

Micro-grid For Rural Areas (Ubon Ratchathani and Chiang Mai)

(Investigation of non-electricity rural areas in Thailand)



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1. Introduction

- In rural areas (those are, for examples, national parks and conserved forests that people have been living there before the government announced the areas as national parks/ conserved forests), the people cannot reach the electricity from national utility grid. They cannot use a lamp/television for their basic needs of life.
- The construction of utility grid system in such the areas is not cost effective and has difficulty of maintenance. Moreover, any utility constructions are not allowed in the national parks or conserved forests.
- Some renewable energy sources are available, such as Solar/PV and Hydro/Micro turbine.
- Some rural areas have solar home systems. However, the systems are not in the good condition to use just because of the failure of electronics parts, such as battery charger or inverter (except the PV panels).

2. Our Activities in The Past

1. Designed, constructed, and installed solar chargers for the rural areas.
They are simple, low cost, and easy to construct and repair (by non-professional technician).
2. Trained students (Ubon Ratchathani Univ.)
3. Made a survey of solar home **(at the end of 2016)**
 - Chiang Mai with Rajamangala University of Technology Chiang Mai
 - Ubon Ratchathani with Ubon Ratchathani University,
 - Karnchanaburi with Rajamangala University of Technology Suvarnabhumi

The solar chargers



- For amorphous PV
- Input power 120 W
- Output power 180 W
- PWM technique



- For Crystalline PV
- Input power 120 W
- Output power 180 W

Pictures of The Past Activities



- Installed solar chargers in Chiang Mai and Ubon Ratchathani
- Trained students and staff of Ubon Ratchathani Univ.

The Road to The rural area in Ubon Ratchathani

(3 Aug. 2016)



Solar Home Survey

(Aug. 2016)



National Electronics and Computer technology Center (NECTEC), Thailand

Solar Home Survey

(Aug. 2016)



Solar Home Survey

(Aug. 2016)



Solar Home Survey

(Aug. 2016)



Useable PV panels were not used.

Capacity: approx. 30kW

Solar Home Survey

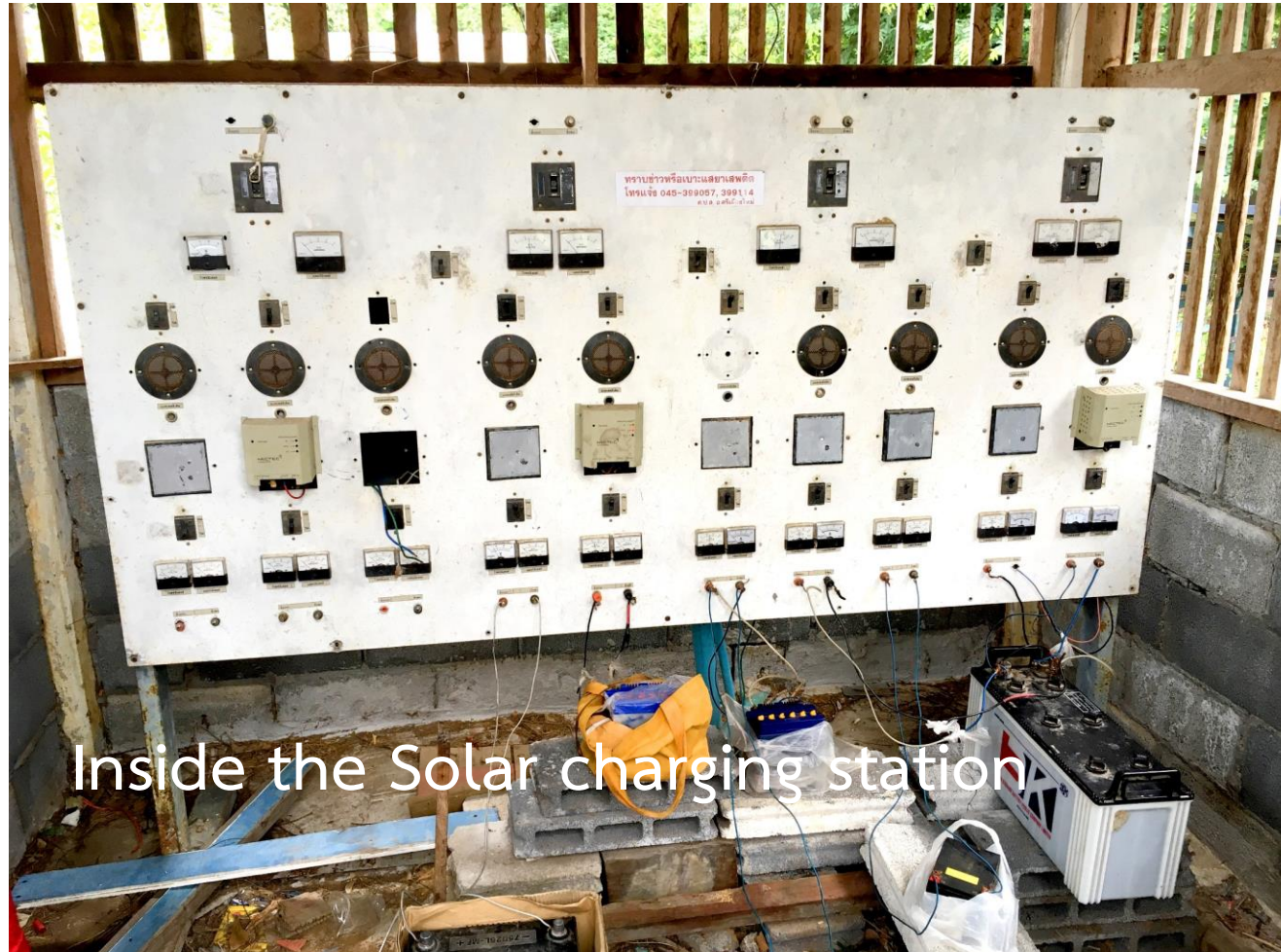
(Aug. 2016)



Solar charging station that was not in good condition.

Solar Home Survey

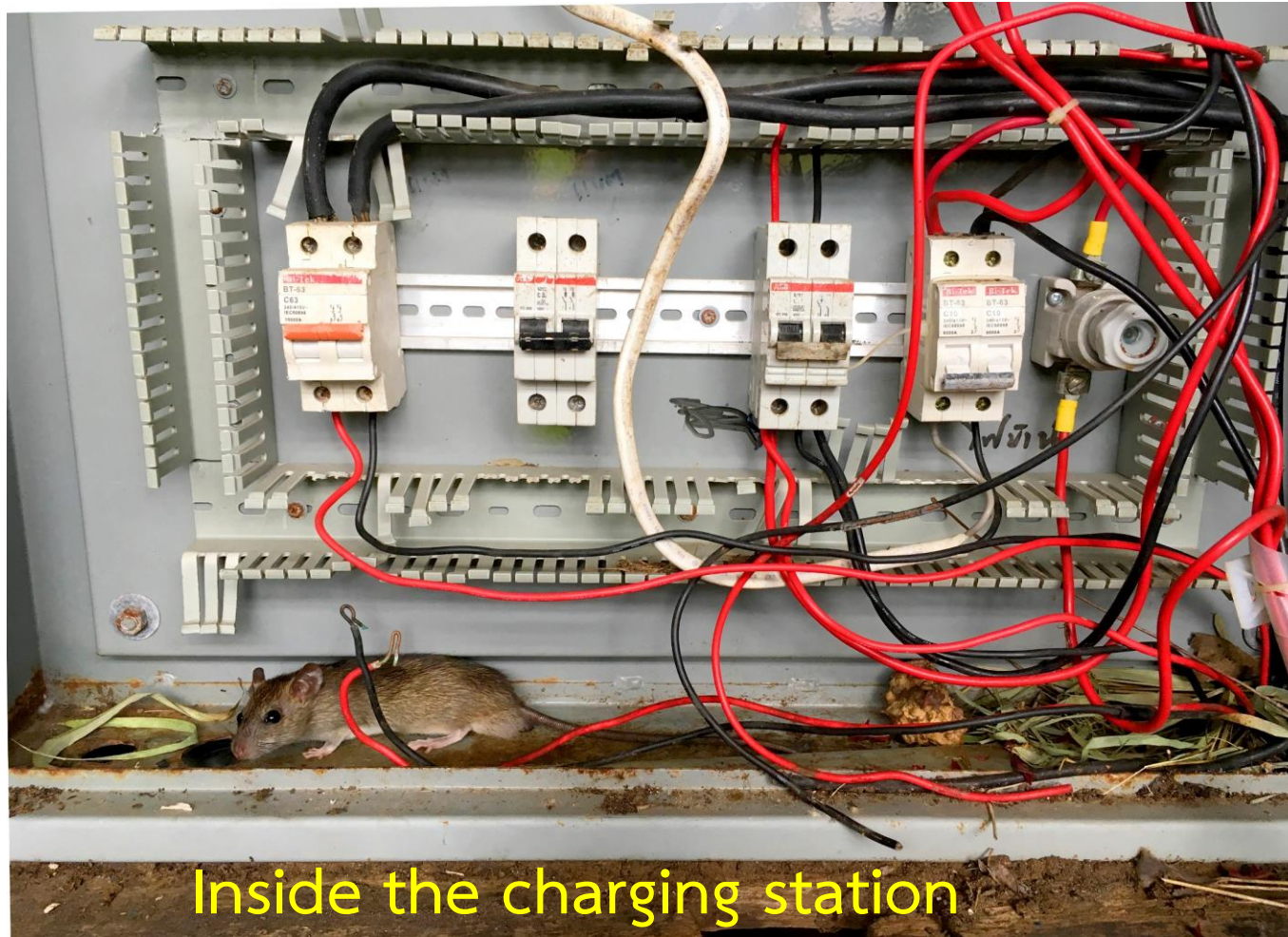
(Aug. 2016)



Inside the Solar charging station

Solar Home Survey

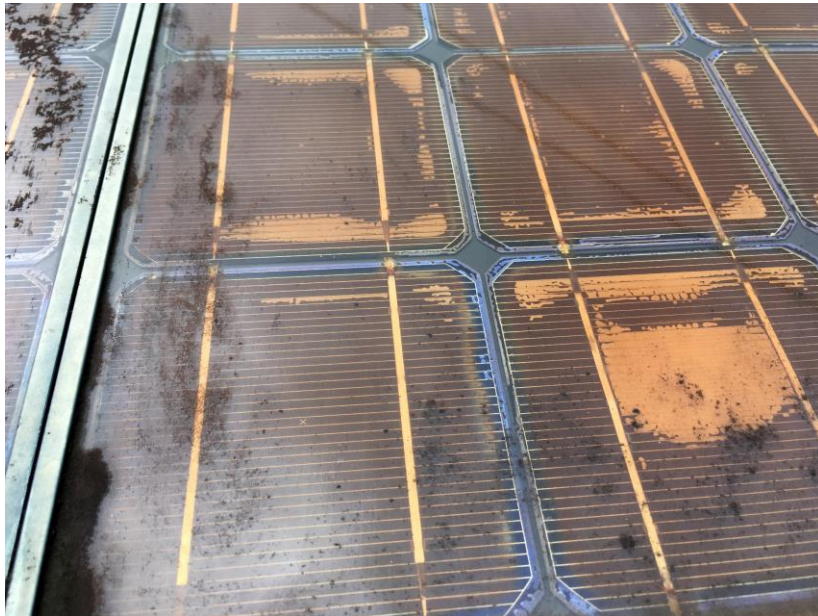
(Aug. 2016)



Inside the charging station

Solar Home Survey

(Aug. 2016)



Some broken PV panels

Solar Home Survey in Chiang Mai

(Dec. 2016)



Solar Home Survey in Karnchanaburi (Dec. 2016)



3. Our Conceptual Plan to do from now

1. Make a survey for electricity load profile, culture, and needs of people in the targeted rural areas (Ubon Ratchathani and Chiang Mai) with expert team from Waseda university and the local universities: Grant would be from **JASTIP-Net**.
2. Discuss how to have further collaboration with on-going e-Asia project with Waseda University and the other countries under JASTIP-NET program. (From Dr. Kanokvate)
3. Design Micro-grid system (would be the need of people) for both rural areas and submit a project proposal to **XXX**.

Microgrid has some advantages over the solar home system: people can use general appliances (230V, 50Hz), hybrid system is possible and efficient (such as a combination of PV and Hydro turbine), ect.

***** such as Energy Regulatory Commission, (it's under the Ministry of Energy)**

Thank you for your kind attention