Damascus rural microgrids

Institutional subscriptions

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Policies and ethics

Dr. Hicham Bouzekri, Director of R& D and Industry for the Moroccan Agency for Sustainable Energy (MASEN), explains how battery energy storage is helping the country to empower all of its people through renewable energy microgrids.

Morocco has close to 99.9% electricity access, and over 98% of our population is grid connected, but we import over 90% of our energy needs. Morocco has very high-quality wind and solar resources, but it still does not provide us with the baseload needed for a developing country where the electricity demand increases by 4% to 5% every year. This means we have to double the installed capacity approximately every 10 years.

Back in 2009, Morocco made a decision that no new fossil fuel generation capacity would be added to the grid, so all of our new generation capacity is coming mostly from solar and wind, but also hydro, which is limited here given the droughts. We have an ambitious program to increase the installed generation capacity of renewable energy sources to about 52% by 2030. However, because solar and wind are intermittent, you need storage for grid stabilization. MASEN sees storage as being a key to increasing the penetration of renewable energy into the electricity mix.

Another really interesting application for battery energy storage is in cities that are adopting electric vehicles. Being able to deploy batteries in gas stations will allow us to have more fast-charging capacity, which will alleviate the range anxiety that people have in the adoption of EVs.

While most of Morocco"s population is connected to the grid, about 2% are not. So, through a national rural electrification program, we initially offered individual solar kits, which included a couple of panels with lead batteries along with a few LED lamps for electricity inside the house.

But what we are seeing is that this barely meets the minimum vital requirement for these populations and does not provide electricity for economic development. You cannot power a facility to preserve fresh produce. You cannot do preprocessing for agricultural products locally. You cannot meet heating needs.

So you basically have two alternatives for getting electricity to non-electrified areas. The first is the traditional way, which means building a grid infrastructure that would take decades and billions of dollars and will take

years before electricity reaches these populations. The second is decentralized electricity generation through microgrids using solar and batteries, and we believe strongly that this is the most effective and efficient way to bring electricity to these populations.

We wanted a system that was as self-reliant as possible. We couldn"t deploy technicians to be there 24/7, so we chose integrated solutions that had the battery system, the battery management system (BMS), and the energy conversion system that would stabilize the grid down the line.

We decided there was an urgent need for approximately 2 MWh of storage total and started with a temporary housing project the government had put up to host populations displaced by the AL Haouz earthquake, and that was the most advanced in terms of construction. We deployed a 600 kWh system there, which was tested and is now operational, and we have started work on the rest of the systems.

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