



# THIRTY TO NET ZERO

## **BIG INTERVIEW:**

Andrew Rippon of Royal Commission For  
AIUla

## **INTERVIEWS:**

Habiba Al Mar'ashi of EEG

Fadi Kobersy of RIB CCS

Dr. Yianni Spanos of KEO

Khayati Mitra- Sustainability and  
Environment Consultant

Rajesh Maheshwari of Knauf

ISSUE NO. 15 VOL 2 | 2022



**SPECIAL REPORT:  
RISE OF SUSTAINABLE  
CONSTRUCTION TRENDS IN 2022  
IN THE MIDDLE EAST**



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# NEWS



## **SAUDI COSMETICS CHAMPION SUSTAINABLE, CRUELTY-FREE VALUES**

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## **MUBARAK AL SUWAIKET TO SET UP MANUFACTURING FACILITY WITHIN KINGDOM'S SPARK**

Mubarak A AlSuwaiket and Sons Oil & Gas Service Company has signed an agreement with King Salman Energy Park (Spark), to set up a manufacturing facility at an

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# NEWS



## AGRINATION START UP CUP ACCELERATES TO PROMOTE HEALTHY AND SUSTAINABLE FOOD CONSUMPTION.

The United Nations Industrial Development Organisation Investment and Technology Promotion Office (Unido ITPO), through its Arab International Centre for Entrepreneurship and Investment in

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# NEWS



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Dubai Electricity and Water Authority (DEWA) has announced that its 3 million imperial gallons per day (MIGD) Water Microfiltration project in Hatta would be completed by the end of the year.

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# RCU'S ANDREW RIPPON EXPLAINS THE GENIUS BEHIND SAUDI ARABIA'S ALULA

**A**s Saudi Arabia continues to grow into a leading hub for tourism, it is becoming increasingly important to ensure sustainable development and transformation of the future. While Saudi Arabia already possesses great biodiversity, vibrant cities, stunning landscapes, food, history, and culture all of which make it an ideal destination for tourism. The logical repercussion of the spotlight on sustainability is logically the need for better preservation of our resources and irrefutable emphasis on a circular economy.

The development of AlUla, a historic Saudi tourism hotspot, encompasses a broad range of initiatives across archaeology, tourism, culture, education and the arts, reflecting the ambitious commitment to cultivating tourism and leisure in Saudi Arabia set out in the national Vision 2030 transformation program.

Speaking exclusively to Thirty To Net Zero Magazine, the Smart City Director for The Royal Commission for AlUla, Andrew Rippon, explained: "AlUla is thousands of years old. AlUla County is designed to be an outdoor museum. However, it still has to have a mix of both modern and ancient elements. We aim to preserve ancient and natural beauty. We have used digital twinning, GIS data, blockchain digital ledgers, AI, video, and many other technologies to monitor biodiversity and enhance the visitor experience, citizen liveability, and mobility. We have developed a digital trust layer relevant to multiple stakeholders."

Mobility, conservation of natural resources, safety and security, crisis management, energy management and other functions, that are ubiquitous to a sustainable smart city, all rely on systems requiring extensive use of IoT sensors, and other hardware, as well as a massive re-organisation of networks. The AlUla smart city has curated its smart technologies mix such that it supports the citizens of today and tomorrow.







"We are 45,000 citizens today and we had over 200,000 visitors last year. Our vision is to grow the citizen strength to 150,000 over the next ten years and the visitor number to two million. We are slowly introducing technologies to develop citizen livability and visitor experience while maintaining the biodiversity and history of this region," he said.

The AIUla master plan is conceived as a model of responsible and sustainable development, representing a unique opportunity for companies that share those values. One of the masterplan's key drivers in ensuring the sustainable development of the region is its yet-to-be-approved 'AIUla Sustainability Charter', which sets out a framework of principles guiding AIUla's future development to create a new path focused on protection, preservation, and regeneration. The charter sets out a carbon-neutral policy supported by circular economy principles, with the goal of AIUla being net carbon neutral by 2035 for local emissions (excluding air travel and food imports).

As a direct response to the challenges of sustainably and responsibly developing a fragile desert environment, the replenishment of the 9km core of the Cultural Oasis - through research and innovative solutions - will be the second flagship element of the master plan. Enabling a major expansion of AIUla's green and open spaces of up to 10 million square meters,

providing a haven for the archaeological sites, an opportunity for sustainable agricultural production, as well as an enchanting experience for visitors.

"Sustainability is a whole track with over 40 projects under sustainability. With the ocean just 250kms away, we hope to develop a micro-hydrogen power station and use the fuel in both public transport and industry.

"We also have 6 projects on policy regulation for smart cities including incorporation of international best practices, and setting up smart codes like building codes," said Rippon.

A trust layer is a smart city system that ensures trust over disparate digital systems owned by multiple stakeholders. When these stakeholders are confident that data can be trusted on other stakeholders' systems, then processes accelerate and costs reduce.

"Our trust layer is composed of many layers that include distributed ledgers, single sources of truth, systems of record and much more. Our project planners have a stupendous task of working around the 23,000 architectural sites and preserving the AIUla heritage. The city master plans have been developed around these sites and we are adding 'smartness' over time, using technology such as sensors, computer vision, and geofencing to enhance our safeguards, helping us maintain the history of this region," said Rippon.

At the beginning of the year, a new fully autonomous pod vehicle service was launched in AIUla along side our partners ZF 2GetThere and RATP DEV. More recently, a second pod has started testign from the autonomous provider EasyMile. On the software and IoT front, the French group



Thales has signed an MoU with The Royal Commission for AlUla to implement its smart and sustainable city. With a strong track record in delivering solutions that support smart, liveable and sustainable cities, Thales will provide the Royal Commission with an ecosystem of solutions.

“Today there is no public transportation at AlUla. We aim to first provide a sustainable and liveable city for our citizens. We want our citizens to have both social and physical mobility. We have a central spine road that runs from North to South. Citizens live along that road and then we have more roads leading off to industrial and leisure centres. With the help of RATP DEV, a leading Global provider of transportation, we have planned for a cloud of small buses and host of Mobility as a Service option to take the citizens from their homes to their workplaces or for leisure activities and leverage the tram project as well,” he said. The Tram is being designed and delivered by the international mobility firm Systra and will connect AlUla County’s most important landmarks, archaeological sites, tourist destinations, urban areas and transport infrastructure.







Last year, the Royal Commission for AlUla (RCU), released 'The Journey Through Time' masterplan for the regeneration of AlUla. Implementation of the wider development strategy for AlUla will welcome 2 million visitors a year into its 9,400 hotel rooms and contribute 120 billion riyals (USD 32 billion) to Saudi GDP as it creates 38,000 new jobs.

Key assets in the regeneration of AlUla as a tourism destination include the newly expanded AlUla International Airport which now has a capacity of 400,000 passengers and Maraya, a 500-seat multipurpose venue and the world's largest mirrored building, has been the site of the 41st GCC Summit and Winter at Tantora, an annual cultural event.

AlUla's roster of hospitality partners so far features Habitas and Accor/Banyan Tree with an expansion of the Ashar Resort and in the future the Architect Jean Nouvel, who is designing an extraordinary resort that will be entirely carved into the native rock.

"We have planned for flagship tourism projects to be the focus of economic diversification. We are in the process of upskilling local Saudi nationals to operate and maintain new technologies that will be brought into use in AlUla. Already we are employing local people in our mobility hub and we hope to attract mobility providers to develop services in the County. We hope that this hub can then service projects across the nation," concluded Andrew Rippon.

All Photos Provided By Andrew Rippon From Royal Commission for AlUla



**TO ACHIEVE SUSTAINABLE  
DEVELOPMENT EVERY SECTOR OF  
SOCIETY MUST BE INVOLVED, SAYS  
HABIBA AL MAR'ASHI, PRESIDENT OF  
ARABIA CSR NETWORK**

**T**eaching sustainability extends far beyond the classroom. It proposes to give students real-world skills they can use to enhance their contribution to the planet. It provides today's children with the self-sufficiency they need for a better tomorrow as it gives them a deeply engraved understanding of why the environment is important.

Emirati environmentalist, Mrs. Habiba Al Mar'ashi, co-founded the Emirates Environmental Group in 1991 and in 2004; she founded the Arabia CSR network devoted to corporate social responsibility across the Arab region. In 2006, she co-founded the Emirates Green Building Council and in 2008 she established the UN Global Compact - GCC Network. She is popularly referred to as the UAE environmental movements' most recognisable figure for her pioneering work in CSR and Sustainability.

In this exclusive with Thirty to Net Zero Mar'ashi highlights how she has served the world of sustainable development for over three decades, including all sectors of society; the students, the youth, the families, the corporations, the Emirates Environmental Group, the Arabian CSR network and the Emirates Green Building Council.

An insightful read...

**Q. Given that the world is very fast progressing in the direction of sustainable development, do you believe schools and universities will have a more integral role to play? Or would the major responsibility be wasted on the corporates?**

**A:** To achieve sustainable development, an issue of that magnitude and on the global level, you need every single member of the society to be involved. We need to start with students to individuals, corporations, academic institutions, NGOs, government organisations to international bodies. So, actually it is every single entity-body. An individual that is living, kicking and thriving has a role to play in this whole equation.

If you are looking at the role of universities and students, that has always been a very strong focus area for me personally and at all the entities and bodies that I have founded or have participated in and contributed to, education has been and will continue to be the main component and backbone of the work that we want to do, we aspire to achieve, and are actually working to diligently achieve it.

When you look at the other sectors of society, for example, the corporations, and this is again an area that I work very closely with, we have looked at who our stakeholders are, and we have identified the private sector to be one of our main stakeholders. In the UAE, which is a young country, we have seen a lot of changes in the corporate behaviour in the last 30 years. We are seeing more private sector entities coming on board the sustainability bandwagon but it has not reached a level of being a mainstream issue yet. We still have a long way to go.

Very few entities stand out from the crowd, doing what needs to be done, because they believe this is the only way to enable them to achieve long-term sustainability of their businesses. Whether these are multinational organisations, national organisations, or even regional organisations, nobody can today ignore the devastating effect of climate change on the environment, the economy and the society and the resultant damages that have been caused.

If you look at the massive destruction of forests, if you look at the fires that are erupting all over the world, if you look at the high-rise temperatures in Europe this year, the floods, and devastating impacts of rains in many parts of the world, all these issues are the result of Climate change.







Everything that we produce has an impact on the environment. The high impact of the speed and scale of our extracting resources from the environment to make the products that we produce not only for our sustenance but for our luxury standard of living.

So, when we look at what is being produced from dental hygiene products, health care products, furniture, textiles and the toxic dyes used in fabrics, building materials, the dominating pharmaceutical industry, oil & gas, petrochemicals, the transport, the packaging that we need for all our items requires serious action. We need to change these unsustainable patterns of production and consumption now and we need to have a disruptive change.

When you look at all the above, you will see that education and raising awareness will be the most effective tool that we need to utilise here. Although it is one of the most effective ones, it cannot deliver single-handedly. We, therefore, need other components to support that. Amongst the critical components that need to be focused on is to look at the laws and policies, we need to change them and enforce laws on products that are manufactured to have a detailed manifesto on how to properly dismantle them into individual components to be reused or recycled or safely disposed of.

We must understand how we can work together to usher in circularity and ensure that we get rid of the unsustainable ways of production over time. So here is where the roles of the schools and universities come into focus. We need to change the syllabus and integrate end of life cycle procedures. It has to be nicely enacted into the curriculum and the modules into the teaching methods so that they understand how to deal with modern-day requirements and modern-day challenges with the opportunities that are there to change their mindset.







How many schools out there are teaching about what to do with the products at the end of the life cycle? How many are addressing the negative impacts of the use and production of items. How many universities have specialities in fields that target end of life of a product?

The actual reality and impact of our modern way of life must be taught to students and critical thinking should be encouraged to build a more sustainable future for all. So, to answer your question, yes the academia will also play a vital role in the path to sustainable future.

**Q: What are some of the key challenges that you face especially when you're trying to reach out, to not just the corporates, but even to the schools and universities? How many of these have you been able to overcome?**

**A:** An environmentalist's life is never boring. It is full of challenges that you try to tackle and conquer. Our focus from the beginning was on how to work with the future generations and how to mould them into the right mindset and create future environmentalists. UAE is a unique place in that it has got so many curriculums from all over the world being taught. We have around 202 nationalities living in this country. So, each community caters to the requirements of its members and that has brought diversity into the educational system.

Schools have become very competitive in bringing the latest, the best, and the newest to the student community to attract parents. This is an area that we have worked with schools very closely. We have created many platforms be it theoretical programmes, workshops, competitions, or hands-on action programmes, (many of our programmes are hands-on). We have quite a few programmes catering only to the student community.

For instance, we have a programme that has been running for more than 12 years called the "Neighbourhood Recycling Programme". The programme caters to the student community whereby we train the students to reach out to and interact with 20 neighbours. So, you are building community links here, but the student is the one who is responsible to convince them to join in recycling. The student has to mobilise, organise, and arrange the collection of the material by liaising with Emirates Environmental Group to pick it up in a limited period of two weeks.

We have a strong criterion that he or she has to follow, and we have a mechanism in place to ensure that it is being followed properly, but the reward is beautiful. Apart from gaining experience, they make new friends, connect with neighbours, and create a strong network. The students manage to learn organisational and management skills, designing, and more.

We have connected our recycling & waste management programme by giving back to nature, through planting trees, we furnish them with data when they are collecting recyclables, to tell them that their action has resulted in a certain amount of CO2 emission reduction from the environment, or a landfill space has been saved because that material did not end up in landfills, but has instead entered the factories for recycling and production of new products. So, they see the whole and complete a cycle.

We receive every year hundreds of students that participate very actively in this programme. This is one of EEG's approaches to help change the mind-set. When you are engaging with the student it is not a solo affair as it entails the involvement of the father, the mother and the siblings. So, therefore, you're engaging the whole family through this programme.

This is one of our very popular activities and action programmes and I think this combination of theory and practice is what has made EEG so popular amongst the education institutions, families and corporations.

We also provide a platform where corporations can utilize a lot of voluntary work hours, and the community comes together. This is where we think, act and see the results together. We have this beautiful programme called “For Our Energy Plant”. This is a programme that we started in 2007. Up until today, we have planted 2,108,513 native trees in the United Arab Emirates. Just imagine the size of forests that have been developed, and the carbon sinks that we have managed to create, which contribute directly to the strategy of the UAE in dealing with the reduction of CO2 emissions. The strategy of the UAE is to be net zero by 2050, we at EEG believe this to be one of the effective ways that we, as a civil society, mobilise the masses to be involved environmental work.





**Q: What do you think are the three fundamentals for creating a lifelong environmentalist?**

**A:** We at EEG expose the students to the surrounding environment and teach them how to respect the environment and the value of preserving it. They even know for example, what their T-shirts are made of and where their resources are coming from, the food that is on their tray, the healthy options, the water footprint, the carbon footprint, and all the energy that goes in there. So, these are all part and parcel of what we expose our students to all the time through different platforms.

We expose them, motivate them and inspire the young minds to do the right thing. As just observing will not be enough, you need to engage them and that's why you find that in all our programmes, the students must work on the projects themselves. We also work with relevant authorities in the country and that help us reach to the different institutions. Our activities are not focused in Dubai only; we work with different educational institutions from all over the UAE.

**Q. How people can get connected to the EEG, should they want to be a part of it? How do you all get your volunteers in? Is it just student volunteers or do you just go ahead and tie up corporations? Can individuals who are genuinely interested from across the board come and join the EEG?**

**A:** When we set EEG up 31 years ago, it was a unique platform. We wanted to engage everybody regardless of nationality, gender, or position in life, we believe that we have to come together as human beings and work together. So that is why we created EEG as a group and it is a membership-based organisation. We have different types of memberships, corporate educational and academic membership.

We also have student membership and individual membership. Our motto since the establishment is; "Together for a Better Environment"

We are accredited by the United Nations Environment Programme and United Nations Convention to Combat Desertification. We were the first member to join the UN Global Compact in the GCC region, we went on to form the UNGC -GCC network and we managed it and oversaw its operation for more than seven years, working with different entities. This has helped us broaden our scope and our strength and to bring what is the best out there to our region.

To join us and be part of this unique experience, simply go to our website and fill up the application form. A lot of companies join us as corporates, and that helps them to connect directly with the different programmes of EEG. We then work with them closely to put strategies for managing their waste and recycling. We arrange collections of materials on complementary bases too. We also work on awareness sessions and provide platforms where the employees can come and be involved and volunteer. 'Clean-up UAE' is a practical example. This is a programme that we started in 2002 and continues very strongly. Every year thousands of people from all walks of life participate in this campaign and we have covered more than 1,000 kilometres in the country and have managed to collect thousands of kg of unsightly waste and clean many areas in the different Emirates.

The main objective of this programme is also to raise awareness and motivate people to come and participate and see the beauty of the natural environment of the UAE. It is very inspiring for the participants to witness first hand their contribution to maintaining the beauty and pristine of the places covered by Clean Up campaign, it definitely resonates well with everybody. It is a win-win situation for anyone who is involved in these programmes.

I would like to, through this platform to invite members to visit our website and see how they can be actively involved. One of the effective ways is also the series of panel discussions, and regular intellectual platforms that we roll out to create awareness on a very high scale.

**Q. Could you tell us for the benefit of the audience a little bit about the UN Global Compact, and of course, your role in it? And how has it impacted your life as a professional?**

**A:** My association with the UN Global Compact, started in 2005-2006. I received a letter from the late UN Secretary-General Kofi Annan, inviting me to be a board member of the UN Global Compact, and I was the 1st Arab woman to be chosen for that platform. I'm an environmentalist and sustainable development advocate and it was very rewarding for me to see the response to the work that I was doing on the ground in my country and the region.

Amongst the areas that I covered during my tenure with the UNGC was to mobilize the private sector to come on board this global platform voluntarily. I'm proud to say that in the six years that I served as a board member, I managed to bring on board more than 110 corporations from the GCC region to be members of the UN Global Compact. Today, UN Global Compact principles are a part and parcel of the corporate culture in the country.

One of our famous and popular products is called the Arabia CSR awards. There is a main component in the application process that we ask entities if they are affiliated with or know about the UN Global Compact, if they are members of it, if they are implementing its 10 principles and if entities produce a communication on the progress report, which is part of the requirement of the UN Global Compact. So, serving as a board member for six years and establishing the UNGC-GCC Network and managing it for 7 years has added a lot of value for me as an individual and as head of several non-government organisations. It has enriched my experience and I learned a lot from my fellow board members and from the international body itself.





At the same time, we have added a lot of value to the global platform. I always say there is no one size fits all and these international platforms need to look very closely at different regions. It requires evolution in ways that fit different regions. So, the products that will fit, the Middle East region will be different from the ones that will be suitable for Africa or Asia or Europe, Latin America, or North America. To be able to engage the different sectors of society there is a need to adopt different ways to ensure that the principles are nicely disseminated and incorporated and acted on. That is what we Alhamdulillah excel in doing.

In October 2019, I was selected by the current Secretary General, His Excellency, Antonio Guterres, to be a board member of a unique platform known as Global Investors for Sustainable Development Alliance. This is another strong platform on the global level, whereby the private sector and the financial institutions are encouraged to mobilise themselves and the right financial resources to enable us collectively to achieve sustainable development goals by 2030. There's a lot of meaningful and constructive work that is going on, on this platform and I'm very proud to be a part of it.

**Q: When it comes to student activism, what is that one incident that probably, propelled this entire journey of you becoming an environmental activist all those years ago when the environment was not on everyone's priority list?**

**A:** I can't say there was one such incident; instead, it was a way of life and I always say I owe to my late father and also to my beloved mother. Right from instilling the right teachings in us from a very, very young age, whether it was the conservation of resources, respect for nature and all living creatures, understanding our role as human beings on the planet and us being the custodians of life, we were taught that we have a responsibility and we will be held accountable on the day of the judgment. Understanding that from an early age and learning how to implement it serves you when you grow up, as it becomes part and parcel of who you are and what you are and why you need to practice resource conservation and environmental protection. I was always out there supporting families and relatives in whichever way I was able to. So that translated into the ability to do something for the environment, when I was exposed in 1989 & 1990, to the modern-day understanding of the environment. I think it's a calling in life that a person is blessed to have and I believe I am one of those privileged, who have found my calling in life through environmental work. So, when I started volunteering in the environmental field and working in its different spheres, I was finding myself, and enjoying what I was doing immensely. That is what makes it all so enriching and fulfilling.

I wanted to explore and when I got the answer, it ignited something within me to change. I wouldn't take no for an answer when I faced challenges and obstacles, I would push and forge ahead armed with goodwill and the support of society at large. That also helped me discover my potential, I believe there is a power within every person that helps define the path, one needs to tap in and start the journey.

When you see those wonderful students shining, achieving and excelling, it is worth all the trouble and effort. When you see the result and the numbers and the data of the different programmes that we are doing, when we become a source of data and can provide data to relevant entities, it gives us immense satisfaction and encourages us to forge ahead.

All Photos Provided By EEG

**“GREENWASHING IS A  
MARKETING FALLACY THAT  
HAS NOT BEEN WELL  
THOUGHT OUT,” SAYS  
IOANNIS SPANOS, DIRECTOR,  
KEO CONSULTANTS**

**I**t is rightly said that adopting sustainable construction methods is not an overnight process. The clients' attitudes can be a significant enabler or a paramount constraint. However, with impending concerns over climate change and the finite nature of available resources, there is pressure on developers and construction firms to minimize environmental impact.

It is on the sidelines of this broader discussion that we got in touch with Dr. Ioannis Spanos, Director of Sustainability at KEO International Consultants, a global multi-disciplinary construction consultancy, specializing in sustainability and environmental services, planning, design, engineering, and project and construction management.

Leading with a vision, Dr. Spanos talks to Thirty to Net Zero exclusively about contemporary ideas in the construction sector, from conceptualization – to realization, of planning for a sustainable tomorrow, including the remarkable changes he has witnessed in client understanding, the acceptance of green construction and the limitations that continue to persist.

**Q: From an architectural perspective do you feel that sustainable design is the seed or the kernel for the journey of the sustainable journey of any assets?**

**A:** Architectural design concepts are important and within the region, we see some great examples. A successful project, however, is a real estate asset that has the highest occupancy, high returns for the developer, and will be there considering climate change and other aspects that are regarded as socio-environmental perspectives. Minimum building regulations make sure that there are sufficient safeguards for real estate, health, safety, and building operations. But sustainability integration has gone beyond that. It takes into consideration the best international guidelines for the whole lifecycle of the project. And of course, this must be defined throughout a project. For me sustainability must be integrated within the brief, then the design and construction, and of course, soft landings for the occupants and long-term operations with a sustainable asset mindset.



**Q: Where were you born? And where did you grow up?**

**A:** I was born on a beautiful Aegean Island in Greece, where I spend most of my annual leave every year. I have lived in five different countries, but most of my life I have lived and worked in the United Kingdom. I have been here in the Middle East for almost 10 years now.

**Q: What experiences or which people led you to the passion that you hold today for sustainability?**

**A:** I've always been interested in improving the efficiency of systems and operations. That's a passion for me. Sustainability is an enabler for better design solutions efficiency for now and the future. It supports the optimization of improving the environment, and how to improve our lives.

One of the main experiences I had that significantly broadened my understanding of sustainability was almost fifteen years ago when, for business, I travelled from the UK to Nigeria, Ireland, and New York. And it was revealing as I could see through the settings of the urban fabric how the cities have been built up and operated, that sustainability aspects play a key role in the growth of the cities, the quality of life of individuals, and their prosperity.

Now, regarding people that have influenced me, I'll talk of Edward Lawrence. He has done a lot of climate science analysis and he has proved that the small variation of parameters may have a large impact on the future which is called the butterfly effect.

One of the books I would recommend to many people is called Collapse by Jared Diamond. I believe it was issued back in 2004. It's a very interesting book because it talks about how great civilizations collapsed due to the underestimation of their capabilities of expanding their resources and how they failed to understand the critical risks and opportunities of the surrounding environment.







4-11 Dec 2011  
Dr. Martin Spanos  
Regional Manager  
- Building Services,  
Sustainability and  
Environmental Services  
Division  
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**Q: Your company believes in investing or building those assets which are low energy, but I'm sure that your clients would have different philosophies toward their energy strategy, which is based on their budget or their goal. When you are building your assets, do you proactively have to convince them to go for low-energy strategies?**

**A:** It's a proven fact that if something is not done correctly in the design during operations, it will cost significantly more to be achieved. And as consultants, project managers, and engineers, the work we are doing for clients always has been to support them with something better that needs to be materialized.

Usually, what we do is, first of all, we try to understand what the overall vision is, what the main operations under each building are, and of course, most importantly, how the building will be used by the occupants.

Now the question is, how can we achieve the same 'work' with less energy? This is the key point because there is always a way of achieving the maximum output of a product, or a process, with less energy input. That's my whole philosophy about energy efficiency. Of course, some technologies provide a paradigm shift. The development of electric vehicles is something that I believe will have a big impact on energy efficiency in the cities, providing services, beyond just transportation, with better efficiencies. At the same time, you can power them with 100% renewable energy.

Significant energy reduction can happen in buildings if we incorporate more energy-efficient solutions and utilize innovative thinking to find these optimum operations solutions. We always like to work with an understanding of the vision and the optimum solution to provide services that are currently provided with less energy.





**Q: When it comes to sustainable construction, where do you see the biggest success stories happening? whether that's clients' success stories or government mindset?**

**A:** During the last two years after the COVID situation, I'm glad to see some large-scale developers benefit from added value services that have been asked for and construction program delivery requirements that indicate environmental, social, and governance perspectives. There is also some push by governments with strategic frameworks that go beyond the minimum building regulations and the requirements associated with construction.

There are many different drivers. Most of them are associated with long-term technical and financial opportunities and risk mitigation drivers linked with both operations and climate change. I'm focusing on two of these drivers, first, digitalization, and the other alternative materials or more sustainable materials because these are linked with carbon neutrality and, potentially, will improve the cost and operation of construction in the long term.

I hope these efforts for innovative solutions will be continued because they can provide a good foundation for further improvements in the global construction industry, not just for climate sensitivity.



**Q: What is better - recycled material or natural alternative materials when it comes to sustainable construction?**

**A:** If there are opportunities, it is better to replace natural materials with appropriate alternatives. Waste is not a good thing. But for material produced with recycled content, there must be a balance between the material choice and their quality and their performance.

Before we think about sustainable materials, we'll have to consider why we are using the materials. We want to comply with performance specifications for a specific duration of time. Now, some recycled materials have already achieved and fulfilled this requirement and have exceeded the performance of natural materials. Some recycled material suppliers try through industrial research to provide alternative materials for an expanded range of building components. And there are going to be some good outcomes in the coming years along with some great new materials.

**Q: They say that green buildings cost more than regular buildings. Do you think this is a Myth or Reality?**

**A:** In the past, there have been some cases where the budget of the overall project was increased because sustainability came as an add-on, and that was the main point. This is not the case anymore. There are many projects, where clients have told us, that they have provided the project budget and in the final design, they would like their full vision of the project, and full high-end sustainability solutions installed and incorporated within the final building within the budget, at no additional cost. And we had a few of such developments, and we delivered.

The construction of a building is just the beginning of the long lifespan of the building which lasts 50-60 years. We found out that if

actual sustainability standards are implemented correctly from the first moment of the brief, then you may go with good sustainability specifications and sustainable building at no additional cost. Advantages include increased occupancy productivity, and lower operational costs for the maintenance of the highest operational standards. If there are any additional costs associated with the highest applicable sustainability standards, the payback is within a few years when all the operational aspects are considered.

**Q: Tell us a little bit about the role of, or the growing role of AI and digital infrastructure in the energy efficiency side of construction, and the life of an asset.**

**A:** AI is a very popular term these days and artificial intelligence has been progressing significantly in specific areas of development like imaging. But for now, for the building and infrastructure sectors, it's more a Computational Intelligence. And that is not a bad thing. It is better to have the most optimum solution by examining 100s of scenarios rather than a handful of potential solutions. When artificial intelligence becomes more cognitive, that will have an impact on the construction industry similarly to all other industries. It is not expected to happen soon though.

**Q: We say that we are still in this era of greenwashing, how do you convince your clients to opt for genuinely sustainable assets?**

**A:** I believe clients are well educated and they understand that history has proven that those who are making false statements are the ones who will be forgotten sooner rather than later. And for me, greenwashing is a marketing fallacy that has not been well thought out.



Qatar-FIFA World Cup St

A green asset is an asset that will be able to be sustainable during its operations for the next 50 - 60 years; we are utilizing sustainability to support the development of real estate assets that are as good, comfortable, and environmental-social friendly today as they will be in the future.

My latest thoughts on green assets and developments that I convey to my clients are that green assets need to be sustainable and assessed. Sustainability in buildings does not deviate from a good design that needs to prove its quality and provide a better answer to how sustainability feels.

All Photos Provided By Spanos / KEO



# FADY KOBERSY ON THE FUNDAMENTAL CHANGE IN THE REGIONAL CONSTRUCTION INDUSTRY THROUGH DIGITISATION

**D**igital transformation and sustainability are at the top of the list in the construction industry. What makes this partnership so important, is that both are future oriented. Digitalisation plays a significant role in reimagining construction.

In this exclusive with Thirty to Net Zero, Fady Kobersy, Head of Sales & Customer Success at RIB CCS chats about helping construction executives and organisations to transform projects for optimum performance, upstream control, and ROI. He stands at the intersection of sustainable construction and digitalisation and through careful detailing Fady Kobersy shares how he is striving to keep his clients ahead of the game in the sustainable fray.

**Q: How has technology enabled the Construction industry over the past few years and how has RIB CCS changed the dynamics of this industry?**

**A:** The construction industry is notorious for being one of the least digitally transformed industries worldwide. Although it is the single largest industry vertical in the world, it lags behind other industries in average productivity growth, only having grown by about 1% in the last decade.



Approximately 80% of all construction projects run over time and/or budget, resulting in high levels of customer dissatisfaction.

Traditionally, information on construction sites has been managed and communicated verbally and via paper-based systems. A common challenge with this approach is miscommunication between on-site and office personnel which, in turn, leads to delays, lost time and money, and decreased morale.

The introduction of Computer-Aided Design (CAD), Building Information Modeling (BIM), supply chain integration, and mobile computing has set the stage for the modernisation of the sector and digital tools are becoming a staple of the industry. What is missing, however, is the seamless and meaningful integration of these technologies.

Companies that are succeeding in this area have embraced innovative software, which has helped them with the identification, quantification, and streamlining of work tasks, resulting in saved time, money, and effort. Digital tools support a host of functions and when they are successfully integrated, users can improve project planning, establish accurate timelines and budgets, and track work in real-time. In addition, contractors can use the data accumulated on digital platforms to improve communication, efficiencies, productivity, and safety, thereby promoting growth, improving profitability, and enabling sustainability.

RIB CCS' role in the industry, which commenced more than 40 years ago, is to leverage the latest digital technologies with a view to empowering its construction clients to run their businesses better – making them more collaborative, transparent, efficient and sustainable.

But we are now at an interesting stage within the built environment with fit-for-purpose digital solutions that allow the journey to be fast-tracked. And that's where RIB CCS comes in. It's our mission to drive the digital transformation of the industry so that it can prosper for many generations to come.

We live this mission when we engage with our customers. It's not just a sales process, but a partnership that lasts for many years, decades even. We become our customer's trusted advisors and we show them not only how to use our software, but how to embed industry best practices into their organizations. We do this by hiring industry professionals who truly understand our customers' challenges and address them via purpose-built solutions.

**Q. When it comes to drawing up estimates Candy provides an interactive link between the bill of quantity (BOQ), estimate, and program in one project management solution. Tell us more about the process.**

**A.** I was always fascinated by how Candy predated the BIM concept where it combined Data from drawings with the estimate, time, and cost all in one solution. Candy is a complete project control tool with multiple features that are built around the main core or the Bill of Quantity.

While being aligned to the client issued BOQ, importing this data to Candy unlocks a process for multiple departments allowing them to contribute and collaborate collectively and subsequently during different phases of the project.



While measurements are taken through the Quantity take-off tool by Quantity Surveyors, results are directly linked to the same BOQ estimators are evaluating and pricing. Following the first principles of estimating with detailed drilled levels of resources can lead you to the smallest level of detail for each item on site.

In parallel to the cost estimate factor, a one-solution process provides BOQ information within the planning module to draft quick schedules all the way to detailed activities that output a full schedule like all other planning tools in the market. Besides being a versatile planning tool for site, this easy-to-use yet powerful Critical Path Scheduling system can link activities directly with bill items.

A 'many to many' links capabilities between bill items and schedule activities essentially building your cash flow analysis baseline. Not only can the money be extracted from the bill, but the resources behind the pricing of the bill items can also be spread over time. This makes it possible to accurately forecast resources required on a project, and as resources are grouped into Cost codes and accounting Ledger codes, money can be gathered in and fed through to the Cost & Allowable forecasting system mentioned above.

The time-money data from Candy produces the typical earned-value S Curves. This is not only from a pre-tender process; but also extends to post-tender where operational teams have immediate use of budgeted BOQ and start capturing progress on site, which can be daily, weekly, or monthly.

The project budget generates the procurement shopping list where our web-based ERP BuildSmart continues the costing side of the project through procurement, payroll, stores, and accounting.

Site progress on both Schedule and BOQ valuations feeds the Cost & Allowable in order to bring together the allowances to date to compare against actual costs to date. Allowances to completion can also be calculated in Candy and are compared to the forecast costs to completion, yielding the Cost at Completion and thereby closing the cycle.

The Cost & Allowable report is fundamental in assessing the project's current situation - what went right and what went wrong and understanding the impact on the remainder of the project - while also considering value engineering, 'what if' scenarios, and project variations. It allows the team to maintain clear visibility of the project completion situation, from day one till handover.

All the data, calculations, assumptions, and lessons learned from one project can be easily shared and applied to future projects through libraries and masters' projects.





**Q. Can traditional structures be more sustainable with technology?**

**A.** While many engineering and construction companies have made sustainability plans and commitments, few have taken concrete steps to realize their sustainability goals. That's because a lack of visibility presents a major issue when it comes to monitoring sustainable practices in their own processes, as well as those of their subcontractors and supply chains.

Technology plays an important role in empowering the entire value chain – owners, consultants, General Contractors, subs, and suppliers – to make the right choices and understand their impact. Enhanced situational awareness comes from visibility, and visibility comes from the suite of ConTech tools the AEC industry brings into its planning, building, and collaboration processes.

Here are the first steps that AEC companies need to take to embed sustainability into their company strategies:

- Create a long-term strategy that considers sustainability in every process, from start to finish.
- Source materials ethically and ensure labour standards and fair humanitarian practices are in place with all subcontractors and suppliers.
- Implement sustainable design, engineering, and construction practices, powered by relevant data to track, measure, and reduce emissions and waste throughout the project lifecycle.
- Use logistics processes that optimize deliveries to reduce mileage, emissions, and carbon footprint and set up to scope 3.
- Operate assets and equipment in an energy-efficient manner that is safe for the environment and workforce.
- Introduce technology in processes that are the root cause of emission blowouts e.g., carbon estimation and analysing of embodied carbon.

**Q: Please tell us about the top 3 or 5 projects that you are particularly proud of.**

**A:** While our software solutions have supported various projects around the world, we are particularly proud of the high-end projects our clients have been involved in the UAE and MENA Region, including the Burj al Arab and the Museum of the Future in Dubai, Yas Waterworld in Abu Dhabi, the Qatar stadiums and infrastructure for the 2022 FIFA World Cup and the Kingdom Tower in Riyadh and many others.

**Q: What are the key opportunities in the MENA region for techno-enabled solutions?**

**A:** The MENA region understands the importance of technology-enabled solutions and the role they play in economic growth and gaining a competitive advantage. Notably, about 50% of cities expected to become smart by 2025 will be in emerging markets and the Middle East.

The area is well positioned to harness its appetite for digital solutions to create viable smart cities that will, in turn, enhance the quality of services offered to their urban populations, reduce costs and resource consumption and allow for more effective engagement with citizens.

We see it has started in Dubai, UAE where it has set an example for other countries in the region and globally. Saudi Arabia, also in line with its vision, has a major share in many techno-based projects such as NEOM and Red Sea Projects. The same goes for other GCC counties like Egypt, Kuwait, and Bahrain.

**Q: What are the key reasons that software implementations fail?**

**A:** Poor Change Management: Software implementation can be incredibly complex and difficult to orchestrate. To be successful requires a dedicated and skilled team to manage the process.

- Unforeseen costs: Typically, this occurs when selecting software that requires a lot of bespoke development. This is because it is difficult to ascertain the total cost upfront. In addition, companies may want to continue to add features and make changes during the implementation process. There may also be delays and errors that occur during development. All these factors can lead to budget overruns and unforeseen expenses. Therefore, it is better to select a partner that has an industry-specific focus with a robust solution that is fit for purpose and ready to deploy.
- Failure to plan: Lack of adequate and competent resources. Successful implementation requires a high level of planning and precision.
- Unrealistic expectations: It is vital to select software that meets industry requirements and standards. Organisations need to do their homework during the purchasing process and select a software partner that addresses their key issues and requirements, to ensure they are met. Having realistic expectations of what the software can and can't do before embarking on the implementation is a critical success factor.





**Q. How important is it to have timely analytics for Project Management Solutions?**

**A:** Being able to access analytics in a timely way is all about predictability. By making decisions in a virtual environment before implementation, project managers can ensure projects don't run over time and budget and reduce the amount of rework.

Business Intelligence (BI) construction technology allows contractors to find, understand and document data. These tools assist the decision-making process, helping contractors to meet the ever-rising demands of the construction industry.

Construction projects make use of a lot of data from many different sources throughout the construction process. By applying BI tools, contractors can make the flow of data more manageable. The aim of this is to take all the information and turn it into something structured and actionable. BI reports and analytics tools take existing data and present it in a way that guides the decisions more clearly. This data consists of insights from past and present performance.

Here are some of the main advantages of using these solutions:

**Access To Reliable Information**

BI reports and analytics offer real-time data insights to help users to understand information more easily. Instead of sifting their way through huge amounts of data from different sources, BI reports provide a clearer source of reliable information when it's needed.

**Reduced Costs**

BI tools make data collection and reporting far easier. It also allows more meaningful insights to be drawn from the data resulting in a better ROI. By making smarter use of data, construction projects can avoid poor decision-making that results in added costs.

**Improved Decision Making**

Instead of just looking at data as numbers, BI reports and analytics reveal data as it relates to the project. These tools make data easier to understand, which allows contractors to make smart data-driven decisions. Ultimately, this leads to greater project and business success.

**Enhanced Insights Across The Project**

A single BI tool can synchronize and coordinate various sources of data across an entire project. This data provides advanced insights for a better overall understanding of how the project is performing. As a result, it makes it easier to hit KPIs and achieve sustained success throughout the project.

**Predict future events**

Importantly, BI and analytics tools help in the anticipation of future events. While nothing can ever be certain, BI reports and analytics use predictive analysis techniques to understand what future scenarios will look like. Instead of just making guesses based on past performance, BI reports and analytics use advanced algorithms to help determine the possible outcome of certain actions more accurately.



**Q. How do you see the Future of AI and Mixed Reality in Construction play out in a big way a decade from today?**

**A:** AI and mixed reality are already playing a significant role in the construction industry. Their usage will become more prevalent in the next decade, especially as they help boost productivity and profitability.

Previously, 3D models and physical plans helped with envisioning what structures would look like. Now, with mixed reality, interested parties can see and experience a structure, and even adjust it in real-time.

In addition, workers on site can get support from their colleagues elsewhere in the world using VR glasses or apps on their mobile devices.

**Q. Please tell us about your journey in the field. Do also tell us about a passion outside of work that you are particularly interested in.**

**A:** I am a Civil Engineer graduate with a Master's in Project Management. I have worn the hard hat and been on site in both Lebanon and Saudi Arabia, where I gained most of my experience. Through my work, I realized that projects are not only constructed on-site with equipment and labour, but the digital side of planning, budgeting, and costing data plays an enormous role, and that's where I became passionate about cost control. While researching systems to enhance the estimating and project control of the company I was working for in Saudi Arabia, I came across Candy, which we implemented along with BuildSmart, the Cost Management and Enterprise Accounting system. I am very tech-oriented, which is critical for our business, and am obsessed with keeping myself up to date on new developments in our field.

I am recently married and as much as I have invested in my career, my family brings a happy balance to my life, especially with a baby on the way.

When not working, I enjoy outdoor activities, like hiking, and scuba diving as well as being an avid music lover. In addition to the guitar, my latest passion is the saxophone, which I started playing during the covid lockdown.

***All photos provide Fady Kobersy RIB CCS***



# HYPER-CONNECTED CITIES: REAPING THE BENEFITS

**C**IO reports that city planners are careening with smart city projects, and authorities in the Middle East are no exception. The Middle East is set to host some of the most advanced smart cities in the world.

Should one look at the generic definition of a hyper-connected city, it is stated that, a city must unlock the full economic, social, environmental and business value of technology – through IoT, AI or mobile connectivity – to become one hyperconnected urban epicenter. The incredible influx of people moving into cities for personal and professional reasons further steps up the need to meet the challenge of urbanization in the swiftest way possible. The UN estimates that approximately 1.5 million people move into cities per week and this is a huge number from the construction angle. Meeting the demands of the growing numbers also means that the world must welcome the idea of a circle that will include hyperconnected cities where economic prosperity, business growth and social well-being combine to become increasingly efficient and effective.

Sustainable construction plays a key role in the development of many of the contributing factors that feed into the iterative growth of a hyper-connected city, such as social, health and business advantages that are difficult to directly monetise. However, the statistics that prove qualitative benefits – creating new business opportunities, filling talent gaps, improving public health, reducing crime, boosting productivity and addressing income inequality – are more measurable. And that is why Sustainable Construction must put its best foot forward even in the Middle East.

According to White and Case, Countries in the Middle East have been remarkably proactive in developing smart cities, with a tendency to build them from the ground up rather than incorporating technology into existing environments. The promotion and implementation of digital and data-driven technologies to enhance the socio-economic potential of these new "smart cities" and to improve the day-to-day lives of those who live there strongly depend on its green architecture right from design to delivery.

According to Smart Cities Drive, A smarter city allows public safety officials to create a more automated approach to public health by implementing preventive measures and ensuring emergency services are kept safe and available for urgent issues. In Sendai, Japan, for example, drones are being trialed for early evacuation warnings in situations of disaster prevention and mitigation.



Majid Al Futtaim, the leading shopping malls pioneer across the Middle East, Africa and Asia, and AECOM, the world's trusted infrastructure consulting firm, had awarded the Mall of Oman as the Sustainable Project of the Year at the Construction Innovation Awards 2021. It comes as no surprise that while the world was still contemplating about green construction and working on it on a voluntary basis, the UAE made it mandatory for all new buildings to abide by new legislation and standards as early as January 2008.

In a hyperconnected world, greater connectivity efficiencies diminish environmental impact. Car use and associated emissions can be substantially reduced with the help of smarter public transport networks that incorporate improvements facilitated by 5G and IoT deployment. These networks can analyze data from real-time updates to improve services and provide customer updates. Improving customer experience from the word 'go' is the key to a hyper-connected city and world.

Take a parallel example in Hyperconnected Streetlights Georgia Power. It is expanding the state's smart LED lighting network one of the core foundational elements for many cities looking to transition into a smart city is the adoption of hyperconnected streetlights. At a basic level, streetlights are equipped with LED lights with the ability to communicate through a centralized network, allowing cities to monitor the individual characteristics (luminosity, color, energy usage) of each streetlight, and that helps with major energy savings. These connected streetlights serve as the backbone of a smart city, providing the base infrastructure for 5G and IoT technologies.



smartcity / itrade  
Ecoliteracy / istock



The classic story of a hyper-connected city comes from Tel Aviv, where they changed their approach to 'citizens as customers.' The authorities especially the local governments and authorities realised that within a municipal office largely concentrated with multiple departments all functioning in a stand-alone manner it was necessary to build a city with smarter strategies which kept the citizens central to the government's function and design. Zohar Sharon, Tel Aviv's Chief Knowledge Officer, explained the story of smart technology within Tel Aviv's City Hall and its impact on resident satisfaction overall. We identified three major elements of Tel Aviv's success as a smart city: a citizen-centric focus, knowledge management, and data-driven digital pushes. Taking the thought further as the Chief Information Officer, Liora Shechter who explained, The ROI is in the satisfaction level of the residents. Our model is built on building a better life in the city and increasing the satisfaction level of the residents.

Another inspiration when it comes to sustainable construction is Saudi Arabia's NEOM which has been designed to respond to some of the most pressing global challenges facing urban areas and also inspire alternative ways of living. It is stated that the city will preserve 95 percent of the site's natural environment, highlighting mankind's relationship with the natural world. The construction of NEOM has been focused on making the city 100 per cent renewable -- from solar, wind and hydrogen-based electricity generation -- ensuring a zero-emissions, carbon-positive ecosystem.

Another big name that is focused on localizing the contract sector is Amaala. It has been reported that Saudi Arabia stands out, especially for its ambitious giga-projects. It is currently developing four significant smart cities—NEOM, Amaala, Qiddiya and the Red Sea Project—each involving multibillion-dollar construction contracts.

Eng. Thabet Al-Sawayeed, Governor at SCA while commenting on Amaala's recent developments said: "This partnership is a key step towards achieving our goal of aiding Saudi contractors to participate in the new landscape of projects established to drive the Vision 2030 strategy forward successfully. Working with AMAALA and their existing contractors in this capacity will also allow us to further enable the uptake of our localization programs which incentivize organizations to empower Saudis through training and employment."

Should one take a look at the latest addition to the sustainable construction fray, Dubai South stays at the top. On the official website, Dubai South is Dubai's largest single urban master development focusing on an aviation and logistics ecosystem that houses the world's largest airport when fully operational complemented by a multi-modal transport infrastructure connecting air, land and sea. Positioned as a global transport hub and a major contributor to the economic growth of Dubai and the United Arab Emirates, Dubai South offers business-friendly free zone benefits and a living environment with a diverse range of residential homes and apartments to suit different lifestyles.



All said it all boils down to the fact that Tel Aviv recognised early on and that is, are cities really keeping it citizen-centric? Or is it just another technological advancement that will soon lose steam? According to Eco Consult when it comes to hyperconnected cities, Citizen engagement is vital to their success of hyperconnected cities. According to research, ensuring citizen support apart from that of other stakeholders is the biggest obstacle to developing a smart city program, cited by 52% of cities. The figure is even higher (75%) in lower-income markets, where citizens often see smart initiatives as more beneficial for the rich. The city of Moscow in the Russian Federation provides an instructive example of best practices when it comes to citizen engagement.

In line with the ambitions of both organizations and the wider Vision 2030 goals, there is a lot left to explore in the case of hyper-connected cities. Especially the dark side of this kind of digitally empowered city. CIO rather aptly states, when we think of smart cities, visions of a utopian hyper-connected world may come to mind. But there's a dark side: Critical city infrastructure connected via sensors and IoT networks is vulnerable to hacking.

All in all hyper-connected cities are a bold vision, one where there is much to be explored and much more to be worked on. One has to identify the challenges on the way. At best it is an ongoing experiment with multiple opportunities and minimal failures if the whole concept of hacking is taken care of.



# DIGITAL TWINNING: CREATING INFRASTRUCTURE OF THE FUTURE

**A**t the recently held Global Technology Governance Summit it was noted that with the overall growth of the world's population, another 2.5 billion people will need accommodation in urban areas by 2050. It is on this premise that cities around the world are now challenged with the onus of building quality property at record speeds but with the affordability factor in mind while managing the impact of cities on the natural environment. It is a proven fact that the construction industry is highly energy-intensive, labor-intensive, and capital-intensive. According to statistics, from design and construction to demolition, buildings consume about 40% of the total energy of the earth and form about 40% of the total waste of the earth.

Should one look at the climate, the environment, resources, economy, and culture must be given strong weightage and considered when deciding on the location it is a must for the designers to prioritise safety and durability, health and comfort, convenient life, resource conservation, and a livable environment? In the lifetime cost of public buildings, operation and management costs account for about 85%, and the high operation costs make the property teams feel the pressure and when it comes to green buildings it includes many aspects of living, that includes ventilation, temperature, sunlight, light source, and voice control, all of which require scientific and technological support.

Either way, a digital twin of the building built in the metaverse becomes a necessity. These technologically sound buildings are different as opposed to conventional buildings. Should one incorporate green concepts into all the aspects of construction, right from the design stage, research and development, building materials, sales, construction, operation and maintenance, they would collectively build a closed-loop construction industry chain.

According to Autodesk, “Digital twins give multi-dimensional views into how an asset is designed and how it’s performing, including occupant behavior, use patterns, space utilization, and traffic patterns. A digital twin offers a means to test “what-if” scenarios, including the impact of design changes, weather disruptions, and security events. It collects substantial data under one environment.”

The entire idea of using the digital twin technology is to ensure that the final product, in this case, the building has been thoughtfully and sustainably designed to cater to the needs of the resident and the environment concomitantly. According to Anas Bataw, director of the Centre of Excellence in Smart Construction at Herriot Watt University Dubai, “Digital twins will address a number of issues the construction industry faces, including timeliness, high labour involvement and sustainability.”

When it boils down to the integration of green construction and the intelligent building industry,



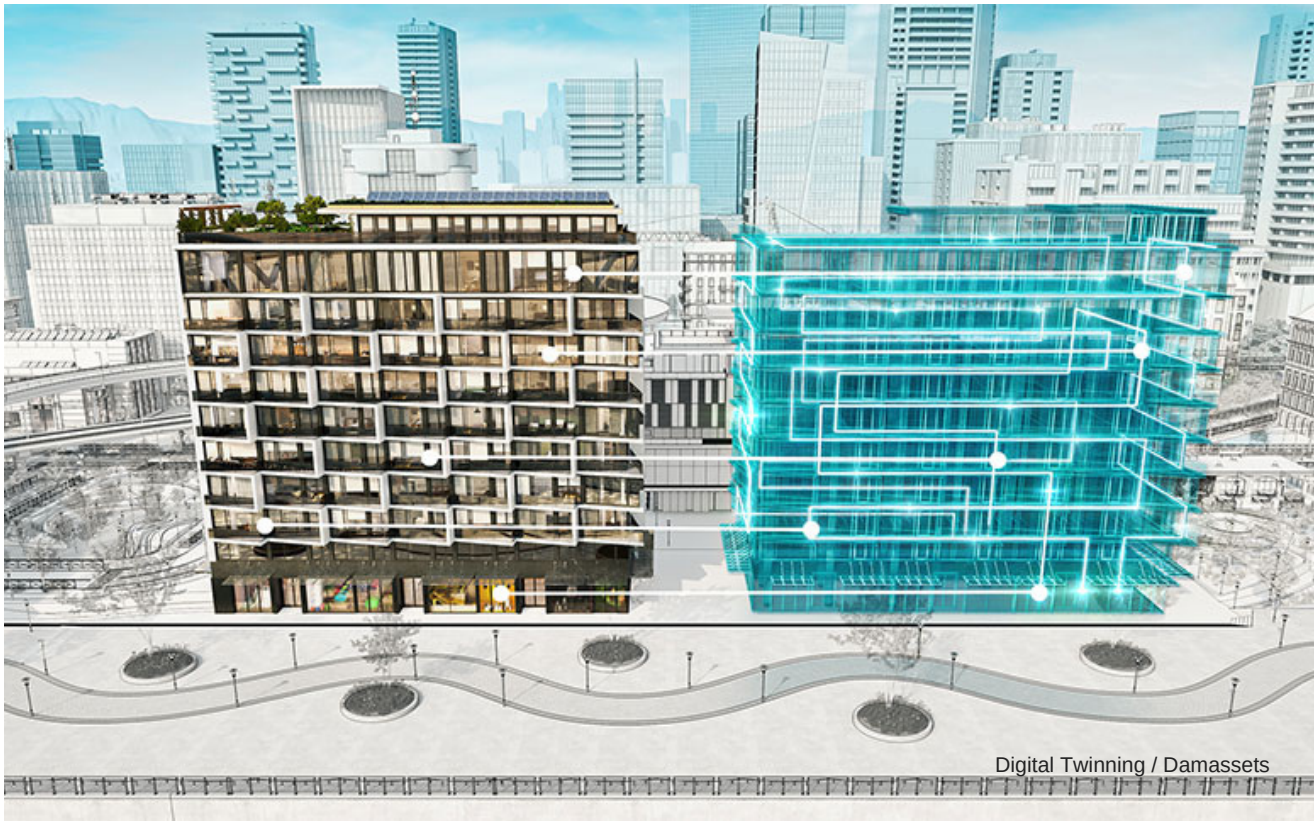
which includes high-quality development, the number of opportunities and adversities are in equal number. New ideas emerging infrastructure, new driving forces, industries, and new models, bring more market space to the construction industry and put forward higher requirements for strengthening and playing a larger role in the construction industry. Intelligent building energy saving is a new science that is part of the green energy-saving building branch, and the original professional division of labor is different.

Should one take a look at the Middle East, the Executive Vice President of Expo 2020 for Siemens, Oliver Kraft, said: “By building a digital twin of the Expo site, we will be able to aggregate, analyse, and visualise data that allows smart decision making. This will enable us to connect more than 130 buildings to drive energy efficiency, optimisation and provide a centralised building-management system that will benefit visitors and operators alike. Plus, we will pilot the first green hydrogen storage solution in the region.”

According to Bin Yang, Zhihan and Faming Wang’s findings, Green building development and construction is not only an important way to save energy and reduce emissions in cities, but it is also an unavoidable choice for implementing sustainable development.

Multiple management systems in intelligent buildings have been systematically designed based on building energy-saving design, from optimization to the control of technical measures. Sustainable Construction is driven by a combination of environment & energy conservation, wherein intelligent buildings use buildings as platforms to actively promote the progression of building platforms to green environmental protection and ecological balance. It must be noted however that the carbon dioxide emission reduction effect of green buildings varies. Green building has grown rapidly over the last decade, and the number of projects with green building evaluation marks has increased dramatically.





It has been stated that the amount of investment into construction tech has grown exponentially, with \$10 billion in investment funding from 2011 through early 2017. Technologies like building information modelling (BIM) are increasingly used throughout the industry globally.

This takes us briefly to distant Ireland where when the world's first digital twin of a hydroelectric power station came up, the team working on it acknowledged that "Our technology allows maintenance engineers to really pinpoint, using rules of science and engineering, where the issues will likely occur and we can also establish what the operational life is in terms of fatigue assessment. It also supports predictive maintenance."

According to WeForum, Digital twins are particularly powerful when used in conjunction with "generative design". Rather than using technology to help people design the building, the design is generated by automation software, in response to the design brief.

Kuwait International Airport has achieved the highest environmental certification, LEED certification and according to sources at ITransporte, The project aims to generate at least 10% of the energy consumed inside and reduces overall consumption by 27% compared to a reference building. At the KIA, provisions have been made for natural light to be maximised through 8,000 skylights incorporated into the roof design, and the energy consumption is optimised through efficient mechanical systems, from lighting to air conditioning. What is interesting is that this airport was made after its digital twin and has been able to achieve more than a regular airport.

“The Government of Kuwait wants to better address issues that many international airports face: high traffic, long lines, and inefficient gate assignments,” explains Mohammad Al-Mutairi, IT Operations Manager of the Directorate General of Civil Aviation. “Kuwait’s Aviation sector has undergone an orbit shift and has played a vital role in the development of the economy. By implementing the latest Microsoft technology, the Kuwait International Airport will further enhance its servicing competencies and drive transformation in the industry.”

Microsoft has played a key role in enabling the Kuwait International Airport. “DGCA is one of the impressive examples of our customers that are truly leveraging technology to transform their operations and improve the services they provide”, said Charles Nahas, General Manager, Microsoft Kuwait. “It is exciting to see how they are adopting the latest technologies and tools to drive change. In particular, the DGCA recognized the power of data as a strategic asset and leveraged the cloud to make more powerful and intelligent decisions. We are proud to support the Digital Transformation journey of DGCA and we stand forth to support the Government of Kuwait in such crucial efforts.”

While highlighting the pioneering work in the UAE, it was stated that “All [decisions] are undertaken in a way that meets the aspirations of the UAE government and its leadership supporting the transit of the country to the next 50 years, and enhancing its global leadership by creating an incubating environment for innovation and advanced technologies.”





In the Kingdom of Saudi Arabia, the Red Sea Development Company has BIM in place and has been using sensors to capture real-time data from their developments and allow one to pull real-time information from the operations to inform future designs. The data captured by the sensors allows facility owners to measure user experience, and to understand where the user finds value. This data can further be used to refine future developments.

It has been further reported by Enterprise that, “The destination is setting new standards in sustainable development and luxury tourism, strategically positioning the Kingdom on the international eco-tourism map. TRSP has been designed to be smart, employing frictionless and invisible technology from the outset of planning stages.”

Digital twin technologies in construction can help minimise the need for constant redevelopments, changes and changes further leverages the design phase in construction. Instead of having to raze down a whole structure, flaws, challenges and limitations can be easily identified and catered to without ever having to waste resources and raw materials.

Anas Bataw is right when he says, “A digital twin not only looks like the asset, but it also behaves like the real asset.”









# EARLY USE OF AI AND CLOUD COMPUTING TECHNOLOGIES WILL SIGNIFICANTLY CONTRIBUTE TO THE SUSTAINABILITY OF THE EDUCATION SYSTEM

UNESCO's official mandate calls inherently for a human-centred approach to AI. It aims to shift the conversation to include AI's role in addressing current inequalities with regard to access to knowledge, research, and diverse cultural expressions to ensure that AI does not widen the technological divide within and between countries. The promise of "AI for all" must be one that everyone can benefit notably in terms of innovation and knowledge.

It is here that we had the opportunity to interview Mejdal Al Qahtani an Assistant Professor at KSU who firmly believes that AI is an emerging dynamic field, where every day, every second, there is new research emerging. He also believes that AI has become a very strong and sustainable tool that enables people to attain progress in their businesses.

He also believes that it's not designed for a specific field and can work with any applicant and that is what distinguishes it from other tools.

In this exclusive interview with Thirty to Net Zero, Al Qahtani shares why he believes that the ball of AI can work with any field, education, energy, governmental sector, agriculture, water, and the environment with added value, output, and outcomes.

**Q: Who was your inspiration to study engineering and then go on to data science and get into AI technology? How did you become so passionate about this subject?**

**A:** My bachelor's degree was in industrial engineering and it was considered an emerging engineering field that linked management with engineering back then. At the organization, however, we wanted to optimise the performance productivity by minimising costs and maximising profit. This was the beginning of my first thought about dealing with data based on which we could analyse, gain understanding, insight and wisdom.

I was selected as one of the top students at King Saud University, and they provided me with a scholarship to continue my learning journey in the United States. As I was discovering which field to continue in, I found quality reliability engineering as the best field. I really liked it, because you need to have a good understanding of the data to have quality monitoring and control of any process. It was a very interesting field. I finished my master's degree in Quality from Rutgers University in the United States, which is considered one of the top 25 universities worldwide.

I had the opportunity to work with two advisors, one, Prof. Elsayed, a distinguished professor in the industrial engineering department at Rutgers university and the other was Pro. Myong K. Jeong, who is full professor in industrial engineering department at Rutgers university but mainly focused on AI and machine learning applications. They advised me to get another Master's degree in Statistic Development with specialization in data mining. So, after that, I finished my second Master's degree which I really enjoyed. When you have a good understanding of how the models can work based on Math and Statistics and all the assumptions that need to be made, it helps you have a good understanding of linking it with real-life applications.

I also studied some courses of data science and AI from an Engineering college, a computer college and a from a Statistic College. All three different colleges taught me to think from different angles. For example, at the engineering college, they were focused more on the application.

They wanted to formulate the problem, get a good understanding of the problem and use technology. At the Statistics College, they focussed more on the hypothesis and once building solution needs, you need to follow some assumptions, and be careful about violating those assumptions as the solution can reflect those assumptions. So, it's very important to have a very specific procedure whenever you want to build a specific solution.

At the computer science college, they focused on building algorithms to increase accuracy and computational speed. I had to connect all of those at the same time to have a very good and comprehensive understanding of my knowledge. After I finished my second master's degree, I started my PhD journal.

I passed the PhD qualification exam. I dealt with functional data, tabulated data, signal data, image data, and one of the emerging types of data, which is the 3d surface topography. It's a type of image which is more complex than a simple image.

We had to build a robust AI model, that was able to get this data and perform quality monitoring. So, we were looking at ways of smart quality monitoring. We had to do a 100% inspection as we inspected the whole batch and then by using the 3D surface topography and within less than a second, we could decide whether the quality is good or not. We adjusted the process parameters as well. The method was more efficient and more cost-effective.

I published four papers out of my thesis in a top journal and the work was recognized globally. This is what motivated me when I came to Saudi Arabia to explore different industries, and to spread awareness among people about the power of this technology, and other emerging technologies like cloud computing, cybersecurity, virtual reality, and augmented reality in everyday use. In the private and governmental entities, I'm trying to formulate the problem understand their business needs, and then customize this tool, to have an impact on the solution



**Q: These AI technologies are very new and very futuristic but are still under development. How do you see them connecting and helping the world solve problems like climate change, and net zero whether that is through the education part of it, or whether it is through the work that you do in the real world?**

**A:** AI technology can work very effectively, especially in the environmental sector. I worked on developing an environmental monitoring system based on AI. The goal of that system was to work on online monitoring and assess the quality of the environment including air, water, and noise. We used this project to work with the Ministry of Environment, Water, and Agriculture in Saudi Arabia. In the project, we had to first collect data, to monitor the air. Once we got the data, we had a microcontroller and some sensors which were able to process and get some parameters that reflect the air quality. Once it was properly processed then we fed it to the model which gave a good indication of the quality of air. The model was connected to a smart dashboard that helped in the prediction of what it could be the next day or the following week. We also worked on water quality to monitor plastic in the water. For this, we built an IPS model that can detect if there is any plastic and then also detect and classify, what type of object uses computer vision. So, the goal was to have a clean water system.

In modern cities, I think the noise is becoming a very big issue. So, to monitor the noise, we set up some KPI indicators that help us to monitor the noise and to check whether the noise is acceptable or not. If it's not acceptable, we need to know the root cause. This can increase the quality of life of people.

The goal of AI is to stop something from happening and use corrective action to return things to their normal state. Vision 2030 is a very ambitious vision and everyone in Saudi Arabia is trying to follow the heart of the vision: sustainability. The Kingdom is doing great in promoting sustainability by running different projects targeting renewable energy, preservation, and protection apart from green cities. These are the kind of initiatives that they are working on since 2016, where the goal is to have a sustainable environment.



**Q: How do you see education helping sustainability or Saudi Arabia achieve its goal, whether that's Saudi vision 2030 or achieving the region's goal of getting to net zero by 2050?**

**A:** When we talk about sustainability in education, we want to start from the early level of education of primary school, elementary school, and high school, so, it becomes a part of the educational training. We must make sure the new generation is able to know all the challenges so they can be involved in any corrective action or reform. Whenever they want to use green energy, they can understand the challenges involved and make some corrective action that helps to achieve sustainability. For instance, taking steps to avoid the use of plastics and going paperless. What I noticed, especially in Saudi Arabia, is that some of the materials are not ready to be printed, so it's already available online.

Now they are using some of the smart learning management systems that fit with sustainability. When we had COVID-19, traditional education did not work as expected. It was an important thing to have the technology for students to attend the lecture virtually where they could have some interaction with the teacher, submit their projects and assignments on time, and have some discussions on board.

**Q: Today you are seeing the students who are in the real world and you are familiar with the changes that the government is coming up with to incorporate what they've been doing since 2016. Where do you see the challenge or where do you see the gap that needs to be fulfilled so that the next generation is even more, better, even more, compelled and even more adapted to facing the issues or challenges that we face with sustainability?**

**A:** There are some gaps and challenges that need to be addressed. Whenever you have a closed cycle between all the players in the game then everyone will be on the same page. We can work together to achieve specific KPIs which can be reflected in achieving productive and effective sustainability. Since I'm from the university, I meet with my students every day trying to understand their concerns so that they can have a very good understanding of what they are, what they should do, and what they should learn.

There is a gap sometimes between the universities and the market. So, they need to understand what the market means and be very well prepared so that once they finish, they can be effective and they don't have to get another certificate of additional skills, to apply.

**Q: How do you think this gap can be bridged?**

**A:** The education system needs to be updated and changed frequently. Therefore, sometimes the education system is a little late when it comes to the need of the market. We need to have industrial decision-makers be close to the decision maker at the education level to align their objectives.





د.مجدل القحطاني

نظرة مستقبلية لتقنية المعلومات والاتصالات

Dr. Mejdal Al-Qhatani  
Future Look CO.





I want them to teach my students the tools required and the application too, one of which is related to environmental sustainability and agriculture, and water. I want them to have a deep understanding of the technology so they can provide some innovative solutions that can have an impact on the environment. Once they have them, we want to give them confidence, give them knowledge, and the tools that help them in the implementation.

Basically, we want to make the students ready and teach them what are the challenges. One of the main challenges is the collection of data and the technology used for its collection. You need high-quality data for good pre-processing, to feed it to the model later and have very good results and outcomes. Usually, we tell them how to understand the problem and formulate the problem in the right way. This is half of the effort and then you can find the right solution that really has an impact on solving the problem.

**Q: You are one of the most well-travelled people. What city has really affected you and gifted you with memories that you will never be able to forget? And why?**

**A:** I travelled to Seattle, in the United States. I spent almost two years there. I think the people there are very interesting. Seattle is the home of Microsoft and Starbucks HQ, and I had a chance to go there. The professionals there are very friendly.

They helped me to have a good understanding of US culture. People from India, the United States, Europe, Middle East, work in the same environment with the same organizational culture. Each one has some very good input and attributes that they want to transfer to the other. This kind of environment motivates each other to work well to work effectively, have very good time management, and have a good impact that helps you to think differently, to think out of the box, and engage in critical thinking to solve some problems. Even though it's been 10, I still have very good connections there. Though I have travelled to different cities in the state and in the world, this city has a lot of sentimental value.





The-Sustainable-Cityweb\_middleeast

## GREEN STEEL: MIDDLE EAST'S STEPPING-STONE TO NET ZERO IN CONSTRUCTION

**W**hile the debate over the current climate crisis rages on, one must look at sustainable construction not just as a means to an end in the quest for a more sustainable world, but as a destination that one could permanently aspire for.

The transition to a green economy is slated to add 24 million new jobs globally by 2030 if the right policies are put in place, says the International Labour Organization (ILO). The same report however warns that almost 6 million jobs will also be lost in the transition. [Read more about this in our interview with Frank Wouters, Issue 12]

“The green economy can enable millions more people to overcome poverty and deliver improved livelihoods for this and future generations.” ILO Deputy Director-General Deborah Greenfield said.

Climate change is both an existential threat and the “greatest commercial opportunity of our time”, said former Bank of England Governor Mark Carney. Blackrock’s CEO Larry Fink agrees while warning that countries and companies that do not invest in the opportunity “risk being left behind [and] risk losing jobs, even as other places gain them”.

Construction causes 40% of the world’s carbon emissions, way more than agriculture or airlines, but is hardly called out for its environmental impact. Given this background the options being explored in the Middle East to adopt eco-friendly practices while assembling green buildings also manifest that this is a world of complex choices and the Middle East Construction business needs to ensure that more is gained than lost in the entire grand sustainability scheme.

The United Nations Climate Change (COP25) conference had Secretary-General António Guterres warning us that a “point of no return” on climate change is “in sight and hurtling toward us.” This is true. The case construction projects that are undertaken currently must be built on renewables. The issue however is the cost of these raw materials or the intermediaries like transportation of goods that could be quite an expense or the lack of experienced labour [Read more in Khyati Mitra’s interview in this issue] and lastly the availability of the experts who can design to satisfy the needs of the consumer and the environment.



Green steel revolution / The Manufacturer

“Over recent years, the industry has strived to understand its impact on the environment, innovate its methods and process and its resource use. In driving a sustainable industry across the Middle East, the construction industry has made considerable progress in its overall impact” reminds Cynthia Corby, Partner and Regional Construction Industry Leader, Deloitte Middle East.

Money matters and so do the technologies to solve climate change. Energy efficiency solutions, renewables, electric vehicles, and climate-smart agriculture are all well-understood and relatively easy to deploy but do have implications for the user. In many cases, the buildings built may not suit the customer’s aesthetic taste but are designed to ensure that the environment is best-taken care of. It has been estimated that In the Arab world, about \$230bn per year is needed to achieve the SDGs. Most of this investment will come from the private sector. But governments in the Middle East have big levers they can pull to mobilise this finance and channel it towards sustainability projects.

The world is watching the Arabian region as the next two UN climate change conferences will be held in Egypt (COP27 in November) and the UAE (COP28 in 2023), making it imperative to establish the Middle East’s climate credentials. The annual summit’s focus has shifted from simply setting carbon reduction targets to actually implementing them. Middle Eastern governments must make a pledge that translates into actions that unlock green investments.



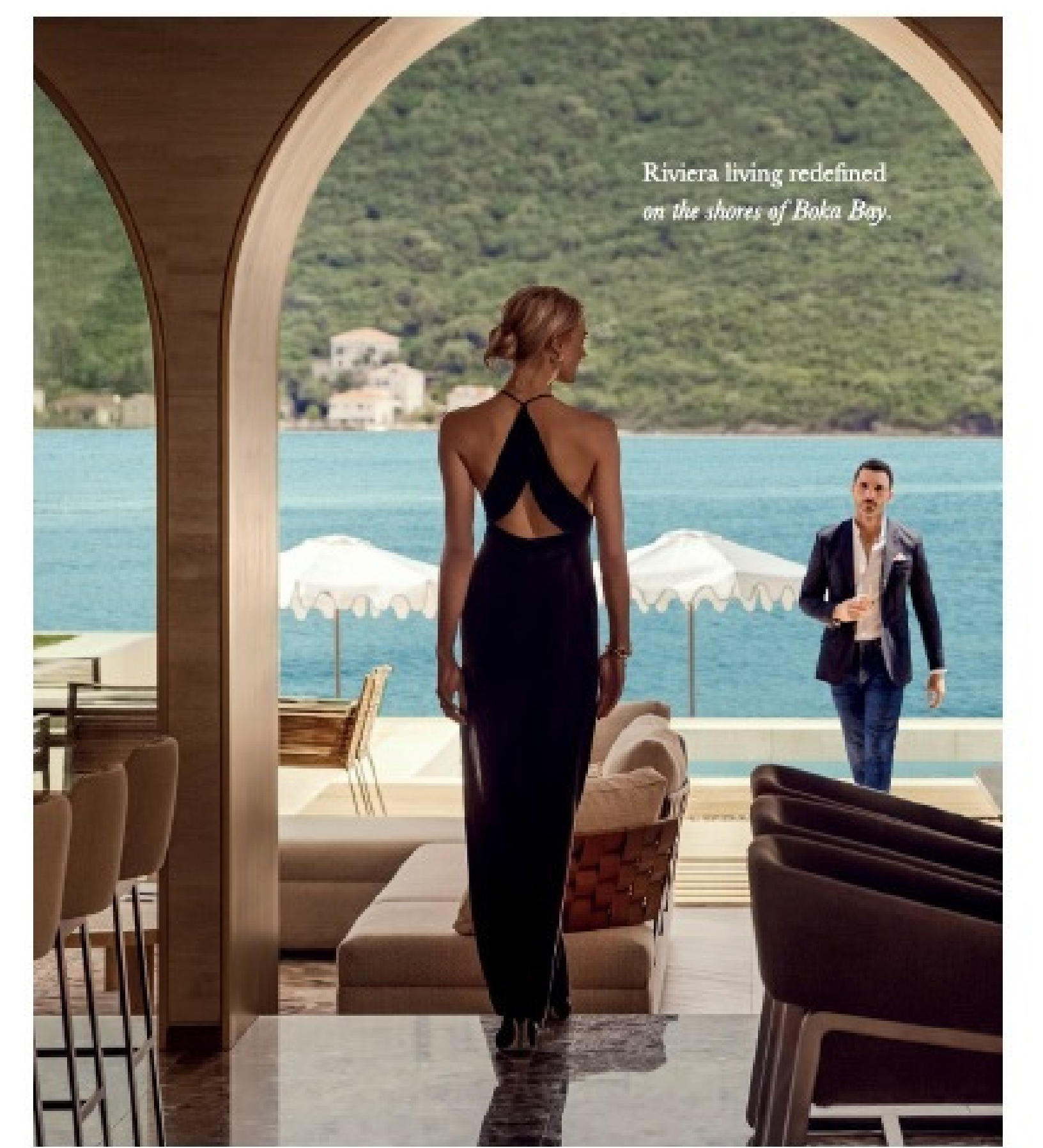
According to the MEI at an individual building scale, it is stated that sustainable development especially sustainable construction faces different – but equally difficult – challenges one of the most important being the region's hot and arid climate. While it is common knowledge that the rapid growth of many of the region's cities was only possible with the help of the great energy resources discovered under its sands, it is perhaps a less known fact that these cities require great energy supplies to keep them habitable given the way they were planned and built.

In the latest, the Moroccan government, announced the establishment of a national charter for sustainable development and the environment, while the governments of the United Arab Emirates (UAE), Egypt, and Jordan have started introducing energy efficiency standards for its construction. Non-governmental organizations (NGOs) and professional organizations in Jordan, Qatar, and the UAE have established green building councils in their respective countries intending to promote sustainable design and developing – or importing – green building rating systems. In Yemen, according to stats, it is estimated that around 6,200 direct, 4,700 indirect and 11,000 induced jobs are to be created by 2030 from solar PV. The King Abdullah University of Science in Saudi Arabia employs many forward-reaching green features while Msheireb Downtown Doha promises to be the world's largest sustainable community with 100 buildings using an average of a third less energy.

The truth is that green buildings are not just an environmental advantage for the Middle East, but also an economic and social one. Should one compare it with traditional buildings it has been proven that the long-term operating costs are significantly reduced energy consumption, reduced emissions, improved water conservation and management, temperature moderation, and reduced waste. According to EcoMena, Avoiding scarce natural resources, like water, and opting instead to recycle, can cut down building costs by an estimated 10 percent.



Young-plants-growing-very-large-plant-commercial-greenhouse / greensteel

A woman in a black, backless, floor-length dress stands on a terrace, looking out at a man in a dark blazer and blue jeans who is walking towards her. The terrace is furnished with a light-colored sofa and several white patio umbrellas. In the background, a large body of blue water (Boka Bay) is visible, with a green, hilly coastline and some buildings in the distance. The scene is framed by a large, arched opening in a building's facade.

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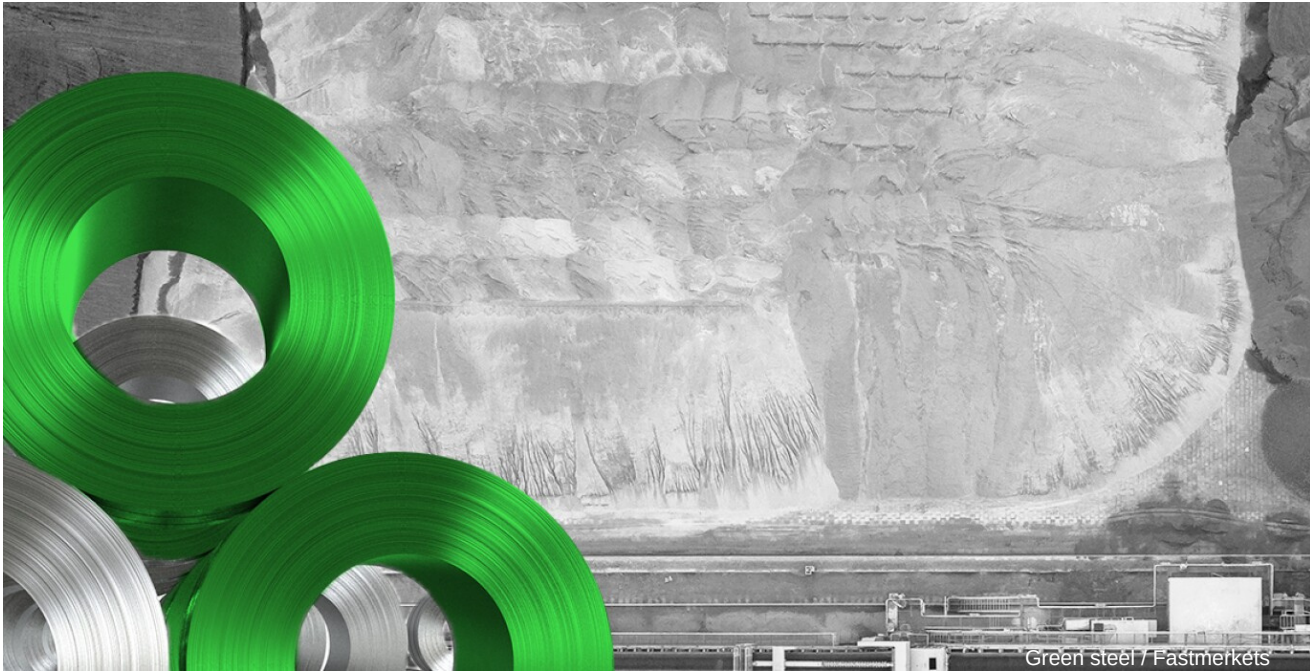


Apart from concrete, steel rods are key components that hold buildings together, but emissions from their production are leading to environmental degradation in a big way. The manufacturing process for a ton of steel releases two tons of carbon dioxide into our atmosphere. This damage can be reduced by replacing fossil fuels with hydrogen for producing metals. The UAE and Saudi Arabia are already on track to extracting green hydrogen by separating hydrogen molecules from the water via solar-powered electrolysis, [Read Issue 12] but the other countries still have some way to go.

Having worked extensively on hydrogen fuels, Emirates Steel and Abu Dhabi's National Energy Company Taqa have partnered to produce green steel. Oman's state-owned firm OQ is also planning to invest in green steel and cement production. Saudi Aramco has already begun to form global partnerships to increase polymer concrete and fiberglass bars to replace metals in construction. With the prices of natural gas and renewable energy steadily declining and the prices of coal rising, green steel is becoming a viable option to eliminate construction costs.

AI technology is revolutionizing every industry and is even assisting Sustainable Construction in the Middle East. 3D printing has led to the elimination of tons of construction waste. As the designs are finalized, the printer knows exactly how much material is needed saving excess material transportation costs for different components, which can print on-site.





With technology surpassing human expectations, recycling desert sand, construction waste, etc are the new in-thing for sustainable construction. In recent times, the UAE took the world by storm when it designed and constructed a traditional villa in Sharjah through a 3D printer. Dubai is home to the world's largest 3D-printed building, which is 9.5 meters high, with a food area of 640 square meters.

Beyond this, 3D-printed construction reduces labour costs since only three people are enough to build an entire house.

There are alternatives to making construction in the Middle East eco-friendly, but first, identification of the sector's carbon footprint followed by strict legislation enforcing the use of green materials is of essence without which sustainable construction becomes a choice over a compulsion. Developers are required to be aware of the long-term cost benefits of metals and cement created using renewable energy or recycled waste. Merely planting more trees won't help unless emissions from concrete jungles are completely relinquished.

Economically the entire Arab region is looking at a powerful economic integration, given that the UAE, Egypt, and Jordan entered into an industrial partnership to promote sustainable economic growth to ensure economic diversification and resilience and explore opportunities for joint investments not too long ago.

"The partnership embodies the vision of President Sheikh Mohamed bin Zayed Al Nahyan to enhance industrial integration with Arab nations and the rest of the world so we can achieve a major leap in the industrial sector and transform its potential as an economic driver. The industry is the backbone of the world's largest economies," Sheikh Mansour said in a statement.





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# KNAUF'S RAJESH MAHESHWARI ON LIGHTWEIGHT CONSTRUCTION BEING AN INIMITABLE PART OF THE SUSTAINABLE CONSTRUCTION INDUSTRY

**F**or many companies, sustainable construction entails responsible manufacturing practices that reduce environmental impact and waste generation during the building materials production process. Leading drywall products and systems manufacturer, Knauf's Rajesh Maheshwari chats to T2NZ about the company's dedication to sustainable goals. Established in 1932, this German company has stood for courage, and determination, and has a business savvy view.

Maheshwari affirms that the empowerment Knauf offers to its employees helps them to explore their individual potential to the limit. In his role, he is happy about both the learning as well as the fact that his customers appreciate Knauf's policies towards health, safety and sustainability. He also speaks about digitalisation as well as growth and tremendous changes within the industry.

**Q: Knauf as a company has a strong commitment to sustainability, how do you prioritize your commitment both within the organization through your products and your services?**

**A:** As the UN states 'Sustainable development and climate action are linked – and both are vital to the present and future well-being of humanity.'

Knauf has a very responsible approach toward society. We have a documented sustainability policy in place, encompassing environmental social and economic aspects. The detailed policy clearly outlines our sustainability goals, plans and actions.

Drywalls, in general, are quite sustainable as they are low in dead weight, consume minimal water and have many more benefits.

**Q: How does Knauf propose to influence other key players in the industry?**

**A:** Our approach towards society and all the stakeholders in the supply chain is very pragmatic. We liaise with local authorities including civil defence, municipality and other relevant bodies to ensure compliance with local regulations. Infact we are among the first ones to lead such initiatives. We can now see other industry players following similar steps, but a quicker approach is needed.



**Q: Please tell us about your key projects and how sustainability has been prioritised in this area.**

**A:** When we started our operations in the UAE all our products were imported. Now, more than ninety percent of our products are made in UAE, thereby reducing the carbon footprint through reduced transportation. We also have a top-driven initiative called “Continuous Improvement”: a global program that has regional managers and managers at individual manufacturing sites, to assess this ongoing increase in productivity and reduction in wastage.

We are one of the first companies to get ISO 50001 certified for better energy management in our industry. We are also certified for ISO 14001 (environment) as well as ISO 45001 for health and safety. We recently won the Green Building Council award in 2021. Our in-house projects lead towards increased sustainable offerings. We also deliver to projects with stringent LEED requirements across the Region.





**KNAUF**





**Q: Is it easy to find potential new customers who are invested in sustainable construction?**

**A:** It's all about sensitising the clients on the benefits of drywall construction for the full "project cycle".

We generally come across clients who start comparing the material rates of lightweight construction vs traditional items.

That's where our role comes into play. We explain to them at length, the overall benefits of drywall constructions in terms of reduced overall weight on foundation, more usable area (thinner walls with better performances), lesser water consumption, logistical benefits (less number of trucks to deliver the same amount of material), quicker project completion and design flexibility.

Consistent and persistent efforts are required to change the established mindset. The good news is that we are already seeing the changes happening in the industry.

**Q: How have developments in Construction Technology impacted the gypsum board industry, and of course, what impact has it had on the overall construction industry sustainable construction?**

**A:** A significant change in the industry has been growth of modular and offsite construction. Lightweight construction has gained importance as its long lasting, easier to install and to work with. Gypsum boards are one of the most important lightweight construction materials and are hence gaining lot of importance.

Also, digitalisation is already a part of construction industry and is going to gain further momentum.

We have developed several online tools like Spekbuild and BIM Plug-in, to enable all clients to design and develop their own drywall solutions based on their needs.





**Q: Could you tell us more about Knauf's social impact strategy?**

**A:** As mentioned before, our sustainability policy has three pillars, environmental, economic and social. The social aspect of our sustainability policy hinges on quality of life and high safety standards. When it comes to products, we supply those that are compliant with regulatory approvals; we will not supply anything which does not qualify under the safety norms.

Our manufacturing maintains a high standard of safety. We are ISO 45001 certified and follow the health and safety norms as per their guidelines. Furthermore, Knauf organises frequent employee training sessions to keep all updated on the latest best practices in health and safety, as well as sustainability. We also have customer training sessions at “Knauf Training Center” at our HQ in Dubai, to not only to educate them about our systems, but the focus is also on how to reduce wastage during installation which also contributes to sustainability. So yes, in terms of the social aspect of our sustainability policy, it is quite comprehensively detailed, and we follow it very seriously.

**Q: Please tell us about your favourite game. Why do you like it so much?**

**A:** I have been quite passionate about cricket right from the beginning. I follow international games. These days, my work schedule permitting, I try to keep track of important matches. I have also organised some cricket games in the office and with our customers and it's always fun.

All Photos Provided By Rajesh Maheshwari Knauf's



# SUSTAINABILITY AND ENVIRONMENT CONSULTANT, KHAYATI MITRA ON SUSTAINABLE STRUCTURES, AND THE ON-GOING EFFORT TO CHANGE PERCEPTIONS FOR A CLIMATE-FORWARD CULTURE

**S**ustainable construction can help build an organization's reputation by demonstrating its sense of corporate social responsibility and an increasingly valuable Real Estate Portfolio. This is how businesses must conduct themselves to have a positive impact on society and be profitable. Ethical considerations and green alternatives to materials are both ways in which the construction industry can demonstrate its commitment to a green planet thereby targeting the 1.5 Deg. Paris Agreement Goal.

Khayati Mitra is a sustainable construction expert and an architect with eight years of working experience at multinational firms. She also holds a post-professional master's in architecture in sustainable environmental design from Architectural Association, London. Her forte lies in delivering interesting projects employing a variety of designing and climatic-simulation skills supported by a solid work ethic to help her to cater to sustainable, creative, research-backed design and technical solutions. She respects climate because of culture, context, and cost in the process.

In this exclusive with Thirty to Net Zero, Khayati Mitra debunks some myths around



sustainable construction and delineates the process in detail for any reader to grasp the finer nuances of this industry in the simplest way possible. Khayati talks to us about traditional and modern construction and the grey areas that can help both sides of the spectrum unite.

Read on to know more about this passionate architect's ideas for construction in the middle east.

**Q: Is it easier to use renewable and recyclable materials when building new structures, especially in the Middle East? What are the key challenges for those who have probably made a significant investment already in a part of their resources?**

**A:** There is a realization that transition to recyclable materials and renewable sources of energy requires navigating several major challenges such as geographical constraints, technological limitations and financial questions. A hybrid approach that leverages the benefits of each of these is a good solution but not straightforward. It is not easy to use sustainable, reusable, and recyclable materials because it is not that easily available in abundance or "homegrown", so this becomes a little bit of a challenge in construction in the Middle East. But it is still possible from efforts of devising interdisciplinary discussions & strategies as well as use of innovative technologies depending upon the scale of the structure.

For example, if you want to use solar energy for a high-rise building, the density of the building is quite high to meet that demand from a small number of solar panels used on the roof but investment in solar farms to source the

buildings future energy needs is a possibility for the energy mix. With respect to materials and for those who have made significant investments in other sources, a major challenge is a cost and use of virgin resources to shift to a more sustainable option.

Technical understanding and advancement towards this shift need a push for more localized solutions to region & project specific problems because these developments are somewhat new for many stakeholders who come from all over the world. There needs to be a project specific database developed for a lot of these materials used and their circularity. So those who have already invested in what they have now, the best thing to do would be to make sure that these resources invested in do not become part of a linear economy.

**Q: When it comes to sustainable construction, are some parts of the industry still withholding due to certain factors and if so, what are those factors?**

**A:** Acceptance is one big challenge. It's probably not considered feasible for every type of construction on every scale to go completely sustainable although it is possible. Larger organizations are more change driven because they have set major climate targets and they've signed climate plans that lean towards sustainable resources and technologies, whereas some have slight hesitancy towards following this path because it seems like a costly affair. Also, there is a lack of widespread knowledge of the technicalities. Behavioral change also happens over time, so you cannot change people instantly.

**Q:** Since sustainable building materials are about choosing materials that are manufactured from resource-efficient processes, what is this process, and is it as smooth as it sounds?

**A:** A resource-efficient process is one in which the material from where the resource is manufactured, extracted, and brought on to







the site in an efficient & sustainable manner so it minimizes impact on the environment. So, there are a lot of challenges in this process as some of our resources are being produced and extracted with the help of old infrastructure. A lot of these processes are not optimized with regard to Scope 3 emissions as most companies avoid its complexity. So, it becomes quite difficult to say how efficiently the product or material sourced is.

**Q: When it comes to transitioning to sustainable construction, how important are LEED certifications? What is the kind of role that they play? And do you see the requirement for any kind of additional changes other than the behavioral changes?**

**A:** Firstly, the difficulty in transition to sustainable construction is dependent on the action in the market towards this transition. Everybody is idea-ting and is quite enthusiastic about it. There are a lot of meet-ups and the Building Council has taken the initiative to invite people from different organizations and share knowledge to close the knowledge gap. So, I think efforts are being made, to minimize this gap for helping everyone work faster towards our common goal of resilient green cities.

The main challenge at present is the lack of skill. It's hard to find people who are trained in this particular segment of construction and so the assistance required in streamlining these processes is sparse. It also takes more time to design a sustainable building than a regular building because of the interdisciplinary process and simulations that go into the building from the onset at the design stage. The decisions taken in the design stage affect the construction and operation. It requires a lot of experts in terms of the different processes, and expertise required to educate the teams on how they can go about things.

Therefore, the LEED certifications do provide checklists for buildings and have weightage in sustainable infrastructure as a provider of a scorecard for the sustainability of a particular project. They offer to recognize innovations and continuously push benchmarks amongst the increasingly efficient building fabric of the city. They help document the latest technologies and make them available for wider use in the construction industry.

However, it is important to remember that LEED, BREEM, WELL, etc., are all certification tools and not design tools. It is crucial to recognize that sustainability principles and tools in design, as well as construction, are related to the climate, the comfort of the occupant, and research-backed technical solutions. There are also ASHRAE, EN, and ISO Standards to be incorporated for the quality of engineering & construction. So, these should be the backbone of environmental-centric construction. It must be noted that it might interest all stakeholders nor fit the budget of every infrastructure project to apply for certification.

So, I think it's good to have LEED for exceeding the baseline, the documentation of innovative technologies, and for the marketability of the project and adding higher value to the project by the certification. But all the design principles must be applied in all buildings, whether they are certified or not.





**Q: Do you believe that the construction styles in the kind of projects and initiatives that Saudi Arabia is coming up with can be a reality for the rest of the Arab region?**

**A:** NEOM as a project pushes the boundaries of city development, architecture, and sustainability. It is an iconic project with a vision and is likely to have an impact on the region. I think the project gives an opportunity to the architects, researchers, engineers, and contractors to bring about innovations at work and new research data specific to the region. The project might not be applicable or be replicated on that same scale, but some parts of it can be adapted to many upcoming projects in the region.

Many experts from across the world put their brains into new solutions that work specifically for the region and climate zone. I'm aware of some of my colleagues that are working in London, Dubai, and Boston that is currently working on these projects and run rigorous climatic 7 design simulations to devise the best available solutions at present. I'm sure these can be useful for the MENA. For example, Masdar is also a very sustainable city, and Expo 2020 City has already added to the Sustainable construction portfolio of the region.

When we study Middle Eastern architecture, some of the contemporary strategies for a climate-centric design are working solutions from Masdar. and these are also applied to many buildings in Expo city. So, bits and pieces can be used according to context even though they cannot be replicated in totality.

**Q: Is it practically possible for traditional structures to be made sustainable? Tell us more about traditional sustainability.**

**A:** Vernacular architecture started before all the technology came in 100 years ago. This forms the basis of the architecture studies for the region. The courtyard houses with shaded small windows give us cues to design buildings for the future. Back then, when people designed their houses, they were very

onscious of the weather and locally available materials. The occupants desired cooler places and solar control to reduce heat gain. So, they would construct wind catchers and have smaller windows to prevent excess light from entering the space. The knowledge bank for the architecture for every region is the vernacular architecture of that region, This is especially true for the Middle East.

In Dubai, you will see the structures on Fahidi Street are fine examples of the rich architectural heritage. Today these are used with minimal air-conditioning after retrofits. This proves that these structures can still be renovated to fit the energy performance for the environment and suitable comfort levels. It is not as advisable to bring them down and build again, using the latest method, which is not sustainable for the planet, depletes virgin resources, and is a loss to the heritage of the city.

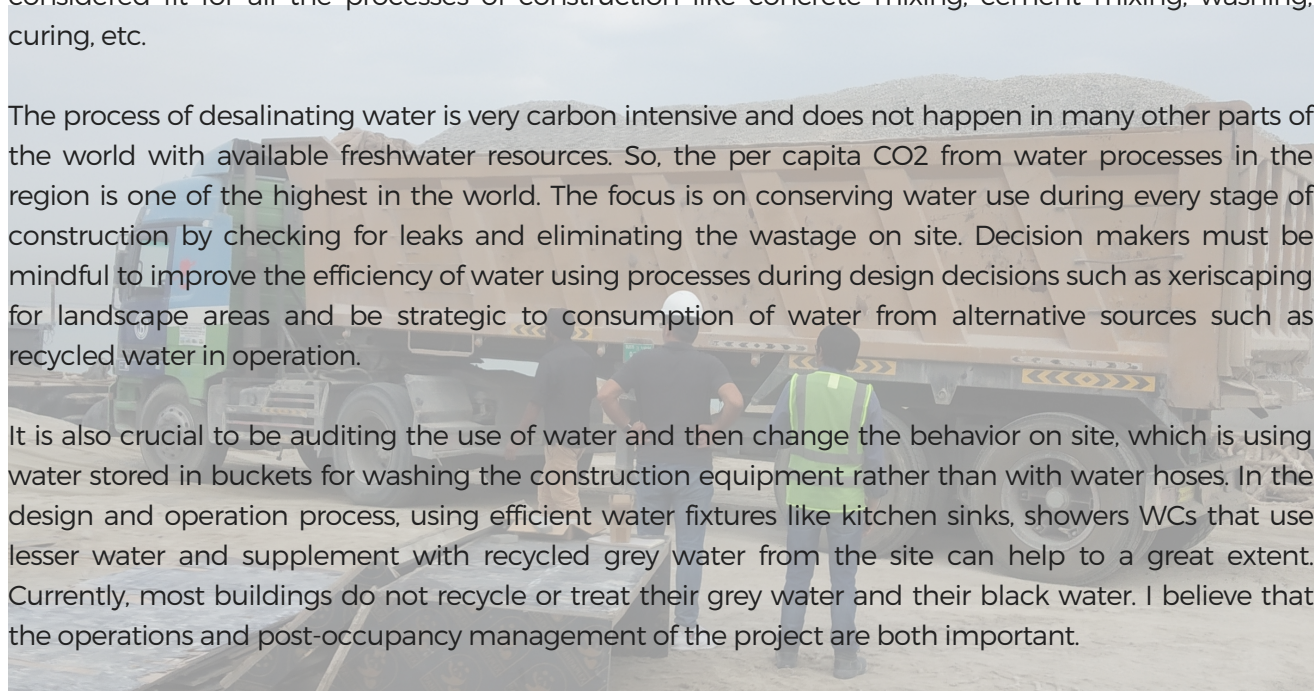
One can instead go for a post-occupancy evaluation that measures the performance with temperatures in the building while examining the construction type and thus suggests corrective measures so that the building envelope performs better than before. We have different tools available for this. For example, a thermal imaging camera, helps us see where the building leaks in terms of its cooling and affects air conditioning loads. A lot of such tools & processes make it possible to ensure a good retrofit.

**Q: It's a given fact that sustainable building projects are counted as sustainable depending upon how much water they're using, during, and after construction. Now, as a region that is known for its scarcity, especially in terms of water, how do you believe the Arab region can work better on this part?**

**A:** Ideally, the next goal is Net Zero water for preventing wastage of water both during the construction & occupancy of the building. This is currently being neglected as water is considered 'inexpensive or cheap compared to the other materials used on-site. However, it's an even more important resource due to the scarcity in the region. The water being used on site is potable quality water which is considered fit for all the processes of construction like concrete mixing, cement mixing, washing, curing, etc.

The process of desalinating water is very carbon intensive and does not happen in many other parts of the world with available freshwater resources. So, the per capita CO<sub>2</sub> from water processes in the region is one of the highest in the world. The focus is on conserving water use during every stage of construction by checking for leaks and eliminating the wastage on site. Decision makers must be mindful to improve the efficiency of water using processes during design decisions such as xeriscaping for landscape areas and be strategic to consumption of water from alternative sources such as recycled water in operation.

It is also crucial to be auditing the use of water and then change the behavior on site, which is using water stored in buckets for washing the construction equipment rather than with water hoses. In the design and operation process, using efficient water fixtures like kitchen sinks, showers WCs that use lesser water and supplement with recycled grey water from the site can help to a great extent. Currently, most buildings do not recycle or treat their grey water and their black water. I believe that the operations and post-occupancy management of the project are both important.





**Q: What are some of the key parameters taken into account when during the lifecycle assessment of an asset?**

**A:** The efforts toward more stringent regulations for actionable metrics and a market increasingly focused on climate action has led to a renewed focus on sustainability in the construction industry. Building Life Cycle Assessment is the most reliable way to assess how sustainable a building is, and what should be changed in order to achieve lower environmental impacts. Various Life cycle assessment tools are used for these complex calculations some of them are SimaPro, One Click LCA, GaBi, Umberto LCA, and openLCA. The parameters are a set of calculation rules which apply to all design stages in a single project from stages A to D.

The parameters that we consider in LCA and LCC usually depend on the project details. The first is the service life of the building which can be technical where the buildings are used without changes till the end of life or commercial where the building interiors, etc., are renovated periodically such as in hotels. The second parameter is the scale of the building as building dimensions and the square meters the building occupies as per IMPS / RICS. Thirdly, transportation of materials, services, labor, and costs are important too because transportation is a very big part of carbon emissions management.

All quantitative values from these parameters are used for establishing a baseline and then we optimize the values by trying some alternative materials, processes, construction methodology, etc. for the best possible lifecycle performance. Later, we compare these models with the as built to determine the success of our lifecycle assessment.

**Q: You are the first architect in your family. Who or what has been your inspiration? And how did you get introduced to sustainable architecture?**

**A:** My father runs signage & graphic design firm, and my grandfather started it working as an artist. So, I wanted to do something that is related to the creative field. Initially, I was drawn toward interior design. But eventually, I decided to go into architecture and for that, one must be able to draw. I studied under another artist to improve my drawing hand when I was 13. It was at the School of Architecture that I was fully convinced that I wanted to build people's houses, and help them build their memories around these structures that they live in.

I was first introduced to sustainable architecture during my undergraduate course in Bangalore, a very climate-conscious city. Later, while working for a British firm based here in Dubai, I tried to bridge the gap between Indian and British architecture even in terms of the design principles that are governed by the different climate zones. This inspired me further to learn about environmental architecture at the AA in London with my research focused on building in the hot arid climate of the Middle East. Eventually, I tried to bring all my learning and exposure together in practice which helped me bring a lot of value to the table for the regional built environment.



All Photos Provided By Khayati Mitra

# FAÇADES FRONTING SUSTAINABLE AND URBAN CHANGE IN THE MIDDLE EAST

**A**s the world tries to work on improving itself within the challenges of energy crisis and climatic changes, builders, architects and construction specialists have started to address old problems with new approaches to address the quest of energy demands in buildings.

History testifies that mankind has drawn inspiration from nature to find solutions to problems since nature has a ready sophisticated process in place that has been refined over time. While most of the earlier manmade systems could easily be termed as unsustainable owing to the nature of experimentation, natural processes on the other hand embody sustainability principles.

There are many things to resolve design problems and create a more sustainable future. This is at the heart of the biomimetic design approach. Another accepted approach is biodesign which also involves utilizing natural elements within a design. The building façade is a ruefully difficult research area given that it lies at the intersection of living spaces and the natural environment, giving rise to challenges, especially with regard to the three essentials energy-air-water and their transition between the indoors and outdoors. Application of key sustainability concepts in architecture which include energy requirements, form and structure, and sustainability considerations are subject to enhancements and enrichments by taking help from natural processes.

UAE-sustainable-buildings / Rethinking the future



Cutting-edge design principles, materials, and designs in building façades through the lens of biomimetics and bio-design in harmony with the concept of sustainability enable sustainability principles to be at the core of the design problem.

As the global climatic situation worsens, achieving carbon neutrality is now not just a CSR option but a mainstream need. The result is that every industry has to work on achieving CO<sub>2</sub> neutrality including architects, environmental firms, and the government all of which are actively pursuing a carbon-neutral approach that is cost-effective and sustainable.

When it comes to sustainable construction, architects have a tremendous responsibility to design energy-efficient buildings. Buildings of the future should strive to be sustainable and carbon neutral. The construction industry which contributes to one-third of the carbon emissions is burdened with the responsibility to accept the changes required to transform existing systems and lead from the front when it comes to dramatically reducing carbon footprint. Take green facades for example. Green façades are climbers which include deciduous and evergreen plants, attaching themselves to the elevation of the building or supported through steel cable, mesh and other supporting material.

Materials used in sustainable buildings should have minimum heat transfer coefficient and minimal embodied energy during the construction and installation phases along with thermal insulation. Green façades cover all three points mentioned above besides providing aesthetic enhancement. They are vital in promoting cleaner air by removing pollutants. The plants not only assist in cleaning air but also aid in providing cooler temperatures.

The report in Alpin as early as 2021 states, "According to the Global Construction 2025 report, the volume of construction output will grow by more than 70% and will reach an annual worth of \$15 trillion worldwide by 2025.

It is estimated that there will be 2 billion additional inhabitants, which will increase urbanization."

A façade is in many ways the face of the building, one that creates an identity for the public would use to describe a specific development; in short, the aesthetics matter. This is also why the new parliament building in Abu Dhabi has a unique aesthetic appeal apart from its sustainable side. The façade of the dome is designed to create a microclimate that will increase the energy efficiency of the project.



According to WFM Media, “An example of sustainable facade design is the building envelope of the King Abdulaziz Center for World Culture, it was created by combining the most recent IT methods and software solutions. The complete free-form envelope is made of thousands of stainless steel tubes bent in three dimensions and was planned in 3D with parameterisation. All phases of the project benefited from the use of a coherent system throughout. This is still the way into the future.”

Given this background, one cannot deny the fact that façades of the future must reckon with the adverse impact of climate change. A high-performance façade takes into account a deeply complex geometry that works in sync with large glass units to allow daylight into the building and prevent solar heat or even moisture. With the help of curved insulated glass units in large formats renovations where large-format panes are used can also create a modern, lightweight and transparent design which is now gaining popularity. For example, in the case of a solar-control coating, we can reduce solar heat gains so that the insulated glass combines aesthetic and functional criteria.



Thomas Spitzer while talking about adaptive facades writes, “Adaptive façade systems can optimise its form in order to react to environmental conditions. Glass used to lead to energy loss, thus the major benefit is to be able to use glass and to control certain conditions at the same time. For example, insulating glass units with an integrated sun protection system protect against sunlight, heat, and noise.” A classic example of an adaptive facade is Butterfly House in Sharjah.

In order to implement a sustainable built environment, there must be a seamless collaboration between designers, construction, and manufacturing teams. The collaboration should not be limited to individual projects but an industry-wide effort has to be made to bring in fundamental changes. Traditional construction that may not have been designed with green principles in mind can proceed with greener alternatives when it's time for a change or an upgrade, as well as considering the basics such as minimising waste and wastewater. One can easily see this in Abu Dhabi where there is an estimated 24 million square feet of typical Hadidian modernist creation of water droplet-shaped buildings. The most interesting aspect of the project by Zaha Hamid is its adherence to Sikka, the old pathways used by communities in the Middle East to create a shaded passage, and to help funnel wind flow.



UAE-sustainable-buildings / wfmmedia

Mostafa M.S.Ahmed Ali, K. Abel-Rahman Ahmed and Hamza H.Ali write, "Facades are crucial to energy consumption and comfort in buildings." Incorporating intelligence in their design is an effective way to achieve low-energy buildings. Three strategies are examined: the first is dependent on active systems and element performance, the second implement intelligent passive design strategies only, and the third combines passive design strategies with early integration of active elements. Their impact on energy performance and visual comfort are compared. A design tool that suggests good starting solutions is presented, which takes into account how architects work during conceptual phases. A classic example here would include the Siemens Middle East Headquarters which is a comfortable blend of traditional design elements, along with parametric analysis to serve a form that is compact and efficient that decreases embodied carbon, and utilizes fewer materials. This project achieved Abu Dhabi's one of the first LEED platinum ratings

According to Wiggington and Harris, the study of examples of building intelligence showed that the façade was performing up to different functions, which influenced the passage of energy from both external environments to the internal environment and the other way around.

The manipulating functions were identified as the enhancement of daylight (e.g., light shelves/reflectors), the maximization of daylight (e.g. full-height glazing/atria), Protection (e.g. blinds), Insulation (e.g. night-time shutters), Ventilation (e.g. automatic dampers).

It also must work on the collection of heat (e.g., solar collectors), the rejection of heat (e.g., overhangs/brise soleil), the attenuation of sound (e.g., acoustic dampers), the generation of electricity (e.g., photovoltaics) and the exploitation of pressure differentials (e.g. ventilation chimneys).

Research has amply shown that humid climate conditions in a region can allow for substantial benefits of a maximum temperature decrease of 8.4oC with vertical greenery systems in an urban canyon. This is important as the distribution of ambient air in the canyon influences the energy consumption of buildings as higher temperatures increase heat convection to a building and correspondingly increase the cooling capacity.

Samar Sheweka from the British University of Egypt writes, For various reasons, sustainability today is producing an important and interesting approach between architecture and the environment.

This is taking place in forms and with different degrees of intensity. Within the challenges of energy crisis and climatic changes, architects started to develop new approaches to address the quest of energy demands in buildings.

Vertical greening can provide a cooling potential on the building surface, which is very important during the sweltering summers. The cooling effect of green facades has also an impact on the inner climate in the building by preventing warming up the façade.





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# GREEN CONSTRUCTION & ARCHITECTURE IN THE MIDDLE EAST: OPPORTUNITIES AND CHALLENGES

**W**hile the world is innovating new technologies and incentivising new ideas, the core concept of building the Middle East that was strong in its commitment to sustainability became the prerogative of both governments and private players.

It was noted in an earlier report that, "Despite the high oil revenues reaped from hydrocarbon resources and their spillover effects on non-oil producing countries, Arab economies suffer from structural problems, with fragile political systems, precluding them from adopting effective green transformations." But this line of thought and course of action was soon changed when a transformational change overcame the Arab region.

"We are an oil-producing nation, but we are today focusing on renewable energy. Though there are many questions raised, the answer is very clear. We want to build the future like we build our present." – Sheikh Abdullah bin Zayed Al Nahyan

Sustainability is now no longer a term for a few chosen industries. It is being increasingly advocated by many including quite recently the global construction industry, owing to an urge in minimising the industry's adverse impacts. An important area when it comes to focusing on sustainability is the issue of project management teams given that these are the people involved from the project's inception to its completion. Ever since there has been a wide range of sustainability practices within the construction industry. Green architecture has picked up.

Considered as the most important advantage green buildings are said to be rather energy efficient. While traditional buildings are bereft of insulation and lose plenty of heat, eco-friendly buildings can retain heat because of better insulation.

Foster-and-partners-dome-in-africa / Ingabiat



Take the example of Morocco's Dazzling Domed Bank which features several ancient Arabic design techniques and a unique geothermal system that keeps it cool in summers. It was also one of the earliest projects handled by Forster and Partners.

Another important feature is that water-efficient devices are installed in all sustainable eco-friendly buildings. For instance, conventional toilets often use large amounts of water for every flush. However, a sizable amount of water can be saved by installing water-conserving toilets instead of conventional ones.



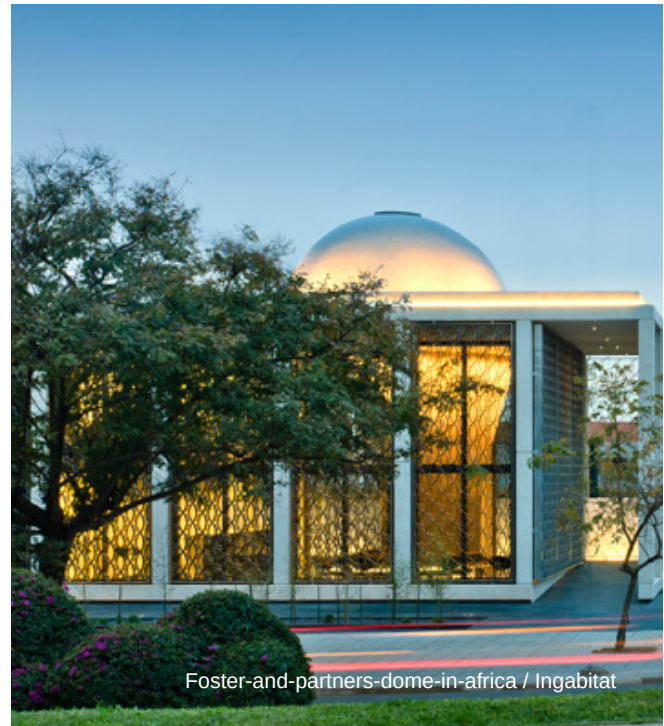
Zaha-hadid-on-worker-deaths-in-qatar-it-s-not-my-duty-as-an-architect / adsttc

The beauty of green architecture is that the buildings also come off as very attractive, very much like the sustainable terra cotta-coloured buildings in Masdar City which was one of the earliest smart cities in the Middle East.

The UAE was the first to accept and empower the Emirates' green building design and implementation. His Highness Sheikh Mohammed bin Rashid Al Maktoum, UAE Vice President & Prime Minister and Ruler of Dubai, announced a decree that mandated all new urban structures to conform to environment-friendly green building standards.

Ismail Radwan, Lead Economist at the World Bank writes, "Abu Dhabi introduced the Pearl Rating System in 2010 - a framework for sustainable design, construction, and operation of all new construction, specifically tailored to the hot climate and arid environment. In 2016, Dubai adopted the Al Sa'fat green rating system. Structures that do not meet the minimum bronze rating are not given permits. However, higher ratings are optional in both systems and standards vary across the country. To achieve deep emissions reduction in the construction sector, governments and regulators could introduce incentives that will encourage developers and builders to adopt lower carbon construction materials and methods."

Abu Dhabi's Central Souq has been constructed with a series of low-rise, ecologically sensitive shops, hotels, offices, and restaurants, as well as rooftop gardens, the internationally renowned firm has given this old-world market a sustainable lift.



Foster-and-partners-dome-in-africa / Ingabibat

With all the GCC countries looking at solar power a strong advantage of green building is that this kind of construction relies on the employment of green energies instead of conventional fossil fuels. In the case of green buildings, solar panels are often used to generate energy so that the building will not need to use energy that is produced with the help of fossil fuels. By using renewable alternative energy sources, green construction also makes a big contribution to revving up the energy transition process from fossil fuels to green energy sources, which is crucial to mitigate various environmental problems, including global warming and all sorts of pollution cesses in the construction sector. Abu Dhabi's Lattice-Domed Parliament Building in Abu Dhabi was designed by Ehrlich Architecture. By incorporating passive solar design and unique desert architectural techniques, the firm has ensured that this super-efficient parliament building won't use up all of the Emirate's own energy.





When Qatar won the bid to host the 2022 Soccer World Cup it came as a surprise to many, but when people saw the host of brand new solar-powered stadiums featuring cutting-edge technology afforded by the country's remarkable oil wealth they ensured that fans don't pass out from the heat.

This does not however mean that green Architecture has zero disadvantages. One of the key limitations identified is the high initial costs, for example, green construction often implies pretty high initial building costs which are usually higher compared to traditional practices which have the potential to discourage people to invest in green construction.

Although green building can mend, alter and change the ecological footprint, it is not a panacea for environmental issues. That part is still heavily dependent on individual practices. There is still plenty of work expected of the individual to make one's behavior as green as possible. There is no real weightage in investing in a green home but behaving in a quite eco-unfriendly manner since the ecological footprint might actually be worse as compared to a person who lives in a conventional home but behaves much eco-friendlier in his or her daily life.

Green alternative energies like solar power are also heavily dependent on outside weather conditions. In the case of heavy rains, chances are that you might run out of energy sooner or later. Thus, green buildings are compelled to turn to conventional energies as an emergency resource. Since green construction is a relatively new technology, the long-term effects of this practice are unclear. For instance, we do not know if there will be any potential side-effects of these practices in the future that are related to green buildings. Since the technology related to green construction is relatively new and not entirely mature yet, chances are that there might be some technical issues sooner or later which may translate into significant additional costs and efforts.

Since green construction often uses the latest technologies, the maintenance of those devices could be challenging because technology becomes increasingly complex and redundant soon enough. Depending on the area you live in, you might also have a pretty hard time finding a qualified worker in case you need repairs or for other maintenance tasks.

Indoor air temperature may greatly vary over time because of limited control over the inside air temperature that would be centrally controlled in a green building. The potential for massive fluctuations in temperatures would affect the overall quality of life and the quality of life will decrease due to this insufficient control over the indoor room temperature. For those picky about designs, green buildings are optimized to use the daylight as efficiently as possible making the shape of those green buildings rather exotic which might not please everyone and many people may even refrain from buying a green flat since they just do not like the design of those green buildings at all. Experienced green construction workers may be rare since most of the construction workers are quite experienced in the conventional construction of buildings, but lack experience and knowledge when it comes to green buildings.

Another key issue is that green construction tries to use as much sunlight as possible in order to produce energy and to use daylight to further reduce the need of using conventional energy sources. However, in regions that do not have many sunny days over the course of the year,



those green buildings may not be the way to go since the outside conditions may be increasingly unsuitable. Even though green construction has become quite popular over the past decade, it is still a relatively new building technology and the infrastructure around green construction has not been optimized yet.

Whether green Architecture is beneficial or not completely depends on the levels of awareness, the extends not only to its potential advantages but includes the adversities that may be in the immediate future or in the long term. The whole idea of green building and its relatively important features is subjective and must implore people to look beyond the realities of today into the possibilities of tomorrow.



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# SUSTAINABLE BUILDING TECHNOLOGIES IN THE MIDDLE EAST

**M**odern technology owes ecology an apology, was the cry against the blatant misuse of modern tech until they found a way to involve technology in helping the environment.

Sustainable development is a relatively new trend within the construction industry in the UAE which seeks to boost economic development and approaches that benefit the local environment and improve the quality of life.

The increase in sustainable development further boosted Green building technology making it a hot trend. The benefits of green technology applications especially in the construction industry are far-reaching and comprehensive, offering superior solutions to old problems that afflicted the industry earlier. Green technology has the potential to make buildings more energy-efficient with a lower carbon footprint and reduced impact on the environment at large.

In the recent past, construction specialists, architects, designers, builders, building owners, and tenants are comprehending the considerable benefits of the application of green construction technology. The core of green construction is energy efficiency. Should one look at newer constructions, the essential components, and elements of the building structure which includes the exterior and interior design, the raw materials and the operations are now slowly on the road to 100% sustainability. And while this could take a while, the fact that the industry has already begun taking the step forward is good news in itself.

In the Middle East as opposed to other countries across the world, sustainable construction does not end with energy efficiency. It seeks to make one more component more worthy and that is water efficiency. The dearth of water for this otherwise arid region makes it imperative that construction experts look at this aspect of sustainability too while working. As industry expert Khyati Mitra highlighted in her interview with us, the whole idea of whether a building will be sustainable or not is discussed at the design stage. Hence, it is quintessential that while fostering to newer consumer needs one does not lose sight of the goalpost: To Build a Sustainable World.



According to Advanced Control Corporation, on an average, approximately thirty to forty percent of a commercial building is typically unoccupied at any given time. Green building technology ensures that with the use of motion detectors, RFID scanners, access card readers, and other sensors it is able to monitor the occupancy status of building sectors.

Whenever a portion of a structure is left vacant, green technology automatically shuts off lights and adjusts HVAC, cooling, heating, and ventilation options. This means that residential and commercial premises owners can look at 30% savings in their energy expenses by eliminating unnecessary energy use.

PBC Today talks about the “sick building syndrome” that ushers in an unhealthy environment in commercial buildings, particularly older buildings and also the ones located in hotter climate zones where ventilation issues are a concern. The National Library of Medicine notes, That sick building syndrome (SBS) is used to describe a situation in which the occupants of a building experience acute health- or comfort-related effects that seem to be linked directly to the time spent in the building. No specific illness or cause can be identified. The complainants may be localized in a particular room or zone or may be widespread throughout the building.



Green-buildings / Worldconstructontoday

The Middle East is one of the fastest developing areas of the world which makes sustainable construction paramount to the developers while they make their investments in their buildings so that they stand the test of climate change, economic turbulence, and energy source changes.

The following technologies have been developed and used extensively in the Middle East;

Green insulation plays a key role in allowing a building to stay cool in hot weather with the help of insulation alternatives which are effective and inexpensive with less to source as they are made from natural materials or reused materials like animal wool, scrap fabric and cotton from clothes production, cellulose (recycled paper), etc. The key is to use dense building materials with a high thermal mass. Mr. Hamad Al Ghurair, Chairman of Middle East Insulation, says, "Changing to the green building measurements and reducing the CO2 emission is one of our commitments to our beloved city and planet."

Knauf, a big name in the construction industry also specialises in insulation especially in countries like Kuwait. Knauf Insulation's green roof system Urbanscape has already been impressing developers in Kuwait with a project to bring greenery to barren areas of desert. But perhaps more importantly in a city where water is precious, Middle East test cases have revealed that Urbanscape with polymers can contain up to 122% more water than sites without the material. They are confident that the solution will be a major success in Dubai.

Rammed earth has recently become popular again for its high thermal mass, and ability to be sourced locally. According to ArchDaily, Typically, the rammed earth technique works best in climates with high humidity and relatively moderate temperatures. These bricks are made from recycled earth materials that are further mixed with concrete (typically 5-10%) making them highly sustainable. They also manage to keep buildings cool in summer, and alternatively warm in winter.

And this brings us to the next technology which is widely used across the MENA region given its suitability to heat, and solar power. Solar power has been exploited as a sustainable construction technology for a long time now in the form of active solar power and passive solar power. Active solar power is the use of functional solar systems that absorb the sun's radiation to cater for heating and electricity provision. It reduces the need for the use of electricity or gas. While expensive in terms of installation, it helps curb rising energy bills and carbon emissions.

Passive solar power conversely is design oriented. It is a design in which the sun's rays warm homes through the strategic placement of windows and the use of heat-absorbing surfaces. The windows allow for a sizable amount of energy and the heat absorbed reduces the need for warming the house during cold periods such as winter.



In terms of statistics, apart from the key players like Saudi Arabia and the UAE, it is interesting to note that in Morocco, renewable energy makes up almost two-fifths of the total electricity generation. The country boasts about some of the largest clean energy projects are being constructed in the country. Morocco has since pledged to increase the renewables in its electricity mix to 52% by 2030 with solar making 20 % of the total capacity. With the increasing numbers in terms of solar-enabled technology, green construction stands to benefit.

The next important technology in green construction involves water supply systems built on the idea of minimising water usage and recycling water to create a building management system that is conducive. Water efficient technologies such as dual plumbing split potable water (clean for drinking) from reclaimed water (which is treated greywater). The reclaimed water is further used for landscape irrigation and flushing toilets while potable water can be recycled for drinking and cleaning. Dual plumbing systems can be more expensive to install than traditional plumbing. However, given the long-term investment much like its solar counterpart, these dual plumbing systems technologies are becoming a viable option. In fact, it is claimed that, cities that use these technologies are ahead of the curve and are more likely to become the most successful cities of the future. This is because as the effects of climate change increase, cities with dual plumbing will have more fresh water readily available. According to Claudia Sadoff and Anders Jagerskog of the World Bank, "Jordan's success in harnessing private sector technological innovation and financing to recycle wastewater offers an especially instructive case. Such technologies, reinforced by new policies, could help put MENA on course toward water security."



Green-buildings / Constructionreview

Biodegradable materials are a salient feature of sustainable building construction. While most traditional construction methods are guilty of accumulating waste products and toxic chemicals, the majority take hundreds of years to degrade. The sad part is that even as it degenerates it ends up contaminating and harming the environment. Biodegradable materials are different since they are sourced organically, like organic paints, which limit the negative impacts on the environment as they easily decay without the release of toxic substances. The use of biodegradable materials for building foundations, walls and insulators are also part of sustainable construction technologies. While soy bioplastics are a relatively new phenomenon, it is stated that soy bioplastics have been limited to disposable food containers and bin bags, [but] with more research, there is certainly potential for biodegradable plastics to be seen in the future of construction.

Earlier in the article, I mentioned sick building syndrome. A building is not just the construction of four solid walls and a roof. The whole idea of sustainability is that it concentrates on the health and safety of the building occupants as a fundamental that must be guaranteed during the construction of any building or home. Sandy Wiggins, Chair of the US Building council was right when she said, "Green buildings are not about buildings, it is about people." Hence sustainable indoor technologies are almost a mandate for sustainable construction. The materials used have to ensure green safety standards which include hazardous free elements, non-toxic materials, low volatile emissions, and moisture resistance. Enova, the regional leader in integrated energy and multi-technical services, is keeping the Middle East's top leisure and entertainment attractions chilled and cost-effective as temperatures soar. Anne Le Guennec while talking about Enova's commitment stated: "Enova has more than 10 years of experience in cooling and maintaining indoor leisure attractions, and is focusing on optimizing the region's growing number of indoor theme parks through innovation and expertise. We agree with the industry's thought leaders that safety and sustainability are vital to long-term success, and continue to share our know-how with the Middle East's leisure & entertainment vision."



Green-buildings / Constructionreview

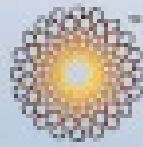


Constructing self-powered buildings is an art within the field of sustainable construction technology. It is the realization of zero-energy construction. These buildings are built such that they are able to generate sufficient power to support their own energy needs and can redirect all the surplus energy back into the power grid. In most cases, wind power technology is being used and it is highly common in skyscrapers whereby wind turbines are mounted on the rooftops. The constant and heavy air currents at higher altitudes propel the turbine blades which generate the power requirements for the building.

All in all a thoughtfully created design and construction has the ability to be a legacy for future generations. We must acknowledge that what we build today must endure and enhance the quality of life now and in the future. The application of the best available technology, the development of strong environmental institutions that are sturdy both externally and internally, and advocacy campaigns for behavioural change are all just the beginning.

It is rightly said, "Great design and construction shouldn't come at an environmental cost, but rather work in a sustainable relationship with the environment and make minimal impact."





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# TRADITIONAL CONSTRUCTION FOR A MODERN AND SUSTAINABLE FUTURE

**S**hould one take a close look at Traditional Sustainability in the Middle East, the history of architecture and the importance of crafting a sustainable city life was completely reliant on ideas that stemmed from the need to be climate-friendly given the hot summers. Every country had its own way of working on its housing and development.

Take Egypt for example which is also the oldest civilisation. Vernacular architecture picked up in more ways than one growing organically in keeping with the need of the people and this was also a time when identity was neglected, changed and stereotyped. Socio-economic and cultural problems emerged as the transition from the traditional to the modern period took place. Drastic changes in the urban settlement were seen with the advent of the colonial style when the traditional courtyard house disappeared and new constructions of single-family homes were erected. These dwellings proved to be completely unsuitable for the harsh climate. And this called for a serious re-think. Should we fast forward to the present century we see the use of traditional elements quite ably employed in modern architecture, the classic example being that of the American University of Cairo? Architect Abdel Halim Ibrahim designed the City of Learning to cater to 7000 students. The plan comprised elements of vernacular architecture which includes cooling elements like courtyards and wind catchers. They also provide cross ventilation.

Similarly in Yemen, in the city of Sana'a traditional architecture was considered unique from other cities because a traditional house in Sanaa was a multi-storeyed home consisting of 5 to 7 floors and constructed from stone or both stone and mud brick. It was considered a model of traditional architecture that was highlighted further by its coherent urban fabric which includes markets, mosques and hotels surrounded by fences. The house design was considered sustainable design has given that it was built of stone and mud and the facades were ornamental which overlooked a backyard with a small farm to work on a kitchen garden. The window openings were created in a way that the wood or stone used to cover it would block the extra heat and provide privacy.

The University of Qatar has employed a campus design that employed local architecture where covered courtyards and the malkaf is used for ventilation and cooling. So popular is the design that even the city of Masdar has employed the use of the Mashrabiya and the Malkaf rather extensively. It is no small feat then the incubator building of Abu Dhabi is also LEED certified.

All-about-green-buildings-in-India / Housing

“Despite Saudi Arabia’s extreme climate, KAUST has been able to achieve a LEED Platinum ranking. Not only will sustainable initiatives have an effect once the building has been finished, but also during the construction phase, with developers using 38% locally-sourced and 20% recycled materials. It’s basically a great project, and one that paves the way for many more in this part of the world – the fact that it has been built in Saudi Arabia is fantastic.”

Should we look at the modern environmentally sustainable design (also called environmentally conscious design, eco-design, etc.) we see it as the philosophy of designing physical objects, the built environment, and services to comply with the principles of ecological sustainability and also aimed at improving the health and comfortability of occupants in a building. Sustainable design seeks to reduce negative climate impact and has a two-fold objective, one to cater to the health and well-being of building occupants, and two to improve building performance. The primary objectives of sustainability include the need to reduce the consumption of non-renewable resources, minimize waste, and create healthy, productive environments.

If anything has enraptured the people of the 21st century, it is the growing need for a sound environmental consciousness. The understanding that the human race is under threat by virtue of its laxity towards the environment is a feeling that has grown at a pace like never before. The Middle East is no different. For decades they have lived off non-renewable sources.



Bait-Al-Bader / weetas



Whole industries aim to convert their approach to protect the environment and future generations. The construction industry is one of the largest contributors to global carbon emissions, representing 40% of the world's total. The built environment uses 40-50% of global energy and produces 50% of landfill waste with disruption of habitat by the loss of around 80% of the land. (Dixon, 2010.) As the pressure rises, leaders of the world have realised that transforming the way we build and live is mandatory to protect the world we live in. Sustainable construction is a new requirement all over the world.

There are six principles of sustainable design according to the National Institute of Building Sciences and each principle incorporates a unique set of strategies. The first principle is Energy conservation where energy consumption is improved and renewable energy resources like solar power, wind energy, etc. are used. The use of solar panels in UAE homes is rare, despite abundant sunshine. But with momentum building, the company behind Sustainable City, Dubai-based Diamond Developers, hopes it will become a blueprint for other residential ventures.

The second principle is indoor environment quality. Enhancing the quality of the interiors by designing the building in accordance with environment-controlled ventilation and humidity as well as improving the thermal and acoustic performance of the building and urban design makes it sustainable. Buildings rely on a properly designed ventilation system (passively/naturally or mechanically powered) to provide adequate ventilation of cleaner air from outdoors or recirculated, filtered air as well as isolated operations (kitchens, dry cleaners, etc.) from other occupancies. In Greater Cairo, while assessing the housing interior sustainability it was concluded that, In becoming familiar with new trends and technologies supporting environmental protection, residents will adopt them; that should help them in their everyday lives thus increasing their overall wellbeing. Therefore, it is a complete cycle, sustainable environments (macro or micro) being a general demand, suppliers will provide proper materials and developers will make sure they deliver the required housing.



shamsard / Eartharchitecture

Jesus Sancho told Construction Week, "To achieve this [Read: Sustainable Construction], it is essential to have stable regulatory environments that attract investment towards projects that foster sustainability, mitigation, adaptation, resilience, and transformation - [in a nutshell,] smart projects. It is possible to have a business model that is environment-friendly, positive for society, and profitable at the same time."

The third principle in sustainable design and construction is the use of environmentally friendly building materials. Conservation of materials through the reuse and recycling of natural resources used in the building. The Dubai Expo 2020 pavilion is said to produce up to 22,000 litres of water per day by using an atmospheric humidity harvesting system to suck moisture from the air and turn it into water. The use of recycled greywater will help meet the water production target.

"Sustainability in the construction sector can be achieved not only through the use of sustainable materials and the integration of energy efficiency frameworks, but also by applying a lean construction culture from the bottom up," Monjid Othman Abdulmajeed, CEO of Qatari construction company RC Al-Mana, told OBG.





The fourth principle involves the people, the residents and their psychological and physiological needs by improving the environmental and social performance of the urban design. Salama states, "sustainability or sustainable design is simply a rephrasing of some of the forgotten values of traditional architecture and urbanism." In addition to offering low-emission transit options and its own renewable energy supply, the developers of Masdar City say that all of the city's buildings, which will house 50,000 people and 40,000 jobs and student placements, will be built with low-carbon concrete which caters to the fifth sustainable principle of space and 90% recycled aluminium and other sustainable materials. These new buildings will use 40 percent less water compared to standards set by the American Society of Heating, Refrigerating and Air-Conditioning Engineers.

Through the integration of the site with the design of the building to achieve sustainability and harmony - the sixth principle: Generalization and inclusiveness. It is stated that when it comes to the Dubai Urban Master Plan 2040, "Launched in March, the plan is a comprehensive blueprint for future sustainable urban development in the emirate. It aims to design Dubai in a way that will enable it to effectively accommodate its growing population, which is expected to increase from 3.3 million to 5.8 million over the next two decades. Dubai is placing a high value on leisure and recreation, with green and recreational areas set to double in size by 2040, and rural reserves and natural areas to account for 60% of the emirate's total area. According to Commercial Interior Design, "When Lulu Group, a UAE-headquartered retailer with operations across the Middle East, wanted to introduce a new shopping mall to Dubai's Silicon Oasis neighbourhood, London-based architecture firm Design International was chosen to translate its vision into the new 'statement architecture'".

The commitment to sustainable construction in the Middle East is very real. According to ASGC, With the world population set to reach 9.8 billion by 2050, the growing number of people will place greater strain on resources and services. While the number of people living in the Gulf's capital cities of Abu Dhabi, Riyadh, Kuwait City, Manama, and Muscat pales in comparison to the populations of megacities such as China, India, and Nigeria, the GCC will, as other regions, face the pressure of urbanisation. Its sustainable construction sector will be the key to building cities that can cope with the challenges of tomorrow.

No one could have put it better than Greg Fewer, chief financial and sustainability officer at Aldar Properties who said, "An effective sustainability policy requires the establishment of an accurate baseline based on properly captured, selected and analysed data. While this is a demanding process that requires considerable investment and time, it is vitally important in establishing measurable targets and key performance indicators designed to lead to tangible results. Without this, talk of sustainability falls into the realm of greenwashing."

# OPINION: DIGITAL TRANSFORMATION: CREATING A SUSTAINABLE FUTURE



By Louay Dahmash, Senior Director at Autodesk

**T**he recent United Nations Climate Change Conference (COP26) saw country leaders convene to discuss upcoming commitments and goals in the mission to end climate change. “COP26 has kept the 1.5 degrees alive. But its pulse is weak and it will only survive if we keep our promises and translate commitments into rapid action,” said Alok Sharma, President for COP26. However, sustainability is bigger than just green initiatives – it includes issues around people. It is the positive impact a company makes in its communities and eventually the world. Sustainability has moved away from a buzzword to actions consumers look for as a part of a brand’s strategy. Every industry needs to take accountability to innovate sustainable processes and ensure implementation has an impact, including a set of nonfinancial criteria like diversity, business ethics, wellbeing, and shareholders rights.

However, sustainability is bigger than just green initiatives – it includes issues around people. It is the positive impact a company makes in its communities and eventually the world. Sustainability has moved away from a buzzword to actions consumers look for as a part of a brand’s strategy. Every industry needs to take accountability to innovate sustainable processes and ensure implementation has an impact, including a set of nonfinancial criteria like diversity, business ethics, well-being, and shareholders' rights.





For the architecture, engineering, and construction industries, it has become a priority in order to respond and prepare for the future, with the pandemic being the catalyst for this change in thinking. To change what we create, we must change how we create, with sustainable, equitable and resilient outcomes in mind. As these industries are notably major contributors to pollution and waste, with the construction industry generating over a third of global waste, with volume expected to double by 2025, a key factor in making this shift is digital transformation through actionable information and digital tools that help achieve sustainable outcomes.

The future of sustainability has many avenues however we focus our efforts to advance positive outcomes across three primary areas: Energy & Materials - maximizing energy efficiency and lower carbon emissions from materials used to make the supply chain more sustainable; Health & Resilience - building safer, healthier, and more sustainable infrastructure; and Work & Prosperity - aiming to have an impact on the entire workforce by advancing access to learning skills of the future.

Digital transformation will, therefore, need to be the partner for the new possibilities, with tech and software transforming industries. Reshaping the processes and developing the tools needed to meet the intensifying industry demands of today can propel the industry towards a more sustainable world that benefits everyone. These industries need to be unified in their approach, with industry-focused solutions, such as the Autodesk Forge platform, empowering customers with data and insights, as well as delivering total carbon solutions to help these industries to get the insights that will allow them to design and develop products in a more sustainable, equitable and resilient way.

Notably, rethinking business plans, design, and manufacturing of products is no small task. While many companies understand the importance of digital transformation, the process of transitioning entire processes and securing the necessary buy-in is a colossal effort. A significant impediment is that many digital tools are too complex and too siloed, making change unnecessarily difficult. However, through innovative software enhancements, such as through Autodesk Fusion 360, it is fulfilling its mission of providing leaders, innovators, and designers of tomorrow with the digital tools and the knowledge needed to address some of the biggest challenges.

In a global research project by Altimeter and Autodesk conducted in July 2021, the research surveyed approximately 750 software buyers and users across key geographies, job titles, and company types. Ultimately, the research confirmed that the past two years had made digital transformation critical, with 65% saying digital transformation had disrupted the industry to a moderate or great extent (69% for D&M, 58% for AEC). It then increased to 71% when respondents were asked if digital transformation will disrupt industries in the next two years to a moderate or great extent (D&M 75% and AEC 65%). Businesses reported a myriad of benefits for digital transformations, including improved efficiency and reduced costs as key components.

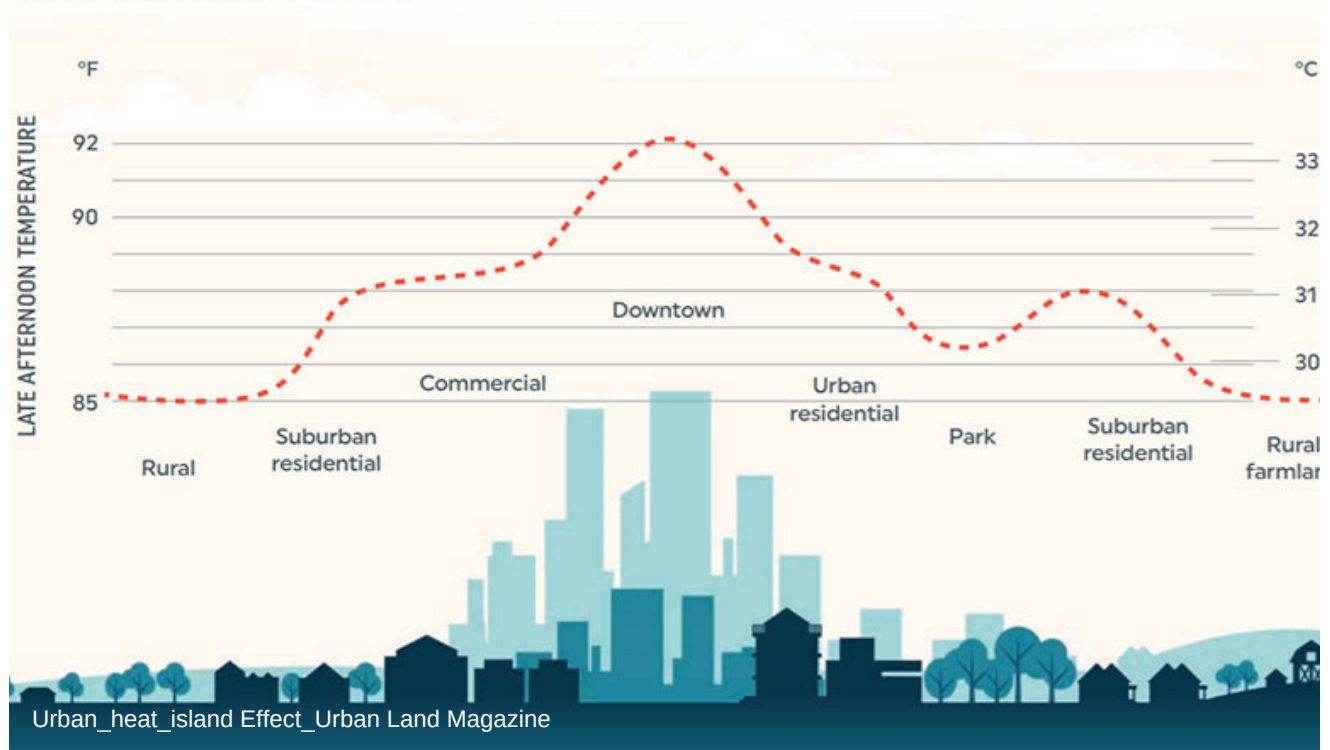
To develop sustainable digital transformation processes, convergence is ultimately the solution, meaning the blending of previously separate technologies, processes, and data to create new combinations of products, services, and experiences that reshape industry structures. Companies are now anticipating and preparing for the next wave of digital convergence disruption. It is notable that 95% of all respondents said convergence of some kind was already affecting their industry today and 73% agreed that their organization approached convergence as a competitive advantage for their company. Through the process of convergence, it benefits organizations first, translating into improved efficiency and reduced operating costs.

To put it into context from an industry standpoint, it is common to find technologically obsolete wastewater network infrastructures and an increasing number do not meet the standards of being in a state of good repair. Updated processes are integral to the health and well-being of community residents and critical to improving society and protecting the environment. However, to understand the condition of the network, teams need the tools and resources to manage, inspect, and respond to risk before it becomes a problem. An example of how digital convergence is assisting in sustainability can be seen through Afsluitdijk - a 32-kilometer dam with a sustainable infrastructure that has been at the forefront of Dutch hydraulic engineering. The project has focused on protecting and preventing damage to the dam and its surroundings, whilst offering ecological and recreational mechanisms. The planners rely on the latest technology so each team can work collaboratively and efficiently, allowing them to strengthen the enclosure dam, increasing the capacity for it to discharge water, as well as constructing pumps to move water into the sea.

Another instance comes from the late 19th century when scientists began to recognize urban heat islands through the discovery of the city of London often being a few degrees higher than the surrounding rural areas. A few degrees difference can impact thermal comfort, caused in part by the process of concrete, asphalt, brick, and other materials absorbing and re-emitting heat during the day and cooling more slowly at night. This isn't just a comfort issue, but rather it is also a sustainability issue.



## URBAN HEAT ISLAND PROFILE



The U.S. Environmental Protection Agency estimates an increase of just 2°F may increase the use of air conditioning by 1-9%—powered mostly by electricity produced by fossil-fuel-powered plants. Through microclimate analysis tools, real estate developers, urban planners, and architects can evaluate the thermal comfort of outdoor spaces. While methods of calculating the urban heat island effect already exist, they're often accessible only to expert users, take hours to run, or do not visualize the data. New microclimate analysis programs, such as Spacemaker, are fast, intuitive, and highly visual. For the first time, the entire site planning team can quickly see the impact of design decisions on thermal comfort, specifically in this case heat islands, and resolve any issues efficiently and effectively.

Buildings generate nearly 40% of global greenhouse gas emissions. A combination of processes can therefore help meet emissions reduction targets set by the Paris Agreement - and reinforced by Glasgow Climate Pact.

It is safe to say that new solutions and the convergence of current software processes have been key in unlocking the insights and unleashing the innovation that is needed to help industries design more sustainable buildings, construct more resilient cities, and make a better future for all. What we build must be paired with how we build, and digital transformation for sustainable outcomes is undeniably at its core. Industries accepting and working together to develop new processes allow for sustainable goals to be met and most importantly, become the industry standard that is needed to ensure a sustainably led future.

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