

GCC Countries: Rising Stars in Solar & Wind Energy

The Gulf region is not only home to some of the world's leaders in oil and gas production, it is also a powerhouse of renewable energy potential. Many of the GCC member countries are perhaps best known for their immense oil and gas reserves, however, they also offer excellent solar resources, and in many cases strong wind resources. The GCC, however, is not a homogenous market and features some very key differences that influence the attractiveness of renewable energy (RE) in each country. In this article, **Apricum's** Managing Partner Nikolai Dobrott explains these differences as well as the opportunities that exist for solar and wind players now and in the medium term.

GCC countries should pursue renewable energy

At first glance it does not seem to be very logical why the countries in the Gulf should rely on solar and wind for power generation given the abundance of oil and gas available. However, there is in fact a strong rationale: All Gulf countries are facing a dramatic increase in electricity demand, with the result that significant power-generating capacity needs to be added in the coming years. Solar and wind can effectively complement the existing conventional capacity and provide electricity at low cost of below USD10 cent/kWh – about half the cost of oil-fired power generation at market prices. In fact, the most recent tender in Dubai has resulted in the remarkable tariff of USD6 cent/kWh (unsubsidized). Therefore, particularly oil-rich countries such as Saudi Arabia, Kuwait or the

United Arab Emirates (UAE) are better off exporting oil instead of burning it domestically for power generation. In addition, both business activities related to manufacturing and the development of solar and wind power plants contribute to countries' economic development goals, in particular, local job creation. Considering the current high unemployment and very high rates of population growth, it is a factor that should not be underestimated.

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GCC markets with the strongest RE potential

Saudi Arabia, as the largest economy in the region by far, has the largest potential for RE according to Apricum's analysis. Reflecting a strong need for new power-

generating capacity during the coming years, both **Saudi Aramco** and **Saudi Electricity Company** are working on multiple GW renewable energy plans. This doesn't mean that other markets should be ignored however. Kuwait, for example, as another oil-rich country also has a strong rationale for RE and therefore has initiated a 2 GW solar and wind program. The frontrunner for large-scale RE deployment in the region has been the UAE realizing a 100 MW solar-thermal project under the Masdar initiative. Further large-scale solar projects are being planned both in Abu Dhabi and Dubai. The remaining three markets, Bahrain, Oman, and Qatar have also developed renewable energy targets, but policy mechanisms and a clear roadmap have yet to take shape. These markets should still be monitored as some projects are expected to follow once the larger markets have demonstrated the renewable energy concept in the region.

Chart 1: Cumulative installed solar capacity, GCC, 2018 (MW)



Chart 2: Cumulative installed wind capacity, GCC, 2018 (MW)



Source: EIA, Apricum wind and solar market model Q3/2014 center scenario

Business opportunities

Apricum sees a range of attractive business opportunities in the GCC's multi-billion USD RE markets, particularly in component manufacturing, project development, construction, power generation and more. The vast solar and wind potential in the GCC region is just starting to be realized. As we have seen in other emerging RE markets, the biggest long-term rewards await those players who establish their presence early in the market. Demonstrating long-term commitment and developing a local footprint are important keys to success in the Arab world. Involving a local partner is not always mandatory, but certainly recommended. Hence, finding the right local partner is a crucial task.

Apricum's renewable energy outlook for GCC countries

Bahrain: The smallest country in the GCC with just 1.2 million inhabitants in an area of only 765 square kilometers, it has also been the GCC country most affected by the Arab Spring. As a result of its small population, the power production capacity is small compared to other GCC countries. While it does have strong solar and moderate wind resources, the size of the RE market in Bahrain is very limited. There is a lack of RE research initiatives, no institutional framework for RE development and limited land availability for large RE developments. Consequently, the market will remain very small compared with neighboring countries.

Kuwait: One of the world's largest oil exporters, Kuwait has a major economic incentive to develop RE, as it generates around 70 percent of its electricity from oil. It has already set a target of

10 percent of electric power from RE sources by 2020 and 15 percent by 2030. **Kuwait Institute for Scientific Research (KISR)** has been mandated to rollout Shagaya RE project with 2 GW by 2020, and to advise government in the development of RE. With a strong economic rationale, political will, and renewable resources, Kuwait is likely

“...Kuwait has a major economic incentive to develop RE”

to become a mid-sized RE market with major developments likely to coincide with those in Saudi Arabia and the UAE. This market is not without risk however, as no clear institutional framework or defined roadmaps have been introduced to date.

Oman: An absolute monarchy with steady growth in population and GDP, Oman features a growing demand for electricity and has diminishing oil reserves. Oman's leadership is attempting to

diversify its energy mix and increase rural electrification. Its first RE steps have been with distributed systems to hybridize diesel generation. Despite Oman's strong solar and wind resources, no RE targets or scheme have been set, and it lacks the appropriate legal framework and transmission capacity for large-scale RE development in the medium term. Oman is likely to be a follower, and will wait until Saudi Arabia and the UAE have clearly demonstrated RE's viability.

Qatar: As one of the smallest nations in the GCC (population of two million) and one of the world's leading natural gas exporters, Qatar has a huge energy surplus and the highest per capita GDP in the world. Its ability to extract gas at low cost, cheap power generation and heavily-subsidized electricity prices mean that little financial incentive exists to develop renewable energy. Although a few medium-scale projects will take shape in the lead up to 2022, when Qatar will host the FIFA World Cup, Apricum



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expects it to remain a minor RE market in the GCC union.

Saudi Arabia: As the largest economy by far in the Middle East, Saudi Arabia is also the largest potential RE market in the region. The country developed a massive renewable energy program that

aimed to install 54 GW by 2032; this program, however, has been delayed and likely will not be implemented as originally announced. Nevertheless, **Saudi Aramco** and **Saudi Electricity Company** are both going ahead with their own initiatives and joint plans to develop renewable energy in Saudi

Arabia in the short and medium term. Expect significant growth in the coming years for both solar and wind, as the Kingdom strives for a sustainable energy mix to preserve a large share of extracted oil for future export.

UAE: The UAE is the most active renewable energy market in the GCC to date, thanks to Abu Dhabi's Masdar program and Dubai's Sheikh Maktoum project. In Abu Dhabi, several utility-scale PV power plants are being realized as part of the Masdar program: Shams 1 (in operation) – a 100 MW CSP plant and Noor 1 (in preparation) – a 100 MW PV plant. In Dubai, the initial stage of Sheikh Maktoum's 13 MW PV project has already been built and phase II (100 MW as mentioned above) is underway, with a final goal of 1,000 MW by 2030. ■

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ليست منطقة الخليج موطناً لبعض أبرز منتجي النفط والغاز فحسب إنما هي أيضاً مصدراً قوياً لإمكانات الطاقة المتجددة. ربما تشتهر الكثير من دول مجلس التعاون الخليجي باحتياطها الهائل من النفط والغاز لكنها توفر أيضاً موارد طاقة شمسية ممتازة وفي كثير من الحالات موارد من الرياح القوية. ومع ذلك، ليست سوق دول مجلس التعاون الخليجي متمثلة وتبرز فيها بعض الاختلافات الرئيسية الأساسية التي تؤثر في عملية جذب الطاقة المتجددة في كل بلد. يشرح (نيكولاي دوبروت) الشريك الإداري في شركة (Apricum) في هذا المقال هذه الاختلافات بالإضافة إلى الفرص المتاحة أمام اللاعبين في قطاعي طاقة الرياح والطاقة الشمسية. ويقول (دوبروت) أن جميع دول الخليج تواجه حالياً طلباً هائلاً على الكهرباء مما سينتج عنه ضرورة زيادة قدرة توليد الطاقة الكهربائية بشكل هائل في السنوات المقبلة. يُمكن للطاقة الشمسية وطاقة الرياح أن تكمل بشكل فعال القدرة التقليدية القائمة فتوفر بالتالي الكهرباء بكلفة أقل من عشر سنتات أمريكية في الكيلوواط ساعة الواحد أي ما يساوي حوالي نصف كلفة توليد الطاقة من النفط وفقاً لأسعار السوق. علاوة على ذلك، أشارت (Apricum) أن المملكة العربية السعودية تملك أكبر إمكانات للطاقة المتجددة في المنطقة نتيجة لتمتعها بأقوى اقتصاد في المنطقة حتى الآن.

WACKER Introduces High-Impact Modifiers

The turbines on windmills consist of half-sectional pipes of composite materials that are bonded together. Such bonding requires the use of special high-impact modifiers for wind turbines. With its VENTOTEC® line of dispersible high-efficiency impact modifiers, **WACKER** offers a product for optimizing reactive resins. The powdery additive combines in one product the two technologies for the production of silicones and organic polymers. The result is a highly efficient hybrid product that makes adhesive layers stronger and more durable. The

additives increase the impact strength of epoxy resins and other thermosets. In addition, the favorable basic properties of these materials are preserved unaltered. This outstanding effect can be achieved with the smallest of quantities, which makes for production processes that are both cost effective and efficient. To meet the demand for higher energy yields from wind turbines, ever longer rotor blades must be constructed, meaning heavier blade weight. This impacts not only on blade design and materials, but on how the blades



are bonded together. The standard adhesives employed are two-component bonding pastes, which consist of a resin and a curing agent. ■