

REPORT

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# SUNSHINE FOR MONASTERIES: IMPLEMENTING RENEWABLE ENERGY FOR OFF-GRID OPERATIONS

PEAK POWER | CASE STUDY

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**P** Peak Power, an international renewable energy micro-grid development social enterprise specializing in high-profile solar installations and challenging off-grid renewable energy applications was engaged by Druk Amitabha Mountain to design the 36-kilowatt solar micro-grid and battery storage system and to bring the micro-grid into reality.

It includes 120 Trina Solar 295w 72 cell commercial modules with Tigo Energy maximizers, as well as six Sunny Island off-grid inverters with multi-cluster box and two Sunny Boy 20000 TL-EE transformer-less inverters by SMA. The ballast mounted system will produce about 61,749.00 kWh annually, which will provide 100 percent of the applications energy needs. The system will be monitored via Sunny Portal and Tigo Energy Portal.

Druk Amitabha Mountain is one of the largest Buddhist monastic colleges in Nepal enrolling around 500 nuns from the Himalayan region including Nepal, Bhutan, Tibet, and India. It is situated just outside of the Kathmandu valley and incorporates a large campus of buildings, including a fully equipped hospital, auditorium with stage and theatre, traditional temple, residences for nuns and staff, shops and cafe, school and animal rehabilitation clinic. Druk Amitabha Mountain is the main seat for His Holiness Gyalwang Drukpa and serves as the head office for the Drukpa Humanitarian Organization in Asia as well as Live to Love International in Nepal.

The objective of the Druk Amitabha Mountain is to provide facilities in which to train and demonstrate a skillful blending of a modern way of living underpinned by the ancient wisdom of Buddhist philosophy. It is a proving ground for technologies and projects which can be incubated and implemented first in Nepal and subsequently rolled out across the other centers in the Himalayan region. It is a showcase of global relevance for sustainable communities all around the world.

Solar Photovoltaic Micro-grids are a key technology that is very applicable to Druk Amitabha Mountain as well as many other communities, businesses and organizations in the Himalayan region. Druk Amitabha Mountain has a goal of completely electrifying the



Location: Kathmandu, Nepal.  
Lat/Long: 27°43'32.80"N, 85°15'40.80"E  
Elevation: 1500m.  
Date: 2013.  
Client: Druk Amitabha Mountain.  
Size: 36Kw PV, 184KwH Battery Backup.  
System: SMA Multi-cluster 3 phase AC coupled.

- Reduced risk of power loss from supply disruptions (load shedding).
- Reduction in fuel and electricity costs, including transportation costs.
- Predictable energy costs, and therefore reduced risk from volatile and rising diesel prices.
- Reduction in carbon emissions and overall a less-polluting source of energy for the campus.
- A secure, reliable and repeatable energy model for organization.
- Training opportunities for nuns and monks who can return to their communities with new skills and invaluable knowledge.
- Supports growth in domestic renewable energy market.



“ We hoped to show the Nepalese government, and the world, that energy poverty can be eradicated by replacing generator-based power systems with clean, renewable energy, and that there is a short payback,” said Rakesh Shrestha, co-founder of Peak Power. “The photovoltaic multi-cluster system at Druk Amitabha Mountain will demonstrate, at a scalable level, that they can generate power at a cost lower than diesel.

entire campus using Solar PV generation with battery storage. Druk Amitabha Mountain asked Peak Power to assist with its aggressive goal and to carry out the analysis, design, procurement, implementation and training of its staff for all of its solar PV projects now and in the future.

Peak Power implemented two off-grid solar PV systems for Druk Amitabha Mountain, one 5 K w

system in 2011 and one 7Kw system in 2012. These projects were fund raised by the Drukpa Humanitarian organization and work commenced once funding became available. These projects served as a basis for evaluating the performance and acceptance of PV and battery technology within the community of Druk Amitabha Mountain.

In 2013 Peak Power and Druk Amitabha Mountain began fund raising for the next project which would provide 36Kw for the main residence building, office and security and surveillance systems. This system would be the first of the large multi-cluster systems which would be at the heart of the micro-grid.

This system will replace two dirty and inefficient diesel generators that run throughout the day, creating an unhealthy environment filled with noise and air pollution. Generators are susceptible to the fluctuating price and unpredictable delivery of diesel, which costs Druk Amitabha Mountain approximately \$7100 each year and \$6000 in servicing and maintenance.

Peak Power worked side by side with nuns from the Druk Amitabha Mountain on all aspects of the installation and commissioning of the system. By involving them so closely it helped break down the barriers in owning and operating such a power system and to smooth out the knowledge transfer necessary to properly understand renewable energy systems.

“ At first we were not sure if solar power would work here properly because we had a lot of problems with other projects not working well in Nepal. Peak Power was adamant about quality and doing things to international standards. We now know solar is the best for us here, once we had some experience with it, its so clean and reliable compared to our generators. We also feel confident to take care of the batteries and other aspects because its very simple and easy. Tenzin - Co-manager of Druk Amitabha Mountain and Druk Pema Karpo Hospital.

