

Global
Sustainable Electricity
Partnership

Demonstrating the potential of solar
energy as a viable power source for improving
education in rural regions

The Nepal Energy for Education Project



**GLOBAL
SUSTAINABLE
ELECTRICITY
PARTNERSHIP**

The Global Sustainable Electricity Partnership (GSEP)—which comprises the leading electricity companies from the global electricity sector—promotes sustainable energy development through electricity sector projects and human capacity building activities in developing nations worldwide. Our projects and activities are mainly financed by our member companies, who also contribute in-kind resources for their execution.

The opening of our membership to major electricity companies from emerging countries emphasizes our commitment to a truly global mission of promoting sustainable energy development.

MISSION

Our mission is to play an active role in global electricity issues in an international framework and to promote sustainable energy development. This diverse international group offers electricity sector skills and practical competencies in electricity generation, transmission and distribution. With international field-proven expertise in the planning, management, design, operation and maintenance of energy facilities, member companies assist and share their know-how in the effective implementation of sustainable energy development with counterparts in developing and emerging countries.

**MEMBER
COMPANIES**

- American Electric Power
United States
- Comisión Federal de Electricidad
Mexico
- Duke Energy
United States
- Électricité de France
France
- Eletrobras
Brazil
- ENEL S.p.A.
Italy
- Eskom
South Africa
- Hydro-Québec
Canada
- Iberdrola
Spain
- JSC “RusHydro”
Russia
- Kansai Electric Power Company, Inc.
Japan
- RWE AG
Germany
- State Grid Corporation of China
China
- Tokyo Electric Power Company, Inc.
Japan

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The Nepal Energy for Education Project



Message from Duke



Niraj Subeti had an idea. Thanks to a scholarship he was awarded from GSEP several years ago, Niraj completed his Master of Environmental and Energy Management at Twente University in the Netherlands and then returned home to Nepal where he made the connection between electricity and education.

Today, Niraj's idea to install solar panels at two local schools in remote western Nepal and then outfit them with computers is a reality. GSEP members Duke Energy (USA) and Kansai Power (Japan) teamed up on the project in the village of Matela, constructing two photovoltaic systems that will provide lighting and computer education for children and adults alike. Additionally, nearly 800 solar home systems were distributed to families of the students, allowing for education to continue after dark, outside the classroom.

In most cases, the home solar system replaces kerosene, eliminating emissions that cause a toxic indoor environment in so many Nepalese homes. And, energy costs will be reduced as residents leave behind their dependency on increasingly-expensive kerosene. Cost savings will make the solar home systems affordable. GSEP worked with a local non-governmental organization—The Beautiful Nepal Association—on this project. The partnership with the local Malika U Ma Vi School's Management Committee was also critical. Together, they will be responsible for the operation and management of the PV system and of the SSHS program.

The business model, too, is sustainable. Residents will use the avoided costs of the kerosene to pay approximately US \$0.63 per month for the solar home system and students will pay approximately US \$1.15 per month charge for the school PV/computer system. Funds collected will be used to replace the batteries of the PV system and portable lamps every five years.

GSEP believes this model is replicable and we hope this project's success will create the momentum for further developments by the international community.

A handwritten signature in black ink that reads "Jim Rogers". The signature is written in a cursive, flowing style.

Jim Rogers
GSEP Chairman 2012-2013
Chairman, President and CEO
Duke Energy

Message from BNA Chairperson



Nepal, a beautiful country situated in South Asia with diverse socio-cultural and geographical settings has a high potential for renewable energies such as hydropower, solar, biomass and biogas. It is the birthplace of 'Lord Buddha' and home to the highest peak of the world 'Mount Everest'. Nepal is a landlocked country and depends mostly on imported petroleum products to meet its energy demand.

Sundar Nepal Sanstha (Beautiful Nepal Association –BNA) is a non-profit organization working in different sectors including Renewable Energy in the Midwestern region of Nepal where the Human Development Index (HDI) is the lowest. BNA has been working as a Regional Renewable Energy Service Centre of Nepalese government's Alternative Energy Promotion Centre for last 9 years.

The Nepal Energy for Education Project is a very effective and innovative project being implemented in Nepal. As the chairperson of BNA, the local implementing partner of the project, I highly appreciate the support from the Global Sustainable Electricity Partnership (GSEP). The project not only provided solar home systems to 785 students of the two rural schools in the Matela VDC of the Surkhet district, but also included the construction of new computer labs with a solar system installed to power the new laptops at the schools. BNA supported the schools' Management Committee and the beneficiary communities throughout the project's implementation and will continue to offer support to ensure the quality and sustainability of the project.

On behalf of our organization BNA and the community, I express my gratitude to the GSEP for this project that is a model for replication not only in Nepal but also in other parts of the world that can benefit from enhancing educational services through the use of solar energy. The project helps reduce carbon emissions, create a clean environment, and increase access to information technology. The 21st century is the age of Information Technology. It gives me an immense pleasure to share with others this successful project that has added value to the positive transformation of the rural community.

Last but not least, may I express to Duke Energy, Kansai and the other GSEP member companies our deepest gratitude for their great support and for coordinating this project. Our gratitude extends to Mr. Luis Calzado (GSEP project coordinator) Mr. Suman Basnet (senior PV advisor), Mr. Niraj Subedi (local project manager), the BNA team, and the people from the community for their valuable efforts in making this project a success. I wish for further replication of such projects and new innovative projects in developing countries like Nepal in the future.

A handwritten signature in black ink, appearing to read 'Buddhi Prasad Sapkota'. The signature is stylized and written in a cursive script.

Buddhi Prasad Sapkota
Chairperson
Sundar Nepal Sanstha (BNA)

Message from the Malika U Ma Vi School



The Nepal Energy for Education Project demonstrates how we can improve education. It is an innovative concept that can help not only education services but ultimately the development of the country. I would like to thank GSEP and Mr. Niraj Subedi for succeeding in making this project a reality.

Our school is located in the rural part of the country where not all modern public services are available. This is the 21st century but people living in this part of the country have a 19th century life style, a misfortune that is now beginning to change.

Our whole school, teachers, students and staff, as well as residents of the Matela VDC have no words to express our happiness and gratitude for this project. In our VDC, there are approximately 1,000 households. Today 785 of them have access to clean solar energy thanks to your support. Similarly, students before had only heard about computers, having never seen or used one. Today with this project, students will learn how to use them.

With the PV system at the school we are able to offer better education. Since the project has been completed, the number of students coming to the school has increased. Parents are now more willing to send their sons and daughters to school. Teachers are also more energetic and the school's management committee is very happy. I hope that this type of project will be replicated in other rural villages. I hope that the supporters of this project find ways to help this become a reality.

Finally, I would like to give thanks once again to the GSEP, the project team, BNA, the local development committee in Surkhet and Mr. Niraj Subedi for supporting us.



Resham Bahadur G.C.
President
Management Committee
Malika U Ma Vi School

Message from ESED Scholar



Energy for Education is the project concept that came to my mind back in 2009. With the completion of the project I am probably the happiest person beside the project beneficiaries. Being a Renewable Energy professional from a developing country, I conceptualized this project to link the use of renewable energy as a tool for the promotion of education in rural areas. I am thankful to GSEP for making my concept a reality, allowing for 785 students to become the beneficiaries of the Nepal Energy for Education Project in Matela VDC of Surkhet in the mid-western region of rural Nepal. The project serves as a pilot of its kind, and I am confident that the project's replication elsewhere in developing countries will demonstrate the relation between energy and education and will prove that off-grid solar photovoltaic systems in rural villages can be one of the best tools for education promotion. As education is the most basic need for the socioeconomic development of a society, the impact of this project is expected as to significantly support the overall development of a country.

The realization of this project would not have been possible without the support of GSEP and our local partner the Beautiful Nepal Association (BNA). I offer my special thanks to GSEP and BNA for their positive attitude since the project's inception until its inauguration, as well as their active role in the project's implementation. I am grateful for Mr. Luis Calzado's support, for Mr. Suman Basnet's advice and collaboration, the subsidy and moral support of AEPC, and the commitment of the school's management committee, all which were major factors that ensured the success of the project. The unfailing support and encouragement of all the people who had a stake in this project is highly appreciated and I remain grateful to all.

Thank you all for being a part of such a wonderful Nepal Energy for Education Project.

A handwritten signature in black ink, appearing to read 'Niraj Subedi'. The signature is stylized and fluid, with a horizontal line underneath the main part of the name.

Niraj Subedi
GSEP Scholar
Local Manager and Promoter
Nepal Energy for Education Project

Message from AEPC



Thanks to GSEP for its effort to make the Nepal Energy for Education Project a success. AEPC, being a government institution for renewable energy promotion in Nepal, is happy to be the part of the project. AEPC supported the project by giving the Government of Nepal's defined subsidy for the portable lamps, which were distributed for cleaner lighting to rural households to improve the education of students in these remote villages in the Surkhet District.

AEPC itself, with direct support from the Government of Nepal and also through support from different development partners, has been making an effort to promote the link between access to energy and better education. Several schools in rural areas have been electrified by solar panels. One step ahead of the general practice, this Nepal Energy for Education Project has gone further by giving a complete package of PV solutions for energizing the villages' rural education system.

AEPC believes that a project will be successful only if its sustainability is proved for which we may have to wait for years to come. In this regard, I would like to request that BNA, GSEP's local partner in the implementation of the project, keep its eyes open and be active in addressing technical and social challenges in the years ahead. I also would like to request all the concerned to continue helping keep the project alive, functional and beneficial for years and years to come.

A handwritten signature in black ink, appearing to read 'Govind Raj Pokharel', written in a cursive style.

Prof. Dr Govind Raj Pokharel
Executive Director
Alternative Energy Promotion Center (AEPC)

Education is the key to unlocking the economic potential in communities, particularly in rural areas in developing countries. The Nepal Energy for Education Project demonstrates the potential of solar energy as a viable power source for improving education in the remote rural villages in Nepal. The project proposes the installation of a stand-alone photovoltaic system at two rural schools to improve the education services given, as well as the distribution of small solar home systems to students and residents of a remote rural village in Nepal.

Sustainable rural energy development is at the heart of this project. Matela, the village where the project is located, is not connected to the national electrical grid and the two schools serving the community have no electricity at all. This has limited the quality of education that the schools can offer their students. The link between greater education and higher income cannot be overstated, in particular in rural areas where many families live in poverty. Increasing access to modern education services in rural areas can help unlock the potential of these regions, giving residents more tools to fight poverty and aspire to a better quality of life.

In addition to improved education services, the portable small solar home system component of the project will help households replace the current kerosene lamps they use with a cleaner source of energy. Students will be able to continue their studies at home after dusk, while other members of the family can take advantage of the light. Furthermore, the elimination of toxic fumes can improve the health of all household members.

In a country where close to 80% of the population lives in rural areas, almost half of which have no access to electricity due to the intrinsic geographical ruggedness of the Nepalese territory, the potential replication of this project can have a substantial positive impact for these regions and the country as a whole.

Education is the key to unlocking the economic potential in communities, particularly in rural areas in developing countries. The Nepal Energy for Education Project demonstrates the potential of solar energy as a viable power source for improving education and quality of life in the remote rural villages in Nepal.

The Federal Democratic Republic of Nepal



Introducing Nepal and Matela

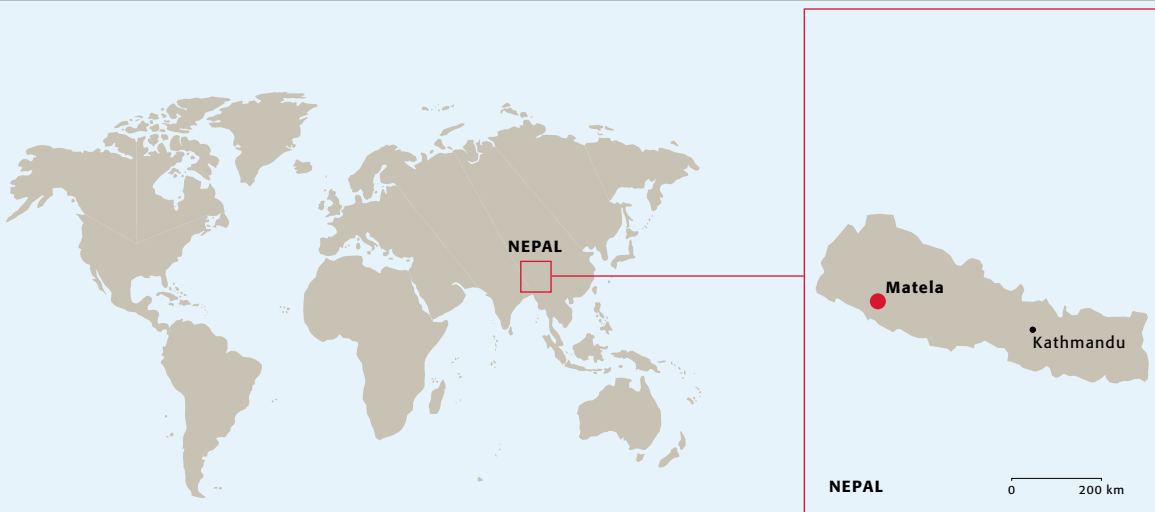


Located in South Asia on the skirts of the Himalayas, the Federal Democratic Republic of Nepal borders the Republic of India to the south, east and west and the People's Republic of China to the north. Home to approximately 30 million people, its surface area of just over 147 km² is rich in geography and culture. Its capital city, Kathmandu, is the largest urban center in the country¹.

Our project is located in the Matela Village Development Committee (VDC), a village in the northeast mountainous region of the Surkhet district. One of the most remote VDCs among 50 VDCs in the district, Matela is only reachable by a road from Surkhet's capital which is open for only 6 months of the year during the dry season. Its total area is approximately 50 km².

1. Central Intelligence Agency. "Nepal". cia.gov. Central Intelligence Agency, 13 Feb. 2013. Web. 8 Mar. 2013.

LOCATION OF THE MATELA VILLAGE DEVELOPMENT COMMITTEE, SURKHET DISTRICT



GEOGRAPHY

The Nepalese territory is divided into three main geographic regions running horizontally across the country: the hills (pahad in Nepali), the plains (terai), and the mountain region (parbat). Situated in the northern part of the country, the parbat lies in the Himalayas. Eight of the world's ten highest mountains lie in the Nepalese parbat, including Mount Everest, the highest point. The pahad is adjacent to the parbat. Altitudes in this region vary between 800 and 4,000 meters above sea level, with different climates reflecting these changes in altitude. The terai, bordering India on the south, has a subtropical to tropical climate, making this the most cultivated region in Nepal.

DEMOGRAPHIC AND SOCIOECONOMIC OVERVIEW

Nepal is one of the least developed nations in the world. Despite making gains in poverty reduction, close to one third of Nepalese still live below the poverty line. This developing country's economic growth has averaged 4% per year over the past two decades. While accounting for just over a third of the country's economy, the agriculture sector employs over 75% of the local population². In spite of a dependence on the environment, in particular the monsoon season, agriculture is the principal source of food, income, and employment for the majority of the population. The main crops, grown mostly by small farmers, are tea, rice, corn and wheat.

Nepal's population is made up of over 40 different races and tribes. However, the majority of Nepalese are descendants of three major migrations from India, Tibet, and North Burma and China (more specifically from the province of Yunnan). This ethnic diversity has bequeathed a rich linguistic heritage, with 10 major languages spoken in the country in addition to Nepali, the mother tongue of over 48% of the population.

In Matela there are about one thousand households, for a population of close to 6,000. Most of the population share the same religion and tribe. The majority of residents are engaged in subsistence farming, mostly rice and corn, while others raise livestock such as cattle.

2. Central Intelligence Agency. "Nepal". cia.gov. Central Intelligence Agency, 13 Feb. 2013. Web. 8 Mar. 2013.



City of Kathmandu



Matela VDC

POLITICAL SYSTEM

Nepal is a federal democratic republic. The chief of state is President Ram Baran Yadav, in office since 2008, and the Prime Minister is Mr. Khil Raj Regmi, who is the head of government and exercises executive powers with his cabinet. Mr. Regmi was appointed Prime Minister in March 2013 following a month-long political gridlock in the country.

Since the introduction of democracy in 1990, Nepal has suffered from political instability. Political tensions still remain following a 10 year violent conflict that ended in 2006. The development of a new constitution, aimed at structuring Nepal's federal democratic state, is in a deadlock after the Constituent Assembly was dissolved in early 2013 for not being able to deliver the constitution by the agreed deadlines and subsequent extensions. The new Prime Minister Regmi will oversee the process to hold elections for a new Constituent Assembly. Political parties in the country agreed to set June 21, 2013 as the deadline.

Despite political instability, security in Nepal has significantly improved since 2010, boosted by the signing of a peace agreement between the former Maoist rebels and the state. This has led, among other things, to a marked reduction in strikes and public demonstrations, which were disruptive for business activities and residents' lives.

Village development committees (VDC) are the lowest administrative level in Nepal. The VDC has the autonomous authority to interact directly with more centralised institutions of the federal government. In this way, the VDC helps give village residents a certain autonomy to discuss basic public services such as education, water supply and health, while monitoring and recording their progress. The chief of the VDC reports to the district development committee, whose chief is considered the local development officer. Matela, the site of our project, is a VDC in the district of Surkhet.



Nepalese man quilting outside his home



Traditional Nepalese house

Nepal's Power Sector

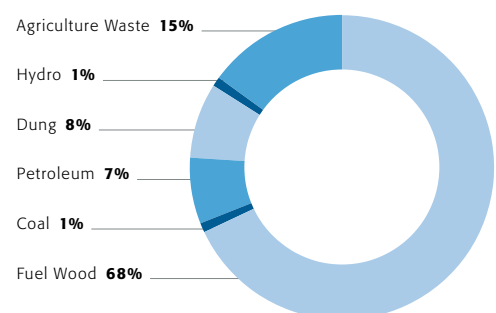
In spite of the country's substantial hydropower potential (estimated at 42,000 MW), only less than 1% is used to supply energy. More than 85% of energy in Nepal is supplied from firewood and biomass. Fossil fuels, which are mainly imported, account for approximately 10% of the energy mix³. Due to the ruggedness of its geography, however, the transportation of fossil fuels to several rural areas is practically impossible, which means most of the firewood and biomass use occurs in these communities. This practice is very inefficient and poses a threat to the country's forests, as well as to resident's health from the inhalation of the fumes.

3. Reegle—Clean Energy Portal. "Country Energy Profile: Nepal". reegle.info. Reegle, n.d. Web. 8 Mar. 2013. World Bank. "Nepal". worldbank.org. World Bank, n.d. Web. 8 Mar. 2013.



The Marsyangdi Hydropower Plant in Nepal

NEPAL'S ENERGY MIX



Source: http://www.sari-energy.org/PageFiles/Countries/Nepal_Energy_detail.asp

ENERGY POLICY AND REGULATION

The Ministry of Energy is responsible for managing Nepal's energy sector and developing the country's energy resources. Policy development and regulation, among other things, fall under the Ministry's mandate. The Nepal Electricity Authority (NEA) is the national public utility responsible for generation, transmission and distribution of electricity, as well as related engineering services. A Board of Directors, with the Minister of Energy as its chairperson, governs the NEA.

The transparency of the regulatory framework, as well as promotion and facilitation of the private sector's participation in the energy sector, is overseen by the Department of Energy Development within the Ministry. Nonetheless, there is no single utility or energy regulator. An Electricity Tariff Fixation Commission was established in 2009 to review and approve tariffs proposed by the NEA. However, the Commission is not required to review the transactions of the various Independent Power Producers (IPP), who sell a large part of the electricity they produce to the NEA through purchase power agreements, or the arrangements made between NEA and India for the import of additional energy⁴.

ELECTRICITY DEMAND AND POWER SYSTEM

National peak power demand in 2011 reached 946.1 MW, a 7% increase over the previous year⁵. The total installed capacity of the power system, including public and IPP power plants, was estimated to be 705.5 MW in 2011⁶. With the demand exceeding the production of electricity, Nepal faces frequent and regular power shortages, which hamper the country's economic development. Power outages can last as much as 16 hours per day.

Currently, the NEA serves only 15% of Nepal's total population, mostly in the main urban centers⁷. In general, Nepal has a 40% electrification rate around the country yet, when divided along urban and rural lines, the differences are sharp—90% of the urban population has access to electricity, as opposed to less than 30% in rural areas⁸.

People living in rural areas are mainly dependent on kerosene lamps for lighting—if they can afford it. Rural households spend on average 11% of their income on energy, with the poorest households spending close to a quarter of their annual income⁹. Small kerosene wick lamps are probably the most widely used form of domestic lighting among rural families. Demand for electricity is projected to continue growing due to rapid urbanization and increased industrial growth.

4. Reegle—Clean Energy Portal. "Country Energy Profile: Nepal". reegle.info. Reegle, n.d. Web. 8 Mar. 2013.

5. 6. Nepal Electricity Authority. "Annual Report 2011". nea.org.np. Nepal Electricity Authority, 2011. Web. 8 Mar. 2013.

7. South Asia Regional Initiative for Energy. "Nepal". sari-energy.org. USAID, n.d. Web. 8 Mar. 2013.

8. 9. Banerjee, Sudeshna Ghosh, Avjeet Singh, and Hussain Samad. "Power and People: the Benefits of Renewable Energy in Nepal". A World Bank Study. World Bank, 2011. Web. 8 Mar. 2013.

RENEWABLE ENERGY

With transmission and distribution lines located mainly in urban areas and their surroundings, combined with the high instances of power outages in the electrified areas, off-grid renewable sources are gaining popularity in rural Nepal. The Nepalese government's Alternative Energy Promotion Centre (AEPC) was created in 1996 with the purpose of developing and promoting renewable energy technologies in the country. Since then, the AEPC has been the national focal point for coordinating all renewable energy related activities in Nepal and all major off-grid electrification programs. AEPC's focus is on promoting micro/mini hydro, solar energy, bio gas, wind energy, improved cooking stoves and geothermal energy. The Government of Nepal has given high priority to developing renewable energy, aiming to increase the share of renewable energies in the energy supply to 10% in the next 20 years, while increasing access to electricity from renewable energy sources to 30%¹⁰.

Hydropower potential in Nepal is put at 83,000 MW, of which 42,000 MW are economically feasible¹¹. With current hydroelectricity meeting around 1% of total national energy consumption, there is ample room for growth. Currently, four hydropower plants are under construction, for a total installed capacity of around 354 MW¹². As for solar energy, according to the AEPC report in 2008 under the Solar & Wind Energy Resource Assessment in Nepal (SWERA), the commercial potential of grid-connected solar power is 2,100 MW.

However, off-grid micro-hydropower plants and off-grid solar home systems (SHS) are currently the largest sources of electrification in Nepal. In the next 3 years, the Government of Nepal plans to add 15 MW of micro/mini hydropower, 225,000 SHS, 1 MW of wind power, among other targets¹³.

At the project site in Matela, the main sources of energy are kerosene and fuel wood for lighting and cooking. Radios are powered with batteries. A total of 65 households in Matela (less than 6%) have installed solar home systems, according to the AEPC solar power systems review in 2010.

SUMMARY OF INSTALLED RENEWABLE ENERGIES IN NEPAL

	Total Number Installed	Total Capacity installed (KW)	Households connected
Small hydropower plants (less than 1MW)	2,519	37,080	116,732
Biogas plants (household, institutional and community)	258,814	n/a	258,642
Solar energy technologies (PV)	296,164	7,529	296,164
Biomass technologies (improved cook stove (ICS))	619,816	n/a	619,816
Windpower plants	23	14	n/a

Source: Alternative Energy Promotion Center (AEPC). "Renewable Energy Databook 2011". AEPC, Government of Nepal, 2012. Web. 10 Apr. 2013.

10. 11. 12. Reegle–Clean Energy Portal. "Country Energy Profile: Nepal". reegle.info. Reegle, n.d. Web. 8 Mar. 2013.

13. Reegle–Clean Energy Portal. "Country Energy Profile: Nepal". reegle.info. Reegle, n.d. Web. 8 Mar. 2013.

RURAL ELECTRIFICATION

The geographical characteristics of the Nepalese territory, compounded by the lack of infrastructure, high costs and current electricity constraints, make the extension of the grid to rural areas almost impossible and not economical. Off-grid solutions using renewable energy are central to the Government of Nepal's strategy to increase access to electricity in these areas, and the AEPC is mandated to coordinate this. Several programs are in place, developed jointly with international development organizations, to scale up this access.

Two main policy elements exist in Nepal to promote rural electrification. The Rural Energy Policy (REP), introduced in 2006, was designed to develop policy elements to address rural energy needs, as well as create a rural energy subsidy per household (as opposed to per kW), and develop credit systems, among other things. Importantly for this project, the REP recognizes solar home systems as a main tool for rural electrification¹⁴. The Subsidy Policy for Renewable (Rural) Energy was introduced in 2009 with the aim of making existing subsidies equitable and effective. Although both policy instruments have been introduced, several acts required for full implementation of these policies are still in the preparatory stages and await approval by the Constituent Assembly.

14. Reegle—Clean Energy Portal. "Country Energy Profile: Nepal". reegle.info. Reegle, n.d. Web. 8 Mar. 2013.



Example of an off-grid solar home system in rural Nepal



Use of firewood and biomass for cooking and heating is extensive in Nepal



Head tank of a mini-hydropower plant in Nepal installed by AEPC

The Nepal Energy for Education Project

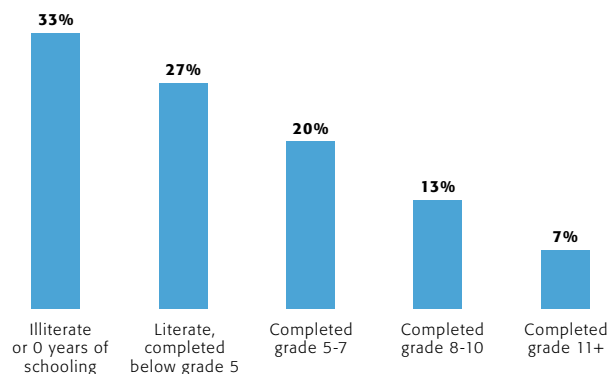


Concept and Objectives

The Nepal Energy for Education Project demonstrates the potential of solar energy as a viable power source for improving education in the remote rural regions in Nepal. With education at the center of improving social and economic development, the benefits of this project can extend well beyond the classroom. The project proposes the installation of a stand-alone photovoltaic system at two local schools to improve the education services given, as well as the distribution of small solar home systems to students and residents of Matela.

THE NEGATIVE CORRELATION BETWEEN EDUCATION AND POVERTY IN NEPAL

(% of People Living Below the Poverty Line—Headcount Ratio)



Students in class at the Malika U Ma Vi School

INCEPTION

In 2011, in response to the proposal by Mr. Niraj Subedi, one of the alumni from our Education for Sustainable Energy Development (ESED) scholarship program, we undertook the development of the Nepal Energy for Education Project.

Sustainable rural energy development has always been at the heart of this project. Matela, the village where the project is located, is not connected to the national electrical grid and the two schools serving the community have no electricity at all. This has limited the quality of education that the schools can offer their students. The link between greater education and the higher income cannot be overstated, in particular in rural areas where many families live in poverty. This project proposes to address this with the installation of a 6 kW photovoltaic (PV) system in one of the two schools in Matela, the Malika Uchha Madhyamik Vidyalaya School (Malika U Ma Vi School). The energy provided from the system will be used for overall lighting in the school and to operate a new computer room. Additionally, the second school, Rastriya Madhyamik Vidyalaya School (Rastriya Ma Vi School), will have a PV system (0.7 kW) installed to light all its classrooms and to operate two computers.

In addition to the PV systems, the project also proposes a program to distribute portable small solar home systems (SSHS) to participating students and residents of the village in order to provide them with light in their homes. The provision of clean portable lamps to students will allow students to do their homework at home after dusk without inhaling the toxic gases produced by the kerosene portable lamps they currently use, the main source of energy for residents of Matela.

In total, approximately 10.6 kW of installed solar energy capacity will be available to the residents of Matela from the installed stand-alone PV systems and the SSHS program.



Residents of Matela receiving their SSHS

THE NEPAL ENERGY FOR EDUCATION PROJECT GOALS ARE:

- To demonstrate the potential of solar energy as a viable power source for improving education in the region
- To use a photovoltaic system for lighting and to launch a computer program in two rural schools and evening classes for the surrounding community
- To provide clean, portable small solar home systems for students and residents in Matela, significantly reducing the emission of toxic gases from the current use of kerosene lamps

BENEFICIARIES

The main beneficiaries of this project are the students at the Malika U Ma Vi and the Rastriya Ma Vi Schools. Special emphasis has been given to the Malika U Ma Vi School which will act as the hub for the project's main components: the small solar home systems (SSHS) program and the new computer room. Operating since 1992, the Malika U Ma Vi School has never had access to electricity. Managed by a Management Committee, 16 teachers, with the help of 2 support staff, currently work with 675 students ranging in age from 5 to 20. School days average 7 hours, with shorter times during the winter due to lack of natural light.

With this project, the students and teachers will benefit from continuous lighting across the school, which will improve the quality of education provided. The positive impact of the availability of light will extend beyond the students enrolled in the school. With the PV system installed, the school is looking forward to opening its doors to adults in the village in order to offer reading and writing classes during the evening after regular school hours.

Students in their last two years of studies will have access to new computers, and will be taught basic computer skills. Indirectly, teachers will benefit from this program as well, as they themselves will learn the computer skills to be transmitted to the students.

In addition, participating students of the Malika U Ma Vi School, as well as other families in Matela and participating students at the Rastriya Ma Vi School, will receive a SSHS. In total over 785 households in Matela will benefit from access to a SSHS. The main source of energy for residents in Matela are kerosene and fuel wood for lighting and cooking. The switch to a portable SSHS will provide an affordable and cleaner alternative energy source.



"It feels good to see computers in the school. We now can get information about the world with the computer and learn new things. Before there was no electricity but now we have. Before we could not start class early in the morning because we had to wait until there was light. But now the lights are installed, we can start and finish whenever we like, even when it is dark! At home we used to read with our Diyalo [traditional kerosene lamp] and it was very hard to study at night but now we have good lights and it is very comfortable while reading. I can even now help my parents learn to read!"

Purna kala Regmi, Student at Malika U Ma Vi School, Class 10



"I am very happy to install the solar home system at my house. Now my children can study better in better light. It will also help me work during the night time."

Resident of Matela

PROJECT FEASIBILITY STUDY KEY RESULTS

With the help of Mr. Niraj Subedi, our ESED scholar and proponent of the project, we conducted a feasibility study for the project in December 2011. The following key findings were reported:

- Renewable energies can be an efficient and cost-effective way to provide lighting to public schools in remote areas.
- Photovoltaic (solar) energy will become the most common source of energy for lighting in off-grid remote areas.
- Currently high schools do not have access to computer education in the region. Photovoltaic systems can be the source of energy to introduce this new technology in public schools.
- Considering the distance of rural households from the center of the closest village, SSHS will be the most economical way for people in poor remote areas to have access to cleaner energy.
- Lighting in schools will allow students to access higher quality education, increasing literacy rates in the community.
- The shift from full reliance on kerosene for lighting to SSHS will help families avoid health conditions caused by inhaling toxic fumes.
- The budget for the project was estimated at US \$138,000 and the monthly cost for lighting using SSHS was found to be equivalent to, if not cheaper than, the kerosene prices already incurred by the community.

Based on these key and encouraging feasibility findings, the Nepal Energy for Education Project was designed as a pilot model to facilitate and enhance sustainable energy development in the region. In addition, the project seeks to show that renewable energy systems can be used to improve education in rural schools, providing access to lighting and computer education.



Students at the Malika U Ma Vi School during morning roll call



Mr. Niraj Subedi (right) speaking to Matela residents

Project Management

The Nepal Energy for Education Project was implemented under the leadership of Duke Energy from the USA on behalf of the Global Sustainable Electricity Partnership. The project management team was composed of the ESED scholar and a senior engineer, both experienced professionals in project development from Nepal, an engineer from GSEP, and representatives from the Beautiful Nepal Association. Members of the team brought together their vast experience in the development and implementation of off-grid photovoltaic systems in Nepal and in other developing countries. The close relationship with local authorities, as well as with the beneficiary communities, ensured the successful implementation of the project throughout its development stages.



Project management team with Rastriya Ma Vi School Headmaster [from left to right]: Mr. Suman Basnet (Senior PV Advisor), Mr. Luis Calzado (GSEP Project Coordinator), Mr. Bod Bikram (Headmaster), Mr. Niraj Subedi (Local Project Manager), Mr. Buddhi Sapkota (Chairperson, BNA), and Mr. Ganesh Shrestha (Managing Director, SunTech)

PARTICIPANTS AND PARTNERS

This project was solely funded by Duke Energy on behalf of the Global Sustainable Electricity Partnership. GSEP's member Kansai supported the project through valuable in-kind contributions, in particular at the level of human capacity-building and training activities. Our main partners on site were the Beautiful Nepal Association, a local non-governmental organization with experience in off-grid solar projects and the Malika U Ma Vi School's Management Committee, headed by the committee chairperson. Support from the Rastriya Ma Vi School's Management Committee, as well as from the Matela VDC secretary and from the Nepalese government through AEPC were critical to the success of the project.

OVERALL MANAGEMENT SYSTEM

The BNA has been promoting the use of renewable energy technologies in rural areas, including off-grid PV systems. Having worked in PV system projects, BNA has the technical expertise, as well as the available human resources, needed to handle operation and maintenance of our systems. With their headquarters in the same Surkhet district as Matela, 50 kilometers from the project site, BNA representatives will be able to monitor the system closely.

Under a memorandum of understanding, the Beautiful Nepal Association (BNA) and the Malika U Ma Vi School's Management Committee will set up an Operational Committee that will be responsible for the operation and management of the computer PV system and of the overall SSHS program. The BNA will offer support to the Operation Committee, both administrative and technical, and will supervise their work to ensure its quality and sustainability. The BNA will also support the Rastriya Ma Vi School with the operation and maintenance of their PV system.

Additionally, the BNA will play a key role in securing the procurement of the PV systems component bought in Nepal.

The Malika U Ma Vi School's Management Committee will supervise the Operational Committee, ensuring that the PV system installed at the school and the overall SSHS program, which will use the school as its main distribution and maintenance center, run smoothly.

SUNDAR NEPAL SANSTHA



Sundar Nepal Sanstha (Beautiful Nepal Association or BNA) is a non-profit, non-governmental organization established in 1996 by the energetic youth of Bidyapur,

Surkhet. The goal of the organization is to assist in the development of a beautiful and ideal society through the enhancement of the living conditions of the local community. Among its major objectives, BNA supports the community in the promotion of activities, such as those related to renewable energies, focusing on building the capacity and skill set of the target community for their empowerment and sustainability of development.

www.sundarnepal.org.np

FINANCIAL DESIGN

The initial investment was provided by Duke Energy on behalf of the Global Sustainable Electricity Partnership. This seed money was used for the purchase of the SSHS and the turn-key PV systems at both schools, construction of the computer room at the Malika U Ma Vi School, installation of computers as well as the purchase of lights for the classrooms, their installation and all related transportation costs.

Students in their last two years of studies at the Malika U Ma Vi School will be charged an additional 100 Nepalese Rupees (NPR) per month (approximately US \$1.15) to have access to the computer program. The fees collected for the computer program will be deposited into a fund managed jointly by the Malika U Ma Vi School's Management Committee and the BNA and will finance the operation and maintenance of the PV systems.

For the SSHS, participating students and residents will be charged 55 NPR per month (approximately US \$0.63) –a fee comparable to that already paid by residents for kerosene lamps– which will ensure the financial sustainability of the program. As for the computer PV system, all fees collected will be deposited in the joint account and will be used mainly for the purchase of new SSHS, battery replacement and disposal, as well as technical maintenance. The funds collected from both programs will also be used to pay the staff of the Operation Committee.

All fees were calculated based on the ability of the families and students participating in the project to pay. They were determined jointly with the local partners after a survey of the school's students and families. Operation and maintenance costs have been calculated to include the cost of operators, cost of regular refilling of distilled water in the base station for the batteries of the PV systems, cost to correct any faults in the SSHS and in the central charging station for the PV systems, cost of replacement batteries for the SSHS (every five years) and for the PV systems (every seven years), as well as costs of new SSHS.

It is expected that, with the introduction of computer education and a continuous source of lighting for the school facilities, the Malika U Ma Vi School will see an increase in requests for enrolment. This will further ensure that the school has sufficient students to generate a positive cash flow in order to continue operating both programs.



Representative of Malika U Ma Vi Management Committee reviewing the records of fees collected for the SSHS program

ENVIRONMENTAL IMPACT

The environmental impact of the project is very small but can potentially come from two sources: the construction of the computer room housing the PV system and battery disposal for both PV systems and the SSHS.

The computer room will be built using local methods with materials available in the village. Only cement and iron will need to be transported to the project site, which will be accomplished using the current available road infrastructure. Any excess earth left over from the excavation of the foundation will be used elsewhere in the school, such as to level the children's play area. The tables and chairs that will be used will be built locally.

Batteries of the SSHS will be replaced every five years, and those of the PV systems every seven years. Only the Operation Committee, who will be trained in the collection of used batteries, will be allowed to handle the batteries. Users of the SSHS will be asked to exchange their used batteries for new ones, ensuring that all used batteries are collected only at the school. The used batteries, once collected, will be safely transported by the government's official registered battery scrap collector that is authorized to take the waste to the battery recycling plant. In the meantime, these batteries will be stored in a single room at the Malika U Ma Vi School, well insulated from natural elements to prevent any rusting and potential leaking, and locked away from students and non-authorized personnel.

SOCIAL ACCEPTABILITY

The acceptability of photovoltaic technology in rural Nepal is high. The government of Nepal and many international donors have supported more than 250,000 households in rural Nepal to install similar solar home systems.

During the feasibility stage of the project, a survey was conducted of the parents of students enrolled in the Malika U Ma Vi and Rastriya Ma Vi Schools. The objectives of the survey were to confirm the interest of the residents to be part of the Nepal Energy for Education Project, confirm their capacity and commitment to pay for the programs offered by the project, and obtain and confirm data needed for the development of these programs. The information collected was used as input for the business model of the project.

Based on the data collected, it was confirmed that the majority of families in Matela use wood and kerosene as their main source of energy. On average, the families pay 155.75 NPR per month for lighting. As expected, 50% of families surveyed said to have suffered negative health effects from inhaling the fumes emitted by the kerosene lamps and 20% even said they had been victims of a fire due to the use of fired-based lighting. Most importantly, the survey confirmed that at least 90% of the families welcomed the promotion of portable SSHS at the price of 55 NPR per month. They also welcomed the new PV system and confirmed their desire to enrol their children in the computer courses. The survey also confirmed that 100 NPR per month is an affordable fee for the parents of students eligible to receive the computer education courses.

Project Implementation

The combined 6.7 kW solar powered systems in the Nepal Energy for Education Project were implemented over a period of 11 months, starting from the project's initial feasibility study. The turn-key PV systems for both schools were purchased from Suryodaya Urja Private Limited, and the same company installed them. Construction of the computer room, as well as the purchase and distribution of the SSHS, was overseen by the project management team.



Malika U Ma Vi students at the groundbreaking of the new computer room



Construction of the new computer room at Malika U Ma Vi School

IMPLEMENTATION SCHEDULE

The groundbreaking ceremony took place on December 16, 2012 at the Malika U Ma Vi School. Construction of the building that houses the computers began in late December, with the installation of the battery and solar panels following shortly after. Construction was completed approximately three months later. The Nepal Energy for Education Project was inaugurated on April 16, 2013 in Matela. The inauguration ceremony was attended by local government representatives and AEPC officials, as well as representatives from the BNA, the project management team and close to 800 villagers, including teachers and students of both schools and their families.

The cost of the project totalled to 9,342,515 NPR, approximately US \$106,000. Upon commissioning of the system, the operation and management responsibility for the computer PV system and SSHS program was transferred to the Malika U Ma Vi School and the BNA. The project will be closely monitored by the GSEP over a period of two years, during which BNA will send periodical reports on the operation and sustainability of the project.

PROJECT IMPLEMENTATION SCHEDULE

Feasibility Study and social acceptability survey	December 2011 to May 2012
Signature of memorandum of understanding and setup of project management team	May 2012 to December 2012
Construction and Installation	December 2012 to Month
Operation and Maintenance training, PV System	December 2012
Operation and Maintenance training, SSHS	March 2013
Inauguration	April 16, 2013
Monitoring	April 2013 to April 2015



Construction of new computer room and levelling of the childrens' play area



Installation of a SSHS in a resident's home

MAIN PROJECT SITE

The Malika U Ma Vi School is composed of six building blocks housing a total of 15 classrooms. The school is fenced and has a single entrance door. The school's Management Committee agreed to provide a space within the school perimeter to the project free of charge for the construction of the building that houses the new computer room. The school also agreed to be the center of distribution for the SSHS handed out to participating students and local residents in Matela, as well as the hub for maintenance and repair of the SSHS.

COMPUTER PV SYSTEM PROJECT DESIGN

The PV system installed at the Malika U Ma Vi School will be a turnkey system provided by Suryodaya Urja Pvt. Ltd, a Nepalese manufacturer. The specifications of the PV system design call for 15 different clusters of solar panels installed on each of the six building blocks of the school. By keeping the clusters independent from one another, reliability of the system as a whole will be maximized. The design will ensure that electricity is available in at least one of the school buildings at any given point in time. Also, each cluster will require smaller more efficient batteries that will be easier to monitor and replace at the end of their life cycle.

The electricity produced from the solar panels will be used for classroom lighting and to power 16 computers and a printer/copier.

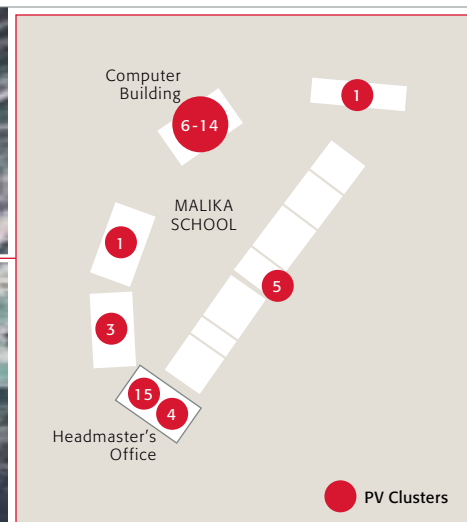
CONSTRUCTION AND INSTALLATION

Under the supervision of a civil engineer, construction of the additional computer room began on December 16, 2012, following an official groundbreaking ceremony on site. Total construction time was 3 months. The installation of the PV system followed shortly thereafter. A civil engineer evaluated all the existing school buildings before the installation to ensure the structures were sound enough to support the PV panels. All extra earth that was excavated and not utilized during construction was used by the Malika U Ma Vi School to level off the children's play area. The new computer room was furnished with desks and chairs purchased from local suppliers.

MALIKA U MA VI SCHOOL PROJECT SITE AND DESIGN



Google Earth® Satellite Imaging



PV system design

SSHS PROGRAM

The SSHS program originated from the idea of giving students the opportunity to complete their homework at home with a portable SSHS. When the results of the survey of parents of Matela residents were compiled, it was confirmed that not only were the majority of the families willing and able to pay for these systems if priced at a comparable rate to what they already pay for kerosene lamps, but many family members were indeed suffering from health impediments brought about by inhalation of toxic fumes from kerosene lamps. As a result, we decided to extend SSHS distribution to all interested families in Matela, limiting distribution to one SSHS per household. For a monthly fee of 55 NPR, equivalent to US \$0.63, each person will receive a new SSHS, access to repair and maintenance service, as well as a new battery replacement every five years. At their request, each resident was charged a lumpsum of 1,000 NPR (covering the first 18 months of their contribution to the SSHS program) on the first day of the program. The money collected will be used to create a fund for the purchase of new replacement batteries and the overall maintenance of the program. After the first year and a half, the collection of 55 NPR per month will resume.

Students at both local schools in Matela, as well as families in Matela without school-aged children, were asked to register in the SSHS program if they wanted to participate. A total of 713 students from both schools registered for the SSHS program, along with 72 additional families.

The SSHS were purchased from SunTech Energy Company Pvt. Ltd, a Nepalese company based in Kathmandu that assembles solar home systems. These types of portable systems are approved by the Nepalese government after extensive testing for reliability and functionality. As a result, they are eligible for a government subsidy when distributed in rural remote areas. All the savings made from the purchase of these subsidized SSHS were passed along to the families that participated in our program through a reduction of monthly fees. The SSHS has 5 W of power at its peak, and it is hung like a ceiling light for the benefit of the students and the whole family. The SSHS features three intensities which will help the students work at home at various times of the day. Distribution of the SSHS began on April 16, 2013.



Arrival of SSHS at Rastriya Ma Vi School



Students carry new computers to the schools



Installation of a SSHS by trained technician

OVERALL OPERATION AND MANAGEMENT DESIGN OF PROJECT

Unique to this project—and a feature that can potentially be replicated for similar projects in other rural areas in Nepal—is its design for the operation and management of the computer PV and SSHS systems. In order to ensure the financial sustainability of the project in the short and long run, a small fee is being charged for access to the computer education program and to a SSHS. This ensures that the beneficiaries take ownership of and responsibility for the computers and SSHS and their care. The model for the collection of funds and the share of responsibilities is unique in the sense that a school, with no prior technical knowledge of PV systems and their functionality, can take responsibility for collecting fees, distributing SSHS, and providing managerial supervision of the operations and maintenance of both the PV system and the SSHS with the support of a local NGO that has the technical knowledge and can ensure quality of maintenance and repairs. The following is a diagram of the operations and management design.

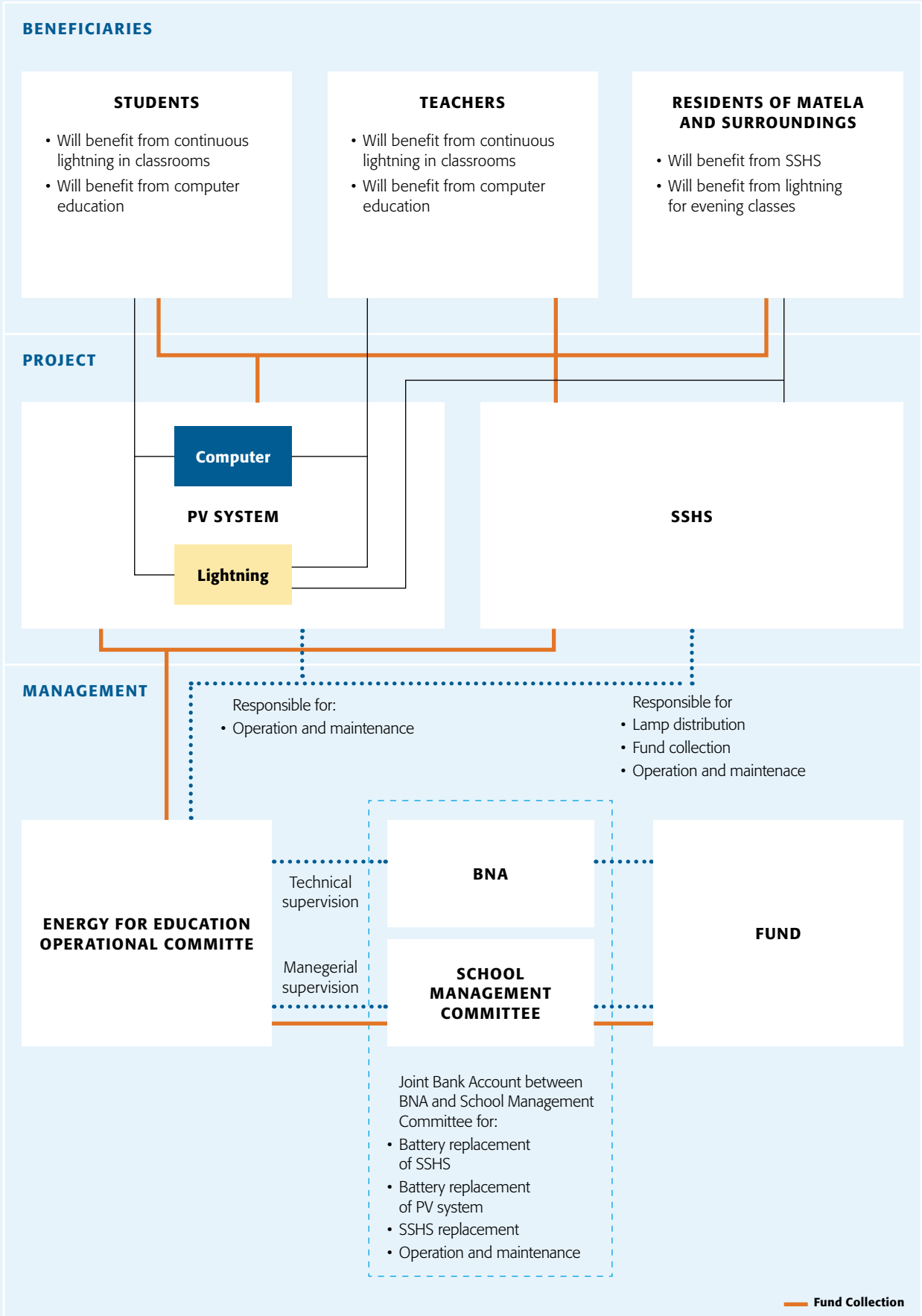


Students at the new computer lab in the Malika U Ma Vi School



New maintenance center for the SSHS in Matela

OPERATIONS AND MANAGEMENT DESIGN



ELECTRIFYING A SECOND SCHOOL

In addition to the computer PV system installed at the Malika U Ma Vi School, a second turn-key PV system was installed at the Rastriya Ma Vi School by the same manufacturer.

The Rastriya Ma Vi School is the only other school in the VDC of Matela. Thirteen teachers give classes to its 615 students who range from ages 5 to 20. Founded in 1975, the Rastriya Ma Vi School, like its neighbouring Malika U Ma Vi School, has never had access to electricity.

Thanks to this project, solar panels were installed on each of the school's five blocks. The PV system will provide sufficient energy for the lighting needs in the 12 classrooms and the installation of two computers. As in the other system, the solar panels will be installed in clusters, each with their own battery in order to ensure greater reliability and facilitate battery replacement. With this design, students and teachers will benefit from continuous lighting throughout the day. The school will run a computer lab with the two newly installed computers to teach students basic computer skills.

The Rastriya Ma Vi School's Management Committee will also create an Operational Committee that will oversee the operation of the PV system. The fact that the school's headmaster lives on the school's premises will help with the monitoring of the installed system.



Newly installed PV system at the Rastriya Ma Vi School



Parents and students of the Rastriya Ma Vi School at the inauguration ceremony

Human Capacity Building Activities

An essential objective of the GSEP is to maximize the transfer of knowledge through close collaboration with the local stakeholders that will have to take over the projects themselves. Furthermore, this transfer of knowledge ensures that a pool of technical and managerial skills is created in local communities, increasing their confidence in continuing their own renewable energy development plans. This pool of expertise also plays a key role in the replication of these projects in surrounding communities.



Kansai experts explain the stand alone PV system during the workshop held in December 2012



Newly trained SSHS technicians and computer teacher at the inauguration ceremony

TRAINING ON PV SYSTEMS AND COMPUTERS

With the support of its members Duke Energy and Kansai Power Electric Company, we conducted a technical training workshop on stand-alone photovoltaic (PV) systems from December 10 to 14, 2012 in Kathmandu, Nepal. This workshop provided the technical training for staff from the BNA responsible for supervising the PV systems and training the staff of the Energy for Education Operational Committee together with engineers from AEPC.

In addition, this workshop enhanced local capacity beyond our project's operations and maintenance crew by reaching out to current and future implementers of solar PV technology in Nepal. A total of 29 participants attended the workshop, including staff from BNA, energy and environment officers from 15 different districts in Nepal in addition to the Surkhet district where the project is implemented, and representatives from the beneficiary schools, from Kathmandu University, and from the Nepalese government's AEPC. The fact that this workshop extends beyond the beneficiaries of the project will generate local capacity to help in the replication of this project in other rural areas of Nepal.

To ensure that the computer education program would be sustained at both schools where we installed the PV systems, teachers were trained on how to operate computers and how to transfer computer skills to their students.

TRAINING ON SSHS

A second technical training workshop on the operation and maintenance of the SSHS, including replacement of batteries and repair of systems, was in March 2013 to the staff of the Energy for Education Operational Committee. A total of 3 people were trained.

The human capacity building offered to local personnel will ensure the operational sustainability of the project's PV systems and SSHS components.

Sustainable Development Footprint

With sustainable development at the heart of our mission, we always take the necessary steps to ensure the sustainability of the projects we complete. The Nepal Energy for Education Project was designed, developed and implemented with its short-run and long-run sustainability in mind.

Over a period of two years, we will monitor the project's performance, even though the operation and management responsibility of the project was transferred to the beneficiary schools and the BNA upon commissioning in April 16, 2013. Beyond taking the necessary measures to ensure the financial and operational sustainability of the project, which have been explained in detail in the previous sections, the project's benefits to the local community, as well as its potential for replicability, further contribute to the positive sustainable development footprint of the project.



Malika U Ma Vi students dance to celebrate the arrival of electricity and computers to their school



Group of women in Matela pictured after receiving their SSHS

BENEFITS TO THE LOCAL COMMUNITY

Students and residents of the Matela VDC will enjoy access to a clean reliable source of energy. The quality of their education will substantially improve with the addition of lights in the classrooms and a computer education program. Students in their last two years of studies will have access to new computers and classes, where they will be taught basic computer skills, providing them with new tools to help their community. Indirectly, teachers will benefit from this program as well, as they themselves learn the computer skills to be transmitted to the students.

Classes after dusk will now be possible, providing the chance for adults in the village to learn how to read and write—a first for many in Matela. The link between greater education and higher income cannot be overstated, in particular in rural areas where many families live in poverty. Access to modern education services will boost the potential of Matela residents to attain a better quality of life, increasing the possibility of getting more qualified jobs and improving income prospects.

In addition to improved education services, the portable small solar home system component of the project will help households replace the current kerosene lamps they use with a cleaner source of energy. Students will be able to continue their studies at home after dusk, improving their chances of succeeding in school. Other members of the family will benefit as well, in particular from the elimination of toxic fumes.

Based on our survey and the experience throughout the project's development, this project is a source of pride for the schools, the students and the residents of the Matela VDC.



"We are very happy to see computers. We had not seen computers before but now we can learn some new things. Before there was no electricity but now we have solar lamps. Now we can study at night at home. Thank you."

Students at Rastriya Ma Vi School [from left to right in uniform]: Bal Bahadur GC (Class 9), Ratna GC (Class 5), Laxmi GC (Class 3), Loken GC (Class 2), Sita Kumari GC (Class 7)



"We are very happy with this project. With the solar lights, students and elderly people will get chance to study at the new computer room. Students will be delighted and can work hard for their studies. Thank you to GSEP and BNA. Namaste."

Yam kumara GC, Teacher at Rastriya Ma Vi School's Children Welfare Committee

REPLICABILITY POTENTIAL

This project will serve as a pilot in Nepal, demonstrating that solar energy can be used to improve education in rural areas in a country where close to 80% of the population lives far from urban centers, half of which have no access to electricity due to the intrinsic geographical ruggedness of the Nepalese territory. We hope that by showing the positive impact computer education can have on students, by showing the benefits clean reliable solar energy can have in improving education services and increasing their reach in the community, and by having the SSHS priced competitively against the widely used kerosene portable lamps, we can mobilize the international community to replicate this project model.

The Nepalese government's Alternative Energy Promotion Center has indicated that they would like to see this concept of "Energy for Education" replicated in other regions in the country. The use of solar energy to support rural development in Nepal is widely accepted. Our project model, including its sustainability features, as well as the operations and management design of its combined stand-alone PV system and SSHS program at a school, can be replicated in other remote schools in rural Nepal. Since the PV systems technical workshop attracted an audience far beyond the beneficiaries of the project, it is likely that there will be local capacity in the region to support a replication strategy. Lessons learned from the 2 year monitoring period will be shared with all stakeholders, including the Nepalese government.

LINK TO GSEP UN SE4ALL COMMITMENTS

In line with our mission to promote sustainable energy development, our Chairmen proudly pledged three commitments as immediate contributions to the United Nation's Sustainable Energy for All (SE4ALL) initiative.

Led by Secretary-General Ban Ki-moon, SE4ALL aims to mobilize key actors around the world in an effort to make sustainable energy for all a reality in 2030. Our commitments to the initiative are:

1. To provide 50,000 solar lanterns in partnership with the Global BrightLight Foundation in order to increase access to clean electricity for off-grid households;
2. To expand our current capacity-building workshops in developing countries in order to help develop local, regional and sub-national capacities and improve the understanding of local circumstances;
3. To fund the development of electrification roadmaps for Southern Africa and for other underserved areas of the world, with the aim of showing how to provide access to electricity for 500 million people by 2025.

The Nepal Energy for Education Project will contribute to our commitment to provide 50,000 solar lanterns. Currently, there are projects being reviewed for implementation in Asia and Africa that will place close to 18,000 lamps. Other projects in these regions, as well as in Latin America, are also being considered to reach our goal. As is evident with this project, replacing kerosene, candles or—in some cases—animal waste with clean solar lanterns will improve indoor air quality, facilitate greater access to education, enhance personal safety and enrich the quality of life of these communities. The simple provision of solar light will generate opportunities—even economic ones—that these people currently lack.

Through these commitments and our regular activities we will continue to show our strong support for the UN SE4ALL initiative, aspiring to take on an increasing role in facilitating energy access by 2030 with other organizations ready to join the call.

Without access to a reliable and affordable source of energy, remote communities are the most prone to poverty and low-quality living conditions. Education is the basis for the development of a society, and modern education systems require energy sources that various schools in Nepal currently lack, in particular those in remote areas. Access to better education can unlock the economic potential in these rural communities. Our Nepal Energy for Education Project provides a successful and replicable model of sustainable rural development that uses solar energy as the basis to improve education services in remote rural regions of Nepal.

With the installation of two photovoltaic systems in two rural schools in Matela, with a combined 6.7 kW of power, classrooms will have a constant source of electricity, and students will have access to computers that will allow them to learn vital skills that are an integral part of modern education services. The positive repercussions of the project will be felt beyond the schools as illiterate adults in the village will now have an opportunity to learn how to read and write during the evening.

The provision of clean portable lamps to students will allow students to do their homework at home after dusk without inhaling the toxic gases produced by the kerosene portable lamps they currently use, the main source of energy for residents of Matela. By providing access to these SSHS for families beyond the schools, we have ensured that more households have access to cleaner and more efficient energy. In total, approximately 10.6 kW clean solar energy is now available to the residents of Matela from the installed stand-alone PV systems and the SSHS program.



ABBREVIATIONS AND TERMS

GSEP Global Sustainable Electricity Partnership

BNA Beautiful Nepal Association, local Nepalese NGO and main project partner

AEPC Alternative Energy Promotion Center, Nepalese government entity in charge of developing and promoting renewable energy technologies

VDC Village Development Committee, the lowest administrative government level in Nepal

NEA Nepal Electricity Authority, the national public utility

IPP Independent Power Producers, generators of electricity that are not part of a public utility who sell their electricity directly to consumers or utilities

PV system Photovoltaic system, uses solar panels to convert sunlight into electricity

SSHS Small solar home systems are portable PV systems with a portable battery. In this project, the SSHS include a lamp strong enough to light a single room.

Off-grid not connected to the main electrical grid

W watt, the unit of electric power

kW kilowatt, equal to one thousand watts

MW megawatt, equal to one thousand kilowatts

www.globalelectricity.org

To see the video for
this project:



For more information:

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