

Final Word



The benefits of PV-hybrid systems



Saudi Arabia can keep the solar dream alive, says Florian Mayr, Principal at Apricum - The Cleantech Advisory

Efforts to reduce reliance on diesel-based power generation are increasing in many regions around the world by off-grid operators or those who are grid-connected but with inadequate power supply. The key drivers include volatile pricing, high transport costs to remote sites, and frequent supply irregularities due to bottlenecks and regional instability.

At the same time, the costs of PV generation are at an all-time low. The price of large PV systems has fallen significantly in the last few years culminating in a LCOE of \$0.06-0.09/kWh in sunny locations with high levels of irradiance. As a result, renewable energy is increasingly seen as a valid alternative by off-takers dependent on diesel.

Solar power's intermittent nature, however, represents a considerable entry barrier due to the potential mismatch between the hours of sunlight and the demand of off-takers, e.g., during the night. This issue can be resolved by hybridising diesel-based generation with PV power (and potentially energy storage) onsite, thus delivering a seamless, uninterrupted supply of high quality power. Hybrid-PV solutions are already in use by a range of customer groups including farms, mines and tourist resorts around the world.

There are few places in the world more suited to PV generation than Saudi Arabia and its neighboring countries due to the high levels of solar irradiation. As a result, extremely low prices for PV-generated electricity have been achieved in competitive tenders in the region - the prime example being the tariff of \$5.85 cents/kWh for a 200 MW PV project in Dubai this year.

However, diesel itself can be obtained at very attractive prices between \$0.02-0.07/liter thanks to generous Saudi government subsidies. Hence, from an end-customer perspective, fuel costs for diesel-based power generation are rather negligible, and have been so even prior to the recent world slump in market prices for oil and diesel.

To supply remote sites in the Kingdom, diesel

may need to be transported by truck over a distance of several hundred kilometers. But given the rather good road infrastructure and again subsidised diesel-based transport, electricity generation costs are typically not heavily impacted. In fact, the cost for diesel-based electricity generation at a remote mining operation was recently quoted as low as 19 Halala per kWh or roughly \$0.05/kWh - including transportation of the fuel.

Therefore, as long as diesel subsidies remain in place, there is hardly any incentive for end users to install PV-hybrid systems to reduce electricity generation costs. There is, however, a benefit in avoiding supply bottlenecks. Due to limited domestic refinery capacities in Saudi Arabia, the diesel is allocated to the consuming industries, such as cement plants, based on their initial demand. If production needs to be expanded and more power is consequently required, the allocated amount of fuel might not be sufficient. Hence, mitigating the exposure to diesel by adding renewable energy can enable companies to break through the allocation barrier and follow their growth plans.

From a state perspective, there is a strong rationale for encouraging PV-hybrid systems in Saudi Arabia - one that directly concerns the government's coffers. In cases where the diesel consumed needs to be imported at market prices, subsidies have a direct impact on the national budget. Even if the diesel is produced within the country based on cheap captive oil resources, opportunity costs still need to be considered. It is the latter that is causing state-owned oil giant Saudi Aramco and state utility Saudi Electricity Company to assess opportunities for PV-hybrid systems to supply remote operations and towns.

With programs for large-scale renewable energy installations mostly on hold in Saudi Arabia, PV-hybrid systems in selected settings constitute a short-term opportunity that could help to keep the solar dream alive in the Kingdom.

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