Project Completion Report
Electrification of 427 SOLAR PV SYSTEMS under the DOE-PAMANA Projects

1. Project Summary

• Name of Project :	Solar Electrification Projects for the PAMANA Target Areas in Zamboanga del Norte, Surigao Del Sur and Agusan Del Norte
• Implementing Agency :	Department of Energy (DOE) and Office of the Presidential Adviser for the Peace Process (OPAPP)
• Project Contractor :	Gendiesel Philippines, Incorporated
• Total Contract Price :	Php 17,900,000.29

2. Introduction

The provision of adequate and affordable electricity is a precursor to economic development and improvement of the quality of life. The benefits of electricity include lighting for education, access to important news and information especially in remote areas, basic entertainment, among others. Electricity is also deemed as the main driver of commercial and industrial growth. Because of these benefits, electrification has always been on top of the Government's policy agenda over the past decades. If made sustainable, the huge financial resources allocated by the Government always outweighed the long-term benefits of electrification to the society as a whole.

Most of the unelectrified households (HHs) in the country are located in very remote rural areas as well as in outskirts of the urban areas, in slum areas and in conflict-affected/vulnerable communities. In general, the lack of access to electricity is deeply rooted to the problem of poverty. Poor HHs cannot pay the initial cost of connection and the full cost of electricity service. The rising cost of fossil fuels, the high capital cost of renewable technologies, and inefficiencies in the sector contribute to higher electricity tariff. The country's archipelagic and mountainous geography is the main barrier in integrating the country's main grids for economy of scale and in reaching out isolated areas and remote islands.

Part of the areas being targeted for household electrification is the conflict-affected communities identified thru the ***Payapa at Masaganang Pamayanan*** (PAMANA) Program. ***Payapa at Masaganang Pamayanan*** (PAMANA) is the national government's peace and

development framework to respond and strengthen peace building, reconstruction and development in conflict-affected areas.

As support to the above national government's program, the Department of Energy in coordination with Office of the Presidential Adviser on Peace Process has endorsed the PAMANA project, for implementation in FY 2014, by electrifying the conflict-affected and vulnerable areas in three Provinces in Mindanao using Solar PV Systems, targeting 351 households and the lighting of communal/public facilities in these areas, with total estimated budget of Php 19,332,000.00.

3. **Summary of Activities**

The bidding was concluded in October 28, 2014, at the DOE and the delivery of the materials from Manila to Project sites was in tranches with Bgy. Panganuran in the Municipality of Sibuco, Zamboanga del Norte, was the first Project site to be installed with solar PV systems on April 25, 2015.

Succeeding PAMANA target sites in Agusan del Norte and Surigao del Sur followed thereafter.

Shown in Annex 2 is the milestone for the installation of solar PV systems for the PAMANA barangays. In Annex 3 are the photodocumentation of the Project.

4. **Installed Solar PV Systems**

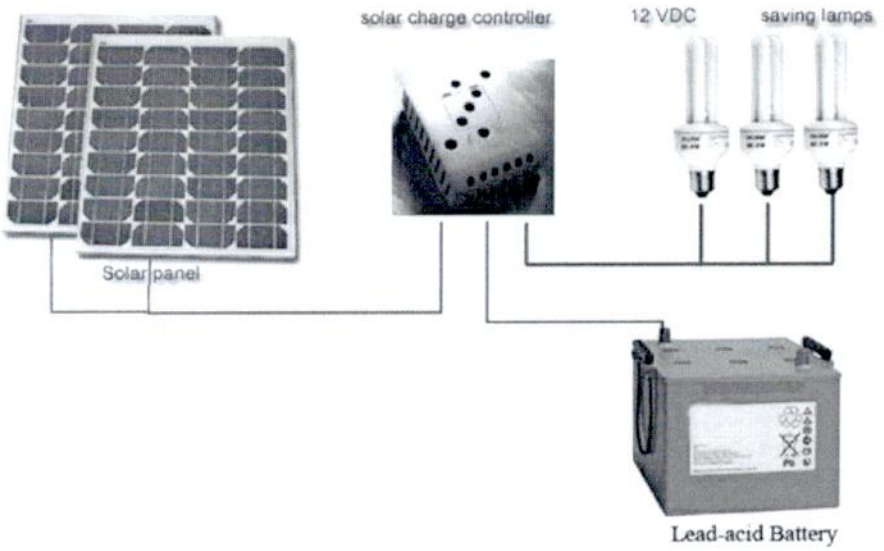
4.1. Solar Home Systems

There are four (4) sets of LED lighting fixtures as 1 very bright LED will be used for general lighting where a bright light is needed such as in the kitchen and dining area, whereas the remaining 2 x 3Watt LED can be used in the bedroom or in the receiving area.

An AM/FM radio is required as the radio links the households in the target barangay with the outside community and serves as a means of entertainment to the end-user as well as an access to news and other information

Shown below are the specifications for a PLUG and PLAY Solar Home Systems.

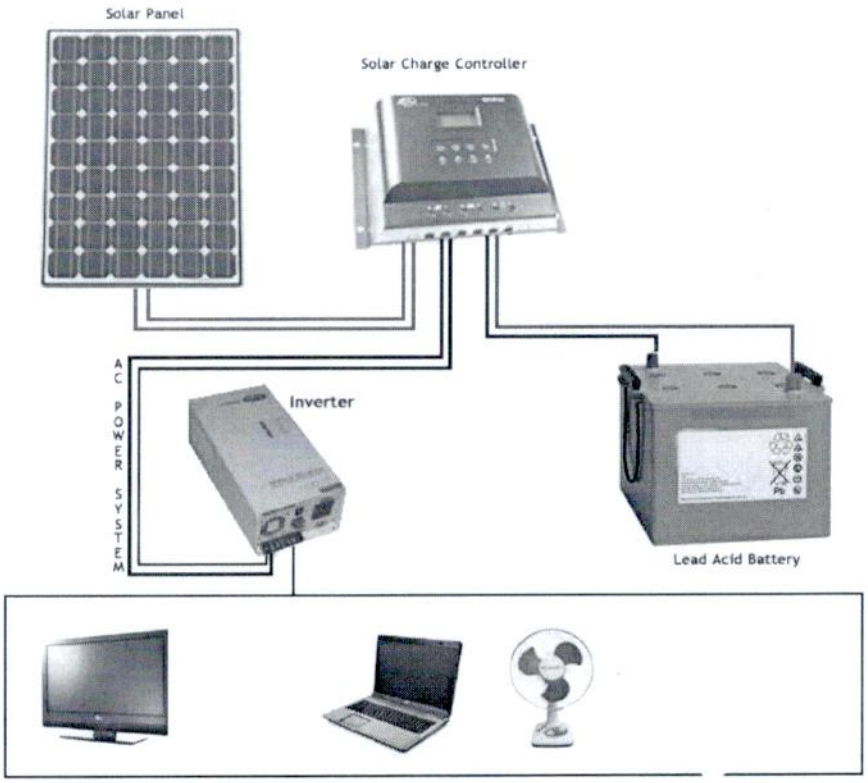
a) 50Wp panel and accessories,
b) a unit of 12VDC, 70Ah VRLA battery;
c) a 12VDC, 10Amperes controller;
d) 4 units of LED luminaries of at least 100lumens per Watt, wide beam angle, 12VDC;
e) Built-in transistor radio (AM/FM); and,
f) With provision for cellphone charging shall be employed.



12VDC Solar Home System

4.2. Barangay Hall (12VDC system)

The SHS for the barangay hall is similar to a 12VDC solar home system. Provisions for energy services – lighting only and cellphone chargers were installed.



4.3. Solar PV systems for Brgy. Health Center and School (AC System)

Installation of solar PV systems at selected public facilities within the PAMANA Project sites. These include Solar PV systems for Bgy. Health Center and School (AC System). The recommended system configuration for the identified solar PV packages in the PAMANA Project is a system providing 220 - 240 V AC electricity for energy efficient appliances such as TV/DVD's

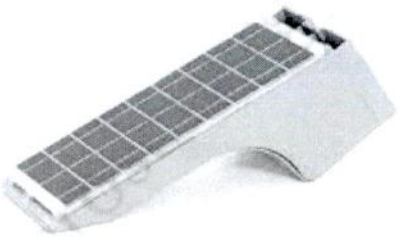
Technical specifications are provided for solar electricity systems for the following applications in the barangay public facilities:

- Health centre energy services –lighting (indoor, outdoor); and,
- Primary/elementary school energy services – lighting (indoor, outdoor and portable), audio-visual equipment.

4.4. Public lighting energy services – streetlights.

The new 800 Lumen (lm) solar streetlight combines high quality with several innovative features at lowest production cost. It provides latest achievements in Lithium-Ion and LED technology for a durable all-in- one independent light source. The high-efficiency LEDs combined with an intelligent power management system leads to relative small battery size, which eventually allows for a lean and elegant system design. The solar panel has been fully integrated into the basic version of the lamp.

Equipped with an intelligent micro- controller and a motion sensor, the lamp will automatically switch to a dimmed mode to save energy when full brightness is not needed. The larger version (for regions with less irradiance or strong seasonality) features a "plug-and-play" additional solar panel with an innovative build-in mounting rail for quick installation. The housing is made of high-quality powder coated aluminium, and together with the integrated mono crystalline solar panel the physical lifetime is beyond 20 years. All electronic components are sealed in IP65 protected housings, which makes the developed streetlight well-suited for tropical climates.



5. **Project Sustainability**

To ensure that the target PAMANA communities are capable of sustaining the Solar PV Systems after the project ends, after installation, the DOE inspection team together with OPAPP representative/s and staff from the concerned Electric Cooperatives validate whether or not said community has acquired the basic technical skills for Solar PV operation. Once confirmed, DOE eventually transfer said PV systems to the PAMANA communities with oversight from the concerned municipal officials and/or electric cooperatives for the acquisition of spare/replaceable parts.

ANNEX 1. MATRIX OF SOLAR PV SYSTEM INSTALLED IN THE PAMANA SITES

Province	Municipality	Barangay	HH	St.Lights	School	Mosque/ Madrasah	Health Center	Bgy Hall
Agusan Del Norte	Remedios T. Romualdez	San Antonio	25	4	0	0	0	
Agusan Del Norte	Tubay	Dona Telesfora	7	2	0	0	0	
Agusan Del Norte	Tubay	Tagmamarkay	11	2	0	0	0	
Agusan Del Norte	Tubay	Tagmamarkay	6	2				
Surigao del Sur	Lanuza	Pakwan	183	30	1	0	1	1
	Cantillan	Lubo	119	20	1	0	1	1
Zamboanga Del Norte	Sibuco	Panganuran		4	2	4		
		TOTAL	351	64	4	4	2	2

ANNEX 2. MATRIX OF ACTIVITIES FOR THE DOE-PAMANA 2014 PROJECTS

Activity	Timeline	Remarks
Issuance of Invitation to Bid	October 1, 2014	Completed
Pre-Bid Conference	October 14,2014	Completed
Submission and Evaluation of Bid	October 28, 2014	Completed
Awarding of Bid	January 26, 2015	Completed
Delivery of Materials to Bgy. Panganuran, Sibuco, Zamboanga del Norte	April 25,2015	Completed
Inspection of installed solar PV systems for Public Facilities in Brgy. Panganuran, Sibuco, Zamboanga del Norte by the composite team from DOE, OPAPP and concerned local officials	June 22 to 26, 2015	Completed
Delivery of Materials to Agusan del Norte	June 11,2015 and July 7,2015	Completed
Completed the installation of solar PV systems in Bgy. San Antonio, R.T. Romualdez, Agusan del Norte	July 21,2015	Completed
Completed the installation of solar PV systems in Brgy, Tagmamarkay, Tubay, Agusan del Norte	July 23,2015	Completed
Completed the installation of solar PV systems in Brgy. Don Telesfora, Tubay, Agusan del Norte	July 25,2015	Completed
Delivery of Materials to Surigao del Sur	August 1,2015	
Completed the installation of solar PV systems in Lubo , Cantilan, Surigao del Sur	August 14,2015	Completed
Completed the installation of solar PV systems in Pakwan, Lanuza, Surigao del Sur	September 10, 2015	Completed
Inspection of installed solar PV systems for the PAMANA target areas of Agusan del Norte and Surigao del Sur by composite team from DOE, OPAPP as well as concerned local officials and electric cooperatives	October 5-10, 2015	Completed