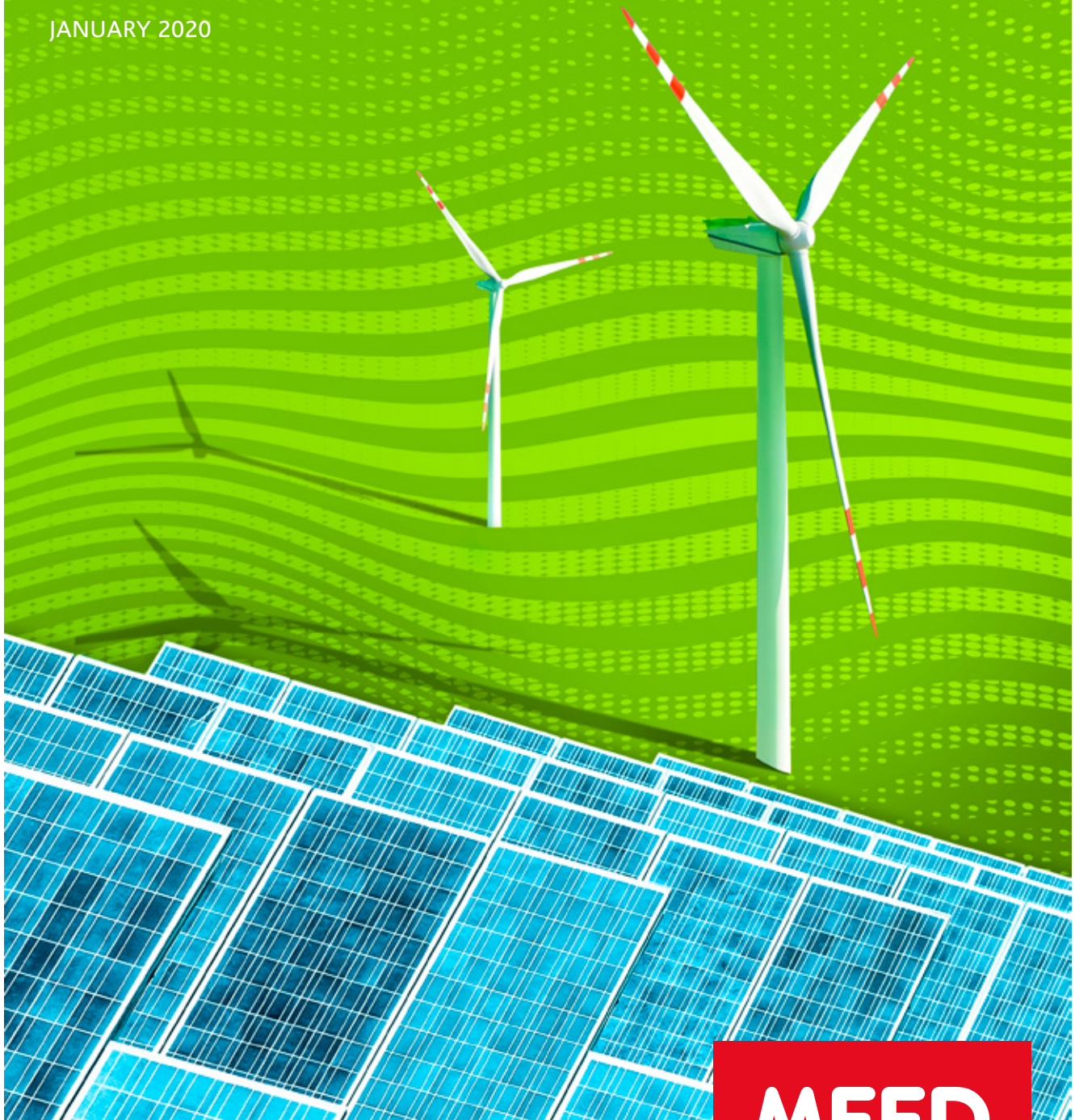


BRIEFING PAPER

SUSTAINABLE VISION

Renewable energy trends across the Mena region

JANUARY 2020



A NEW ENERGY FUTURE

Energy supply in the Middle East and North Africa (Mena) has traditionally been centred on the generation of electricity from oil and gas-fired power stations. The abundance of low-cost hydrocarbon fuels has made conventional thermal power the most economic source of energy.

As a result, renewables and alternate fuel sources have been underdeveloped in the Mena region. But a growing drive to maximise returns on the region’s hydrocarbons assets and reduce carbon emissions has seen a surge in renewable energy investments in recent years. And, led by the UAE and Saudi Arabia, the Middle East is now a significant player in renewable energy.

The sharp fall in the cost of solar and wind technologies has led to governments setting ambitious renewable energy targets as part of wider energy diversification strategies. Meanwhile, private developers have begun to enter the market, reforming current costs and technology.

ALTERNATE STRATEGY

Boosting power supply and production capacity is a priority for all governments in the region, as they aim to meet growing domestic demand. By meeting their power needs through renewable sources, the governments can optimise hydrocarbons for export to finance the economy.

With nearly \$76bn worth of renewable energy projects planned or underway, according to regional projects

tracker MEED Projects, the Mena region is steadily increasing the share of renewables in its energy mix. Of this, nearly \$19bn are under execution.

Despite their widespread recognition for being sustainable and ‘clean’, it is the falling cost of solar and wind power generation that has seen renewable energy becoming widely adopted in the Mena region. They are now cheaper to build and the cost of solar photovoltaic (PV) solar panels has declined by 80 per

cent globally. Other technologies such as waste-to-energy (WTE) are slowly gaining traction in the region as well.

Renewables also face their share of challenges. Renewable sources have high adoption costs, provide an inconsistent and unpredictable amount of electricity and are affected by uncontrollable conditions such as erratic weather. These come in addition to the political instability that has rocked some countries in the region.

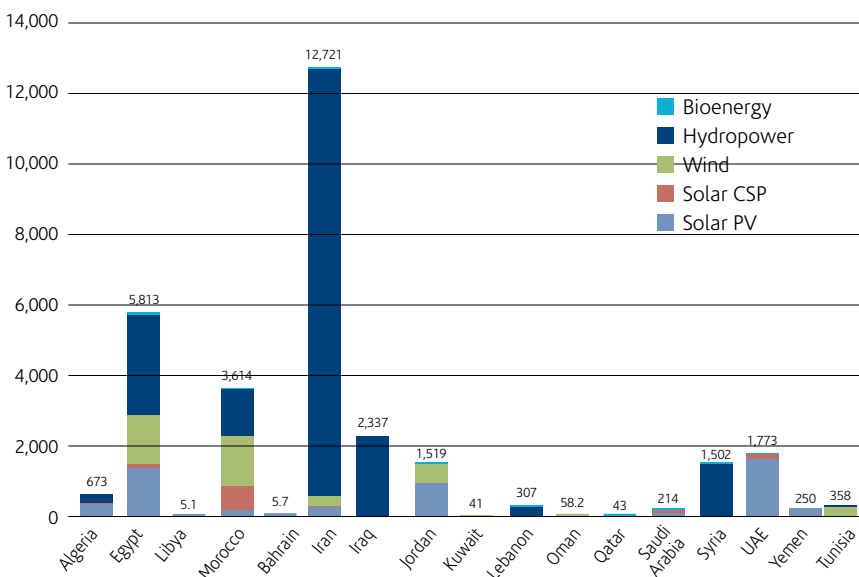
Given the abundance of natural light in the Mena region, solar takes the lead as the preferred source, except in Iran where hydropower is the main source of renewable energy. Mena’s total installed solar capacity stands at 6.57GW, based on data from the International Renewable Energy Agency (Irena) and MEED Projects.

Mena’s renewable energy producers have invested heavily in PV, one of the cheapest forms of solar technology. Nearly every nation has some installed solar PV capacity, with a total of 5.54GW installed PV across the Mena region led by the UAE and Egypt.

On the other hand, installed concentrated solar power (CSP) capacity stands at 1.02GW, led by Morocco.

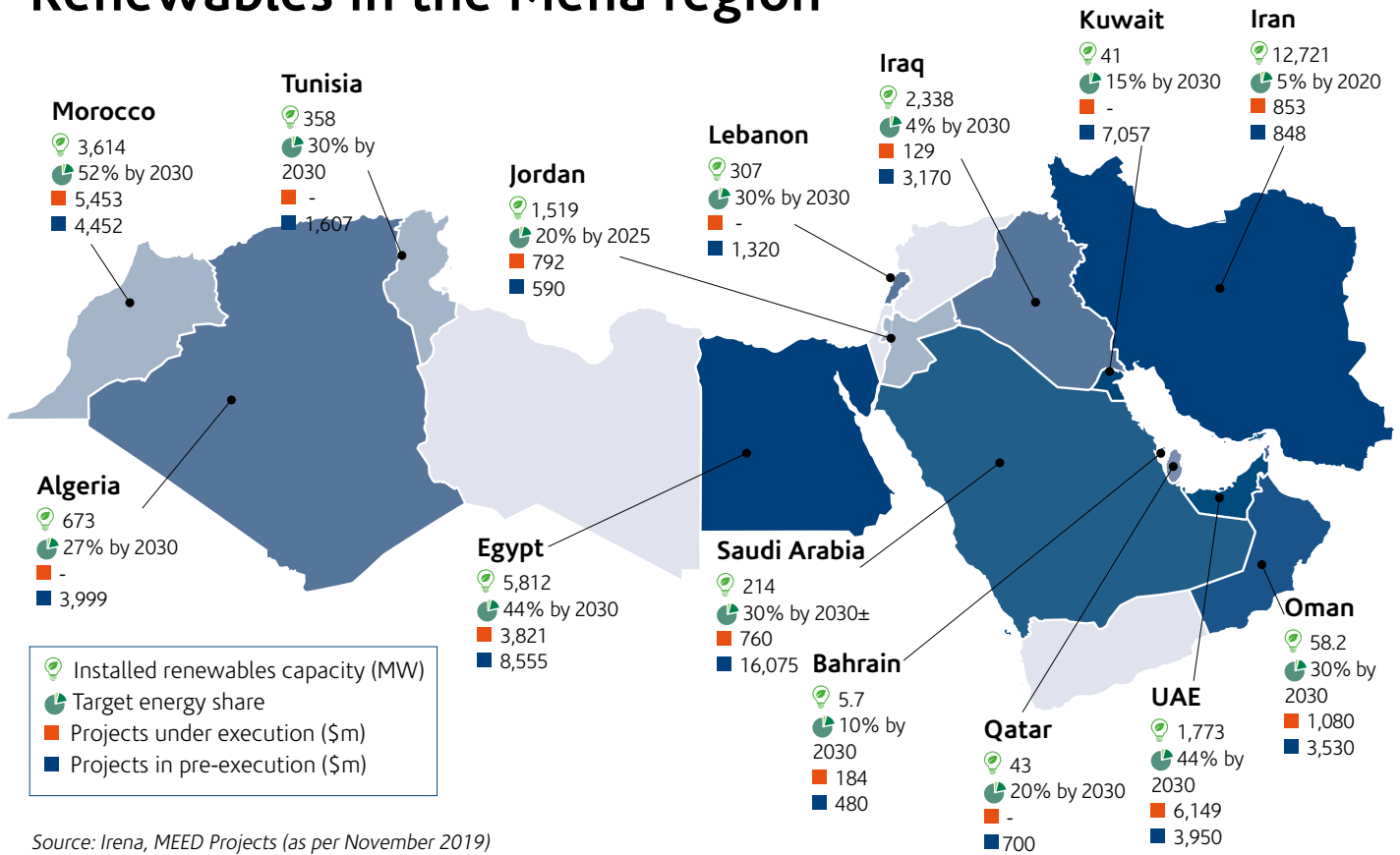
Other renewable sources are also finding increasing favour in the region, with several wind energy projects under way in Morocco, Egypt, Jordan, Iran and Saudi Arabia.

Breakdown of installed renewables capacity in the Mena region (MW)



Source: Irena

Renewables in the Mena region



Source: Irena, MEED Projects (as per November 2019)

±Value as per Irena; Saudi Arabia's target energy share is 58.7GW. No official percentage share has been revealed

MEETING TARGETS

Ambitious renewable energy targets have set the path for a promising pipeline of projects

ALGERIA



Algiers has launched an ambitious renewable energy programme in order to sustain steady exports in oil and gas, its main source of income, and meet growing domestic demand.

According to the plan, 22GW of renewables-based power generating capacity will be installed between 2011 and 2030 in three phases by state-owned Sonelgaz, of which 12GW will meet domestic

demand while 10GW will be exported. Solar PV will contribute nearly 62 per cent of the total renewable energy target; only 343MW is currently installed.

BAHRAIN



Bahrain's Electricity & Water Authority is currently undertaking two schemes – the first is a 100MW IPP solar PV plant at Askar landfill, which was awarded to a consortium led by Saudi Arabia's Acwa Power and Japan's Mitsui. The second is a 5MW hybrid solar and wind power facility, to be commissioned in early 2020.

EGYPT



Even with the discovery of the giant offshore Zohr gas field, a decrease in gas dependence is seen as a necessity for long-term energy security. With the government introducing a feed-in-tariff

(FIT) programme to encourage private sector firms to invest in renewable energy schemes, Egypt is set to generate 10 per cent electricity from PV and 6 per cent from CSP technologies.

Egypt's biggest renewable energy project under execution is the Attaqa hydropower plant, expected to come online in 2024. Owned by the Egypt Ministry of Electricity and Energy, its net value is \$2bn. Egypt also has four solar schemes under way, including Scatec Solar's 400MW solar power plant in Aswan and a 300MW solar power station by Egyptalum.

IRAN



Tehran is focusing heavily on renewables and has set a target of developing a further 5GW of installed renewables capacity by 2020.

Iran's biggest project under execution is the \$770m Khersan 3 dam and

power plant owned by Iran Water and Power Resources. Its estimated completion date is 2020. Iran's other schemes under execution include a 50MW pilot geothermal power plant, a 20MW WTE plant and two wind farms in Khuzestan region.

IRAQ



Iraq suffers from a significant power deficit and faces the need to address both the existing and growing energy demand. The only renewable energy project currently underway in Iraq is the \$129m package 2 for the Deralok hydropower plant, owned by KRG Ministry of Electricity, expected to come online in 2021. The remaining active renewables schemes are in varying stages of planning.

JORDAN



The importance of renewables to Jordan's long-term energy diversification strategy increased significantly in 2018 as plans for its first nuclear power plant were dropped. By the end of 2018, Jordan was meeting 11 per cent of its total energy requirements through renewables.

Today, Jordan is the only country in the region to have legislation in place for both fixed tariffs and net metering, although it lags behind some other states in terms of fiscal incentives. It was also the first in the region to have framework in place for FIT schemes.

Of the eleven schemes under execution in Jordan, the biggest is Baynouna Solar Energy Company's (BSEC) 200MW Baynouna solar project worth \$220m, due in April 2020.



KUWAIT

Electricity demand in Kuwait is expected to triple by 2030 and the Shagaya renewable energy complex will play a vital role in achieving this target.

Developed by the Kuwait Institute for Scientific Research, the complex was launched in 2012 and the 70MW first pilot phase of park (50MW CSP, 10MW PV and 10MW wind) was completed in 2018.

The second phase, overseen by oil firm Kuwait National Petroleum Company will be a 1.5GW PV project. In 2019 Kuwait announced that it would launch a tender for the 2GW third phase, which will include IPP projects focusing on solar CSP and wind energy.

MOROCCO



In a bid to reduce energy dependency and save billions of dollars on imports, Morocco is emerging as a regional renewables leader. The Moroccan Agency for Solar Energy (Masen) provides for the bulk of clean energy projects in the country.

Masen awarded a contract to Abu Dhabi's Masdar and France's EDF in May 2019, to develop Morocco's first hybrid-solar plant, the 800MW Noor Midelt scheme.

In July 2019, Masen invited developers to submit proposals for the Noor Midelt 2 scheme. Almost identical in scope to Noor Midelt 1, the key difference is the addition of a battery storage option for bidders in addition to the molten salt storage for the CSP component.

Other major projects under way include the \$1.2bn Sebkhah Tah Solar Power Plant, to be commissioned in 2021, as well as several wind and hydropower projects.

OMAN



Natural gas is the primary source of Oman's power generation, but with rising supply constraints, the sultanate is recognising the need to diversify its energy mix.

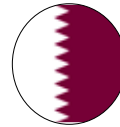
Work is underway on state owned Petroleum Development Oman's Miraah Solar thermal power plant, targeting an

installed capacity of 1,021MW.

Meanwhile, Oman Power and Water Procurement Company (OPWP) is developing its first solar IPP – a 500MW solar PV facility in Ibri, valued at \$400m. In March 2019, a consortium of Saudi Arabia's Acwa Power, Gulf Investment Corporation (GIC) and Alternative Energy Projects, a member of Kuwait Projects Company, was selected as the developer for the power project. The plant is scheduled to start commercial operations by 2022.

OPWP will also announce a list of prequalified firms for the Manah I and II PV projects in November 2019. The projects will have a capacity of 500MW-600MW each.

QATAR



Despite being comfortably placed with regards to energy needs thanks to the offshore North Field, the world's largest non-associated gas reservoir, Qatar is also undertaking some high-profile projects such as the planned solar-powered air conditioning systems for the 2022 Fifa World Cup stadiums, a move that comes in light of the country being classified as one of the highest per capita greenhouse gas emitters in the world.

In 2019 Qatar made progress with procurement of a sizable solar project: Siraj Power, a joint venture (JV) of Qatar Electricity & Water Company and state oil company Qatar Petroleum, is evaluating bids for its 800MW solar power plant in Al Kharsaah, at an estimated project cost of \$600m.

SAUDI ARABIA



The kingdom's target of developing 58.7GW of renewable energy by 2030 is one of the largest clean energy programmes in the world. Riyadh's Renewable Energy Project Development Office (Repdo) will oversee the completion of 30 per cent of this target, while the Public Investment Fund (PIF) is expected to

develop the remaining 70 per cent.

Having already awarded contracts for the first two projects under its National Renewable Energy Programme (NREP), Repdo issued tender documents for the second round in July this year. The second round contains six PV solar projects with a total capacity of almost 1.5GW.

Repdo will launch tenders for the third round of the NREP in 2019. This round will comprise of six renewable energy projects (one wind and five PV) with a total capacity of 1.58GW, including the 850MW Yanbu wind IPP. The 400MW Dumat al-Jandal IPP, Saudi's first utility-scale wind farm, was tendered and awarded to a consortium of Masdar and EDF in July 2019.

TUNISIA



Tunisia is just starting out on its clean energy project pipeline, holding its first major competitive bidding round for utility-scale IPPs in 2019. In March 2019, its Ministry of Industry, Energy & Small and Medium Enterprises issued a request for proposal for two major solar and wind projects. Prequalified developers had to submit proposals for a 300MW wind project and a 500MW PV solar project. With 16 international groups prequalified for the solar tender and 12 for the wind, Tunis is expecting a competitive tendering process with suitably low tariffs to help kickstart its 4.7GW renewables programme.

UAE



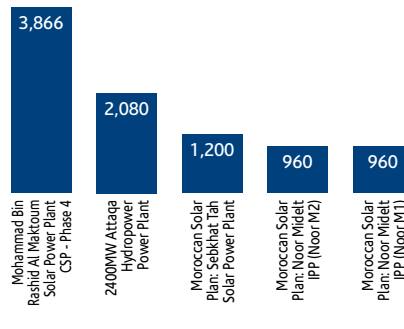
The UAE has set ambitious clean energy targets for 2050, which includes adding 44 per cent of renewables to its energy mix.

ABU DHABI

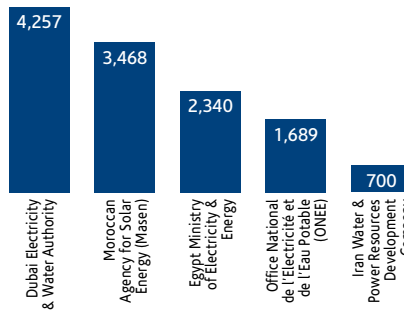
Following the commissioning of the 1.17GW Sweihan PV solar unit in July, Abu Dhabi-based Emirates Water & Electricity Company (Ewec), a JV of Sharjah's Bee'ah and Masdar, began the pre-qualification on an even larger 2GW PV project planned for the

RENEWABLES PROJECTS IN THE MENA REGION

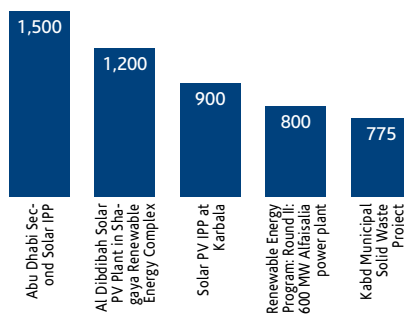
Top projects under execution (\$m)



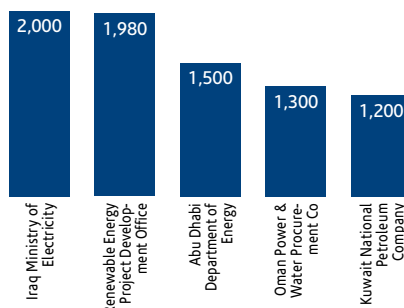
Top owners by projects under execution (\$m)



Top projects in advanced pre-execution* (\$m)



Top owners by projects in advanced pre-execution* (\$m)



Source: MEED Projects

Al-Dhafra area. Ewec is also currently assessing options for a planned 1.5GW solar PV 3 scheme.

DUBAI

Dubai's clean energy targets stand at seven per cent by 2020, 25 per cent by 2030 and 75 per cent by 2050. Following the success with its initial forays into the PV solar world, Dubai Electricity & Water Authority (Dewa) turned its attention to thermal CSP for the fourth phase of its ambitious Mohammed bin Rashid (MBR) solar park, which is expected to have a total capacity of 5GW by 2030.

The project achieved a tariff of \$cents 7.3 per kilowatt hour (\$/kWh) for the CSP component and \$c2.4/kWh for the PV capacity for its fifth phase, two of the lowest tariffs for CSP and PV solar technology in the world. The CSP storage element will allow the plant to store energy for up to 15 hours after daylight hours.

Dubai also has other renewable schemes underway, including Dubai Municipality's WTE plant in Al Warisan which could convert 6,000 t/d of waste to 185MW of energy, and the Shams rooftop solar programme.

Dewa is also undertaking the 250MW hydroelectric power plant in Hatta, the first of its kind in the GCC.

NORTHERN EMIRATES

The northern emirates are also increasing their share of renewable energy in a bid to reduce their dependency on Abu Dhabi for electricity and power.

Ewec is developing a \$200m WTE facility located within Bee'ah's waste management centre in Sharjah. The facility will incinerate up to 37.5 tonnes of solid waste per hour to create 30MW of energy, and is expected to come online in 2020.

In Fujairah, China Power International Engineering Company (CPIEC) is building a 20MW wind and 70MW solar PV power station.

The Federal Electricity and Water Authority (FEWA) is in early stages of planning a 200MW solar PV plant in Ras al-Khaimah.

* = progressed beyond study

About MEED

MEED has been integral to delivering business information, news, intelligence and analysis on the Middle East economies and activities for over 60 years.

Attracting a key senior management audience through its content and activities, MEED is a media brand, publication and data business that covers a spectrum of services which inform, engage, connect and ultimately support our subscribers and partners in their business development and strategic growth.

Acquired by GlobalData Plc in December 2017, MEED is now part of one of the largest data and insights solution providers in the world with the capacity to build global communities for our clients.

Our purpose is to support the region's companies make better and more timely decisions through our innovative data solutions and grow through our comprehensive and world-class marketing solutions. To find out more email: info@meed.com

About Mashreq

Established in 1967, Mashreq is the oldest bank in the UAE, with award-winning financial solutions and services.

Throughout its 50 years' history, Mashreq has differentiated itself through innovative financial solutions, making it possible for its customers to achieve their aspirations.

Today, Mashreq has a significant presence in 11 countries outside the UAE, with 21 overseas branches and offices across Europe, the US, Asia and Africa.

Mashreq launched its new Vision and Mission recently, outlining its commitment towards its clients, colleagues

and the community. In line with its vision to be the region's most progressive bank, Mashreq leverages its leadership position in the banking industry to enable innovative possibilities and solutions for its customers across corporate, retail, international, treasury and Islamic banking.

Mashreq is proud to be the first financial institution in the UAE to be awarded the Gallup Great Workplace Award for four consecutive years from 2014-17.

Mashreq also continues to invest in recruiting, training and developing future generations of UAE national bankers.

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