THIRTY TO NET ZERO

ISSUE NO. 18 VOL 2 | 2022

DATE: 30 DEC 2022

INTERVIEWS

Aliakbar Ajmerwala: Pavilion Renewables

Mohammed Alkour: Haji Commercial Company Llc

Mohammed Fagir: Haala Energy

Omar Fattom: Engie Solutions Middle East

Dr Tariq Aslam: AspenTech

SPECIAL REPORT: SOLAR POWER

www.thirtytonetzero.com


TYNZ
2023
HAPPY NEW YEAR

Editor's Note

Dear Reader,

We kicked off 2022 with the unfashionable topic of transition to sustainability in the core industries that contribute to the regional GDP but that has since become a mainstay of regional sustainability conversations.

It's a fascinating topic, which raises complex questions about what sustainability really is, and how to make it happen. If we transition to AI and IoT what happens to the people reliant on the industry for jobs? Is it fair to restrict countries that haven't had the chance to develop as fully as others? How do we ensure a "just transition" to environmental goals?

Today's issue — our last of 2022 — examines similar from the social power industry. Looking at the slow growth of the sun-drenched region, It's obvious that fashion is still reckoning with the divide between commercial, social and environmental impacts. As we move into 2023, the key question will be: how can the solar industry finally balance people and the planet with the regions energy requirements, and drive systems change rather than thinking in silos?

Thanks for reading, and Happy New Year!

Best Regards

Pallavi Shevade
Editor-in-Chief
Thirty to Net Zero

CONTENTS

CONTENTS

T2NZ Team:

Editor-in-Chief: Pallavi Shevade
Senior Journalist: Nitin Konde
Editorial Planning Manager: Archana Bansode
Editorial Associate: Ramzy Abdul Kalam
Design & Mkt Manager: Ritesh Jamkhedkar
Data Associate: Sonali Ambekar
Assistant Publisher: Pareekshita Bhat
Journalist: Sumita Pawar
Digital Mkt Manager: Arun Chandra
Advertising Sales Manager: Ishan Pandey

T2NZ is published by:
Secretariat's World Groupe
License No. 22152,
A: P O Box 124609, Dubai, UAE
T: +44 203 286 8458
E: PR@secretariatsworld.com
W: https://thirtytonetzero.com/


SUPER CHRONOMAT
BREITLING
1884
#SQUADONAMISSION

MIDDLE EAST WITNESSING THE DAWN OF GREEN HYDROGEN

Green hydrogen has the potential to displace fossil fuels as a major energy source for transportation, electricity, and heating in the Middle East, which now accounts for approximately three-quarters of global greenhouse gas emissions.

There are still considerable obstacles to overcome before the full promise of green hydrogen can be realised, but the region appears to be in an excellent position to play a leading role. A 2022 Strategy& research indicates that the cost of producing solar, wind, and green hydrogen in the Gulf is around one-third of the world average, and that Gulf solar panels produce double the electricity that those in Germany do.

The 1.2 GW Noor Abu Dhabi solar facility is the world's largest single-site solar plant, and the 2 GW Al Dhafra solar plant will go live in the emirate this year. As of the date of the agreement on its funding in December 2020, Dhafra's solar price was the lowest in the world at $0.0132/kWh. The Mohammed bin Rashid Al Maktoum Solar Park in Dubai has a 1.6 GW capacity now and can expand to 5 GW.

Some of this capability will be used to produce green hydrogen, according to Gulf policymakers.

Strategy& said that in order for the Gulf Cooperation Council (GCC) countries to diversify their economies, they should take advantage of their competitive advantage of low-cost renewable energy resources. This potential can be attributed to two key aspects of the region's energy supply system: (1) an abundance of high-yield renewable resources, and (2) a financially viable model for private investment.

Hydrogen is now created using a chemical process that uses gas or coal, which generates significant volumes of carbon dioxide. Only about two percent of the world's hydrogen is "green," meaning it was produced using renewable electricity to separate water into its oxygen and hydrogen components in electrolysers.

Hydrogen is versatile since it may be used as a fuel source (with water as the only byproduct), stored to use later, transformed into other compounds, and used to store excess energy from renewable electricity plants.

Significant Bets on Hydrogen

Murray Douglas, Wood Mackenzie's Head of Hydrogen Research, believes the Middle East may become a key player in the green hydrogen business. The cost of electricity for a green hydrogen project can be significantly higher than expected.

In other words, as Douglas put it, "the lower the cost of electricity, the more competitive the project."

The Saudi Arabian government has committed $5 billion to the construction of the world's largest green hydrogen plant, which would use solar and wind energy to generate 650 tonnes of hydrogen each day. In 2026, production will begin.

From less than 100 Mt in 2022, Wood Mackenzie predicts demand for low-carbon hydrogen, which includes blue hydrogen that captures and stores carbon created when manufacturing the gas via conventional techniques, will increase to 223 Mt by 2050. The consultants estimate that the falling cost of green hydrogen production will open a $600 billion market for investors.

It appears that governments in the Gulf region share this view. The United Arab Emirates' energy minister stated in January that the government plans to produce hydrogen using electrolysis and natural gas in order to grab around 25% of the worldwide hydrogen market.

The time range will determine whether or not it is possible, Douglas said. The great draw of hydrogen is that you may enhance your diversity of supply due to potentially lower entry hurdles. This is especially appealing to policymakers in Europe and East Asia, where the hydrogen economy is still in its infancy.

When it comes to gas, the European Union no longer wants to rely so heavily on a single source, Russia, from which it previously imported 43 percent. The EU prefers to purchase from a wide variety of vendors, so the UAE's plans to corner the world's hydrogen market could be met with resistance.

Together with Emirates Steel, the Abu Dhabi National Energy Company (TAQA) plans to develop green hydrogen for use in the production of green steel. A green ammonia plant on an industrial scale is in the "advanced stage" of development by TAQA and Abu Dhabi Ports Co, both of which are majority controlled by the government of the emirate. The plant will use solar energy to create hydrogen from water. Green hydrogen will also be produced at Dubai's solar park.

The Sultanate of Oman and BP announced a deal in January to launch renewable hydrogen initiatives by the year 2030. The oil giant will analyse wind and solar data covering 8,000 square kilometres of land as part of the partnership.

On June 30th, Egypt announced a hydrogen project capacity of around 1.5 million tonnes per year, according to Wood Mackenzie.

As Douglas pointed out, "Egypt has the resources in terms of solar and wind potential," but the country is confronting severe economic and fiscal issues that it has historically found very hard to overcome.

A 'rapid action' is required for the Middle East's ambitious green hydrogen goals

According to 400 Middle Eastern energy industry executives, the area is poised to become a global leader in the production and distribution of green hydrogen. But the region’s own optimism needs to be backed by real action, notes a new analysis.

The goal of the region is to become a significant provider of sustainable energy to global markets, and the analysis by Siemens Energy and strategic consultancy Roland Berger examines the progress being made toward this goal.

It is not unexpected that the region prioritises green hydrogen, or the generation of hydrogen from sustainable sources of energy (or from low-carbon power). With the International Renewable Energy Agency projecting that hydrogen and its derivatives will be able to account for 12% of world energy consumption by 2050, green hydrogen is widely regarded as a cornerstone of the energy transition.

There was not a significant difference in opinion between the general public and the 400 energy professionals surveyed by Siemens Energy and Roland Berger. Karim Amin, a member of Siemens Energy's Executive Board, sums up the importance of green hydrogen for the company's ongoing energy shift.

The region has all the makings of a big exporter, thanks to its access to cheap and plentiful renewable energy sources, an established export infrastructure, and ample financial backing.

Europe is regarded as the top and logistically most realistic export opportunity. Demand for hydrogen in Europe is predicted to expand from its present level of 10 million tonnes a year to 20 million tonnes by 2030, and 95 million tonnes by 2050. Close to half of this need will be covered by importing.

According to Roland Berger Partner Pierre Samaties, "Exporting green hydrogen to Europe presents a big economic promise and the opportunity to earn geo-political relevance in the global decarbonisation effort."

The UAE and Saudi Arabia have been quick to notice the opportunity, and have created grandiose plans. It is the stated goal of the United Arab Emirates to corner 25% of the worldwide hydrogen market, and the Kingdom of Saudi Arabia's ambition to become the largest provider in the world. In addition to these countries, Oman and Egypt are also making significant strides forward in the region.

Noor Abu Dhabi solar facility / HELIOSCSP

46 green hydrogen projects are now active in the MENA region. More than 40 investments totaling more than $20 billion have been announced for the period until 2030, along with several other smaller projects.

"Hydrogen developers like NEOM, ACWA Power, Masdar, and OQ are actively driving the development of green hydrogen." According to Samaties, the public sector is what makes opportunities like hydrogen valleys, open source software, well-defined regulations, and a skilled workforce possible for these companies.

On the charge

The paper underlines the necessity of increasing production capacity, however, to fulfil demand and the region's aspirations. As a result, the writers highlight the need for change in the realms of legislation, money, and technical advancement.

Having a consistent policy framework is crucial to the success of the energy transition. Institutions of commerce and finance require this reliable foundation on which to build their long-term, frequently irrevocable investments. Building the essential infrastructure for decarbonising society also requires finance that is front-loaded during the development stage of projects," notes the research.

Meanwhile, technology is needed to streamline and organise (international) energy flows across networks, prepare the future energy grid for a greater share of intermittent renewable energies, and increase the efficiency with which hydrogen is produced (for example, to ensure that hydrogen can also decarbonize hard-to-abate sectors).

According to Saudi Aramco's Chief Digital Officer Nabil Alnuaim stated,"Transitioning to hydrogen demands tremendous investment to create technologies, implement projects, and establish marketplaces that collectively contribute to a cleaner energy future." It is imperative that politicians back this concerted effort by all parties involved.

Siemens Energy and Roland Berger argue that the cost of delay is increasing daily and that urgent action is required to prevent further damage. "Everyone gets [the burning platform for change] and has the same vision, but we have an execution problem, not an identification one," explains Christian Bruch, President and CEO of Siemens Energy.

H.E. Suhail Al Mazrouei, Minister of Energy and Infrastructure of the United Arab Emirates, agrees with the report's conclusion, saying, "We need to act, and we need to act swiftly."

Siemens Energy Plant / Siemens

HOW BIG DATA IMPROVES SOLAR O&M AND ASSET MANAGEMENT

Solar system operation and maintenance is an area with plenty of room for innovation. The sector is implementing a wide range of applications to make sure the States' renewable energy assets function as planned despite erratic weather and increasingly complex governmental frameworks. Increased electricity generation from renewable resources is a priority for EU member states as they work toward meeting the bloc's 2030 climate ambitions. Enhancing the actual performance of, and decreasing the operational expenses of, current renewable power facilities is one of the most effective paths forward, both ecologically and economically. Implementing digitalization strategies like as artificial intelligence (AI), data mining, drone operation, and robotics is a powerful method for attaining this objective and making sense of the massive amounts of data produced by these facilities.

The O&M of solar power assets covering hundreds of acres of land can be simplified and the margin for mistake greatly reduced with the help of digitalization. The financial and operational needs of future plants cannot be met by the conventional O&M models for power production plants, which centre on a single location with a dedicated permanent crew. Because of the increasing proportion of distributed solar assets, the approaching massive solar capacity will necessitate effective O&M with remote monitoring and rapid fault diagnosis and repair by a rotating professional crew. There is a growing need to decrease reliance on human labour for O&M tasks as solar electricity becomes more integrated into the grid and solar rates fall. As a result, businesses are concentrating on cutting costs and increasing productivity by digitising and automating more processes.

Industries are getting smarter thanks to data mining and AI

As long as the data is of sufficient quality and granularity, is consistent and stable, and is processed within the appropriate system model framework, the potential of data mining techniques to optimise performance and minimise operational costs is well demonstrated. Beyond the obvious advantage of making full use of the plant's capacity, this method of managing renewable portfolios also helps boost revenues (by lowering the plant's LCOE) and reduces some operational hazards. Eventually, this will lead to increased investments, both for renewable projects and grid infrastructure, creating a positive feedback loop that will lead to the deployment of new capacity and a greater share of renewable energy in the overall energy mix.

Predictive maintenance

Retrieving massive volumes of data from one or more sources and combining them for the purpose of detecting ongoing irregularities and projecting the future behaviour of linked devices is what predictive maintenance through data mining entails. Any step in the asset management process, from initial data collection and analysis through fault diagnosis and optimization via suggestions, can benefit from the application of big data analytics.

Various strategies are being discussed and proposed today. While traditional AI delivers cutting-edge diagnostics via knowledge-based models, unsupervised and supervised learning techniques provide other options (such as neural networks) by way of statistical methodologies. Predictive maintenance has many advantages, including the minimization of plant losses and the enhancement of plant functionality. The plant's state can be analysed in near real-time by using high-frequency data supplied from the site in conjunction with a complete model of the installed system. Today's data-mining methods make it simple for asset operators to choose the best course of action for their routine O&M tasks, allowing them to boost the portfolio's performance and predict device failures in these intricate systems. Rapid progress has been made in the field of predictive maintenance in recent years. Independent monitoring and data gathering can be paired with the most trustworthy performance analysis algorithms in the PV sector on monitoring and performance platforms. Advanced monitoring and automatic diagnostics technologies do a thorough analysis of all available asset data, in conjunction with a well-known set of characteristics of the site and consistent algorithms. By comparing the projected losses to the actual losses (the "digital twin"), these technologies provide a comprehensive root cause analysis of the loss at each stage of the transformation. This is accomplished by the sensitive reduction of device downtime and underperformances, which is driven by recommendations for immediate or intermediate actions. Costs for both hardware and operations can be cut with improved planning of activities and the replacement of devices.

A solar farm in the UAE / Pexels

Cloud computing

The key to efficient administration of renewable assets and portfolios is a user-friendly platform with open architecture that can accept, store, and analyse data from a wide variety of on-site devices and external platforms. Cloud computing achieves this goal by coordinating the transmission of operational dispatching and contract management data in real time across the internet, as well as by gathering and transferring information to and from on-site equipment. Cloud computing is a model of distributed computing in which many users access and use a shared pool of computing resources using a web-based interface (or "cloud") rather than installing and maintaining software on their individual computers. Cloud computing offers the clear advantage of decreasing all efforts in gathering and aggregating data to produce relevant information for any user, once the initial phase of configuration and customization necessary to connect to the numerous data sources has passed. It is a combination of communication and collaborative tools that can be accessed on-demand from any internet-connected device, lowering operational costs while simultaneously improving plant management effectiveness. The demand for interoperability arises from the need to combine these disparate data sources in an open and honest manner. To maximise their inherent diversification, today's portfolios must connect and enable the interaction of a wide variety of devices, applications, and services. This has led to the development of "Platforms as a Service" (PaaS). PaaS incorporate the benefits of cloud computing over various applications and act as a single point of access to the many underlying services that support the solar industry at both the operational and administrative levels.

Big data analytics

Tracking the current, voltage, power, and energy generation of the equipment, from solar modules to tiny wires, is essential for appropriate monitoring of solar projects. It is also important to keep tabs on the weather and solar resources in order to make reliable predictions about energy production. Real-time monitoring can produce a massive amount of information about a single solar facility. Developers with many equivalent projects or O&M providers for numerous solar assets could benefit from this. Embedded sensors coupled with SCADA and web-based monitoring systems can automatically acquire data to eliminate hassles. Different projects require different types of monitoring systems due to factors including plant size, location, distance from O&M facilities, availability and performance ratio assurances, and budget. It is not enough to simply acquire the proper data; this data must be carefully analysed in order to enhance project outcomes. There needs to be a link between digital data and a serious push for better performance from the part of developers and operators for this to happen. With the help of artificial intelligence (AI) and machine learning (ML) technologies, "large volume, high variety data with high velocity" is analysed using big data analytics.

Role of AI

Artificial intelligence (AI) works on the premise that a computer can be programmed to perform similar tasks as a human brain. Software and computer applications have progressed to the point that a machine may be taught to learn, adapt, and react to the many performance parameters and operational operations of a solar power plant.

Black Solar Panels / Pexels

Several technologies are being applied to increase the intelligence of these devices to the point where they can not only detect malfunctions, but also learn to anticipate and prevent future failures. This has the potential to vastly enhance plant diagnostics and facilitate the repair of defects and breakdowns, ultimately leading to enhanced plant performance. As a result, using AI for solar can hasten the research phase and cut down on the time needed for analysis and planning. The potential of using AI in energy storage to keep the grid running smoothly and without interruptions is currently being investigated. It is challenging to keep the frequency of a solar power plant within the acceptable grid range because of solar's intermittent nature. The use of AI can assist in solving this problem. It can help with power generation scheduling and forecasting so that penalties for over or under generation can be avoided. By analysing vast amounts of real-time weather data from a variety of sources, including satellites, weather stations, and other devices, and comparing it to previous weather data, AI can aid in the prediction of weather trends. It can also forecast the impact of such weather on solar production, allowing utilities to better plan their electricity schedules. Additionally, AI allows for the creation of a "digital twin," or a virtual representation of a physical object that can be utilised as a reference point in problem detection via data anomalies. Because of this, O&M is aided because operators are forewarned of impending faults and can fix them in advance, hence enhancing the efficiency of the plant.

The Use of Solar Energy With Intelligence

While the use of artificial intelligence (AI) in solar plants is still in its infancy, it is already being put to use in a variety of forecasting, monitoring, and maintenance capacities. True Capture, the tracker control system in NEXTracker, is one example. Each module row's tracking algorithms are optimised in real time using machine learning software that takes into account the current weather. Real-time shading data is used to generate 3D digital models of the plant site, and tracking instructions for each row are adjusted accordingly. It is estimated that the system's use might boost energy output by 2–6%. Similarly, DNV GL's GreenPowerMonitor (GPM) is another good illustration. The firm's proprietary GPM Horizon software is an all-in-one resource for managing wind, solar, and battery storage. Owners of wind, solar, and energy storage assets can benefit from this service because it allows for portfolio management rather than separate systems. Through the help of GPM Horizon, asset data collected from various sources and mediums may be visualised rapidly and simply. DNV GL's control centre uses it to remotely monitor and operate all assets, staffed by engineers and analysts. At the company's command and control facility in Bengaluru, India, analysts and engineers utilise GPM Horizon, renewable energy data, and other software tools to keep tabs on their clients' operational assets. Krypton's products allow O&M businesses to perform real-time remote monitoring. Krypton Collect is responsible for collecting data from various sources, Krypton Decision Engine for spotting and correlating anomalies, and Krypton Applications for preventing and fixing problems using cutting-edge machine learning techniques. IBM, the undisputed king of software, has its own self-learning system that combines data from several sources (such as the weather, solar output, and the operation of the electricity grid) to produce an accurate forecast. Up to a 30% improvement in solar forecasting has been demonstrated using this method, which estimates solar energy 15 minutes to 30 days in advance.

Smart-grid / Pexels

ASPENTECH'S DR. TARIQ ASLAM ON RENEWABLE ENERGY BECOMING THE REGION'S DRIVING FORCE

Reduced energy costs, greater price stability, and lessening of the effects of climate change are all possible benefits of using renewable energy sources. This is of the utmost importance now, as the rising cost of fossil fuels brought on by the geo-political crisis in Europe impacts developing nations that rely on imports for their energy needs. Organisations representing both the business and scientific communities have been urging government officials to implement laws to boost renewable energy for decades now, as part of the crucial worldwide effort to combat climate change. Large-scale renewable power projects not only help the environment by cutting down on carbon emissions, but they also offer clear financial benefits for investors, governments, and, most importantly, consumers who are in need of consistent, affordable power.

Thankfully, there has been a rise in support for investing in expansive, cutting-edge infrastructure projects in this sector. Over US$300 billion was invested in renewable energy in 2020 alone, but yearly expenditures in clean energy need to more than triple by 2030 if we're going to achieve net-zero emissions by 2050. In order to entice much-needed private funding, developing nations must roll out a series of massive renewable infrastructure projects that guarantee a return on investment while keeping prices low enough that even the poorest can afford them.

In an exclusive interview with Thirty To Net Zero Magazine, AspenTech's VP & Head of MEA, Dr. Tariq Aslam, said, "There has never been a time when organisations such as AspenTech have been more relevant as we provide asset-intensive industries with solutions to help them address the dual challenge of meeting the increasing demand for resources from a rapidly-growing population, with increasing standards of living, in a sustainable manner. Our solutions are already advancing progress on critical sustainability pathways, such as improving resource efficiencies, the energy transition, and achieving decarbonisation initiatives."

Seventy per cent of workers surveyed expressed a desire for additional training in sustainability-related topics. In light of this and the generational shifts already occurring in the workforce, training and education in this field are of paramount importance. AspenTech has developed the first-of-its-kind "Sustainability Training Programme" to fill this knowledge gap and prepare for future difficulties. As a result, both customers and partners will be better able to acquire and employ digital solutions that have been shown to improve environmental sustainability. Asset-intensive companies, which are typically scrutinised for their environmental impact, would benefit from the programme because of the new skills they will get to apply digital solutions and speed up progress toward sustainability goals.

“While adding to your skill set is important, applying these skills to real-world problems is the most obvious next step. At AspenTech, we have more than 100 sustainability models that are easy-to-use, industry-scale sustainability application examples. They can be easily adapted to our customer’s initiatives and then scaled up across an entire site or enterprise. These models are accompanied by supporting documentation for quick set-up and implementation, and they are a perfect complement to AspenTech’s Sustainability Training Programme,” added Dr. Aslam.

Middle East Stepping At The Right Time

Authorities in the Middle East have established sustainability targets and developed a strategy to lessen the region's environmental effects. The United Arab Emirates (UAE) has approved 22 policies to hasten the shift to a circular economy. These policies will primarily impact the manufacturing, food, infrastructure, and transportation industries. Efforts to lessen the consumption of raw materials, recycle more extensively, and restore depleted ecosystems are prioritised. The goal is to safeguard the UAE's environment and guarantee its long-term economic and social development by 2050, all while achieving its Net Zero aim adding to AspenTech's efforts. In 2023, the United Arab Emirates (UAE) will also play host to the 28th Conference of the Parties (COP28). This momentous occasion presents a tremendous chance for the UAE to advance regional political and economic interests by identifying and implementing workable, commonsense approaches to speeding up the world's energy transition.

Sustainability targets have also been established by other regional governments. By 2030, Saudi Arabia plans to have completely transitioned to renewable energy, and by 2060, it will have reached Net Zero. By 2050, Oman plans to have Zero emissions as well.

With goals in place, quite a few regional players are joining hands with international players to support disruptive acceleration towards these goals. Dr Aslam said, “Since AspenTech's sample models in green hydrogen showed promising results, ACME Group decided to hire the company. AspenTech is the appropriate partner for ACME Group as it strives for operational excellence to stay ahead of market trends, according to the company's 40 years of experience working with asset-intensive process industries. To optimise the process configuration for large-scale green ammonia plants, AspenTech's Performance Engineering solution will be used to design the hydrolysis process at this useful plant. As a result of this collaboration, ACME Group will be able to improve performance, quality, and time-to-market with the best-in-class simulation software; furthermore, circular economy initiatives will be able to respond to global economic challenges, dynamic market conditions, and competitive pressures.”

Challenges Impeding Progress

Industries with high capital requirements must take a broad view and be flexible to succeed. Companies in the energy sector must hasten their digitally led shift if they are to live up to the public's high expectations. The future of any significant industry can be predicted with the use of digital technologies. These sectors are entering a new era characterised by AI-driven efficiency and sustainability initiatives employing mind-bogglingly diverse applications. “Adopting digital tools such as digital twins, digital simulation, and AI-powered predictive maintenance to optimise assets is one example of a more efficient and sustainable approach to delivering this energy to its users. By highlighting inefficiencies in a company's processes, these digital technologies are essential to sdecarbonisation initiatives” opined Dr. Aslam.

Dr Tariq Aslam VP & Head of MEA / AspenTech

Carbon Capture and Utilisation / Aspentech

Innovative Sustainable Solutions Are The Right Card

The need for constant innovation has spread to all industries. There is no way for any sector to make significant progress without either technological innovation or an update to existing methods. The sustainable energy sector requires cutting-edge technological answers to enable the expansion of its own nexus.

Elaborating on AspenTech's partnership with Saudi Aramco Dr Aslam said, "In December of 2022, we announced our partnership with Aramco to optimise Carbon Capture and Utilisation (CCU) options considering sustainability and profitability objectives. Another solution that has been popular among our GCC customers recently is a carbon emission decision support solution. This high-value solution employs multiple existing AspenTech products implemented together for customers looking for actionable insight into their carbon emissions landscape. The solution empowers the company to get an actionable birds-eye view of its carbon emissions by mobilising underlying data and models, helping customers make better-operating decisions to reduce carbon emissions on a day-to-day basis."

DR. AHMED HANDAM ON THE MIDDLE EAST WRITING A SUSTAINABLE AND CLIMATE FORWARD FUTURE

In the Middle East and North Africa, the shift toward renewable energy sources is already underway.

The region's energy investment and diversification plans are cutting-edge and ambitious because of the pressing need to keep up with rising energy consumption, boost economic growth, maximise social and economic benefits, and achieve decarbonization goals. While market size and maturity vary by country, the global picture is one of vitality. The economic benefits of renewables are clear when compared to the costs of using traditional energy sources. The region's support of the global energy transition demonstrates its commitment to achieving the goals of the Paris Agreement, which include keeping the global average temperature rise to well below 1.5˚C. Although there has been substantial growth in renewable energy in recent years, current levels are still significantly below what countries in the region had hoped to achieve. Development is anticipated to accelerate in the future.

Almost 26% of the region's primary energy supply might come from renewables by 2050, according to the analysis conducted for IRENA's World Energy Transitions Outlook (WETO), and this share could rise to 53% in the power sector. This would lead to a decrease in emissions of about 1.1 Gt CO2 per year. According to the Transforming Energy Scenario, the number of jobs in the renewables industry in the region will grow to 2 million by 2050, from 542,000 in 2017. IRENA predicts that hydrogen will provide up to 12 percent of world energy consumption by 2050 in response to the climate emergency and countries' promises to net zero. As a result, various local plans are in the works to meet demand from export markets and hard-to-abate sectors, turning the Middle Eastern market for green hydrogen from a distant possibility into a hopeful reality.

Stretching further on that line, Dr. Ahmed Handam, Academic and expert in energy affairs from Jordan stated, “The future that I see for the renewable energy sector is fully consistent with what was stated by the International Energy Agency in its latest report issued last week,

which stated that the global energy crisis sparked by Russia's war in Ukraine has "sparked unprecedented momentum" for renewable energy capacity, which will increase by 2,400 gigawatts between 2022 and 2027—an 85 percent jump in comparison to the growth rate in the last five years. The most important thing that the report indicated, in my opinion, is that the five-year growth forecast for renewables is 30 percent higher than what the IEA projected in last year's report, marking the group's largest upward revision and giving a new indication that confirms and increases the importance of renewable energy in energy security and, thus, the security of countries and their access to sustainability."

Embedding More Sustainable Solutions Will Lead To A Healthy Future

Concerns about the future, such as climate change, are receiving increased attention from the general public, and more people are calling for long-term, effective answers. While lawmakers are bogged down by political pragmatism and sometimes unable to reach quick consensus on difficult global issues, corporations are often poised and ready to undertake beneficial change quickly. While the considerable focus is placed on how governments respond to environmental concerns, businesses can make a difference right now. Enterprises that want to scale their sustainability initiatives might learn from the proactive, nimble, and intrinsic approach used by platform businesses.

"There are many suggestions in this aspect, and many experts and specialists in this field have preceded me, and they are very important suggestions that will be really useful if they are applied, whether they are related to the production of electricity through renewable energy or what is related to construction, insulation, recycling, etc. Therefore, in my opinion, the most important thing is what makes these proposals applicable, the foremost of which is convincing investors of the importance of such solutions, in addition to decision-makers and society itself, and the impact of this on the world, especially health, which today is witnessing dire consequences due to increased pollution," said Dr. Ahmed.

While delivering a lecture on the future of renewable energy in the Middle East at a symposium held at Ammah Arab University 2022

for instance, The United Arab Emirates' largest steel and construction materials manufacturer, Emirates Steel Arkan, revealed in October 2022 that it is attempting to begin DRI production in Abu Dhabi. In the beginning, the project's technology would be a gas-based direct reduction, but eventually, it might switch to employing green hydrogen to lessen its impact on the environment. Not only will renewable energy sources like wind and solar be in operation by the end of 2025, but also a 2GW solar facility that will be the largest in Saudi Arabia and among the biggest planned in the Middle East. It sweeps through the Middle Eastern deserts, mountains, and coastlines, and is being harnessed by massive construction projects. The Gulfs of Suez and Aqaba, Jordan, the northwest corner of Saudi Arabia, and the southeastern coast of Oman are all quite windy and therefore a great location for harnessing the region's abundant wind resources. Wind farms can be built without facing objections from nearby residents, unlike in many parts of Europe.

Highlighting some major obstacles in achieving sustainable goals, Dr. Ahmed commented, “There are certainly a number of barriers that must be overcome before more sustainable solutions can be incorporated into the system, but it is evident that these barriers are being gradually removed as people become more aware of the benefits of using renewable energy sources, the role that they play in ensuring energy security, the use of alternative energy sources, and the reduction of greenhouse gas emissions. For instance, the Middle East lacked clear policies for renewable energy initiatives at least ten years ago. The circumstance is considerably different today. The global tendency to change to dependence on renewable energy sources is supported by regulatory and encouraging policies, whether for investors or citizens.”

When it comes to encouraging investment in the renewable energy sector and setting appropriate policies that lead to the stability of the energy market, the two most pressing issues that must be addressed immediately are the lack of awareness in this regard and the lack of a connection between the industrial and academic sectors in order to prepare qualified cadres capable of keeping pace with market needs and the necessary skills for that.

If reports of energy-focused organisations are to be believed then expanding the renewable energy industry throughout the region is both essential and urgent. Efforts to grow the renewable energy sector across the region are necessary to preserve the environment and cut down on carbon dioxide emissions.

Active Promotion Of Sustainable Solutions Could Prove A Master Stroke For Middle East

If the right policies are implemented and professional cadres capable of educating and qualifying engineers are drawn to the Middle East region, the region will become a leader in the sustainable energy industry. There is no resistance to the development of massive and enormous projects that will allow the Middle East to export electricity and connectivity with neighbouring countries, which will have a beneficial effect on the energy price in the Middle East and be felt by citizens and investors.

At office and while performing duties as Head of the Renewable Energy Engineering Department at Amman Arab

“I believe that the transformation has already begun through the major projects that I mentioned before, and this is certainly the beginning. The Middle East has many intercontinental projects in the near future in the field of renewable energy,” Dr. Ahmed opined.

The increasing success of solar energy projects in 11 Arab countries including Algeria, Bahrain, Egypt, Jordan, Iraq, Kuwait, the Kingdom of Morocco, Oman, the Kingdom of Saudi Arabia, Tunisia, and the United Arab Emirates shows that the Middle East is a leader in the solar energy field. Solar energy is also playing an increasingly important role in the region's ability to produce hydrogen and ammonia.
Commenting further on the developments, Dr. Ahmed said, “I was born in Tabuk, Saudi Arabia, where, coincidentally, a massive sustainability project known as the NEOM is currently under construction. In that sense, without a doubt, my ideal city is one that eliminates all carbon emissions while maintaining a beautiful green space for its residents to enjoy.”

During a visit to a solar energy project in the Jordanian capital, Amman, with a number of students of the Department of Energy Engineering at Amman Arab University 2021

All photos are Provided By Ahmed Handam From Amman Arab University

People who see challenges differently, see the world differently.

A world where healthcare workers are better equipped to treat patients. Where energy is more sustainable and can power more lives. And where faraway places feel closer with flight that's more fuel-efficient. Because seeing a smarter, healthier, cleaner world isn't something that's far in the future. **It's the world we're building now.**

Building a world that works

SOLAR AND WIND POWER BECOME INCREASINGLY IMPORTANT TO THE GULF COOPERATION COUNCIL

The countries of the Gulf Cooperation Council (GCCC) are investing more in renewable energy than in conventional energy sources in order to achieve sustainable development, that is, to strike a healthy balance between environmental, socio-economic, and energy security and governance. Based on current renewables targets, the GCCC could save 354 million barrels of oil equivalent (a 23% reduction), generate over 220,500 new jobs, cut carbon dioxide emissions by 22% in the power sector, and reduce water withdrawal by 17% by 2030, according to a report by the International Renewable Energy Agency (IRENA). For over 30 years, the GCCC has been implementing renewable energy initiatives, with a recent trend showing an increase in the scope of these endeavours. Renewable energy goals, cutting-edge R&D, and investments in the full value chain of the relevant industry are all in support of these. GCCC has the following goals for renewable energy production: Oman 10 by 2020 (600 MW), Kuwait 15 by 2030 (11,000 MW), Saudi Arabia 30 by 2040 (5400 MW), United Arab Emirates 30 by 2030 (5000 MW), Kingdom of Saudi Arabia 30 by 2040 (5400 MW), and Qatar 20 by 2030 (20,000 MW) (1800 MW).

More and more studies are being conducted to determine the viability of using the vast amounts of land available in the GCCC, especially in Saudi Arabia, for the production of renewable energy sources like solar and wind power. Using 69 years of daily data, researchers in the Kingdom of Saudi Arabia (KSA) used a Monte Carlo Simulation (MCS) and Brownian Motion (BM) approach to forecast the behaviour of solar and wind energy, as well as the long-term performance of temperatures. According to the findings, the northwestern part of the KSA is the best bet for deploying solar and wind energy applications due to the region's abundant solar and wind energy resources, low temperature, and clearer sky throughout the year. The southern region comes next, boasting strong solar and wind potential.

Additionally, similar efforts were made in Bahrain and Oman, and the King Abdullah City for Atomic and Renewable Energy (KACARE) has released a more in-depth Renewable Resource Atlas to provide a solar and wind energy resource-monitoring system for live data recorded from 41 stations across the country. This system is intended for use by researchers, developers, policy-makers, government institutions, and those working to mitigate risk. During 2018, it was stated that wind energy resources (wind speed and wind power density) were available over GCCC's water at heights of 10, 30, and 50 m, spanning 2300 grid points.

Historical wind speed measurements and the examination of wind speed frequency distributions for several places in Saudi Arabia had shown that the wind resources in the KSA were greatest around the coastlines (Tabuk) and smallest in the Middle (Riyadh). Wind speeds were found to be highest in the country's western mountains and northern region, with favourable conditions in the south.

“Clean and sustainable tourism has the potential to transform the world by demonstrating to political and economic leaders as well as advocates for civil society that we are all part of the same global family. In addition, Saudi Arabia may take the lead in the area by becoming a solar and hydrogen power superpower,” stated Author Jeffery Sachs, Director of the Center for Sustainable Development at Columbia University.

Making a long-term investment in wind power

Using their 3500 km of coastline, GCCC could install wind turbines with a total capacity of about 10 GW (annual wind electricity output) if each turbine had a rotor size of 167 metres and provided a specific power rating of 365 W/m2 at a hub height of 150 metres. One example of such a turbine is the Siemens Gamesa SG 8.0-167 DD, which has a cut-in speed of 3 metres per second, a rated wind speed of (14 GW). According to the Global Wind Report, the overall capacity for wind energy across the globe is currently over 651 GW, a growth of 10% from 2018. This represents a very big wind electricity yield, equivalent to nearly 23% of installed wind turbine globally in 2019 (60.4 GW). The amount of power produced by the GCCC has increased from 51 TWh in 1990 to over 536 TWh in 2015. Research indicates that by 2025, the GCCC's electricity demand would have skyrocketed to 1093 TWh. When compared to the global average of 2728 kWh and the Middle Eastern average of 3378 kWh, the power use per capita in the GCC countries in 2010 ranges from 5340 kWh to 17,610 kWh, making it one of the highest rates of energy consumption per capita in the world.

The Al Diriyah Palace where the 39th Gulf Cooperation Council (GCC) summit was held / Xinhua

The daily wind electricity production is around 86 TWh, and the required investment is US$70 bn if each wind turbine costs USD 40 m (including installation). In 2025, this quantity will supply 86% of the required electrical demand. If wind turbines are operational for 30 years, the cost per kilowatt hour is estimated to be roughly US$2.7.

Saudi Arabia has committed to producing 54 GW of renewable energy by 2040, Kuwait and Oman aim to increase the share of RE in the energy mix to 15% and 30% respectively by 2030, the United Arab Emirates has increased its clean energy target from 24% to 27% by 2021 and from 44% by 2050, Bahrain has set 5% of capacity by RE by 2020, and Qatar plans 20% RE out of 1800 MW capacity by 2030.

In the future, Saudi Arabia may be a world leader in solar energy production and exports thanks to the country's abundant solar resources.

According to Alharbi and Csala's findings, the northwestern part of KSA has greater daily total solar GHI and DNI (9.0 and 7.5 kWm2, respectively), which is supported by relatively low temperatures and clear skies. In addition, daily average wind speeds are predicted to be highest (between 5.8 and 8.5 ms1) in the northwestern region. Good daily total values of GHI and DNI (7.6 and 7.2 kWm2, respectively) were also revealed in the southern region, making it a second viable area. The daily average wind speed performance in the south was quite predictable (between 4.8 and 8.57 ms1), and the daily average wind speed distribution was sufficient for the long-term and low temperature values. This study found that Saudi Arabia has a lot of potential solar and wind energy resources, giving the country a lot of room to diversify its power grid. The northwestern region was found to have the highest potential for solar and wind energy applications after extensive evaluation and careful analysis of various aspects of solar and wind energy resources in the three studied regions. The southern region also exhibited strong solar and wind energy resources. In the GCC countries, annual average solar radiation is about 1.1 barrels of oil equivalent per square metre. In the months of June and July, the radiation is highest in Kuwait at 8200 kWhm2 and lowest in Oman at 6400 kWhm2. Radiation levels are low from January to December (4,200 kWhm2 in the UAE and 3,200 kWm2 in Bahrain).

Record low prices and a supportive policy climate make the GCC one of the most alluring places in the world for building massive solar and wind power plants. That renewable energy is the most cost-effective way to generate power in GCCC was just confirmed by the International Renewable Energy Agency (IRENA). Power from solar photovoltaic panels (PV) costs less than US$3 per kilowatt-hour (kWh) and dispatchable concentrated solar power (CSP) costs less than US$7.3 per kilowatt-hour (kWh), less than some utilities in the region pay for natural gas, thanks to abundant resources and strong enabling frameworks.

Additionally, meeting these targets by 2030 can have major economic benefits for the region, including the creation of over 220,000 new employment and the saving of over 354 million barrels of oil equivalent (MBOE) in regional power sectors. Unfortunately, due to the COVID 19 pandemic that began in GCCC in late January 2020 and is still predominating, these goals will not be met by late 2020. The targets could reduce CO2 emissions in the power sector by 136 million tonnes (22% reduction) and cut water withdrawals in the power sector by 11.5 trillion litres (17%).


Solar and Wind Power / Pexels

Several technologies are being applied to increase the intelligence of these devices to the point where they can not only detect malfunctions, but also learn to anticipate and prevent future failures. This has the potential to vastly enhance plant diagnostics and facilitate the repair of defects and breakdowns, ultimately leading to enhanced plant performance. As a result, using AI for solar can hasten the research phase and cut down on the time needed for analysis and planning. The potential of using AI in energy storage to keep the grid running smoothly and without interruptions is currently being investigated. It is challenging to keep the frequency of a solar power plant within the acceptable grid range because of solar's intermittent nature. The use of AI can assist in solving this problem. It can help with power generation scheduling and forecasting so that penalties for over or under generation can be avoided. By analysing vast amounts of real-time weather data from a variety of sources, including satellites, weather stations, and other devices, and comparing it to previous weather data, AI can aid in the prediction of weather trends. It can also forecast the impact of such weather on solar production, allowing utilities to better plan their electricity schedules. Additionally, AI allows for the creation of a "digital twin," or a virtual representation of a physical object that can be utilised as a reference point in problem detection via data anomalies. Because of this, O&M is aided because operators are forewarned of impending faults and can fix them in advance, hence enhancing the efficiency of the plant.

As solar power becomes increasingly popular in GCC countries, what effects will this have on the energy sector?

Understanding the importance of using renewable energy, and solar energy in particular, is crucial for the Gulf Cooperation Council (GCC) countries. These include places that: a) are at risk from rising sea levels; b) have expanding industrial areas; c) have a high annual energy demand growth rate, which ranges from 7 to 10%; d) need natural gas to meet its future energy demand; e) have very high solar radiation levels; f) have a Renewable Energy target in their vision 2030; g) require the creation of green jobs; and h) facilitate the sharing of knowledge, technology, and cooperation. The following effects may result from such a rapid shift toward using solar energy, rather than the previous, more gradual approach.

Solar energy price cuts in the area are substantial

The 300 MW Sakaka project in Saudi Arabia had the lowest PV LCOE (2.34 US$ cents per kWh), according to the Renewable Energy Project Development Office (REPDO). In addition, Masdar and its French partner EDF submitted the project's lowest price at 1.79 US cents per kilowatt hour (kWh). PV panel costs have reduced from $76 per Watt to $0.3 per Watt. Reasons for the price drop include the proliferation of PV manufacturers, the availability of PV panels with warranties of over 30 years, and the gradual decline in the cost of individual solar system components. Table 5 details the concentrated solar power pipeline projects, whereas Table 4 details the photovoltaic pipeline projects.

Solar and Wind Power / Pexels

More investors in renewable energy business

There are many potential benefits for the Gulf Cooperation Council (GCC) countries if they increase their use of renewable energy, such as a reduction in water withdrawal of 11 trillion litres (16%), a savings of 400 billion barrels of oil in the power sector, the creation of 2000 direct jobs, and a reduction in the region's per capita carbon footprint of 8% by 2030. This quickening in implementing significant successful solar project with relatively low cost would entice investors to further employ solar energy. This could entice more renewable energy developers to enter the GCC market with competitive costs and amenities.

Elaborating on the similar thoughts, H.E. Yousif Ahmed Al Ali, Assistant Undersecretary for Water, Electricity and Future Energy Affairs, Ministry of Energy and Infrastructure, UAE, "Following strategies to unlock capital flows in support of clean energy transitions and guaranteeing affordability, the United Arab Emirates plans to drive clean electrification through solar and nuclear power over the next decade. Other goals include improving energy efficiency, lowering methane emissions, and commercialising hydrogen."

China's share of international investment rose to a record 45% in 2017 from 35% in 2016. This was followed by Europe (15%) and the United States (14%). The Americas (except Brazil and the United States; 5%), India (4%), the Middle East and Africa (4%), and Brazil (2%); Asia and the Oceania (excluding China and India; 11%), and Europe (2%). With about 57% and 38% of the total investment going toward solar PV and wind power, respectively, in 2017. With new investments increasing 18% over 2016 levels to USD 161 billion, solar power was the only technology to see growth in 2017. In 2017, investment in the Middle East and Africa rose by 11%, to USD 10.1 billion; this growth was driven largely by increases in Egypt (USD 2.6 billion) and the United Arab Emirates (USD 2.2 billion).

Mohammed Al Taani, Secretary-General of the Arab Renewable Energy Commission, said, "Arab World will witness US$700 billion investment in renewable energy transition between 2020 and 2050 with a target to generate more than 70 Gigawatts of power from renewable energy by 2050. Hydrogen and EVs future up to 300 million vehicles by 2040 and more than 60 percent of the total active vehicles by 2050."

Numerous solar technology companies that provide maintenance and repair services have recently emerged Unfortunately, only the government of Bahrain has a net metering facility. It is expected that all GCC countries will implement such a facility as a result of this increased use of solar energy utility. The purpose of the metering and billing arrangement known as "net metering" is to provide compensation to the owners of distributed energy generation systems for any generation that is exported to the utility grid. It enables commercial and residential customers who produce their own electricity through solar power to sell any excess back to the utility company. Having a Feed-In-Tariff that allows homes to have a payback in less than 5 years makes a facility more appealing. While the United Arab Emirates (UAE) has implemented a programme named "Grants and subsidies," which is mandated under the Renewable Energy Deployment Strategy, no other GCC nations have announced the Feed-In-Tariff facility (2009, 2011, and last updated in 2015). Egypt and Tunisia are two of the Arab countries that have a feed-in tariff system in place.

Therefore, any downtime experienced by the PV system would result in financial loss and waste. Consequently, many repair or energy-conservation businesses will sprout up to meet the need (ESCo). More green jobs and a greener economy will result from this. Investors will be enticed by the solar industry's rapid expansion to launch new ventures in areas like photovoltaic (PV) panels, maximum power point tracking (MPPT) regulators, PV aluminium frames and structures, PV auto cleaning with nanotechnology, AC/Dc invertors, and solar energy marketing and media.

Transitioning to a green economy is covered in depth elsewhere, as are the effects of various renewable energy routes on ecosystems and biodiversity.

GCC IS SHIFTING GEARS TO RENEWABLE ENERGY THROUGH THESE GREEN PROJECTS

Energy consumption in the Gulf Cooperation Council (GCC) countries is the highest in the world at 6260 MW h per capita per year because of their enormous populations, large fossil fuel reserves, and high levels of industrial activity. The primary fuels are oil and gas, with the Kingdom of Saudi Arabia (KSA) being the world's second-largest oil producer and Qatar being the top LNG exporter. Since the Gulf Cooperation Council (GCC) countries are dry states (only receiving an average of 90 millimetres of precipitation annually), a significant portion of their energy output goes toward desalinization projects. Numerous reports have pointed to the importance of expanding renewable energy technology as part of the answer to ensuring people have access to safer, more sustainable options. Efforts around the world to reduce carbon emissions are expected to increase demand for renewable energy, which is predicted to rise by 45 percent worldwide by 2040. According to the IRENA data from 2019, however, renewable energy sources account for only 0.6% of GCC's total electricity generation.

As countries in the Middle East work to boost the proportion of renewables in their energy mix, the region is well on its way to becoming one of the world's most important Renewable Energy hubs. The first semester of 2021 saw no contracts for oil-powered or gas-fueled power stations in the Middle East and North Africa region, as reported by Middle East Energy Transition. During the same time period, about USD $2.8 billion was spent on contracts for renewable energy projects in the area.

Since the GCC states realised the environmental effects of climate change and rising global temperatures, they have been investing extensively in cutting-edge renewable energy technologies. Consistent with the worldwide shift toward renewable energy sources, many large-scale projects have been implemented in the region. For example, in 2017, the United Arab Emirates (UAE) implanted the Mohammed bin Rashid Al Maktoum Solar Park, which has a capacity of around 1288 MW, and in 2019, the Kingdom of Saudi Arabia (KSA) completed the Sakaka project to generate 100 MW from Solar power.

More renewable energy projects are not only bringing GCC countries closer to their sustainability target, but are also providing a boost to their economies.

Al Dhafra Solar Project – Abu Dhabi, UAE

A 2 GW photovoltaic (PV) IPP project, the Al Dhafra Solar Project will be situated in the United Arab Emirates, roughly 35 km south of Abu Dhabi (UAE). Public-private partnerships (PPPs) allow the government-owned energy providers in Abu Dhabi, Abu Dhabi National Energy Company (TAQA) and Masdar, to own 60% of the project.

The remaining 40% is held by EDF Renewables of France and Jinko Power of China. In July 2020, the aforementioned four companies formed a consortium with Emirates Water and Electricity Company (EWEC) to execute a power purchase agreement (PPA) for 30 years.

The project is planned to be fully operational by the year 2022, and more than 4,000 people would be employed throughout the building phase. When fully functional, the plant is estimated to cut annual CO2 emissions by more than 2.4 million tonnes (equivalent to removing approximately 470,000 cars off the road). Solar photovoltaic (PV) modules based on crystalline, bifacial module technology, which captures sunlight from both sides to maximise yield, will be used for the panels to be placed. This effort is a component of the United Arab Emirates' Energy Strategy 2050, which has set a goal of doubling the share of renewables in the country's entire energy mix by that year.

"Abu Dhabi has exhibited a tremendous step-change in the way the Emirate generates power through an improved focus on sustainability and renewable technology," stated Jasim Husain Thabet, CEO and Managing Director of ADPower. The goal of Abu Dhabi is to have 50% of its energy needs met by renewable and clean energy sources by 2030, and the average carbon intensity of the generation system is expected to decrease by more than 70% from 2015 levels. We look forward to working with our partners to deliver the Al Dhafra Solar PV project, which will play a crucial role in realising these goals.

The CEO of EWEC, Othman Al Ali, has claimed that the Al Dhafra Solar PV project is a turning point in the company's ambitious and strategic move toward clean electricity generation in the Emirate. The cost-competitiveness of the proposals submitted is truly extraordinary, putting Abu Dhabi as one of the world's most attractive locations for solar energy production and underscoring the economic benefits presently available through renewable technologies. It is critical to the growth of all sectors in the UAE economy that we are able to secure such competitive pricing on our energy projects. We plan to have the Power Purchase Agreement signed and the project completed by the end of the second quarter of 2022.

Saudi-Arabias-renewables-sector

Noor Energy 1 – Dubai, UAE

With the completion of Noor Energy 1, the Mohammed Bin Rashid Al Maktoum Solar Park will have reached its fourth and final phase. The project has a total capacity of 950 MW and uses a combination of 700 MW of Concentrated Solar Power (CSP) and 250 MW of photovoltaics. The finished project, estimated to cost $3.9 billion, will be the largest CSP plant in the world. ACWA Power, a Saudi Arabian power generation firm, is leading the project's development alongside Shanghai Electric, the Industrial and Commercial Bank of China (ICBC), and Abengoa, a Spanish firm. In September 2017, DEWA, the Dubai Electricity and Water Authority, granted a consortium consisting of ACWA Power and Shanghai Electric a build-operate-transfer (BOT) contract for the CPS project. This agreement includes a 35-year PPA. The contract for the additional 250MW of PV capacity was signed in the month of November, 2018. Dubai's Clean Energy Strategy 2050 calls for 75% of the emirate's energy to come from renewable sources by the year 2050, and the Noor Energy 1 project will help get them there.

Sudair Solar Power Plant – Riyadh, Saudi Arabia

With a projected 1.5GW of total generation capacity, the Sudair Solar Power Plant will be the largest solar photovoltaic (PV) plant in Saudi Arabia and one of the largest in the world. The PV system will use bi-directional panels equipped with tracking technology, as well as a robotic cleaning system. In August of 2021, financial close was reached on the SAR3.4bn ($906m) project led by ACWA Power. Aramco's subsidiary, Saudi Aramco Power Company (SAPCO), along with ACWA (35% each), and Badeel (Water and Electricity Holding Company, bringing the total to 70%), are working together on this project. The Public Investments Fund owns a stake in Badeel (PIF). In April 2021, at the opening ceremony for Saudi Arabia's first utility-scale solar energy project, the 300MW Sakaka solar plant, the Sudair Solar project was announced. The Public Investment Fund's first renewable energy project is planned to generate enough power to supply 185,000 homes and prevent the annual release of almost 2.9 million tonnes of carbon dioxide. A preliminary commissioning of the project is anticipated for the second semester of 2022.

Manah I & II Projects – Manah, Oman

One gigawatt (GW) of solar power will be generated by the Manah I and II Solar Independent Power Projects (IPPs), which are scheduled to become live in the fourth quarter of 2023 and the first quarter of 2024, respectively. Due to the global pandemic and economic downturn, the project's implementation timeline had to be shifted, prompting the announcement. The project, which is being overseen by the Oman Power and Water Procurement Company (OPWP), is expected to cost over RO300 million ($780 million). The corporation received technical bids for the two projects in the beginning of 2021, and the original deadline for commercial offers was the 25th of May 2021. As of right now, OPWP has prequalified nine multinational consortia to take part in the competitive tender for the Manah Solar I and II schemes. Oman's Vision 2040 Implementation Follow-Up Unit released a statement saying, We expect that the Manah 1 and 2 solar projects will help Oman diversify its energy sources and meet its goal of producing 30% of its electricity from renewable sources by 2030. Manah I and II are anticipated to cut GHG emissions by about 680,000 tonnes.

Mohammed bin Rashid Solar Park

As part of its clean energy push, Dubai intends to meet 25% of its energy needs from renewable sources by 2030, and 75% of its needs by 2050. To lessen its dependency on natural gas and diversify its power sources, Dewa is constructing the largest solar energy park in the world. By 2030, the Mohammed bin Rashid Solar Park could attract up to Dh50 billion ($13.6bn) in investment and produce 5,000 Megawatts of power. To carry out the project's fifth phase, Shuaa Energy 3, a company in which Dewa owns 60% and a consortium including Acwa Power and Gulf Investment Corporation own the other 40%, is now in operation.

HE DEWA's managing director and chief executive officer Saeed Mohammed Al Tayer has stated that the Independent Power Producer (IPP) model being used to undertake projects in the Mohammed bin Rashid Al Maktoum Solar Park has attracted international investors and developers. Through this paradigm of public-private partnerships, he said, DEWA has attracted investments of roughly AED 40 billion. For five years in a row, DEWA's Levelised Cost of Energy (LCOE) for solar power was the lowest in the world, setting the bar for solar power pricing around the world.

His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, has stated, "At DEWA, we work in accordance with the vision and directives of His Highness Sheikh Mohammed bin Rashid Al Maktoum to promote sustainability and innovation and transform into a sustainable green economy. In accordance with the Dubai Clean Energy Strategy 2050 and the Dubai Net Zero Carbon Emissions Strategy, this is accomplished by generating all of Dubai's electricity from renewable and sustainable sources by that year.

To realise this goal, our largest project to date has been the Mohammed bin Rashid Al Maktoum Solar Park, the world's largest solar park. By 2030, its capacity is expected to reach 5,000 MW. The solar park's current capacity, generated by photovoltaic solar panels, is 1,527 MW. In addition to future stages to achieve 5,000MW by 2030, DEWA is now executing projects with a combined capacity of 1,333MW using solar photovoltaic and Concentrated Solar Power (CSP). The percentage of clean energy capacity in Dubai's energy mix is estimated to rise to 14% by the end of 2022, said Al Tayer.


Wash Basin and WC: RAK-VALET
Furniture: RAK-ZEN LINE
Wall and Floor: TOKYO CONCRETE
RAK
CERAMICS
RAKCERAMICS.COM

"MIDDLE EAST ON THE RIGHT TRACK TO ACHIEVE NET-ZERO EMISSIONS BY 2050,": ENGIE'S OMAR FATOOM

Over the course of the forecast period, the renewable energy market in the UAE is projected to grow at a CAGR of 7.5%. Remarkably, the COVID-19 epidemic had no effect on the country's growth in the field of renewable energy. In 2019 and 2020, the country had a rise in its installed solar PV capacity of roughly 34%. Numerous factors point to the renewable energy market in the United Arab Emirates expanding in the years ahead including the increasing need for cleaner ways to generate energy thereby tackling the current GHG (greenhouse gas emissions) rates and a continual advance in solar power technology.

Competition from alternative energy sources, such as nuclear power, may slow the (solar) market's expansion. However, increased commercialisation opportunities through the GCC grid are being explored as witnessed by the agreement between GCC countries and Iraq. The agreement stipulates that the GCC will connect their electricity network to Iraq's grid. The agreements are expected to advance plans to supply Iraq through the GCC Interconnection Authority (GCCIA), an idea first raised in late 2018 and that began to take shape the following year. Such opportunities will further increase with the reduction of cost of generation through the use of sources such as solar and the global support for renewable energy in itself.

AED 100 billion Dubai Green Fund to support the Shams Dubai initiative, a programme to encourage the installation of rooftop solar panels, is just one example of the financial innovation taking place in the sector to help facilitate and supply the investments necessary over the long run.
Omar Fattom, Solar Engineer, ENGIE Solutions in an exclusive chat with T2NZ magazine reveals the floor plans for the Middle East to achieve net-zero emissions by 2050.

Fatoom opined that as a major renewable energy source with a low LCOE and great efficiency over the long term, solar is extremely significant. A partnership with ENGIE will help the UAE get closer to its objective of reaching zero emissions by the year 2050. KAHRAMAA recently granted ENGIE Cofely Mannai a contract for the supply and installation of electric vehicle chargers (Phase I). With the help of this project, Qatar and the GCC will be able to significantly cut their CO2 output.

Renewable Energy Market Increases Its Network
Historically, government-owned utilities have dominated the electrical market in the MENA area, leaving limited openings for private enterprises to establish cost-effective on-site electricity generation.

Omar Fattom / Engie Solutions Middle East

This sudden change occurred for a number of reasons. Many nations in the MENA region have begun setting goals and objectives to reduce their CO2 emissions in line with those of other nations across the world. As a result, governments in these nations have issued new legislation aimed at getting energy consumers interested in and using renewable sources of power.

Numerous builders and financiers are considering making investments in renewable energy projects in the MENA areas.

Large commercial and industrial businesses in the region are becoming increasingly interested in having their own rooftop and utility-scale on-site PV plant installed as a result of the declining costs of PV installations and their increased efficiency, as well as the progressive removal of subsidies on fuel and electricity prices in the context of increased sustainability challenges.

“Those who currently utilise Diesel/HFO Genests will appreciate the ease and lower cost of switching to a renewable energy source. It is for this reason that the term "PV-Agri" has recently begun to circulate.
“In addition, the availability of renewable energy has made food production nearly carbon dioxide (CO2) neutral,” said Fatoom.

Role Of Private Sector
Economic growth in the Gulf region is still being propelled by the state and state-linked groups. However, a determined effort to diversify the economy has created opportunities for domestic private companies to enter the renewable energy market.

For example, Saudi Crown Prince Mohammed bin Salman reshuffled the political and economic influence of oligarchic families and co-opted newer groups, such as the Abunayyan and al-Muhaidib families, who founded Acwa in 2002 and continue to be key executives and shareholders, in order to shape and consolidate his power base. The power of some of the older oligarchic families, such as that of Abdul Latif Jameel, was maintained, however. The renewable energy company Fotowatio Renewable Ventures owned by the latter now has assets (including those still in development) totalling more than 5 GW in countries other than Saudi Arabia.

In the United Arab Emirates, well-established family-run enterprises have done the same thing during the past decade, using their credibility, client base, and financial resources to launch brand-new lines of business. These are focused on creating residential and commercial solar power installations in the United Arab Emirates, South Asia, and the MENA region (MENA). Yellow Door (a spin-off from Adenium Energy owned by the Saudi AK Bakri family conglomerate and based in Dubai with distributed solar assets of 120 MW), Siraj Power (co-founded by notable Emirati businessman Abdul Ghaffar Hussain of Green Coast Enterprises with distributed solar assets of 100 MW), and AMEA Power are just a few examples (a subsidiary of Al Nowais Investment, which is owned by one of the wealthiest families in the UAE, with solar assets in Africa). The likes of Enerwhere, has thrived despite its lack of early connections to wealthy families in business, are still the exception. Manufacturers of solar and wind components are proliferating throughout the Gulf. A number of new players have entered the solar industry in the Middle East, complementing long-standing powerhouses like Dubai's DuSol and Maysun and Saudi Arabia's Bin Omairah, Desert Technologies, and GTek and Bahrain's Solar One (PV Hardware in Saudi Arabia). In comparison to the proportion of the market held by imported renewable energy component manufacturers, the current scale of their manufacturing lines is low.


zero-hour.
This is our decisive moment.
For CO_2, time is up.
For every single company, every single industry.
It's time to transition to a post-carbon world.
It's net zero everything. Or nothing.
Time to get ahead. Or get left behind.
It's why, with a holistic, scientific perspective, our Net Zero Investing Strategies can analyse and decarbonise entire portfolios.
So our clients can benefit from the industry leaders preparing for the economic impact of a net zero transition.
Not tomorrow, but today.
Because net zero isn't 30 years away.
Net zero is now.
Find out more about our Net Zero Investing Strategies at LombardOdier.com
rethink everything.
17 96
LOMBARD ODIER
PRIVATE CLIENTS
ASSET MANAGEMENT
INVESTMENT

MOHAMMAD AL KOUR SHEDS LIGHT ON THE REGION'S SOLAR BELT

With numerous high-volume oil exporters and carbon-emitting industries being located in the Middle East, interest and emphasis on the use of CCUs and renewable energy are at an all-time high. The region is investing in renewables, particularly solar energy, to diversify its power generation energy mix and meet its environmental commitments, and their expanding energy needs.

The abundance of sunlight makes the region ideal for the growth of the solar power industry. Population and economic expansion in the region are to blame for the increase in total energy demands. In the Middle East, 26% of investors said they were already investing in the energy transition, making it the region with the highest concentration of renewable investment at present. Others indicated they were considering making an investment in the promising sector.

T2NZ spoke with Mohammad AlKour, Sr. Solar PV Engineer & Team Leader, Haji Commercial Company LLC, in an exclusive interview to learn more:

"The Middle East is located within what is known as the solar belt, an area that receives a disproportionate amount of sunlight due to its position near to Earth's equator. And we can enhance the solar energy production significantly. If you believe the numbers, for instance, you'll get over 1800 kWh/kWp annually, which is excellent when compared to European or Western countries. And then, in terms of solar power's future in this region, we've lucked out by spending so much time in Dubai, home to a number of international corporations with expertise in the field. And starting with UAE's solar projects, which have been started almost nine years ago, they have started with Mohammad Bis Rashid Solar Park, which has been reached to over 2.8GW, combining solar photovoltaic and Concentrated Solar Power (CSP), over five phases as well as AlDhafra and Sweihan solar PV projects, which are 3.2GWp. Moreover, the Tariff rates are so low compared with other regions, low labour costs, competitive project financing prices, well-experienced vendors who can design, procure, and implement the project. Besides, the comprehensive costs of building a solar PV power plant are coming down with the time. Due to all the above-mentioned strong factors, Middle East is one of the best destinations for solar investors. Let's not forget that the first CSP plant in the world was built in 1912 by Frank Shuman, operating steam engine in Maadi, Egypt," stated Mohammad AlKour, Sr. Solar PV Engineer & Team Leader, Haji Commercial Company LLC.

“The capital cost of an investment in solar PV project can be covered over the course of four to five years, they will drastically help reduce business overheads as they have a lifespan of 25–30 years. Given the significant advantages, many solar energy projects have been green-lighted in the region,” said AlKour.

Technology Is The Real Driving Force

Solar energy is collected through three main technologies: photovoltaics (PV), which converts light into electricity directly, concentrated solar power (CSP), which uses thermal energy from the sun to drive utility-scale electric turbines, and solar heating and cooling (SHC) systems, which collect thermal energy to provide hot water and air heating or conditioning.

“PV stands for "photovoltaic”, it is a Greek word. The word itself implies the working methodology; the word “photo” comes from the photons that generates voltage “voltaic” by touching the PV cells. PV cells can convert the photo energy into electricity. PV cells are made of Semiconductor, when the photon of the sunlight touches the solar PV cell, it activates the electrons within the semiconductor causing the material to conduct power. This power is then converted from direct current (DC) to alternating current (AC) by inverter” explained AlKour.

“While concentrated solar power (CSP) systems use mirrors to focus a large area of sunlight onto a much smaller area where it contains a fluid, where it is used to transfer the heat from solar collectors to the power cycles to drives a steam turbine connected to an electrical power generator.
“When it comes to solar power plants, the Middle East prefers solar PV power plants over CSP because CSP is only used on a utility-scale. In contrast, solar photovoltaics can be utilised practically anywhere and requires less CAPEX and OPEX” he said.

Shedding more light on the subject, Mohammad said, “The Middle East has become a focal point for investors and the realisation of visionary financiers' plans due to the region's strategic location and the approach or assistance offered by the region's governments. And that's great news for governments keen on adopting solar power; they're increasing their share of renewable energy to 50 percent. Because of the Middle East's strategic location, we can mostly rely on solar power and not on wind or other renewable sources relatively. Solar energy, whether PV or CSP, will soon become the primary source of power for the vast majority of people.”

The government’s Support Can Act As A Catalyst For This Sector

It's important to show individuals the government's plan to encourage solar adoption by individual households before they can convince them to switch to solar power by showcasing how it can help turn a profit for both individuals and businesses through net metering feature.

“Therefore, I believe that the government should adopt policies like net metering and allow consumers to sell back to the government all the excess energy they generate.”

Further, AlKour said that through education and public awareness campaigns, solar power will gain popularity leading to the growth and development of the industry in the region.

Training on Solar Energy Technologies for HCC Team - 3

He also added, “As I faced a disappointed period seeking for the first opportunity to join the solar world in Dubai, I wish the organizations focus on hiring graduates as an internee to give the chance, they may be going to be better than those who are experienced, as we all know that the character matters the most and the experience can be gained sooner or later”

Top Solar Power Plants in the Middle East

- 100MW - CSP - Masder - UAE
- 1.2 GW - PV - Noor Sweihan - UAE
- 2 GW - PV - AlDhafra - UAE
- 13 MW - PV - 1st Phase MBR Solar Park - UAE
- 200 MW - PV - 2nd Phase MBR Solar Park - UAE
- 800 MW - PV - 3rd Phase MBR Solar Park - UAE
- 950 MW - PV + CSP - 4th Phase MBR Solar Park - UAE
- 900 MW - PV + CSP - 5th Phase MBR Solar Park - UAE
- 300MW - PV - Sakaka - KSA
- 2GW - PV - Western Saudi - KSA
- 800MW - PV – Al Kharsaah - Qatar
- 1 GW - PV - Karapinar - Turkey
- 105 MW - PV - Ma'an - Jordan

Explaining further on such mega projects, Al Kour said “If you look back in time, you'll see that the United Arab Emirates and Saudi Arabia are the two countries that have put the most emphasis on solar power. Also, for the past two years, there has been a proliferation of utilities skills-related projects in KSA. And there has been a great deal of funding, or during the for the utility-scale projects going for many courses, mega points.”

Energy Storage Devices’ Real Picture

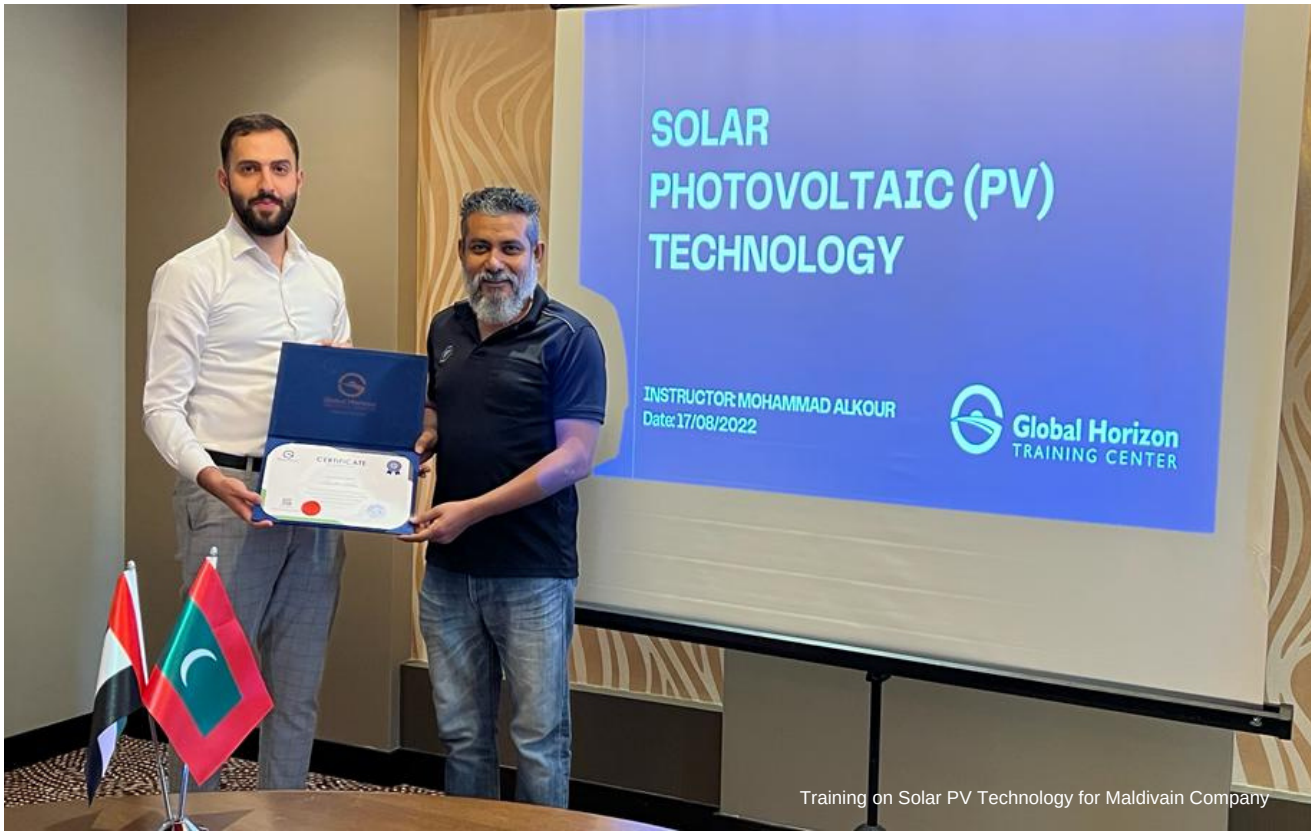
One of the many drawbacks to renewable energy is the difficulty of putting that energy to use later. Energy storage is challenging in general, but especially so for wind and hydropower; solar energy can be stored using batteries. When the well-designed size of the batteries is taken into account, it's clear that this is a massive system. There are a lot of different technologies packed into batteries, so it's important to select the right one and construct it in such a way that it can provide power for at least two days if cloudy weather strikes. As a result, the design and engineering must be spot-on.

“Ideally, every project dependent relying on batteries should be sized for minimum two days autonomy. However, high-quality batteries are quite expensive and thus out of budget for many customers. One silver lining is that today technology is moving beyond the storage of solar power through hydrogen green cells.

He added further, “They are now looking for a hybrid system that combines solar power with Diesel Generator. As a result, you can minimize or eliminate the use of batteries.”

Speaking more on the practical change as far as the solar industry is concerned for the region, Mohammad said, “When it comes to making changes because we must first make those adjustments within ourselves. We need to give ourselves the option of using renewable sources of energy or reducing our overall energy consumption. The shift has to come from within, first and foremost in terms of individual attitudes and beliefs; second, it will require action on the part of regional and national governments, which will need to promote a greener way of life and provide resources to businesses so they can implement green initiatives. Finally, we come to the topic of schooling and instruction. More people need to realise that this plan isn't just about us; it's about future generations as well. Of course, we also need to provide them with even cleaner air than they are already breathing. Therefore, it is everyone's duty to realise that we are in a climate emergency and that immediate action is required. Right now, I'm in the middle of reading NetZero City. This book, then, describes the plan and the precise transformation necessary within ten years to reach net-zero. It is an incredible book. As far as I can see, we are out of options and therefore require it.”

Mohammad hails from Jordan. He has been raised his whole life here in Dubai. This is where he completed his senior year of high school. After that, he relocated to Cyprus to finish his undergraduate studies in Energy Systems Engineering, specializing in Renewable Energy Resources from Girne American University . After realising the region's potential and untapped opportunities, he relocated back to Dubai. In the beginning, he had some difficulty here because the market was already quite saturated. Thankfully, he recovered and was able to take advantage of a subsequent opportunity. He is now a valued member of Haji Commercial Company LLC (HCC), where he is the senior solar PV engineer leading the design, execution, and O&M teams and he is perusing a master’s degree in Global Sustainability Engineering from Heriot-Watt University. HCC has done many projects in Dubai has ongoing projects working with high prestigious clients and governments.



Training on Solar PV Technology for Maldivain Company

All Photos Supplied By Mohammad Alkour From Haji Commercial Company


Omar Fattom / Engie Solutions Middle East

For instance, Jinko Solar, a Chinese photovoltaic panel manufacturer, controls about a third of the Middle Eastern and North African (MENA) market. Caps set by state-owned utilities on the size of rooftop solar systems installed at industrial and commercial organisations of 500 kW in Bahrain and 2 MW in Saudi Arabia and Dubai also limit local demand. Despite concerns over the feasibility and legality of such schemes, local firms in Saudi Arabia and Oman are seeking to gain from larger levels of local (or even GCC) content requirements.

“The biggest difficulty is the LCOE, yet there are numerous sustainable solutions now being developed and researched to be included in the system. Energy Transition Masterplans, developed jointly by the public and private entities in the region's countries, can help accelerate this process,” opined Fatoom.

Role of state-owned enterprises

The second dissimilarity concerns government-owned businesses operating in the renewable energy field. Acwa Power (Saudi Arabia), Masdar (Abu Dhabi), and Nebras Power (Oman) are "national champions" in renewable energy both domestically and internationally, representing three different Gulf republics (Qatar). Acwa and Masdar focus primarily on electricity development and operation, while Nebras Power is an equity investor. Nebras's asset portfolio is the smallest, with only 6.5 GW of producing capacity outside of Qatar. Masdar's new cooperation with Abu Dhabi's Taqa and the Abu Dhabi National Oil Company (ADNOC) has increased the size of its renewable portfolio from 10 to 23 GW, while Acwa's total power project capacity is over 42 GW. While Acwa and Nebras include fossil-fuel power stations as part of their portfolio, Masdar is the only one whose exclusive focus is on renewable energy. Acwa plans to double the percentage of renewable energy it uses by 2030, from the current 13%.

Speaking about expectations from the government, Fattom commented, “The rights of developers, contractors, and off-takers can be safeguarded by providing well-defined regulatory frameworks. In addition to making, it easier to get the necessary permits to connect a PV system to the utility grid, having an available power purchase agreement at a reasonable purchase price makes it possible to inject the surplus energy into the grid.”

All Photos Supplied By Omar Fattom From Engie Solutions


A product designed by Cosentino®
TOPS ON TOP
Cindy Crawford on Silestone Seaport
SILESTONE
On Top
Find inspiration at cosentino.com | Follow Us @CosentinoMiddleEast
COSENTINO CITY DUBAI Dubai Design District (D3) Building 4-A, Unit 401
04 242 8131 - infomiddleeast@cosentino.com
The Silestone® LOFT series designs have been registered by Cosentino S.A.U.
ESPAÑA
Expo Dubái 2020

"SOLAR ENERGY MIGHT STRIKE A RIGHT CHORD FOR SAUDI ARABIA": HALAA'S MOHAMMED FAGIR

Unexpected places have proven to be fertile ground for the spread of renewable energy. The Middle East has made significant investments in solar energy and other forms of renewable energy in recent years.

It may come as a surprise to people who aren't familiar with the Middle East - home to the world's greatest crude oil reserves and one of the world's leading petrochemical manufacturers & exporters but between 2010 and 2020, the region saw a doubling of its renewable electricity generation to 40GW, and another doubling is expected by 2024.

We see the pattern escalating due to a number of factors. As oil prices have fluctuated, making fossil fuels an uncertain investment, renewable technologies have become increasingly competitive with them in terms of price. In addition to having an abundance of sunshine, the Middle East is home to large, sparsely populated desert landscapes that are ideal for solar-energy farms.

The rising price of natural gas and the falling price of solar photovoltaic panels in the United Arab Emirates have increased the attractiveness of renewable energy in that country. Within the next three years, the country wants to generate 20% of its electricity from non-fossil fuel sources, with a goal of generating 50% of its energy needs from such sources by 2050.

Stretching further on that thought, Mohammed Fagir, Senior Solar Engineer, HAALA Energy stated, "Awareness of climate change and measures to counteract it on the part of the public and private sectors are recent developments in Saudi Arabia. The heat in MENA region is already so intense that handling a person's viral slide can be dangerous. People are understandably wary of embracing or being embraced by climate change, but they will do a fantastic job anyway. In light of this, we have made it a priority to spread information to the public. A growing number of corporations are exploring the potential of solar energy to help them meet their emissions reduction goals."

After growing up in Saudi Arabia, Fagir studied Electrical and Electronics Engineering at the University of Sunderland in Malaysia. After completing his degree in 2014, Fagir returned to his home country – Sudan, to find work in the diesel generator industry. Even though Renewables accounts for approximately 80% of Sudan's energy generation, the country has other challenges. Today, Sudan's market is just getting organised. It was here that he first became interested in solar power; after returning home, he continued work in the Kingdom.

Fagir currently works at Haala Energy Industry. The enterprise is committed to C&I. However, the company also works on a variety of other projects, including research products for government institutions, Research Centres and feasibility studies for elite clients in the commercial and industrial sector.

Solar Energy Can Become The Oasis For Saudi Arabia

There has been rising hope in recent years that solar energy may become increasingly viable in Saudi Arabia. Since most of the country lies within the sun belt. Solar power has the potential to become an important part of the country's energy mix within the next few years, as was pointed out in a 2014 article published by academics at King Saud University.

"Since I first became involved, the solar industry has undergone tremendous growth, with dozens of conferences and dozens of new solar-related businesses opening each year, as well as massive investments in infrastructure and rules and regulations. So, I believe the market will begin to take notice within the next two to three years at the very most. Now we have a business with strong incentives to undertake solar installation, a task that remains challenging due to the myriad variables at play in building design, energy usage, municipal pricing structures, and so on," opined Fagir.

Mohammed Fagir

By 2030, Saudi Arabia hopes to have produced half of its electricity from renewable resources. The Renewable Energy Project Development Office is responsible for the competitive procurement of 30% of this target; the kingdom's Public Investment Fund (PIF) is tasked with delivering the remaining 70% through direct negotiations with investors in an effort to develop Giga-scale projects. However, only 0.3% of its electricity supply came from renewable energy in 2020 (the most recent year for which data is available), meaning that additional investment is needed if Saudi Arabia is to achieve its high targets for renewables.

However, the month of October saw significant impetus for climate action from the monarchy as it set a net-zero objective for 2060 ahead of the COP26 U.N. Climate Change Conference and updated its Nationally Determined Contributions under the Paris Agreement. With the United Arab Emirates, Saudi Arabia has committed US$340 billion in net-zero investments to be used for renewable energy, storage, and hydrogen, as well as carbon capture, utilisation, and storage projects.

Stronger Awareness Coupled With Technology Will Beef-Up The Entire System

What's happening in Saudi Arabia right now isn't just about energy; it's about everything that has an impact on the lives of the people in the region. This is why the shift is so important: it promotes a broader understanding of the region's ideology and the developments that have already taken place. Climate change is a bigger issue than these beneficial shifts, so let's talk about it. Because there are a plethora of options to consider when setting your sights on such long-term shifts. Which begs the question: how high up on your list of priorities (or lack thereof) does raising public awareness about climate change appear? We are essentially discussing business, the energy industry, and the tourism industry. So, according to these standards, how does the global warming rate on this bubble? The good news is that a lot of people are learning about it today and working to spread the word. That's why a lot of large corporations are making an effort to move in that direction.

Shedding some more thought on the involvement of technology, Fagir said, “what I've seen is that, at the most fundamental level, we're talking about cells, right? In what capacity does a single cell take in information? Therefore, if you have provided me with a model or panel that is one metre and two metres in size and generates 400 watts, I would like to further develop and optimise that design. Therefore, you increase the number to 600 or 550. However, expanding it also means making it bigger. You increase the 1.2 to the 1.5 by a factor of, say, 2.3."

"Consequently, it is exceedingly challenging to document the progress in this area. Therefore, I am not claiming that the redevelopment has already taken place. Yet it moves more slowly than I anticipated. That, however, is only true for the past five years. However, if you look at the period between the recent five years and the ten years before that, you will notice a massive shift. I believe it was initially quite rapid but eventually slowed down. But the point is, now we're this generation, this era, and everything occurs swiftly, and we don't even recognise it. As a result, you should start construction on the little panel right once, because, in about two years and six months, it will be even more compact. We overestimated its speed. But, yeah, it has settled down to a constant rate.”

“Production versus consumption, that is, panel manufacture versus panel installation, depends on which is more rapid, but both involve completely automated processes. If we're focusing on the Middle East alone, I believe output is outpacing consumption,” he added further.

Fagir’s travels have taken him to many destinations, but nothing stands out as much as sustainable Abu Dhabi. The cutting-edge technology is what sets it apart. Diverse traditions coexist in harmony, creating a stunning fusion of aesthetics.

All Photos Supplied By Mohammed Fagir From Haala Energy

EXPO 2020 DUBAI UAE

UZBEKISTAN PAVILION
EXPO 2020 DUBAI

OFFICIAL PARTICIPANT • UZBEKISTAN

DISCOVER THE HIDDEN GEM OF CENTRAL ASIA
AT EXPO 2020 DUBAI

MAPPING THE FUTURE PATHWAY

VISIT UZBEKISTAN PAVILION
1ST OCTOBER, 2021 – 31ST MARCH, 2022

www.uzbekistanexpo2020.com

POWER FROM THE SUN AND RELIABLE STORAGE COULD SPARK A REVOLUTION IN THE ENERGY INDUSTRY

This is one of those cases where having two people is preferable to having just one. One example is the integration of solar power with battery storage. The primary reason for this is that solar panels do not always provide energy when it is most required. In the summer, peak electricity demand typically comes in the afternoons and nights, when solar energy production is decreasing. This is when most individuals who work throughout the day have returned home and are utilising power to do things like keep cool, prepare meals, and clean up afterward.

Solar energy may still contribute to the grid even when the sun isn't out, thanks to storage. Also, it can assist even out the peaks and valleys in the flow of solar power into the system. The amount of sunlight reaching photovoltaic (PV) panels and concentrating solar thermal power (CSP) systems varies throughout the year. Seasons, hours of daylight, clouds, dust, haze, and impediments like shadows, rain, snow, and dirt can all have an impact on the amount of energy harvested from the sun. Energy storage can assist integrate solar into the energy landscape in two different configurations: when it is positioned adjacent to a solar energy system (co-location) or when it is located elsewhere (stand-alone).

To lessen their reliance on fossil fuels, boost energy security, and reduce greenhouse gas emissions, governments in the Middle East and North Africa (MENA) have committed to meeting aggressive renewable energy targets. By the year 2030, many Middle Eastern and North African countries hope to have generated between 15 and 50 percent of their electricity from renewable sources. As the price of technology decreases and more attention is paid to green legislation, the climate becomes more conducive to the use of renewable energy sources like solar and wind. However, compared to the global total of 2,799 GW as of 2020, the MENA area has only installed a capacity of roughly 10.6 GW of renewable energy.

Increased integration of variable renewable energy (VRE) systems into power grids will necessitate the use of energy storage systems (ESS). By providing capacity firming and other ancillary services like frequency and voltage management, ESS will improve the adaptability and reliability of power grids.

Further, ESS can play a pivotal role in peak shaving, the process of reducing the impact of energy consumption peaks, and the stacking of a wide variety of ancillary services.

Solar Technician Installing Solar Panel / Pexels

Depending on the demands and requirements of the power system and grid, ESS can deliver dozens of services that can be stacked to enhance value. Pay for these services varies widely in response to fluctuating demand. In addition to storage capacity payment, the stacking of services also permits revenue stacking, giving a positive economic case for ESS. Expanding power generation capacity has been a primary priority in power system design for the past few decades. Because of this, the MENA region is in a constant state of competition to increase its power generation, which is now growing at an average annual rate of 7% and relies primarily on thermal energy. Subsidies, population growth, and the ever-increasing requirement for cooling and water all contribute to the ever-increasing demand. It is crucial for MENA countries to slow the rate and pace of adding power generation capacity, and the current trend in power system design is toward reduced peak load.

Thirty energy storage projects are now in development in the region with a target implementation date of 2025. Currently operational ESS include pumped hydro-storage (PHS), which accounts for 55% of the region's ESS installed capacity compared to 90% globally, and batteries, especially sodium-sulfur and lithium-ion batteries, which are projected to increase from 7% to 45% of MENA's ESS by 2025.

This is especially true with renewable energy-plus-storage auctions or co-location of wind and solar plus storage, both of which are examples of utility-scale front-of-meter (FTM) applications, or grid-scale energy storage connected to the generation sources or the transmission and distribution networks (T&D). Currently, 89% of the region's ESS installed capacity is used for FTM applications. However, substantial power supply deficits give another motivation for ESS in nations like Iraq and Lebanon that experience periodic power blackouts. This is especially true of applications that store electricity on-site, behind the consumer's metre, known as "behind-the-meter" (BTM), which help mitigate the societal and financial costs of power outages.

“In spite of these motivators, ESS deployment in MENA is only at roughly 1.46 GW, compared to a global capacity of 10 GW, or slightly under 15% of the total, which is similar to the battery storage in the U.K. Now, in order to speed up the deployment of ESS and VRE throughout the region, governments, electricity utilities, and finance institutions will need to overcome a number of legislative, financial, and market impediments,” stated Suhail Shatila, Senior Energy Specialist, APICORP.

Combining Solar Energy with Storage has Many Benefits In order to prevent over-generation and grid reliability difficulties, grid operators may "curtail" certain generation in order to balance electrical loads if storage is not available. On the other hand, there may be instances when there is low solar production but high demand for electricity, such as after sunset or on foggy days. The solution is to use a battery or other kind of storage that can be charged when power

generation is high but consumption is low and then released when demand is high. By storing some of the sun's energy, grid operators will have access to that power anytime it is needed, even when the sun has set. Storage can be thought of as a hedge against cloudy days.

Short-term storage can "firm" solar generation, meaning that it will not significantly alter the output of a solar power plant if the amount of solar energy generated is fluctuated often. A tiny battery, for instance, can be utilised to endure a temporary interruption in generation caused by a passing cloud, allowing the grid to continue providing a "solid" and consistent electrical supply.

Backup power during blackouts is possible using solar and storage systems. They are able to maintain vital infrastructure to guarantee the continuity of lifeline services like communication. Microgrids and other distributed energy resources, such as mobile or portable power units, can also benefit from solar energy and energy storage.

Challenges that are spoiling the game

The development of energy storage is hampered by other laws, such as the net-metering technique favoured by flat rates. Under this plan, customers can reduce their utility bills by feeding any excess power they generate back into the system. An incentive to construct small-scale renewable energy, but not BTM energy storage, is provided by a flat-tariff scheme, with the exception of countries with significant blackouts. To promote distributed renewable energy installations that use BTM, a revision of the net-metering scheme is necessary, especially as the share of renewables rises.

Low levels of investment, prohibitively expensive finance, and the need for large subsidies all work together to make it difficult to secure funding for ESS projects. A regulatory scheme that includes ESS as part of T&D will need to provide substantial funding for the grid network. Almost a third of the $805 billion allocated to MENA energy sector projects from 2021-25 goes toward the power sector, making it the sector with the highest level of investment. The transmission and distribution (T&D) networks only receive between 8 and 12% of these funds, with the rest going toward the generation value chain. Since ESS is still a developing and evolving technology, it typically requires more equity funding than traditional power projects. Utility-scale projects become more expensive as a result, necessitating direct government cooperation through state-owned corporations. High risks in these countries increase the cost of financing and limit the ability to borrow money, despite the evident need for ESS and reduced reliance on diesel generators in countries with substantial scarcity.

Financial flexibility is crucial for energy storage projects and should be provided by both the private and governmental sectors as well as multilateral development institutions.

Energy subsidies, on the other hand, have weighed down state coffers and slowed the spread of low-carbon technologies in the MENA area, where they total more than $40 billion annually. Due to non-cost-reflective electricity pricing, utilities and, by extension, governments, must foot the bill for energy storage. Governments should therefore encourage public-private partnerships and financial incentives for ESS initiatives.

Investments can be encouraged with the use of policy and market mechanisms like tax credits, accelerated depreciation, direct equity ownership, and carbon credits. Despite the difficulty that MENA governments have had in reorganising the electricity price, it is essential for utility financial performance and the economic feasibility of ESS to implement a more cost-reflective tariff where pricing fluctuates dependent on time of usage.

“When it comes to the marketplace, ESS implementation faces obstacles such as power market design and renewable energy auctions. Electricity utilities in the Middle East and North Africa are mostly state-owned monopolies that are vertically integrated and adhere to the single buyer model (SBM). Since a revenue stacking business model is essential to the economic viability and attractiveness of any ESS project, the SBM reduces the potential for energy storage investments. The ESS business model can be improved by unbundling parts of the power value chain so that several producers can serve multiple off-takers with their solutions,” stated Jessica Obeid, independent energy policy consultant and a non-resident scholar with MEI’s Lebanon and Economics and Energy programs.

Auctions for renewable energy have helped to increase private sector participation in the region of the Middle East and North Africa. These have encouraged investment and created competitive pricing, but they have favoured the most affordable options among those that are technically acceptable. However, the final bid price cannot be the only award criterion for energy storage systems because they also deliver value through layered services beyond storage. For ESS to be implemented, auction design, assessment, and reward criteria must be revised to account for the unique characteristics of each ESS goal. In addition, off-takers (i.e. governments) are sometimes bound by expensive take-or-pay terms in long-term power purchase agreements as a result of these auctions. It's usual for intermittent VREs to cause governments to continue paying for power even during periods of supply reduction. In order to move forward with ESS deployment, auctions of renewables-plus-storage assets are needed to provide off-takers with the ability to purchase dispatchable electricity.

MIDDLE EAST'S ROADMAP TO EMBED SOLAR POWER INTO THE REGION THROUGH THE LENS OF ALI AKBAR AJMERWALA

The United Arab Emirates is leading the way in the Gulf region's energy transition. By 2030, the United Arab Emirates aims to meet half of its energy demands through carbon-free technology, primarily solar. While ambitious Dubai aims to meet three-quarters of its energy needs through such sources by 2050.

With a 5GW capacity, Dubai's Mohammad Bin Rashid Al Maktoum Solar Park is the world's largest single-site solar park. By 2030, we expect to have completed the project. Around 900 MW of total capacity has been reached at present. Expanding Abu Dhabi's solar power infrastructure has prompted a new round of bids. Noor's solar park has a total capacity of 1.18 GW, making it the largest solar park in the world. Across 3.2 million panels have been installed over an area of 8 km2 and the project is now operational and providing electricity.

Early in 2019, it was agreed that Al Darah would be the site of a 2 GW solar project. The Northern Emirates have also shown interest, with plans to develop 300MWp of solar projects in Ras al-Khaimah, Sharjah, Ajman, Fujairah, and Umm al-Quwain. An additional 200 MW solar farm is proposed for the emirate of Umm Al-Quwain. To streamline all these developments, Thirty To Net Zero Magazine spoke to Ali Akbar Ajmerwala, Head Solar Engineering at Pavilion Energy. Ajmerwala's core experience lies in the design and commissioning many solar projects of capacity over 100MWp, valued at over US$75 million spanning across 40+ sites in GCC and India. At Pavilion, he leads the Solar design team and is primarily responsible for all the design details and essentials.

Highlighting some of the key solar energy developments in Middle East region, Ajmerwala stated, "For me and this region, the last seven or eight years have been the most prosperous. I believe Dubai's excellent net metering policy, which was introduced in 2014-15, was the first of its kind in the entire region. Sure, things got a little rough in the beginning, but by 2016-17 the solar industry took off. The Commercial & Industrial (C&I) sector is what I'm focusing on most because it was the first to see explosive growth, which in turn spawned numerous megacities and their attendant central power plants[A1] . The net metering policy that Dubai implemented at the outset attracted many C&I firms, thus exposing a sizable portion of the C&I market. The firms can expect a reduction of more than 60% on their energy bills if they switch to solar considering today's market conditions."


ATHLETIC
93
LEAGUE
Ali Akbar Ajmerwala

“Dubai became a role model not only for the other Emirates but also for other Gulf Cooperation Council (GCC) nations and the rest of the region. Bahrain released a similarly beneficial net metering regulation. That, I believe, is where things really began. Then, Dubai launched their own central energy initiative - Sheikh Mohammed bin Rashid Al Maktoum Solar Park. Developers from all over the world, including many from India, have begun relocating to the region and operate from this region serving a lot of Arab and African nations.

“Saudi Arabia has also began its emphatic journey towards renewables, with a lot of mega scale renewable energy projects taking shape in the country. The Red Sea project, which is currently under construction, will also make extensive use of solar energy, similarly Neom is also on path of powering The Line majorly of renewable energy. Moreover, recently, Saudi Arabia has launched a large number of central wind power plants of capacity upwards of 1.8GW in addition to solar power plants of 1.5GW. As a result, the shift from conventional energy to renewable energy in KSA can be marked the beginning of widespread acceptance. Qatar’s recent 800 MWp central power plant offsetting around 50% of the 2022 FIFA World Cup emissions, clearly demonstrate the regions move towards renewable sources of energy”.

“There is a great potential for renewable energy in this region majorly in the C&I sector, as this way the energy is directly produced at the consumers premises greatly reducing the losses. While the C&I market is booming in Dubai and Bahrain, I believe there is much room for growth in theother regions. This is because many other GCC nations have not yet implemented a net metering legislation. If Saudi Arabia and other GCC regions were to adopt a fair net metering regulation, for example, the country's population would likely embrace C&I at a rapid clip,” said Ajmerwala.

Vertical Wind Turbine To Be A Game Changer

One variety of wind turbine, known as a vertical axis wind turbine, is increasingly being put to use as a clean, renewable energy option for homes around the country. The rotor shaft and two or three blades are found in this type of turbine, which rotates vertically. The action of the turbines can be compared to the spinning of coins on a tabletop. The generator in this turbine is housed at the base of the tower, and the shaft is enclosed by the rotor blades. The rotors in a vertical axis wind turbine have a vertical orientation, and the blades rotate around a vertical shaft. They use the wind to create electricity. Since the rotor is coupled to an electrical generator, the latter can transform mechanical energy into electrical power when driven by the wind. The blade, shaft, bearing, frame, and blade support are all parts of a wind turbine with a vertical axis.

Stretching more on vertical wind turbines, Ajmerwala commented, “In Bahrain, we have worked with two hotels that wanted to go solar but didn't have enough available rooftop space to install the system, which is where pavilion energy comes in. Since these hotels are very tall, we figured we'd equip them with vertical power.

So we figured, fine, if they want renewable, we'll give it to them, since one of our basic beliefs is encouraging people to work toward environmental sustainability in whatever way they can.

“In order to achieve net-zero goals and mitigate climate change's worst effects, the Global Wind Report 2021 states that the world must triple the rate at which it installs wind power during the next decade. Joachim Toftegaard Hansen, a recent Bachelor of Engineering graduate and the report's lead author, said, ‘Modern wind farms are one of the most efficient ways to generate green energy, but they have one major flaw: as the wind approaches the front row of turbines, turbulence will be generated downstream.’ The turbulence hinders the efficiency of the rows that follow it. As a result, the front row will convert roughly 50% of the wind's kinetic energy into electricity, whereas the back row will convert only 25% to 30%. As an engineer, the thought "there must be a more energy-effective solution" immediately popped into my head,” said the IITian with a smile.

Energy Storage Systems Still Have Long Way To Go

As it stands, the energy storage industry is best suited for use in areas without a grid or a net metering legislation. Numerous energy storage projects are now in development, with the Red Sea project serving as a prime example; if completed, it will have the world's largest energy storage capacity, complementing its extensive solar array. The solar energy storage industry is expanding rapidly due to the increasing demand for environmentally responsible and economically viable energy solutions in the industrial and commercial sectors. Additionally, the worldwide industry is trending toward the use of solar along with batteries as a means of mitigating carbon emissions and decreasing reliance on fossil fuels. High up-front expenses of installing solar energy storage systems are a barrier to entry for small and medium-sized businesses, which slows the growth of the global market. Even so, the rising need for renewable energy storage solutions would aid in producing massive investment for solar energy storage, consequently creating substantial potential opportunities for the global market.

Echoing similar sentiments, Ajmerwala opined, “The US$300-700 per kilowatt-hour value of energy storage seems excessive to me at moment. Given that the cost of storing energy for the C&I sector is currently prohibitive due to the power's exceedingly high tariffs on the grid, energy storage is currently not a viable option. Also, if you've signed a PPA for a certain price per kilowatt hour, you'll need to replace your batteries every few years or risk losing your power. It is true that energy storage is currently taking place in this area, but only on a large scale, near the power plants themselves; on a lower scale, where we are only talking about a few mega for the C&I industry, it is not yet economically viable.

Ali Akbar with Family

Major Hurdles

"With such a high income, it seems like renewable energy might be a wise investment. However, we have noticed a few difficulties unique to this area. The first is that if you approach banks in this region to raise debt for the projects, the banks are usually hesitant to invest in the project, the high interest values makes the project less financially viable, and the high Debt Service Credit Ratio (DSCR) required makes it difficult to repay the debt. To that end, I believe there is considerable room for development in that respect," said Ajmerwala.

The banks are required to intervene, but many of them will not even consider loan proposals for new projects in their exploratory stages. As a result, many projects never get off the ground because investors are unwilling to put up the necessary capital until construction is complete, at which point just the debt is raised. That is one difficulty developers have observed.

"There would be a dramatic rise in the solar projects, that is practical in this region if net metering policies became more possible elsewhere, such as in Saudi Arabia, which is a very large territory. In addition, many new players can enter the market. These are the few obstacles I've encountered in this country; nevertheless, I believe things are steadily changing, especially considering how challenging it was to acquire solar equipments in the region just five or six years ago due to the sheer scale of the market. A lot of good has come from it; for example, construction time for new projects have decreased dramatically, from years to months. We have come a long way and there is a lot further to go, concluded Ajmerwala.

All photos provided by Ali Akbar Ajmerwala from Pavilion Renewables

BRANDED RESIDENCES AVAILABLE TO OWN

Discover an exclusive collection of 3 and 4 bedroom beachfront villas, with an ultra-chic resort destination on your doorstep.

portonovi.com

One&Only

PRIVATE HOMES

Perinovi, Montenegro