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SOLAR SOLUTIONS FOR CONSTRUCTION

BIPV IN THE MENA REGION

WHAT IS

BIPV?



FIGURE 1: Example of a BIPV façade (Source: Cmfe News)

While driving on the road, one might notice some strangely colored buildings. Mostly dark, their facades seem to come straight out of a sci-fi movie. For now, we count only a few in the region but those buildings are paving the way to an eco-conscious environment. The buildings are equipped with Building Integrated Photovoltaics (BIPV), photovoltaic generating components built into the fundamental structures of buildings. Examples include solar facades, solar windows or solar roofs (Figure 1). BIPV solutions can also be installed in car parks (integrated with shades), bus stations, stadiums and even homes. BIPV structures exist in areas of buildings which would typically be replaced by a regular, non-PV generating component. This technology should not be confused with rooftop PV, which consists of simply installing or attaching solar panels to the roofs of buildings. The BIPV portion of a building primarily acts as a part of the building structure while its secondary function is to act as a power generation source.

The BIPV sector in the MENA region is still in its nascent stages. Recently, much attention has been paid to large, utility scale power plants and rooftop solar projects, but this article will explore the use of BIPV and how the technology can potentially help countries in the region achieve their decarbonization targets.

EXAMPLES OF BIPV PROJECTS:

DEWA'S UPCOMING RESEARCH AND DEVELOPMENT CENTER

DEWA's upcoming research and development center, expected to be completed around 2020, will incorporate different colored photovoltaic glass panels that are fixed to the façade.



FIGURE 2: DEWA R&D Center (Source: Onyx Solar)

THE MAKKAH ROYAL CLOCK TOWER IN SAUDI ARABIA

Includes a glass orb which sits at the top of the structure. The glass serves as part of a viewing deck and incorporates 233 solar panels, cut into the shape of a dome, to help generate the power necessary to turn the clock's hands

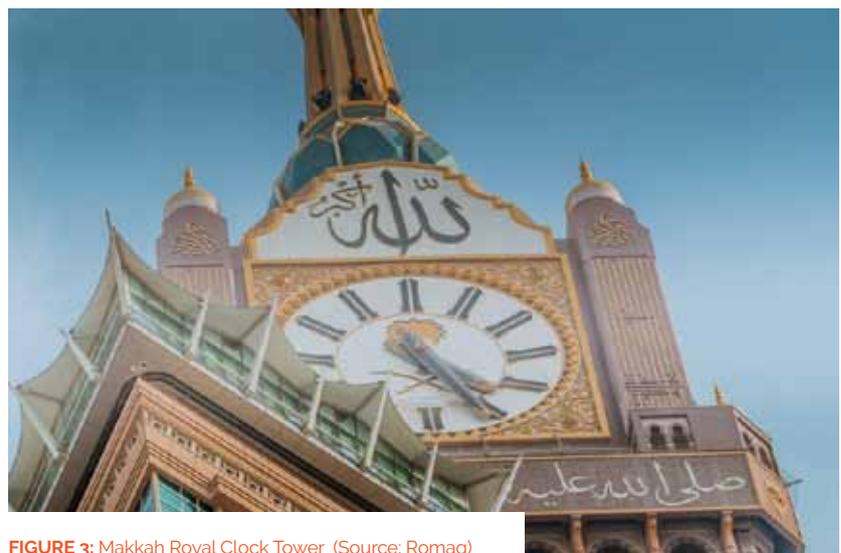


FIGURE 3: Makkah Royal Clock Tower (Source: Romag)

EXAMPLES OF BIPV PROJECTS:

DUBAI ELECTRICITY AND WATER AUTHORITY'S NEW HEADQUARTERS

Although BIPV projects are limited in the MENA region, one of the major upcoming developments is Dubai Electricity and Water Authority's (DEWA) new headquarters (Figure 4). The project, expected to be completed in 2019, will include roughly 10,000 square meters of BIPV solutions producing over 1,100 kWh which will help the building achieve its goals of becoming a net zero energy building.

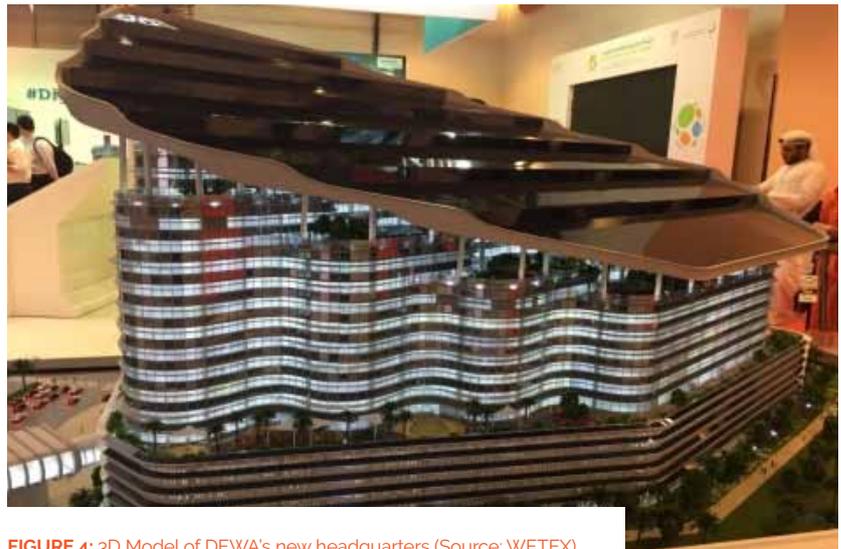


FIGURE 4: 3D Model of DEWA's new headquarters (Source: WETEX)

OTHER INTERNATIONAL PROJECTS

THE COPENHAGEN INTERNATIONAL SCHOOL PROJECT IN DENMARK.

The school's façade is covered in 12,000 blue toned photovoltaic generating panels which will provide more than 50% of the school's electricity.



FIGURE 5: Copenhagen International School (Source: C.F.Moller)

BIPV

BENEFITS



BIPV components are useful because they can:

- 1.** Save on electricity costs by generating power from a clean, low carbon source (i.e the sun) and help buildings increase their overall energy efficiency.
- 2.** Reduce carbon emissions because buildings contribute to a major portion of energy used in cities (Up to ~40% or higher). As the sustainability requirements in green codes for buildings become more stringent, BIPV products can help meet the necessary sustainability standards and drive down net energy usage.
- 3.** Save on material and labor costs that would normally be used to construct the portion of the building that a BIPV component replaces.
- 4.** Add visual elegance and architectural beauty to a building. The components can be designed in a multitude of ways to seamlessly blend in with the rest of a building.

BIPV

CHALLENGES



BIPV in the MENA region will be defined by upcoming challenges facing the sector, and the way in which countries overcome the same:

Regulations and Safety Standards: BIPV solutions are a relatively new solution in the GCC, so local safety standards and building codes are yet to be updated to include sections specific to BIPV products. Future development of standards will focus on the fire safety requirements of BIPV products because of the added risk that comes from energized facades, as well as the customizable nature of BIPV solutions that demands standard application to a wide range of BIPV products.

Green codes for buildings will also be updated to ensure that the integration of BIPV elements provides the right amount of credits towards different sustainability certifications (E.g. LEED silver, gold or platinum).

Local & International Lab Testing Protocols/Attestation: Once products are tested, the certificates obtained are submitted to the necessary authorities to validate the quality and performance of different products. Attesting protocols vary according to country specific regulation requirements however and still need to be further developed in the GCC to make the process easier and faster. According to Hamid Syed - VP & GM for (Underwriters Laboratories) UL - Middle East: It is important to help ensure that both module safety and performance is addressed in the emerging regulations, without compromising on aesthetics as well as fire safety of buildings and firefighters.

Through its joint venture with GCC Electrical Labs, Gulf Renewables Lab, UL is building the region's largest independently accredited test facility, drawing on its 120 years of experience in helping authorities with regulations through adoption of codes and testing to the latest international UL & IEC standards.

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Costs: Due to the added cost of retrofitting BIPV solutions onto existing buildings, an ideal evolution of the market would be to integrate these solutions into new buildings during the design/construction phase or into buildings undergoing major renovations.

Furthermore, the current emphasis on being able to customize BIPV solutions has made mass-production difficult - if manufacturers can standardize certain products they can produce on a larger scale and bring down costs.

Awareness: Educating the general public on the benefits BIPV provides is crucial to help spur demand in the region. To encourage this, local governments and renewable energy advocates can make project developers, construction firms, architects and other stakeholders more aware of the benefits BIPV could provide in the long run.

WHAT NEEDS TO HAPPEN?

Although BIPV products in the MENA region are still new when compared to other PV markets, they will play a vital role in helping countries in the MENA region meet their long term decarbonization goals. To boost large scale adoption of such technologies, regional governments look to establish regulations governing the use of BIPV solutions, to add incentives to install or mandate the use of BIPV solutions, and to increase awareness of the general public.



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