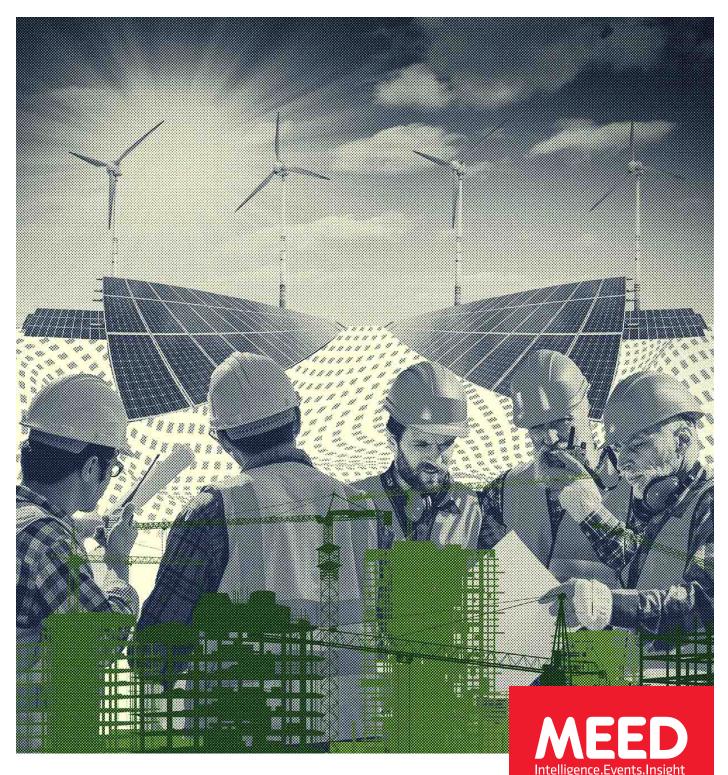


MEED-MASHREQ CONTRACTORS BUSINESS LEADERS FORUM

Future of EPC in a Sustainable World

September 2023



Foreword

There is a massive opportunity for EPC players to deliver projects with lower environmental impact







ngineering, procurement and construction (EPC) companies have played a crucial role in the Middle East and North Africa (Mena) region, where an average of \$180bn-worth of capital projects are awarded annually.

The past decade saw the rise of new asset classes, particularly in the power generation sector, as regional economic and energy diversification programmes took hold.

For example, renewable energy contract awards have gradually increased since 2010. This peaked at \$10bn in 2017, when Dubai awarded the \$3.8bn contract for the hybrid solar photovoltaic (PV) and concentrated solar power project for the fourth phase of the Mohammed bin Rashid solar park and Abu Dhabi awarded the contract for its first utility-scale solar PV plant in Sweihan. While these projects make up a small fraction of past project awards, this is set to change as the drive to meet net-zero targets by 2050 or 2060 by major countries, including the UAE, Saudi Arabia and Bahrain, gathers momentum.

In addition to renewable energy projects, several countries in the Mena region are developing strategies to become global hydrogen hubs, with dozens of multibillion-dollar projects within this nascent sector being explored.

All these projects offer opportunities worth in excess of \$400bn – as well as unique challenges – for regulators, lenders and EPC contractors alike. They also necessitate the re-evaluation of conventional practices and call for the industry to embrace digitalisation and collaborative practices. There has never been a better time for change.

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A new era for EPC contractors

A growing pipeline of GCC clean energy projects is a major opportunity for the region's engineering, procurement and construction players



ith an average of \$180bn-worth of contracts awarded annually across the Middle East and North Africa (Mena) region, engineering, procurement and construction (EPC) contractors play a pivotal role in the region's economic development.

From the construction of the world's tallest buildings to the engineering of its largest refineries, construction firms have helped turn government visions into reality.

Today, as states transition their economies to meet their net-zero targets, contractors are having to adapt their businesses to confront the decarbonisation challenge. The development of new oil and gas megaprojects will continue to be a necessity. Still, many EPC contractors will need to explore opportunities in projects that typify energy transition, in the fields of renewable energy, hydrogen production and carbon capture.

The most established of these three market segments is renewable energy. Investment in utility-scale solar, wind and hydropower production projects has been increasing steadily in the region.

Expenditure reached a record high of \$10bn in 2017 thanks to a \$3.8bn contract for the hybrid solar photovoltaic (PV) and concentrated solar power fourth phase of Mohammed bin Rashid Solar Park in Dubai and the contract for Abu Dhabi's first utility-scale solar PV plant in Sweihan.

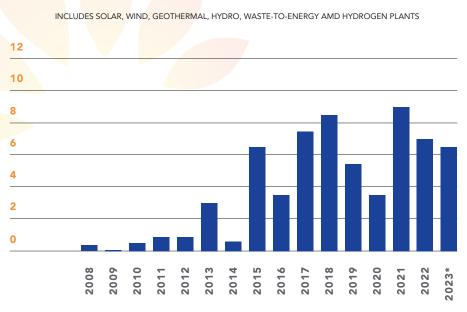
As of mid-2023, over \$150bn-worth of

"Recent years have seen the GCC states actively reduce their dependency on fossil fuels, both to pursue economic diversification and in response to the global call against climate change"

Arun Mathur,

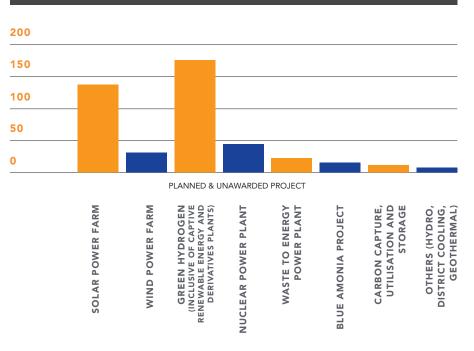
Executive vice president and global head of the contracting division Mashreg

MENA CLEAN ENERGY GENERATION CONTRACT AWARDS (\$bn)



*Contract awards for the first six months of 2023; Source: MEED Projects

MENA CLEAN ENERGY KNOWN AND UNAWARDED PROJECTS (\$bn)



Source: MEED Projects

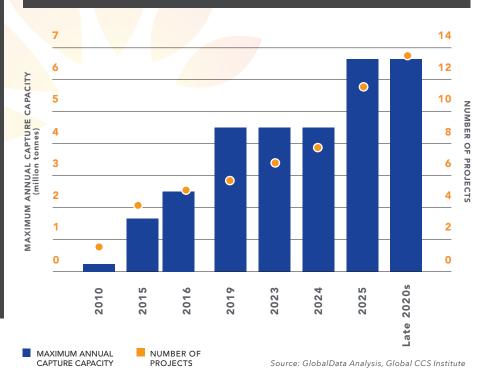
solar and wind power plants are in the planning and procurement stages across the Middle East and North Africa (Mena) states, with Algeria, Egypt, Morocco and Saudi Arabia having the largest pipelines.

The UAE and Oman have committed to achieving carbon neutrality by 2050, while Saudi Arabia and Bahrain expect to achieve net-zero carbon emissions by 2060. These targets imply a rapid adoption of policies and increased investments to decarbonise the countries' power generation sectors.

The region's high solar irradiation levels and plentiful land availability have made it a prime potential location for green hydrogen production. Several countries in the Mena region – particularly Egypt, Morocco, Oman, Saudi Arabia and the



MIDDLE EAST CARBON CAPTURE AND STORAGE AND CARBON CAPTURE AND UTILISATION PROJECTS



UAE – are developing strategies to become global hydrogen hubs.

An estimated \$160bn-worth of green hydrogen projects, inclusive of captive renewable energy power plants, are being planned in these five nations alone. The majority of the projects integrate the production of derivatives such as green ammonia for export to demand centres, particularly in Europe and Asia.

Carbon capture will be integral to the region's ambitions to become a leader in blue hydrogen production. The GCC already accounts for 10 per cent of the global carbon capture and storage (CCS) and carbon capture and utilisation (CCU) capacity, with almost 4 million tonnes a year of capture and storage capacity.

The region's hydrocarbons-producing states, such as Saudi Arabia and the UAE, are expanding their blue hydrogen production capacities to cater to demand.

Abu Dhabi National Oil Company (Adnoc) has been cooperating with Japanese and South Korean entities to formulate strategies for commercial production and utilisation of blue hydrogen and blue ammonia.

Meanwhile, in April, Saudi Aramco delivered its first blue ammonia cargo to Japan. The kingdom also plans to use the gas produced from its \$10bn Jafurah onshore project to process blue hydrogen. Understanding the challenges presented by the rapidly developing renewable energy, hydrogen production and carbon capture sectors was at the centre of discussions at the MEED-Mashreq Contractors Forum, held in Dubai on 30 May.

"Recent years have seen the GCC states actively reduce their dependency on fossil fuels, both to pursue economic diversification and in response to the global call against climate change," said Arun Mathur, executive vice president and global head of the contracting division at Mashreq.

"This has paved the way for supportive policy frameworks and the financing of multibillion-dollar schemes geared at clean energy production."

In 2022, the UAE launched more than \$43bn-worth of environmentally friendly energy projects, which form part of at least \$160bn earmarked for projects contributing to the country's 2050 net-zero target, Mathur added.

Heightened risks

The majority of these assets are planned to be developed as public-private partnership (PPP) projects, highlighting the importance of risk-allocation strategies to maintain successful partnerships between project stakeholders.

During the past decade, some GCC states have set world-record-low tariffs for unsubsidised solar power production,

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primarily due to a significant decline in renewable energy technology and EPC costs, in addition to the scale of these projects.

The prevailing and near-term environment threatens to upend this trend, however. The sourcing of renewable energy components faces persistent supply chain constraints that began during the Covid-19 pandemic and have been exacerbated by the Russia-Ukraine war. Together with the increased cost of finance and a slew of projects coming to the market, this has created a perfect storm for the industry – and particularly for EPC contractors, which need to manage their resources while at the same time complying with more stringent environment, social and corporate governance standards.

Across sectors, and especially in the construction, water and power segments, EPC accounts for the majority of a capital asset's construction and operation costs. An ultra-competitive environment, where the developer or contractor offering the lowest cost usually wins a contract and where risks are sometimes misallocated between stakeholders, can have dire consequences. It increases the risk of project delays and expensive arbitration procedures, which have driven some contractors out of business or the region.

Things are starting to change for the better, however. "In the renewable energy sector – specifically solar PV projects – the conversation has broadened from a focus on the lowest tariffs to also include the pursuit of certainty of project delivery and ensuring we continue to receive quality proposals by bidders and their EPC contractors," said Andy Biffen, asset development executive director at Abu Dhabi-based Emirates Water & Electricity Company, during the forum.

If adopted across jurisdictions and sectors, this shift in approach could help to ensure smoother project execution and delivery as Mena states endeavour to meet their near- to long-term decarbonisation targets.



watch more



Government support vital for clean energy growth

Greater public-private collaboration will be key to meeting net-zero energy production targets



P ower developers and utility providers in the Middle East and North Africa (Mena) have set ambitious targets to expand their renewable energy portfolios by the end of this decade.

For example, Oman and the UAE intend to become net zero by 2050, with the latter targeting a carbon emissions reduction of 23.5 per cent by 2030. Saudi Arabia and Bahrain aim to become net zero by 2060.

These net-zero targets, in theory, mean that by the set deadlines, each of the four countries must have most of their electricity generated from renewable or alternative energy sources, such as solar, wind and nuclear, or be able to capture any carbon produced from gas-fuelled power facilities. Green hydrogen production will also play a major role in these GCC states achieving net zero.

Investments by respective governments to attain these net-zero goals will therefore

translate into a growing pipeline of projects. This will result in government agencies and state utilities not just spending on clean energy production projects, but also undertaking cost, demand and other risks associated with such projects that private players are unwilling or incapable of taking on.

This is an important consideration given that the substantial increase in utilityscale renewable energy capacity will be driven primarily through public-private partnerships (PPPs), with the private sector taking on the responsibility of financing, building and operating facilities.

However, since these major clean energy growth plans align with regional states' strategic, long-term climate action and sustainability goals, continued government support will also be key to their success.

During a panel discussion titled 'Future of EPC in a sustainable world' hosted

"The scaling up of renewables basically happened because the lead was taken by the public sector, by providing measures like lower tariffs and incentives to EPC [engineering, procurement and construction] and manufacturing companies"

Gagan Porwal

Head of international market partnerships – carbon solutions **GE Gas Power**



jointly by MEED and Mashreq in Dubai on 30 May, participants emphasised the role governments must play both at the policy and implementation levels in the growth of sustainable energy production.

"If you look at solar energy, basically it was driven by government backing and taking a lot of the risk in place," said panellist Konstantinos Kanellaidis, partner – Infrastructure and Transport Advisory at EY Mena.

"So yes, the private sector was able to accelerate power production, but the government took a lot of the risk. You needed support from the government to encourage the adoption of new technologies, have them proven and then taken forward."

An obvious way the government can support continued growth is through an evolving regulatory regime that can continue to attract and accelerate investment.

"If you look at the pipeline, I don't think there's a lack of [renewable energy] projects," said Gagan Porwal, head of International Market Partnerships – Carbon Solutions at GE Gas Power.

"So, when it comes to challenges, if all that money is ready to be pledged and available, then what is limiting the momentum? And I think the momentum funding starts coming with the regulatory mandates and policy support.

"This is because people invest money when they have confidence that there's a bankability of the project and there's a longer-term IRR [internal rate of return] and ROI [return on investment].

"If we go back 20 years, when wind energy was still at a nascent stage, the scaling up of renewables basically happened because the lead was taken by the public sector, by providing measures like lower tariffs and incentives to EPC and manufacturing companies. That gave the technology providers the breathing space to grow and say we are now going to scale up," Porwal explained.

"If you put all those equation sets together, the government has to be the first to take the lead so that we don't end up in a chicken and egg situation of do I put the steel in the ground first and get it going, and then everything will come? Or do I wait for a policy and incentive to happen?"

Gulf climate commitments

Although the PPP model for power and water generation in the region is now wellestablished, it is clear that the ramp-up in new production capacity required for each state to meet its net-zero ambitions will need even greater government support if the targets are to be achieved.

A case in point is the Mena region's efforts to kick-start a green hydrogen industry.

"If we take hydrogen as an example, the cost of hydrogen today, with all the bestknown incentives, if it reaches production, it is going to be \$2/kg at the consumption point. This basically means you need to be able to displace a gas consumption of \$14 a million BTUs against that hydrogen," Porwal illustrated.

"Who is going to go and incentivise and push the utilities producer to move away from running a gas asset to hydrogen? So, the role of government becomes fundamentally critical to make sure that this technology sees the right amount of seeding in the early stages."

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Industry experts gathered at the Contractors Business Leaders Forum held by MEED and Mashreq on 30 May 2023.





















Private sector participation vital for sustainable development

PPP projects offer opportunities for the region to transition away from hydrocarbons dependence if ESG goals are clearly defined and prioritised



he sheer scale of the region's planned infrastructure, utility, industrial and smart city projects is a unique opportunity to transition away from hydrocarbons dependence. But the region can only do so with greater private sector participation that embraces environmental, social and governance (ESG) initiatives.

The two topics were a central theme of the MEED-Mashreq Contractors Forum held in Dubai on 30 May.

Panellist Craig Thackray, Aecom's vice president for the environment in the Middle East and Africa, has observed an increasing number of major regional projects with sustainability at their core.

"There is a great opportunity and project pipeline leading into those sustainable projects," he said.

These translate to major opportunities for EPC contractors willing to be trained on the ESG ethos these projects require.

"EPC [engineering, procurement and construction] staff need to be trained on ESG. For instance, a client could require carbon modelling up front to see a project's embedded and operational output and "The future of EPC and EPC contractors in a sustainable world is evolving. The idea of having a PPP project is to transfer risk to a part that best manages it"

Konstantinos Kanellaidis, Partner – Infrastructure and Transport Advisory EY Mena



carbon emissions," Thackray added. Tools like this could help reduce emissions and waste and result in significant cost savings.

"A carbon modelling approach can lead to innovations and design changes, resulting in major cost savings. We are all coming up with ways to stay relevant and agile," said Thackray.

The current contracting landscape has also elevated the role of environment impact assessment (EIA) studies, as they often present the biggest challenge to the economic viability of a project.

However, the path for EPC contractors, particularly in the region, has been challenging. Some large contractors have ceased operating or have been taken over by state entities, while several large multinational companies have withdrawn from the region.

Strict terms and conditions set by some clients, despite adopting Fidic-compliant contracts, have often been cited as the culprit for the souring of some client-EPC relationships.

"Deviations from Fidic, which result in contractors' increased willingness to take indirect losses, could harm mutual goals," said Jesus Sancho of Spain's Acciona.

PPPs

Depending on the willingness of project stakeholders to engage in future dialogues, the expected rise of projects to be delivered using a public-private partnership (PPP) model could either improve or exacerbate the region's EPC landscape.

For nearly three decades, the PPP route has succeeded in procuring power and water generation capacity, particularly in the GCC states.

This model is now being exported to social infrastructure, transport projects and other low-carbon energy production schemes such as green hydrogen.

A PPP expands the number of stakeholders in a project to include an offtaker or the party that pays for the service or products over the long term; the developer, which sells the service or the product; the lenders or investors that provide equity and long-term debt; and EPC contractors.

"The future of EPC and EPC contractors in a sustainable world is evolving. The idea of having a PPP project is to transfer risk to a part that best manages it," said Konstantinos Kanellaidis, partner, Infrastructure and Transport Advisory at EY Mena.

As things stand, upcoming PPP projects could take a cue from failed projects in the past, many of which did not have clear ESG goals.

According to Thackray, the key is for project stakeholders to initiate dialogue early on. "The scenario where a client transfers risks entirely to the contractor can be avoided. For instance, how much of that risk are you unwilling to price simply "In the renewable energy sector, specifically solar photovoltaic projects, the conversation has broadened from a focus on the lowest tariffs to also include the pursuit of certainty of project delivery and ensuring we continue to receive quality proposals by bidders and their EPC contractors"

Andy Biffen, Asset development executive director EWEC



because of a lack of dialogue?" Significant fundamental issues and risks must be shared and not passed on to another party that may not understand the relevant risks, he warned.

"Everyone should have a voice. Sustainable development has economic and social aspects that must be met to bring a new project online."

EY's Kanellaidis agrees: "The practice of misappropriating risks or transferring risks to a party – in this case an EPC contractor – that is not equipped to handle them could mean there may not be enough good ones when you need them most."

New technologies

The relative novelty of upcoming lowcarbon projects adds to the growing complexity of the EPC landscape. The Covid-19 pandemic and Russia-Ukraine war posed huge challenges to every project, especially for the region's solar and wind projects, due to the heavily constrained China-centric supply chain.

The complexity is multiplied for battery energy storage system projects, green hydrogen and electrolyser plants, and carbon capture, utilisation and storage (CCUS) projects that rely on new technologies or existing technologies that are in short supply and may require new regulations or contractor skill sets.

"Some 90 per cent of these energy transition transactions today are solar projects, which are proving to be more economically feasible than hydro or thermal power plants in this region," said EY's Kanellaidis. "Renewable energy with battery storage is not yet commercially feasible, but this will likely change within five years."

The executive suggested specific technology contractors need to be

adopted now to deliver opportunities in the future. "With new technologies, you will need government support to increase decarbonisation coverage. The private sector has to make returns, and finance will be difficult if the numbers don't stack up."

Growing pipeline

The good news is that there will be no shortage of projects that aim to reduce carbon emissions over the long term.

Abu Dhabi's state utility, for instance, has set a firm target to expand the share of renewable resources in its energy mix.

"We have a firm legal target to achieve 60 per cent low-carbon and renewable energy by 2035, which will be supported through our strategic plan to decouple power and water production," said Andy Biffen, asset development executive director at Abu Dhabi-based Emirates Water & Electricity Company (Ewec).

"To this end, we can expect that reverse osmosis desalination technology will account for 90 per cent of desalination capacity by 2030."

The executive also noted that "in the renewable energy sector, specifically solar photovoltaic (PV) projects, the conversation has broadened from a focus on the lowest tariffs to also include the pursuit of certainty of project delivery and ensuring we continue to receive quality proposals by bidders and their EPC contractors".

As things stand, Ewec aims to procure 1.5GW of solar PV capacity over the next year and expects to launch its first 400MW battery energy storage system project soon.

With finance and EPC being the main costs for a typical PPP project, equipping contractors and encouraging dialogues between clients, developers and contractors will go a long way in ensuring a smooth energy transition.

Green energy drive requires adequate financing

Banks and other financial institutions must step up to mitigate the inherent cost risks associated with clean energy projects



he volume of investments earmarked by power and utilities players to develop clean energy projects in the Middle East and North Africa (Mena) region demonstrates the mammoth size and scale of the opportunity ahead.

A total of \$486bn-worth of power and water generation and hydrogen projects are in various stages of planning, study and procurement across 15 Mena states, according to regional projects tracker MEED Projects and MEED data.

Power generation projects, including nuclear, thermal and renewable power plants, comprise nearly 55 per cent of the total projects.

Water desalination and wastewater treatment plants make up 10 per cent. Green hydrogen schemes – including captive renewable plants, electrolyser facilities and derivatives conversion units – account for the remaining 35 per cent.

This project pipeline includes estimated investments for projects being procured using the public-private partnership (PPP) model, as well as engineering, procurement and construction (EPC) schemes.

Underlining the size of the opportunity, Andy Biffen, asset development executive director at Emirates Water & Electricity Company (Ewec), told a panel discussion on the future of EPC in a sustainable world that Ewec has "a firm legal target to achieve 60 per cent low carbon and renewable energy by 2035".

At the discussion on 30 May, hosted jointly by MEED and Mashreq in Dubai, Biffen said this would be supported through Ewec's strategic plan to decouple power and water production.

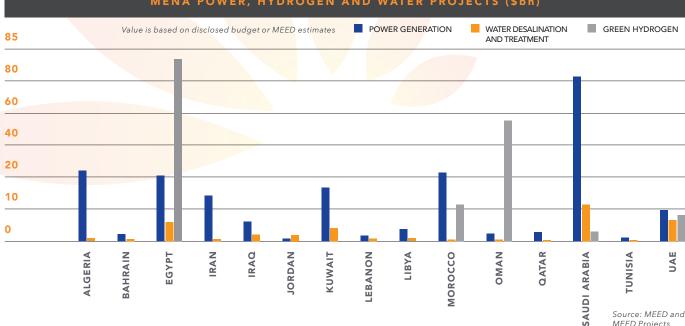
"To this end, we can expect that reverse osmosis will account for 90 per cent of desalination capacity by 2030," he added.

"We're also developing a solar photovoltaic (PV) portfolio. We have a pipeline of projects to produce 1.5GW of new capacity annually. That's roughly a billion dollars. So it's a massive [projects] pipeline.

"With an ambitious pipeline of new PV projects, Ewec continues to present attractive investment opportunities to international developing partners and thereby attract the best bidders," he said.

Addressing the need for finance

Given the inherent risks associated with developing renewables, mainly related to higher costs and efficient technology, adequate financing mechanisms for such projects are crucial.



Source: MEED and MEED Projects

"What we are really seeing is changing demand from shareholders and companies in that they don't just want International Finance Corporation compliance with sustainability. They want the next level up"

Craig Thackray, Vice president of environment for Middle East and Africa Aecom

Both the project developers and EPC contractors working on clean energy projects need financial support to undertake their respective shares of associated risks.

Panellists observed during the discussion that banks have a vital role not just in lending funds, but also in mitigating some of the cost risks. Other financial institutions play an important part, too.

"The current model, which includes project guarantees for solar and thermal projects, continues to enable key projects to be successful. Ewec will also look towards the bond market for refinancing solar projects," Biffen said.

Mashreq started its contracting finance practice in 1991, becoming the first bank in the region to do so and setting an example of how lenders can benefit from financing all energy project categories.

Moreover, with government bodies and stakeholders regularly upgrading the sustainability quotient of their projects in the region, there are new growth avenues for both contractors and financiers to explore.

"What we are really seeing is changing demand from shareholders and companies in that they don't just want International Finance Corporation compliance with sustainability. They want the next level up," said Craig Thackray, vice-president of environment for the Middle East and Africa at Aecom.

"So we're seeing a lot of local companies, like Masdar, upgrading in terms of opportunities."

"And also leading into those sustainable projects, there are other developments

currently under engineering design. Red Sea Global has just said that they've managed platinum green certification on their project," he added.

'What we see from clients like Neom is new for us as consultants. We were used to Estidama Green, and so forth, as the standard for financing. Then they upgraded [their requirement] to Envision, so we just had to get our environmental and infrastructure advisory changed to Envision."

Envision is a flexible system of criteria and performance objectives to aid decision-makers and help project teams identify sustainable approaches during the planning, design and construction of infrastructure projects. The framework continues to be implemented throughout the project's operations, and maintenance and end-of-life phases.

It is quickly gaining global recognition as a highly credible approach to sustainable development, which means the Envision Sustainability Professional credential is becoming an increasingly important designation in the infrastructure industry.

"There is a great opportunity for the EPC market that we're seeing, especially at the moment, because we have done a lot of work in Saudi Arabia on the Neom project," Thackray continued.

"Many of those projects have very high sustainability requirements under Envision and will come out for EPC bidding soon. So we've seen not just the energy sector but also other fields of engineering and contracting that many contractors and financiers can look at."

MEED-Mashreq Knowledge Partnership

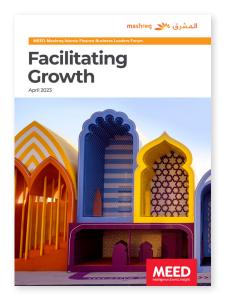
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Arun Mathur Executive vice president and global head of the contracting division at Mashreq Bank

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Established in 1967, Mashreq is the oldest privately-owned bank in the UAE, with award-winning financial solutions and services. Through its 50 year 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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