DIGO BIKAS INSTITUTE

Dhapsung Community Solar Micro Grid-Democratic Community Renewable Energy System

Digo Bikas Institute with the support of Grid Alternatives and the technical assistance from Gham Power installed 16 KW community solar micro grid at Dhapsung Village, Helambu rural municipality ward no. 6 of Sindhupalchowk District towards the end of 2016. This community owned solar micro grid is the first of its kind in Nepal which is led and run by the women's group of Dhapsung village.

Dhapsung Village is a remote isolated village with low income and literacy rate that is not accessible by road during the monsoon season that lasts from June to November. The major inhabitants of the village belong to the Hyolmo ethnic group that have been marginalized socio-economically. Furthermore, during the massive 7.8 magnitude earthquake of 2015, Sindhupalchowk was one of the most affected districts with over 3,057 reported deaths[1]. Dhapsung village was not spared by the earthquake and 12 people from the village lost their lives. Most of the villagers inhabited in shelters made from mud-stone walls and slate roof due to their poor economic conditions. Almost all of the houses in the villages turned to rubble in the aftermath of the earthquake. Before the earthquake, Dhapsung village had a 3KW Peltric set that provided energy for basic lighting purposes in the village. Unfortunately, the earthquake destroyed this energy generation system which left the villagers dependent on kerosene, pine wax and candles.

In the reconstruction phase post-earthquake, DBI and their partners realized the need for a reliable renewable energy source for Dhapsung. DBI, Grid Alternatives and Gham Power launched a campaign titled "Power Up Nepal" post-earthquake that raised funds to build a solar micro grid in Dhapsung village in 2016 that aimed to provide reliable and accessible renewable energy for people of Dhapsung.

To solve this energy crisis, DBI first installed a 200W renewable solar PV system to initially light up the households of Dhapsung for which the fund was collected through public outreach via Generosity, an online crowd-funding platform. Later, a much larger solar grid system of 16KW was installed with the intent of fulfilling all the energy requirements of the village through a renewable energy source which was supported through public funding in collaboration with grid alternatives.

It is important to note that the construction of this solar micro-grid energy employed a different approach. This new approach promoted the principles of a decentralized energy system which put the community members of the village at the heart of the energy project. The community members of Dhapsung were involved in the designing, installation and decision making processes of the system. Community participation before and during the solar installation was essential and included digging

[1]*data obtained from Nepal Earthquake District Profile – Sindhupalchok. UNOCHA, 2015.*

of holes, erecting power poles, carrying batteries, solar panels, and power poles to the community location from the nearest accessible road to the village which is approximately four hours in walking distance. Furthermore, the ownership of the entire energy project was given to the community solar micro grid user group led by the women's group of Dhapsung. They are tasked to oversee the operation and maintenance of the micro grid.

This community owned energy system under the leadership and management of the women's group provides independent, affordable and reliable renewable energy. According to Raju Tamang, the community mobilizer at Dhapsung, over 200 people have benefited through the installation of this innovative solar micro grid system. The installed solar micro grid benefits around 52 households with facilities beyond providing electricity for lighting purposes. The energy generated from the solar micro grid can be utilized for the productive end uses also. This benefits both the villagers' livelihoods and also help ensure the sustainability of the energy project. On one hand, the villagers can utilize the energy generated from the solar micro-grid to engage in small scale economic activities, for example: electric grinding mill for cereal and pulses that allows them to earn a living. On the other hand, the management group of the energy project can generate additional income through additional tariffs collected from such productive end use applications which is critical to ensure the generation of enough funds for the ongoing maintenance of the energy project.

Since, the community owned solar micro grid of Dhapsung is managed and operated by the women's group, they are responsible to set the tariff rates for the electricity generated by the energy project for community consumption. The group sets and revises the tariff rate for the electricity as and when necessary with consensus from the users. Putali Tamang, the current treasurer of the women's group, mentioned that currently every month the tariff rate for household consumption is Rs.100 whilst the use of additional energy to engage in small scale economic activities that require energy is Rs.500.

The installation of the community solar micro grid has resulted in many positive socio-economic changes in the village. First, the respiratory health of the village inhabitants has improved as there has been a sharp decline in the cases of respiratory issues and injuries as reported by Putali Tamang. LED bulbs powered by the solar micro grid has replaced kerosene and pine wax light sources that emit smoke resin and soot in the unventilated housing environment.

Second, Raju Tamang reported that the academic performance of villager children has improved. The provision of reliable electricity at homes has allowed school children to engage in educational endeavors in the night, giving them extra hours daily to engage in learning activities.

Third, the village has seen a surge in socio-economic activities. Khalbale Tamang, a socially active community member reported that almost all families in Dhapsung rebuilt their homes after the earthquakes and made wooden furniture, windows and doors by borrowing an electric saw from a nearby community and utilized the electricity generated from the 16KW Solar micro grid. These families paid an additional Rs.500 that month, in addition to the regular monthly tariff of Rs.100 for their increased electricity use. This brought more money into the village's micro grid maintenance fund. Similarly, village homes now have light in the evenings which has allowed family members additional time to process their harvested crops. Families have also saved money as they do not have to buy candles or kerosene for lighting purposes.

Additionally, villagers now have increased access to micro-lending as income generated from the tariff of the micro grid is pooled under the management of the women's group. The villagers now have the ability to undertake short-term micro loans at low interest rate of 10% as per the management of Dhapsung women's group. These loans have helped families to support their small businesses for personal income generation and in times of emergency and crisis. Putali Tamang reported that so far six villagers have utilized the micro-lending scheme operated under the leadership of the women's group.

Moreover, the presence of the community solar micro grid has increased community gatherings in the village. The availability of reliable electric lighting has allowed for social gatherings and celebrations, especially during the evening. This has improved the community dynamics as people gather, celebrate, share, discuss and make decisions together when they are free in the evenings. Moreover, the creation of the women's group has allowed the women of the village to congregate and discuss issues pertinent to them and the village. Further, the energy project

has also helped to fight the patriarchal mindset entrenched in the Nepali society by giving women the leadership and management roles and decision making power with regards to the energy project.

Lastly, people's access to information has drastically improved in Dhapsung. Currently, few homes in Dhapsung have televisions and most homes have radios that operate with the help of the energy from the community solar micro grid. This has giving the community access to news, entertainment and information outside of the community on a regular basis. With reliable energy supply from the micro grid, families can now charge their cell phones at home, which has increased communication with people outside of the community. This has saved villagers valuable time, as they no longer need to walk to another village to charge their phones. In fact, right next to the battery bank of the solar grid, the villagers have access to free wi-fi connection, giving them access to the internet and its benefits.

The adoption of the community owned energy model has equipped the villagers with the power to utilize the energy generated from the project to improve their livelihoods and it has supported the holistic development of the village.

At the moment, the community solar micro grid can supply 16KW of energy at any given time. However, the highest instantaneous energy demand has only been up to 7KW so far. With proper guidance, and training on conducting economic activities, the villagers can utilize the maximum potential of the energy project to further improve their quality of life. So far they have planned on utilizing the excess electricity to pump water to irrigate cardamom plantations during the dry seasons and then use an electric roaster to roast their cardamom instead of using a wood fireplace to roast the spice. Other residents have discussed using electricity to power food processing machines, a food sealer for packaging local produce and agricultural products, and using electric wood saws to make and sell furniture; all of which are possible with reliable electricity from the community owned solar micro grid.

Currently, many rural villages of Nepal do not have access to either grid or off-grid electricity. While Nepal heads towards ensuring energy access for all, the adoption of democratic energy systems needs more mainstreaming so that people can truly become energy independent. The intervention in Dhapsung village is a pioneer initiative that has helped to promote values of energy democracy through meaningful participation of the local inhabitants throughout the entire project initiatives. The adoption and implementation of community owned renewable energy initiatives like that of Dhapsung has the potential to make access to energy more equitable and just. Community owned renewable energy system will allow energy to be produced where it is needed with the active participation of community, ensuring public ownership from the ground up to the national level.

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