

## Rural microgrids kabul

In areas where the difficult terrain makes the connection of a household or a business to the national grid difficult or impossible, mini-grids make a decisive contribution towards their electrification.

Mini-grids are off-grid electricity networks that enable the distribution of electricity from various small scale power sources such as PV or MHP systems to the connected households or businesses. Especially with regard to the electrification of many rural areas in Afghanistan, mini-grids can make a real difference concerning basic access to electricity. Access to electricity can boost economic and social progress and thus, mini-grids enable a transformative development that leaves no one behind.

The Bamiyan mini-grid is one of the largest solar hybrid mini-grids in the world used to power an off-grid rural provincial center. Installed in 2013 it provides access to electricity for more than 2,400 households. It's 1,050 kW of power is divided between four generation sites. Each of the four systems uses PV modules which provide the primary generation source, with the diesel as secondary source, and batteries for energy storage. Mini-grids with battery storage can charge them during the day, using any excess electricity at night.

The system's size allows it to provide enough electricity to power institutional and commercial loads in addition to meeting household needs 24 hours a day. For most of the year, the PV system provides all of the power to the loads during the day while charging the batteries. During nighttime and times of poor solar irradiation, a diesel generator on site will automatically start and charge the batteries.

The Bamiyan Renewable Energy Program (BREP) with its PV mini-grid is a good example for the electrification of rural areas with renewable energy sources. More PV modules or a nearby MHP could be used to plan the next mini-grid even without the diesel generators.



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