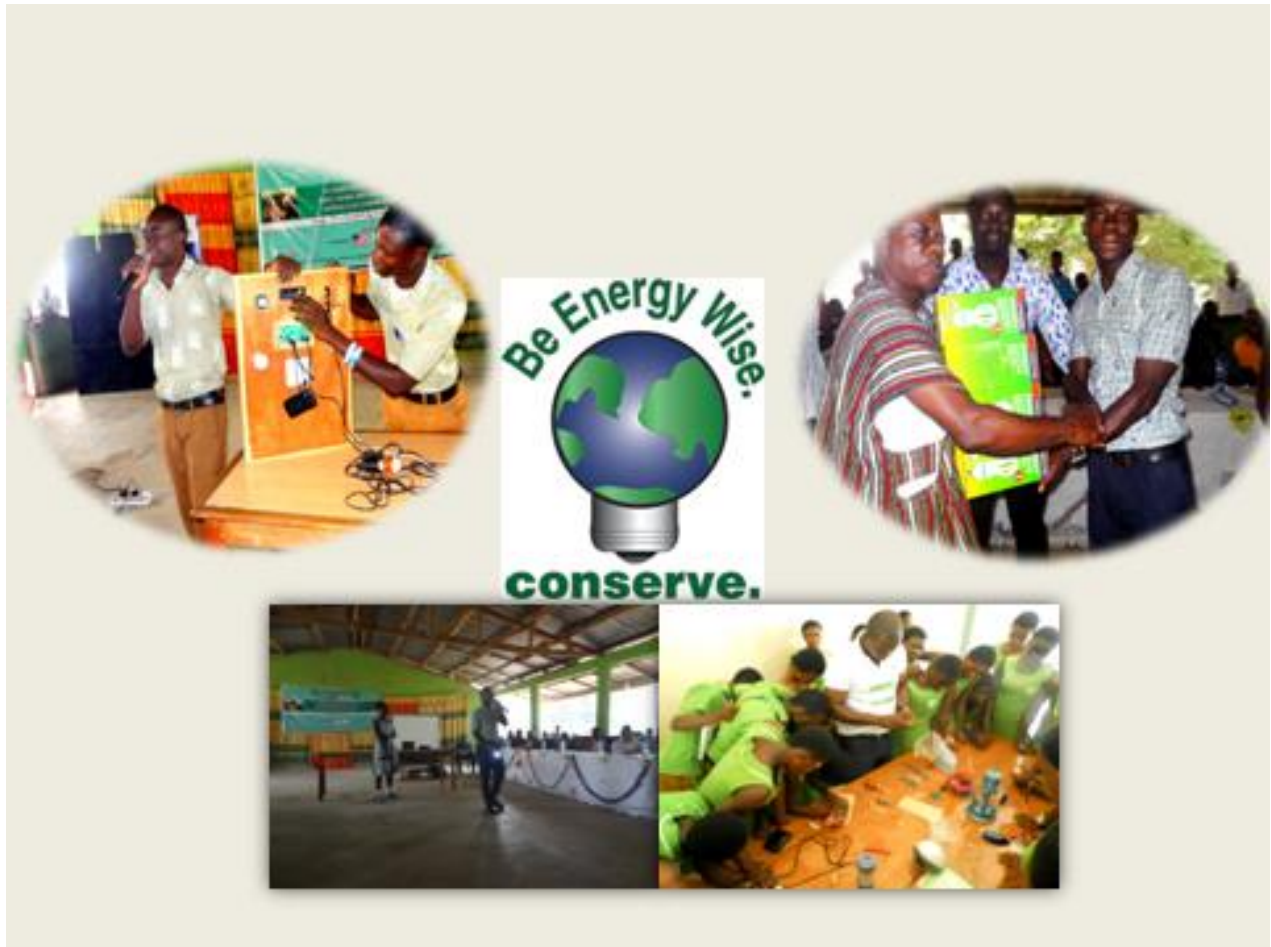


FINAL REPORT

“SUSTAINABLE ENERGY FOR ACHIEVING RESULTS IN HOMES AND SCHOOLS”



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Introduction

The United States Embassy, Ghana in partnership with A Rocha Ghana piloted an Energy Conservation project titled “Sustainable energy for achieving results in homes and schools”. The project which was piloted in Damongo and Kumasi was launched at the Kumasi High School Assembly Hall on 21st November, 2014. The year-long project aimed for behavioral and/or cultural change on energy utilization particularly among the youth as they are the future leaders of the country. The project provides a new framework for efficient measures and opportunities to permanently reduce the amount of energy the schools use. It was also to engender students as agents of change for our homes and communities. The project specific objectives were:

- To increase awareness on energy conservation issues in Senior High Schools
- To develop strategies for efficient use of energy
- To introduce and build local capacity to install and service solar lightening systems

The project innovatively adopted participatory processes to challenge the youth, leading to growth in efficient energy utilization and management. Notable among the major achievements since its inception in November, 2014 are;

1. Mass grassroots awareness created among the younger generation on energy, sources, availability, use, management and conservation. More than 5000 students in 6 Senior High Schools (SHS) were engaged through awareness on different forms of energy, sources, availability, management and efficient utilization. The engagement was aimed at instilling the culture of energy conservation as well as influencing behavioral change in them.
2. 500 students have been empowered and trained in some do-it-yourself energy technologies (construction of simple solar systems). The main thrust of this component was the use of local available materials and recycling of solar panels to build solar lightening systems.
3. 500 energy conservation manuals were also produced and distributed to students in the selected schools and communities (see plate 5).
4. 50 big-size pieces of efficient energy saving bulbs were donated to the participating schools (see plate 24)
5. Award mechanism instituted in participating schools.

Outline of the report

This final report highlights all the activities implemented during the one year period. The activities has been captured under main themes and presented as sections.

Section one: Project launch

Section two: Produced manual for use by schools,

Section three: Energy conservation education and awareness creation in schools,

Section four: Do-it-yourself solar energy trainings in schools and communities,

Section five: Final energy symposium (a detail description is given because it is the first time it is being reported).

Section six: Conclusion and Way forward.

SECTION ONE: PROJECT LAUNCH

The launch created the platform, where project details were shared with stakeholders (particularly the selected participating schools). Accordingly, it served as the basis for the rolling out of all projects related activities with actors. Besides keynote speeches, other key highlights of the launch include: poetry recitals, an innovative drama and video presentation on energy conservation (<http://goanimate.com/videos/011FQw3gxIIs>). These were used to further distinguish acceptable and unacceptable norms, aimed at stimulating environmentally concerned and fiscally responsible youth leaders in energy conservation in higher schools and homes.

A momentum towards establishing energy efficiency as a social norm and part of the day-to-day lifestyle of the youth was built during the launch (See first report for details).

The launch brought together participating stakeholders to share and learn. These include: US Embassy (Main Sponsor-represented by their Public Diplomacy Officer), A Rocha Ghana (Main implementing organization- represented by National Director, Scientific Director, and Project Manager), Over 300 Selected Students from participating schools, Project Coordinators from participating schools, Students from Kwame Nkrumah University of Science and Technology, Media, Distinguished invited guest (Pra Basin Manager-Water Resources Commission), Headmasters and staff of participating schools.



Plate 1: A representative from the US Embassy giving a keynote address



Plate 2: An officer of A Rocha Ghana presents on the need to save energy



Plate 3: A section of the audience at the program launching



Plate 4: Interns from A Rocha Ghana present an energy drama

SECTION TWO: SCHOOLS ENERGY CONSERVATION MANUAL

A Six member team was constituted to design and produce an energy conservation manual for use by schools. The team after series of meetings and consultations set the manual guiding principles:

1. An easy to read and use manual
2. Locally oriented manual
3. Simplified but very educative manual
4. Should be meaningful at all times

The above principles are however, premised on the following manual objectives:

1. Educate students, staff, and community on the importance of energy conservation.
2. Reduce energy consumption in all buildings so that school funds can be directed to other uses.
3. Empower administrators to make decisions that favorably impact the use of energy at their site.
4. Promote energy awareness and encourage energy efficient behaviors among all staff and students
5. Engage students in active responsible citizenship through energy activities.

The manual has different sections covered sections such as basic energy concepts and energy auditing in schools. The manuals also includes energy games, puzzles, energy conservation tips and other facts to enhance knowledge, attitude and practice of actors.

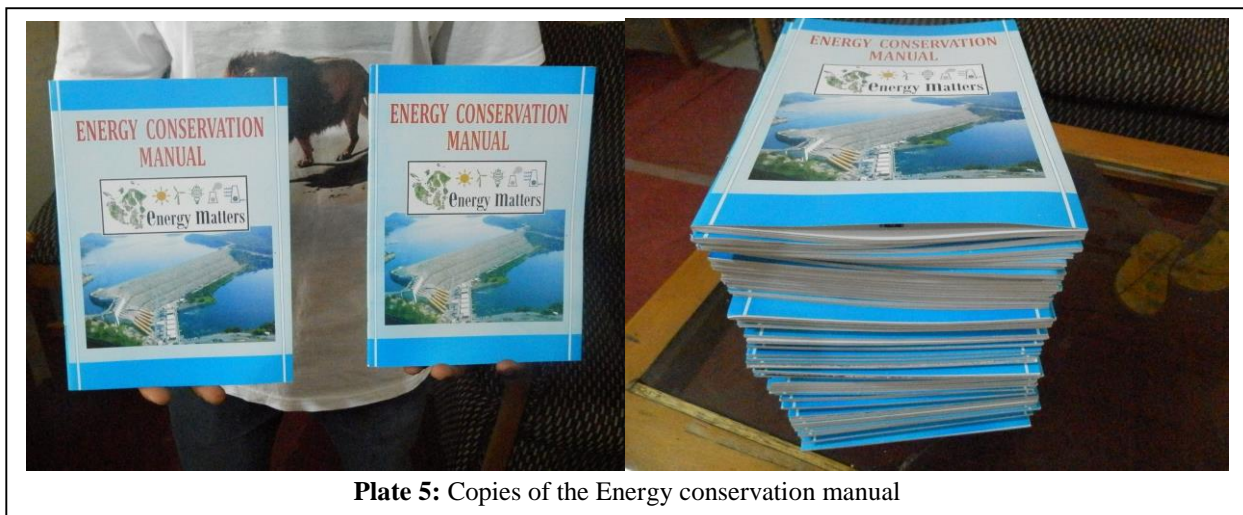


Plate 5: Copies of the Energy conservation manual

SECTION THREE: SCHOOLS ENERGY CONSERVATION EDUCATION AND AWARENESS CREATION

Energy conservation education and awareness creation programs were organized in all participating schools (four schools in Southern Ghana and three schools in Northern Ghana). The team from A Rocha Ghana educated and created awareness on the need to judiciously use energy. They also held joint sessions with some staff of Electricity Company of Ghana. Specifically, the team used some key elements from the energy manual as learning and sharing points. Schools were taken through energy auditing and subsequently encouraged to form energy audit teams.



Plate 6: Students at an energy conservation and awareness creation programme



Plate 7: Energy Conservation awareness creation at Nyinahinii Catholic SHS



Plate 8: Energy Conservation awareness creation at NDESCO



Plate 9: Energy Conservation awareness at DASS

SECTION FOUR: DO-IT-YOURSELF SOLAR ENERGY TRAINING IN SCHOOLS AND COMMUNITIES

The Do-it-yourself program sought to train and equip participants with the basic skills of assembling a solar lightening system. Locally available materials such as used kerosene lamps, were used in together with recyclable solar panels and other accessories (Refer to Annex). A total of 500 selected students from all seven participating schools were trained. For each training session, Resource persons went to the schools and engaged students in a practical capacity building and training in assembling very simple solar systems for use both in school and home (see plates 10 and 11).

In order to achieve the goal of the training, participants were taking through hands on practical sessions where resource persons only instructed and directed students in the assemblage process (see plates 12 and 13). We strongly believe this approach was best practice and useful as it gave students the hands on experience and hence they can easily repeat the process at any time when the basic resources were available.



Plate 10; Students being instructed to solder at a training session



Plate 11; Students interact with resource person before a training session



Plate 12; Students connect a wire to a solar pannel



Plate 13; A resource person inspects a system assembled by students

Additionally, 7 communities were also trained and given solar panels and accessories which have capacity to charge 6 mobile phones simultaneously and 15 phones in a day. This aside, the above reasons for sensitization and the training were to help them appreciate solar energy system as well as improving communication issues of these communities since they have no electricity. Without these community charging centers, community members usually have to travel at least 18 miles to Larabanga, Damongo and Daboya to charge their mobile phones (usually done weekly on market days). The charging centers will help relief communication stress in these communities. Each community was given a solar panel and accessories each which has been entrusted to one caretaker but for use by all community members.



An officer showing caretaker and others how the solar panel works

SECTION FIVE: ENERGY SYMPOSIUM

The Schools energy symposium 2015 was organized at the Namong Technical Senior High School on 4th of December, 2015. The program can best be described as: the premier energy event for students, a robust agenda and educational offering, an unparalleled learning opportunities; simply put “a beautiful day to learn to conserve energy”. Notable among the program outline for the day were: energy drama, poetry recitals, schools innovative energy display, solar system assembling contest among others. Importantly, an award system was instituted to honour very creative and innovative schools in the contest that arose from project activities. Schools were tasked to propose possible behavioral and attitudinal changes that could drastically reduce energy consumption in their respective schools. They were also to design miniatures of simple electrical systems that could potentially provide affordable, clean, efficient and sustainable energy to their schools and homes. The symposium saw six (6) out of the seven (7) participating schools displaying their innovative ideas and inventions.

Poetry Recitals

Students from each school recited their own crafted energy conservation poems to educate the gathering at the symposium. Almost all poems were questioning why Ghanaians will misuse energy in the midst of the current power crisis (see pictures on next page).



Plate 14: Students recite poems to convey their own energy conservation messages to the gathering



Plate 15: Students recite poems to convey their own energy conservation messages to the gathering

Energy Drama

The drama troupe of the host school climaxed the symposium with a beautiful cultural display and energy conservation drama. In the drama, one character was well noted for wasting energy (switches all electrical appliances simultaneously and fails to turn them off after use). Through related events, he eventually accepted and agreed to put off appliances when not in use and judiciously use energy by using one appliance at a time. This attitude portrayed in the drama is typical of most Ghanaians and hence, students were admonished to share the lessons with their parents and neighbours in their respective homes and communities



Plate 17: A cultural dance by the Namong Technical SHS drama troupe



Plate 16: An energy drama to educate the gathering on judicious use of energy by the Namong Technical SHS drama troupe

Schools Energy Innovative Display

Students from Bompata PRESEC used local bamboo materials to construct a handheld solar torch light. Aside the energy source being clean, they also taught of sustainability and environmental impacts. Bamboo as a material has not received much attention with regards to its utilization in Ghana and thus using the material to construct portable electrical systems for domestic use was considered ingenious. A self-explanatory manual was also produced to that effect and as at December 4th, 2015, the school had produced over 50 pieces of the locally assembled solar torch lights (see plate 18).

A multifunctional solar system that produces light, charge up to 10 phones at a time, has an audio output for radio and music playback from USB ports (see plate 19) was unveiled by the Namong Technical Senior High School.

Ndewura Jakpa Senior High School presented a simple solar lightening system that could be used by students in their dormitories and homes (see plate 20).

The Kumasi Senior High school also presented a portable table top wooden structure (miniature of a solar lightning system commonly referred to as street lights). The device could be used by students for their personal studies both at home and in school (see plate 21).

Mole Junior High school also unveiled a very simple and easy to assemble solar system for studies at night and other domestic purposes (see plate 22).

The Nyinahinii Catholic Senior High School did not unveil any artifact but also presented on the measures that the school had put in place, to conserve, efficiently utilize and drastically reduce electricity consumption.





Plate 19; Among Technical SHS display their composite solar system



Plate 20; Ndwura Jakpa SHS displays their invention



Plate 21; Kumasi High School displays a portable solar light system

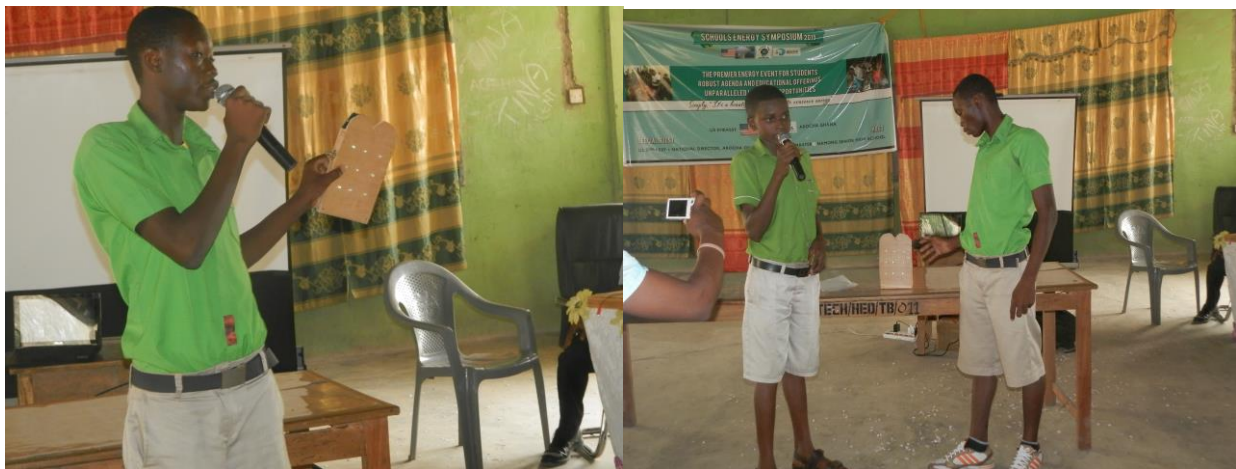


Plate 22; Mole Junior High School unveil their invention

Solar energy assembling contest

Again, an open competition to test the impacts of the training was also held during the symposium. Two Students each from the participating school were giving all necessary equipment to assemble simple solar systems (see plate 23) within a stipulated time of 15 minutes.



Plate 23; some students busy joining wires during the do-it-yourself contest and the jury inspecting students' assembled systems

Activities outcomes and awards

A four team jury collated all scores of schools in the various activities and based on total scores of all activities as per defined criteria by the jury, an award of energy saving bulbs and cash prizes to schools were presented;

Bompata Presbyterian Senior High School was adjudged the best school in the competition. Students from the school used local bamboo materials to construct a handheld solar torch light. A self-explanatory manual was also produced to that effect and as at December 4th, 2015, the school had produced over 50 pieces of the locally assembled solar torch lights.

A composite system designed by the Namong Technical Senior High School was talk of the day. The multifunctional solar system could produce light, charge up to 10 phones at a time, an audio output for radio and play music from USB ports. The system was adjudged the best innovation of the project.

Ndwura Dgakpa Senior High School presented a simple solar lightening system that could be used by students in their dormitories and homes

The Kumasi Senior High school also presented a portable table top wooden structure (miniature of a solar lightning system commonly referred to as street lights). The device could be used by students for their personal studies both at home and in school

Mole Junior High school also unveiled a very simple and easy to assemble solar system for studies at night and other domestic purposes

Finally, the Nyinahinii Catholic Senior High School did not unveil any artifact but also presented on the measures that the school had put in place, to conserve, efficiently utilize and drastically reduce electricity consumption. Outstanding students and schools were awarded accordingly (see plates 24 and 25)

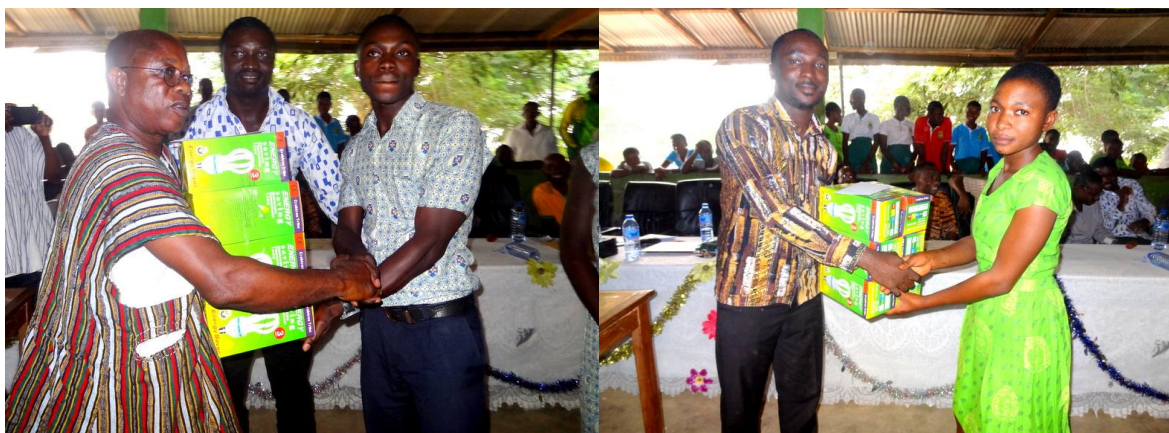


Plate 24; Left, Chairman of the symposium (Headmaster of host school) and a guest presenting prizes to outstanding schools.



Plate 25; Some schools receiving cash and energy saving bulbs for their outstanding performance

CONCLUSION AND WAYFORWARD

The year-long project has instigated a sense of awareness to selected participating schools in energy conservation as well as built capacity of students in solar lightening assembling. Schools have innovatively produced different solar lightening systems using local available materials. An easy to use manual has been produced for use by schools and most schools have an energy audit teams overseeing the energy use of the schools- an activity that A Rocha Ghana would continue to monitor to identify the best performing school.

To positively impact the larger society, it is important the project is sustained in the schools and up-scaled in other schools. By up-scaling, more youth would be impacted and an opportunity created for more agents of change for our schools and communities. On the whole, the project though a pilot has created a lasting impact in schools.

The communities are expected to generate some income from the community charging centers for community development and enhancement of livelihood of beneficiary caretakers of the charging centers. This will form a basis for building a business case for future projects.

Despite challenges with release of funds on time which led to the delay of the project coupled with inability to follow timelines of school sessions, the project has set a good basis for future expansion. The project hope to in the future leverage more funds to expand the number of schools and communities reached under the pilot stage.

ANNEX

Major materials required in the conversion of the kerosene lamp to solar lamp include:

- ❖ Solar panel (smaller size or preferred size)
- ❖ Battery
- ❖ Flexible wire (conductor)
- ❖ Led light
- ❖ Kerosene lamp/lantern
- ❖ Led
- ❖ Soldering iron
- ❖ Connectors
- ❖ Screw driver
- ❖ Pliers etc.

Brief Description Of How Solar Lamps are made (not in details)

1. With the help of pliers, small portion of a wire is made naked
2. Soldering iron is used to solder (lead) naked part of the wire to the battery (negative to negative (-) and positive to positive (+))
3. The other naked end of the wire is also fasten to a connector (negative to negative (-) and positive to positive (+))
4. The same procedure is used for the solar panel
5. A connector from the battery is joined with the connector from the solar panel and place in the sun; so that as the panel traps the energy from the sun, the battery stores it
6. Almost the same procedure is used for the lead light with exception that the lead light is joined with the wire through bulb connector by screwing
7. The wick holder and the wick itself is removed from the lantern leaving the rest of the lantern intact
8. The prepared led light is placed in the lantern where the wick was with the connector outside
9. Charged battery connector is joined or inserted into the lantern connector and then you have your light

COMMUNITIES ENGAGED IN WEST GONJA DISTRICT, DAMONGO

1. Mognori
2. Murugu
3. Kpulumbo
4. Yazori
5. Bawena
6. Wawato
7. Grubagu

SCHOOLS ENGAGED IN ASHANTI REGION

1. Kumasi Senior High School
2. Bompata Presbyterian Senior High School
3. Namong Technical Senior High School
4. Nyinahinii Catholic Senior High School

SCHOOLS ENGAGED IN WEST GONJA DISTRICT, DAMONGO

1. Mole Junior High School
2. Ndwura Dgakpa Senior High School
3. Damongo Senior High School