



## Improving Health & Education in Honduras

Initiative by IEEE Industrial Electronics Society

By: Morgan Kiani

### EMPOWERING THOSE WHO ARE POWERLESS

The IES initiative started with Honduras. The proposed system aims to improve the health and education in Honduras by introducing off-grid solar powered lighting, charging station, and cooking fans. The proposed system is composed of two phases. Phase one was finished by end of May and it was dedicated to provide lighting for Hogar CREA Madres, a campus located in San Matias municipality of Tegucigalpa, Honduras.

This location finalized by going through several Zoom meetings and in person visits by local IEEE officers and members. The chosen location houses a school during day times and is used as a shelter at night for woman and girls. The proposed system was conceptualized and designed by team members and it was the best match for the proposed location. The first phase harvests solar energy during the day and the stored energy in batteries will be used to provide LED-lighting during evening hours. The second phase will be dedicated to power cooking fans in the kitchen, to charge portable electronics (i.e. computers or cellular phones), and other dc equipment (such as sewing machine) on campus area. Appropriate safety precautions will be developed on the site and it will be added for safe operation of the system in both phases.

Unfortunately, start of the project coincided with the global epidemic spread of Covid-19 and under the given circumstances with very limited national and international travels, it went forward only through online meetings. Phase one was executed by helping from IEEE Honduras section officers, on campus volunteers, teachers and a local company, TECNOSOL.

This project marks the first collaboration between IES and ISV, under the initiative and leadership of Prof. Morgan Kiani, leading to start of recruiting new local members for IES too. This is a stepping stone towards creation of a local chapter of IEEE-IES in Honduras as well.



*Figure 1. From right side, Kitchen facilities at Hogar CREA during a normal day of meal preparation. The wood burning stove on the campus, produces harmful emissions inside kitchen. In the middle, broken and unsafe light fixture in the classroom. On the left side, unsafe hanging electric wires from the roof with no exterior lighting system right where you need it.*

## **SUSTAINABILITY**

After the identification of the location, definition of the system requirements and ensuring sustainability are among the most prominent goals of the project. In addition to the technical goals of the project, the proposed project will include an educational component too. There will be a close collaboration between local teachers on the campus, local IEEE member and Prof. Morgan Kiani from TCU to achieve following goals:

- a) developing an educational program to create employment on campus (i.e. tailoring by tenants on campus, Hogar CREA Madres). The educational program should be a fit for the defined location and local people. To ensure a successful educational program, local economic, culture, and local market need to be considered.
- b) to teach basic technical knowledge for on-site maintenance by local teachers on campus. This could be done through a series of workshops on site or online lectures.

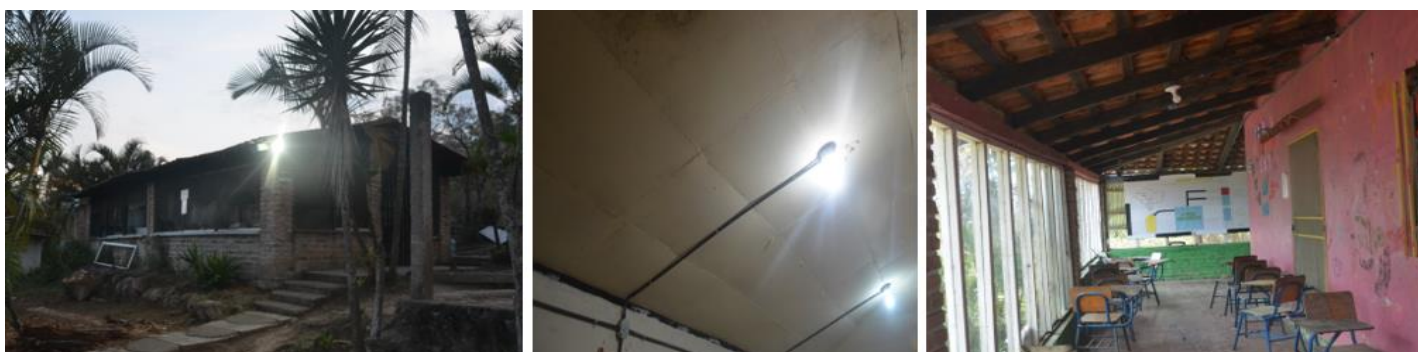


Figure 2. From left side, new outdoor LED light on the campus. In the middle, new LED lighting, wiring and insulation in rooms. On the right side, new LED lighting in classroom on the Campus.

### PROJECT- PHASE ONE:

During the week of 24-28 May 2021, ISV-IES solar project - phase one took place on the campus. The 5kW PV system is going to support the living quality of 25 young girls and young-single mothers living in underserved conditions. Phase one was the first step to provide a better education and lighting system at HOGAR CREA.



Figure 3. From left side, Controller Box and batteries in phase one. In the middle, new wiring, insulation and connections inside building. On the right side, a lunch break for a group of volunteers at Hogar CREA, technicians and local volunteers from IEEE Honduras section under the new PV structure that was built to install solar panels.



Figure 4. From left side, starting with new PV structure to hold solar panels in the system in phase one. In the middle and on the right side, new LED wiring, connections with insulation and new electric switches.

## PROJECT- PHASE TWO:

During the second phase of the project, the goal is to hold educational workshops on the campus. The workshops are designed based on basic techniques and necessary tools to create a livable income. Learning basic techniques through these workshops like computer skills and sewing-tailoring skills could be essential for people living on the campus to support their life and keep a sustainable project on the campus.

## PROJECT TEAM:

Morgan Kiani ( [m.kiani@tcu.edu](mailto:m.kiani@tcu.edu)): IES representative and principle investigator for technical modifications.

John P. Nelson, P.E. ( [jnelson@neieng.com](mailto:jnelson@neieng.com) ): President of IEEE Smart Village.

Mario Aleman ( [alemani@ieee.org](mailto:alemani@ieee.org)): ISV Chair, Latin America Working Group (LAWG).

Jorge Pagoaga ( [jorge.pagoaga@ieee.org](mailto:jorge.pagoaga@ieee.org) ) : 2021 Chair, IEEE Honduras Section.

Raul CastellanosZelaya ( [rcastellanos@ieee.org](mailto:rcastellanos@ieee.org)): 2021 Vice Chair, IEEE Honduras Section.

Ethel Enamorado ( [ethelines@gmail.com](mailto:ethelines@gmail.com) ): 2021 Treasurer, IEEE Honduras Section.

Gabriela Garay ( [aggaray@gmail.com](mailto:aggaray@gmail.com) ): 2020 Chair IEEE Honduras Section.

Daniel Flores ( [danielflores2111@gmail.com](mailto:danielflores2111@gmail.com) ): IEEE Member, IEEE Honduras Section.