergem reiterates.

HMEC is currently involved in several major projects in the Middle East region including metros, railways, ports and infrastructure.

The company has a series of innovations for the regional market. “We have Wenco Mining Management Systems, autonomous dump trucks, hybrids and electrical



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HMEC will participate in major events in the region including the MEC/PMV Live in March 2018.

powered excavators, and next generation wheel loaders. Hitachi Construction Machinery is part of a big multinational company, which is active in transport, IT, customer electrics and medical systems, to name a few," van Bakergem points out. He also reports that HMEC will participate



Piet van Bakergem is general manager at Hitachi Construction Machinery Middle East Corporation.

in major events in the region including Ethio-net in September 2017, INDABA South Africa in February 2018, MEC/PMV Live in Dubai in March 2018 as well as major shows

in Iran. The company will exhibit its 20- and 30-tonne excavators together with wheeled excavators, wheel loaders and mining machinery at these shows. ■



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Securing scaffolding standards

Ascend Access Scaffolding has a range of safety products to ensure safe practices.



Platform ladder folded.



Ascend Access System Scaffolding LLC
managing director Shadab Ahsan.

INTERNATIONAL STANDARDS FOR safety manufacturer of aluminium scaffolds ensure that manufacturers are producing Kitemark quality certified or GS Mark certified scaffold towers. These product and service quality certifications ensure these products are manufactured to the best possible quality, following quality production procedures and ensuring stringent quality control, as well as product traceability in any cases of faulty manufactured products.

According to Ascend Access System Scaffolding, a number of local manufacturers in the Middle East have been producing scaffolding equipment that could prove to be faulty, potentially leading to accidents, scaffold collapses and severe injuries for operators. The scaffold work platform quality and plywood standard is a very important standard for optimum load bearing capacity and plywood quality must be certified EN1995-1-1.

To ensure safety standards are adhered to, Dubai-based manufacturer of movable aluminium scaffolding and ladders, Ascend Access System, introduced an easy-to-erect platform ladder and a new safety system. The company says that thanks to continuous research and development in aluminium scaffolding, its innovative products have been crafted to last longer and for greater ease of assembly.

The rolling platform ladder aimed specifically for exhibition stand builders and interior decorators. Being lightweight, the platform ladder is easy to erect and fold by just one person. It is available in different

adjustable working heights. The platform ladder has been designed in accordance with the latest health and safety standards and is very compact for storage and easy to transport, says the company.

Ascend also introduced the 'Advanced Guard Rail' (AGR), designed as a collective fall prevention system when assembling or erecting mobile access towers. The AGR is mounted on the external edge of the tower before the working platform is installed. The system has been designed to be safer than assembling a tower using the usual 3T (through the trap) method. Although the 3T method is still widely accepted as a safe means of tower assembly, more sites across the UAE and Qatar are now insisting on AGRs being used, says the company. AGR frames are fully compatible with Ascend's standard mobile access towers. The AGR is available for DIY as well as industrial towers and can be used on narrow as well as wide towers.

Ascend has started the process of having its mobile access towers recognised by Kitemark™, a registered trademark awarded by the British Standards Institution for products that have demonstrated standards for quality and safety, and which is one of the most recognised symbols of quality and safety.

The company says that it is the only mobile access tower manufacturing company in the Middle East that is an associated member of the UK's 'Prefabricated Access Suppliers Manufacturers' Association' (PASMA), which is the lead trade association for the mobile access tower industry. ■

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Section One: International and regional suppliers of Gensets

Section Two: Contact details of Middle East agents & subsidiaries listed by country, page 87

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Ansaldo Energia Group



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Web: www.ansaldoenergia.com
E-mail: eleonora.gazzo@ansaldoenergia.com

Ansaldo Energia is a leading international player in the power generation industry, to which it brings an integrated model embracing turnkey power plants construction, power equipment (gas & steam turbines, generators and microturbines), manufacturing and services and nuclear activities. Ansaldo Energia is active as full service provider with a broad portfolio on heavy duty gas turbines offering complete maintenance solutions on power generation rotating equipment and plants, built both by itself or by other OEMs. Our mission is to deliver innovative, proven, state-of-the-art, flexible solutions for the power generating industry, aimed at increasing the customer's value.

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German manufacturer of multipurpose high quality stainless steel prefabricated flue and chimney systems for the exhaust of gases and ventilation.

The Jeremias Group has more than 40 years' experience in the flue and chimney production. The headquarters are situated in Germany with 7 production sites, 2 sites in Germany, 1 site each in Poland, Spain, Russia, Czech Republic and USA. Jeremias is one of the world's leading manufacturers of high pressure high temperature stainless steel flue and chimney systems for the exhaust of gases and ventilation. Jeremias Product range includes 60 different CE and UL certified systems covering all kind of domestic, commercial and industrial applications complemented by freestanding industrial steel chimneys up to 3 meter diameter.

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Web: www.deere.com
E-mail: jdengine@johndeere.com

JDPS develops, manufactures and markets diesel engines from 36 to 448kW for a large variety of industrial applications, generator sets, compressors, material handling and agricultural equipment.

Agents:
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Kirloskar Oil Engines Ltd.

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Kirloskar Group is among India's largest multi-products, multi-location diversified engineering conglomerates with annual sales of US\$1.6 billion. Kirloskar Oil Engines Ltd. was incorporated in 1946, and is the flagship company of the Kirloskar Group. Today KOEL is an acknowledged leader in the manufacturing of diesel engines, agricultural pump sets and 'Kirloskar Green' generating sets. Company has state-of-the-art manufacturing units in India that offers world-class products. KOEL has a sizable presence in international markets, with offices in Dubai, South Africa and Kenya and representatives in Nigeria. KOEL also has a strong distribution network throughout the Middle East and Africa.

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Qatar - Boodai Trading Co. Ltd. (Qatar)
Saudi Arabia - Abdullah Hashim Co. Ltd. (SAU)
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KJ Power Generator

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KJ Power Generator manufactures 1033. KVA - 25033kVA diesel generator sets, soundproof canopies, control and power transfer boards and synchronization systems in Istanbul - Turkey. We meet energy requirements of construction, oil, health, telecommunication sectors and state institutions in more than 50 countries abroad, through our sales and after-sales services.

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Linz Electric S.p.A is specialized in the production of alternators and rotating welders. Part of the Pedrollo Group of companies, Linz Electric has become one of the major players in the sector in just a few years, thanks to the original innovative solutions in energy transformations.

Lister Petter Ltd.

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MAN Diesel & Turbo SE

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Mantrac Group

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National Instruments is a provider of automated test, control and monitoring equipment and graphical system design with a board focus on energy, oil and gas, and condition monitoring sectors. NI has established its presence in the Arab region in 2004 along with offices in Lebanon, Egypt, Saudi Arabia and Turkey.

Agents:
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NED S.r.l.

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OMICRON Electronics Middle East



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ORTEA S.p.A

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Powersource Projects Ltd.

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Ranco Group



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SAB, Standard Aggregatebau Evers GmbH & Co. KG

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Sakr Power Group

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Scania is one of the world's leading manufacturers of trucks and buses for heavy transport applications and of industrial, marine and power generation engines. Employing some 44,400 people, Scania operates in about 100 countries. Research and development activities are concentrated in Sweden, while production takes place in Europe and South America.

Agents:

United Arab Emirates - Scania Middle East FZE

SDMO Industries



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SES Smart Energy Solutions

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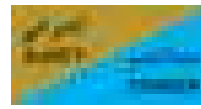
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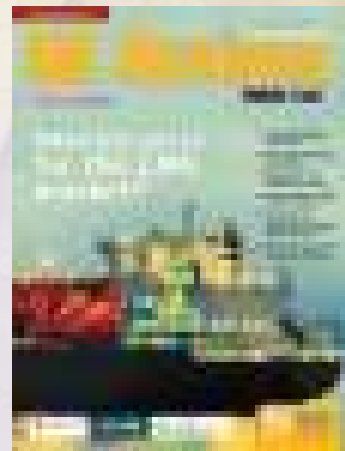
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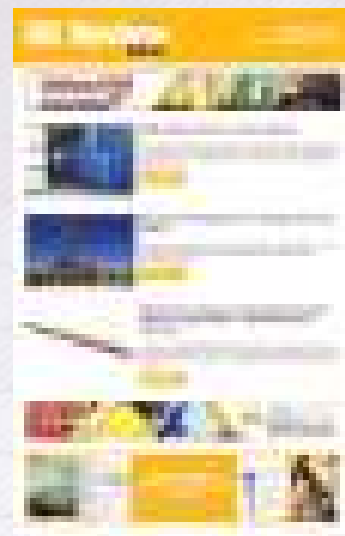
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بمستوى أعلى من الوضوح؛ مثل الإعفاء من الضريبة على نقل السلع من دول مجلس التعاون الخليجي الأخرى. وعندما يتعلق الأمر بالمناطق الحرة من الناحية الفنية، يطرح النظام الضريبي الجديد «مجموعة من الأسئلة المعقدة»، حسب تقرير صادر عن «برايس ووتر هاوس كوبرز» حول هذه المسألة. وقد ذكر ما يلي ضمن الاعتبارات الرئيسية:

- تصنيف ضريبة القيمة المضافة والتعامل مع السلع والخدمات التي يتم الحصول عليها داخل المنطقة الحرة، والتي يتم جلبها من خارج المنطقة الحرة ومن خارج الدولة.
- تعامل ضريبة القيمة المضافة مع الإمدادات من منطقة حرة لأخرى.
- تعامل ضريبة القيمة المضافة مع الكيانات التي تعمل في المناطق الحرة (المُحاصرة) ومناطق التجارة الحرة (غير المُحاصرة).
- أية تغييرات تنظيمية وهيكلية مطلوبة لتحسين التنافسية.

ومما يدعو للتفاؤل في دولة الإمارات أن المناطق الحرة تتمتع حاليا بمستويات تداول قوية على الرغم من الغموض الذي يشوب الخلفية الاقتصادية العالمية، مما يوفر درجة من المرونة عند تطبيق التغييرات الضريبية. ففي العام الماضي نجحت المنطقة الحرة في جبل علي في جذب 470 شركة جديدة في صفها وفي الربع الأول من 2017، انضمت إليها 122 شركة أخرى من 33 دولة. وتُحلق الشركة العملاقة المالكة لها دبي العالمية للموانئ عاليا في سماء النجاح بفضل النتائج الجيدة، كما تواصل ضخ الاستثمارات في التكنولوجيا الرقمية وتكنولوجيا التشغيل الآلي من أجل تعبيد الطريق لنمو المنطقة الحرة في المستقبل.

وجدير بالذكر أن الخبراء الرئيسيين، ومن بينهم صندوق النقد الدولي الذي اختتم زيارة لدولة الإمارات في يوليو/تموز الماضي، يشيرون إلى أن التطبيق المخطط له لضريبة القيمة المضافة لن يحمل أي آثار سلبية على التنمية بوجه عام. وفي الوقت الذي تعاني فيه المنطقة وطأة انهيار أسعار النفط، تلقى هذه الخطوة ترحيبا هائلا، لا سيما من قبل شركات المنطقة الحرة.

للضرائب قائلا: «نعمل على تأسيس بيئة تشريعية وتنفيذية مثالية لتسهيل تطبيق الدولة لضريبة القيمة المضافة وأنظمة المكوس. فتطبيق هذه الضرائب يعزز وضع دولة الإمارات على صعيد المنافسة الدولية».

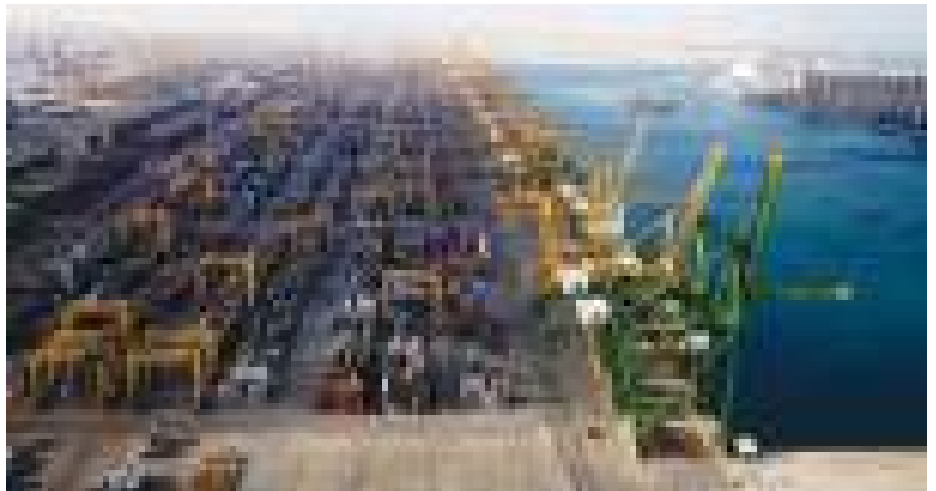
وفي محاولة لتخفيف حدة هذه الخطوة، أعلنت دولة الإمارات أيضا أنها على الأرجح ستُفعل إعفاء نحو 100 سلعة وخدمة من هذه الضريبة، مثل الأغذية وخدمات الرعاية الصحية. وقد اعترف بعض المسؤولين وخبراء الاقتصاد سرا أن تطبيق الضريبة المتزامن في جميع الدول قد لا يكون ممكنا، وأن بعض الدول قد يؤجل تلك الخطوة. وتأتي الكويت وعمان والبحرين أيضا ضمن مجموعة دول مجلس التعاون الخليجي. والرأي السائد هو أن الموقف السياسي الذي تواجهه دول الخليج - مع عزل قطر من قبل المملكة العربية السعودية والدول الأخرى - ليس هو المتسبب في التأخير، وإنما يرجع ذلك لأسباب اقتصادية وعملية. وهناك أيضا عامل آخر متمثل فيما إذا كان المستخدمون بمناطق التجارة الحرة مستعدين لتطبيق ضريبة القيمة المضافة، إذ يشير الخبراء إلى أن الأنشطة التجارية بدول مجلس التعاون الخليجي ككل غير مستعدة على الإطلاق لتطبيق النظام الجديد.

وبينما تمتلك بعض الشركات الخليجية خبرة داخلية في ضريبة القيمة المضافة، فإن من بين مستخدمي المناطق الحرة عددا كبيرا غير متكافئ من المؤسسات الكبرى والدولية الخبيرة في التعامل مع النظم الضريبية المعقدة. وقد أصدرت المملكة العربية السعودية مشاريع قوانين بخصوص ضريبة القيمة المضافة في مايو/أيار تتسم



تسجيل الضرائب، والإعداد لرد الضرائب والأموال المُقدّمة، وقواعد السداد، والكشف الطوعي.

وبحسب وكالة الأنباء المحلية (وام) يتضمن القانون الاتحادي الجديد أيضا قائمة بعقوبات عدم الامتثال. كما يحدد عملية واضحة لدعاوى الاستئناف، ويوفر للهيئة الاتحادية للضرائب بيئة تتسم بالعدل والشفافية لتنفيذ مهامها. وفي معرض حديثه عن القانون، أضاف سمو الشيخ حمدان بن راشد آل مكتوم، ولي عهد دبي ووزير المالية الإماراتي ورئيس مجلس إدارة الهيئة الاتحادية





في العام الماضي جذبت المنطقة الحرة في جبل علي ٤٧٠ شركة جديدة وفي الربع الأول من ٢٠١٧، انضمت إليها ١٢٢ شركة أخرى من ٣٣ دولة

ضريبة القيمة المضافة واقعاً فعلياً

بحلول أول يناير/كانون الثاني 2018، تبدأ دول مجلس التعاون الخليجي في تطبيق ضريبة القيمة المضافة لأول مرة، وهو الإجراء الذي قد يكون، أو لا يكون، له تبعات على مناطق التجارة الحرة الشهيرة بالمنطقة. وتتعقد النية على تطبيق ضريبة بنسبة خمسة في المائة على الرغم من العواقب الإدارية والفنية القائمة، وهو ما قد يؤدي إلى تأخر بعض الدول الأعضاء عن الركب.

الضرائب، أيضا القواعد الأساسية لنظام الضرائب الذي تم التخطيط له في دولة الإمارات. ويحدد القانون مجموعة واضحة من الإجراءات والقواعد العامة التي سيجري تطبيقها على جميع قوانين الضرائب في دولة الإمارات مثل ضريبة القيمة المضافة والمكوس. ويشمل ذلك إجراءات فرض الضرائب والمراجعات والاعتراضات ورد الضرائب وتحصيلها، إلى جانب التزامات مثل

العساف قد أكد بالفعل، في شهر مايو/أيار، أن المملكة ستكون مستعدة لذلك بحلول تاريخ بدء تطبيق الضريبة. وفي 31 يوليو/تموز، أصدر سمو الشيخ خليفة بن زايد آل نهيان، رئيس الإمارات العربية المتحدة وحاكم إمارة أبوظبي والقائد الأعلى للقوات المسلحة قانونا جديدا يحدد دور الهيئة الاتحادية للضرائب. كما يحدد القانون الاتحادي رقم 7، الصادر عام 2017 والخاص بإجراءات

حكومات الخليج تأمل أن يساعد رفع الضرائب الموحد في تعويض تأثير انخفاض أسعار النفط، والتي قد استهلكت مدخرات الدول خلال السنوات الأخيرة. وقد أعلن وزير المالية الإماراتي، خلال أشهر الصيف، أن الدولة تمضي في طريقها نحو تطبيق الضريبة، وأن دولاً أخرى، مثل المملكة العربية السعودية، مستعدة أيضا للسير على نفس الدرب. وكان وزير المالية السعودي، إبراهيم

إيران تكشف النقاب عن محطة لتخزين الطاقة الشمسية في قزوين



تواصل إيران الاعتماد على قطاع الطاقة الجديدة والمتجددة الذي يسهم بنسبة 14,6 في المائة تقريبا من قدرة توليد الكهرباء الإجمالية

ويمكن استخدام النظام في الأغراض السكنية ومجالات الأعمال وأماكن العمل إلى جانب الصوبات الزراعية عبر ضبط درجة الحرارة والرطوبة. ويجدر بالذكر أن إنشاء محطة الطاقة الشمسية قد تم على يد رقية جلاي، أحد أعضاء مجتمع المبدعين الإيراني. وكانت جلاي قد سجلت ستة اختراعات من قبل.

أماطت إيران اللثام عن محطتها للتخزين طويل الأجل للطاقة الشمسية، والتي أنشئت بأيد إيرانية في مجمع العلوم والتكنولوجيا في قزوين بهدف تخزين وتوليد الطاقة الشمسية لأغراض الاستخدام المنزلي. ووفقا لما ذكرته وكالة أنباء الجمهورية الإسلامية (ايرنا)، تعمل المحطة بواسطة تفاعلات فيزيائية وكيميائية لتخزين البخار المؤلّد بواسطة الطاقة الشمسية على المدى البعيد. ومن المتوقع أن تضيف محطة الطاقة الشمسية قيمة لهدف الدولة المتمثل في تعزيز القدرة على توليد الطاقة لأغراض الاستهلاك المنزلي. ومع زيادة استهلاك الطاقة المنزلية وشح موارد الوقود الأحفوري والنفط، تواصل إيران الاعتماد على قطاع الطاقة الجديدة والمتجددة الذي يسهم بنسبة 14,6 في المائة تقريبا من قدرة توليد الكهرباء الإجمالية في الدولة. ويزخر فصل الصيف بوفرة من أشعة الشمس التي تساعد في حدوث التفاعلات الفيزيائية والكيميائية لتخزين البخار الذي تبلغ درجة حرارته 300 درجة مئوية تقريبا في المحطة لاستخدامه خلال فصل الشتاء. وقد ذكر يوسف جورج، رئيس مجمع قزوين للعلوم والتكنولوجيا للمصدر، أن المحطة من شأنها تخزين الطاقة الشمسية لمدة ثمانية أشهر لاستخدامها في التطبيقات الحرارية أو توليد الكهرباء. وفي معرض حديثه عن مستقبل الطاقة الشمسية في توليد الكهرباء، ذكر جورج أن مقدار الطاقة الشمسية التي تصل الأرض تبلغ 85 تريون كيلواط، بينما لا يتعدى إجمالي الاستهلاك العالمي 800 ألف ميواط.

زين العراق تشر حزمة إريكسون الافتراضية المتطورة

لقدر أكبر من البيانات والتغطية». وذكرت أن حزمة إريكسون المتطورة الافتراضية تدعم البيئات ذات القدرات العالية، وتوفر الحلول المطلوبة، وتتعامل مع العديد من حالات الاستخدام الرأسي لتوفير فرص جديدة للمشغلين.

إريكسون الافتراضية ستتيح لنا تحقيق أهدافنا الإستراتيجية، هذا إلى جانب تلبية احتياجات عملائنا ومتطلباتهم فضلاً عن مواصلة تقديم الأداء الفائق، وفي الوقت ذاته سد الاحتياجات المتنامية للبيانات.

أبرمت إريكسون اتفاقية شراكة مع زين العراق لخدمات الاتصالات في الشرق الأوسط وأفريقيا لترقية شبكتها الحالية باستخدام حزمة إريكسون الافتراضية المتطورة (vEPC) وذلك لتلبية احتياجات العملاء المتزايدة من استخدام البيانات.

وأضاف: «يُجسد هذا الاستثمار والتحديث المتواصل لشبكتنا مثالا حيا على تفانينا الكبير لتحسين عملياتنا في المستقبل بما يحقق الفائدة لجميع أصحاب المصالح. كما يعكس مدى التزامنا بتزويد مجتمع الاتصالات المتنقلة في العراق بأعلى مستويات الخدمة المتاحة عبر البنية التحتية والتكنولوجيا المتطورة، وهو ما يضمن لعملائنا تجربة اتصالات متنقلة فائقة». وقالت رافيه إبراهيم رئيس إريكسون الشرق الأوسط وأفريقيا، في معرض تعليقها على هذه الاتفاقية: «يعتبر العراق من أهم الأسواق لتطوير شبكات الاتصالات المتنقلة وتزويدها بخصائص مبتكرة. ومما أن المستخدمين العراقيين مولعون دوما باقتناء التكنولوجيا الحديثة، فإن تحديث الشبكة وتبني التكنولوجيا الجديدة يصبح أمرا بالغ الأهمية لتلبية حاجة هؤلاء المستخدمين

و بموجب هذه الاتفاقية، سوف تقدم إريكسون المساعدة في ترقية البنية التحتية الحالية لشبكة زين بتطبيق حل يركز على تمكين المشغل من تقديم الخدمات الجديدة بشكل أسرع للعملاء مع المحافظة على متطلبات الأداء العالي للشبكة. كما ستتولى إريكسون تحديث البنية التحتية الحالية لشبكة زين باستخدام الحل NFV للبنية التحتية من إريكسون، وهو يوفر بنية أساسية محددة برمجيا في نظام مركز البيانات 8000 ذي السعة الهائلة. وسوف توفر إريكسون خدمات تكامل النظم وخدمات الدعم لترقية البنية التحتية القائمة لشبكة زين.

في هذا الإطار، قال علي الزاهد، الرئيس التنفيذي لزين العراق: «نحن على ثقة من أن حلول وظائف شبكة

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دراسة تشير إلى زيادة الطلب على الوحدات الصناعية الخفيفة في دبي



يظل مُجمع دبي للاستثمار واحداً من أبرز المواقع الداخلية التي يرتفع الطلب عليها، كما يحظى أيضا بسوق ثانوية نشطة

ويحرص الشاغلون - لأسباب مفهومة - على الاستفادة من السوق السائدة للانتقال إلى مرافق أحدث ذات إيجارات أقل وبنية تحتية ووسائل مواصلات أفضل.

وتظهر بوادر التوتر الأخرى بالتزامن مع توطيد صناعة الخدمات اللوجستية ومع استحواذ الشركات الكبرى على تلك الأصغر حجماً. ويسعى العديد من المطورين والصناديق الخاصة، إلى جانب المطورين الرئيسيين، مثل واحة دبي للسيليكون والمنطقة الحرة في جبل علي وودي الجنوب ومجموعة «تيكوم»، إلى البحث عن شاغلين بهدف تزويدهم بمرافق صناعية ولوجستية مخصصة منشأة للتوافق مع معايير معينة.

وقد ظلت سوق إسكان العمالة مستقرة نسبياً خلال الاثني عشر شهراً المنصرمة، إذ سجلت غالبية الأسواق الرئيسية نمواً ثابتاً، - المنطقة الصناعية في جبل علي (المعدل السنوي 0 في المائة)، القوز (المعدل السنوي 0 في المائة). في حين شهد مُجمع دبي للاستثمار انخفاضاً بنسبة خمسة في المائة (المعدل السنوي) في الأسعار مدفوعاً بزيادة العرض في السوق الفرعية، في مقابل ضعف أساسيات الطلب. وتبلغ الإيجارات الحالية في المنطقة الصناعية بجبل علي الآن ما يقرب من 953 دولاراً أمريكياً للغرفة شهرياً، بينما تصل في القوز ومُجمع دبي للاستثمار إلى 1007 دولارات أمريكية للغرفة شهرياً.

حيث شهدت السوق انخفاضاً متوسطاً بنسبة سبعة في المائة.

وفي حين شهدت جميع المواقع التي تم تعقبها انخفاضاً في قيمة الإيجارات أو ظلت ثابتة خلال العام الماضي، كانت الأصول الصناعية من الفئة الأولى هي الأكثر مرونة، إذ سجلت انخفاضاً أقل من خمسة في المائة في الإيجارات خلال هذه المدة. ومن المتوقع أن يستمر هذا التوجه على المدى القريب على الأقل، مع توقع محدودية الإمدادات الجديدة عالية الجودة.

ولم تشهد السوق الفرعية للمنطقة الحرة في جبل علي أي تغيير مادي على الإيجارات خلال العام المنصرم، مدعومة بمعدلات الإشغال المرتفعة للمخازن والوحدات الصناعية الخفيفة من جانب مُشغل المنطقة الحرة (السوق الأولية)، إذ تتراوح نسبة الوحدات الشاغرة حالياً بين سبعة وعشرة في المائة فقط. ويُستخدم الجزء الأكبر منها كمرافق حاضنة للمُشغلين، قبل التحول إلى المرافق المنشأة لأغراض معينة. هذا في حين شهدت السوق الثانوية للمنطقة الحرة في جبل علي زيادةً في عدد العقارات المتاحة للإيجار من الباطن والبيع، مما أدى إلى انهيار القيم الرأسمالية خلال الأشهر الاثني عشر الأخيرة. فقد أصبحت الأسعار الآن تتراوح بين 586-732 دولاراً أمريكياً للمتر المربع للأصول الصناعية من الفئة الأولى.

تسعى دولة الإمارات إلى جذب استثمارات إضافية بقيمة 75 مليار دولار أمريكي إلى قطاع الصناعة والتصنيع بحلول 2025. ويأتي ذلك في إطار توجهات الحكومة المتواصلة لتنويع المصادر الاقتصادية لزيادة عوائد القطاعات الأخرى بخلاف النفط والغاز، وذلك حسب دراسة بعنوان «رؤية السوق الصناعية في دولة الإمارات» صادرة عن شركة الاستشارات العقارية العالمية «سي بي آر إي».

ويظل مُجمع دبي للاستثمار واحداً من أبرز المواقع الداخلية التي يرتفع الطلب عليها، كما يحظى أيضاً بسوق ثانوية نشطة. وتتراوح القيم الرأسمالية في المجمع الآن بين 1089-1225 دولار أمريكي لكل متر مربع. وفي حين شهدت إيجارات المرافق ذات الأنواع المختلفة في المناطق الصناعية ضغوطاً انكماشية على مدى الإثني عشر شهراً الأخيرة، فقد حافظت إيجارات الأراضي في هذه السوق على مستوياتها إلى حد كبير.

فمن ناحية الموقع، كانت غالبية الاستعلامات الجديدة، التي جرى تسجيلها، حول مرافق في المناطق الحرة، وجاءت المنطقة الحرة في جبل علي بوصفها السوق الفرعية الأكثر شهرة. كذلك شهد مُجمع دبي للاستثمار أيضاً ارتفاع مستويات العرض، مع تطوير العديد من مخططات الوحدات المزودة بشرفات من قبل مُطورين من القطاع الخاص، وتتراوح مساحتها بين 500 متر مربع و2000 متر مربع. ونتيجة لذلك، من المتوقع تيسير الإيجار لسندات الفئة الثانية مع زيادة المنتجات المتوفرة.

ومع تخفيف الشروط، بدأ عددٌ متزايدٌ من الشاغلين في اختبار السوق على أمل إبرام صفقات تفضيلية بأسعار يُعتقد أنها أقل من مستوى السوق الحالي. كما يتواصل «التوجه نحو الجودة» مع انتقال الشاغلين من المناطق الصناعية التقليدية بخلاف المناطق الحرة، مثل أم رمول والقوز ورأس الخور، إلى مواقع أحدث مثل مُجمع دبي للاستثمار ومُجمع دبي الصناعي.

وإزاء تباطؤ أداء السوق، نشأ نوعٌ من الاختلال الآخذ في التنامي بين عدد الراغبين في البيع، وعدد الراغبين في الشراء. وقد نجم عن ذلك انخفاض أسعار البيع عبر المواقع الرئيسية. كما تتعرض الإيجارات أيضاً للضغوط،

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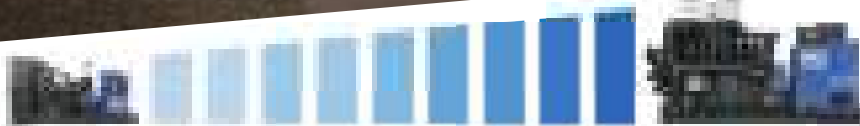
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