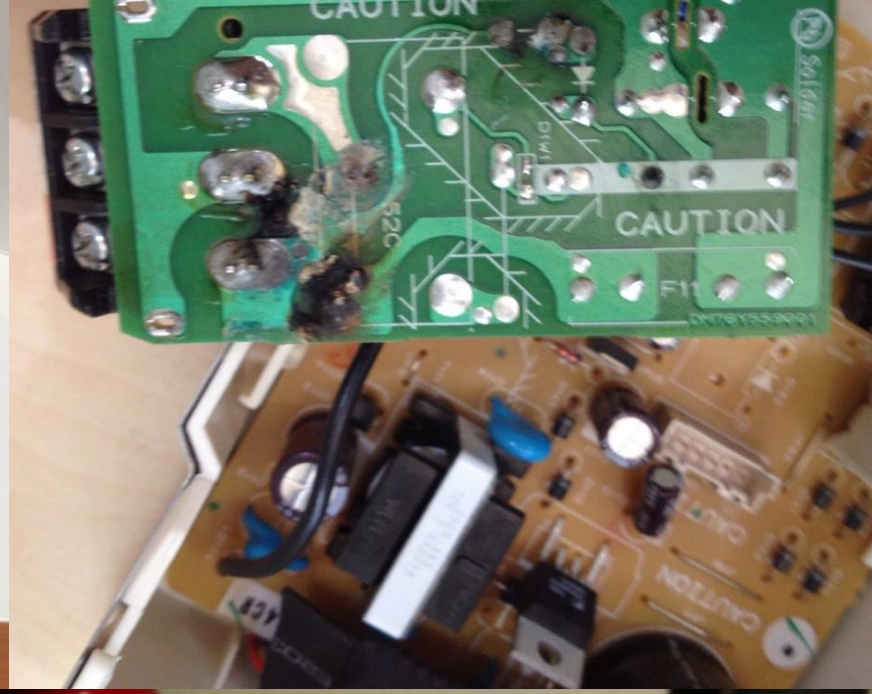
Issues to Overcome

- System Issues
  - Stability/Durability of components of the power supply when switching between DC and AC (capacitor, PLC)
  - The online connectivity with university network
  - Integrating Distributed Generations (voltage range - Diesel Generator)
  - Air conditioner in the battery house failed and causing battery to explode
- Nature Issues
  - During the rain, the voltage fluctuates from the utility line which cause the Hybrid Microgrid system to be disrupted.
  - Animals
- Human Issues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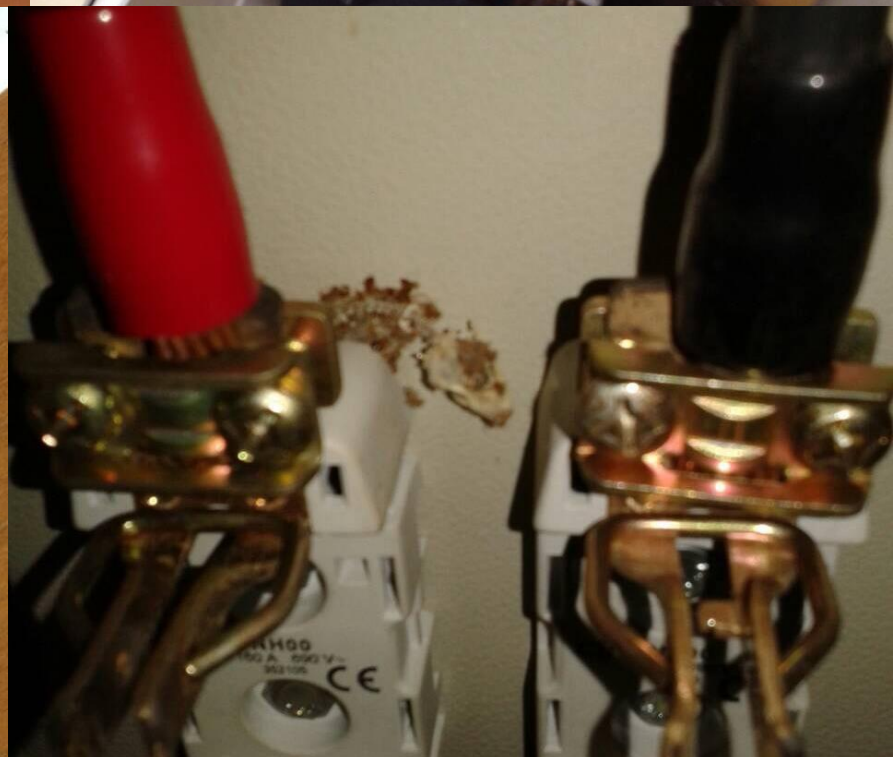


Battery

- Battery failure
- Hot weather

Lesson Learned!!

Energy Policy
and Planning Office
MINISTRY OF ENERGY

Rural Village Electrification to Improve the Quality of Life based on Sufficiency Economy for Lampoon Communities

Renewable Energy for Sustainability Association

Supported by
Energy Conservation Fund, Ministry of Energy, Thailand

Project Goal

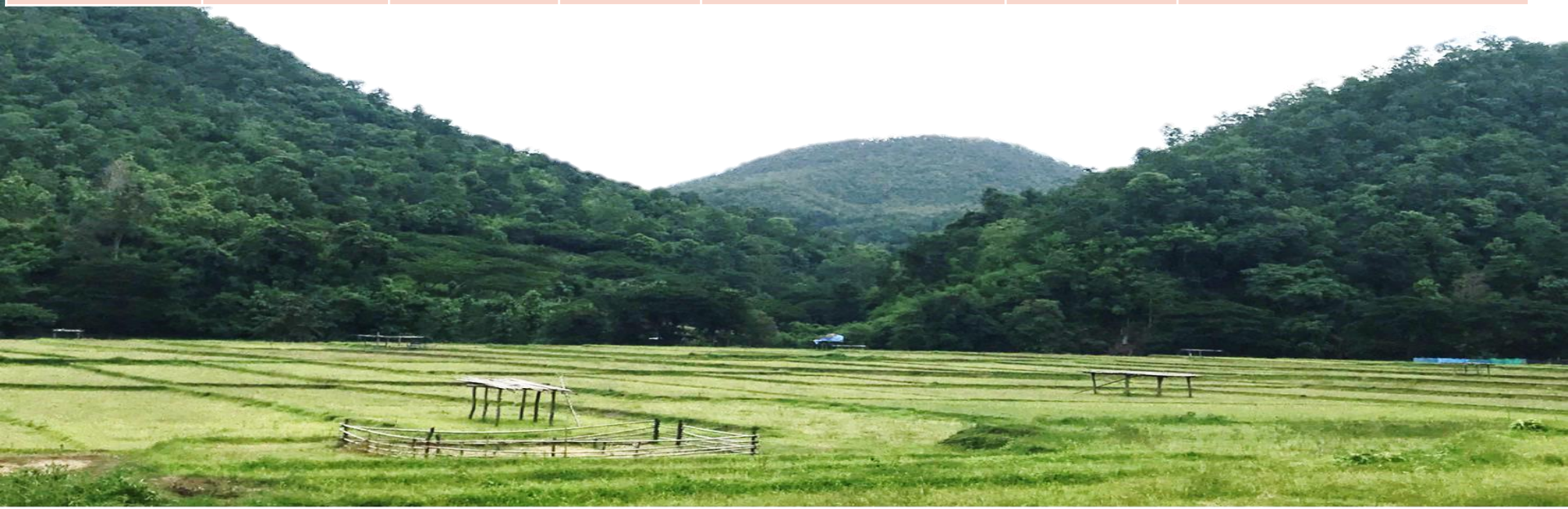
- Improve the quality of Life for rural villages in Lamphun Province
  - Pha Dan Community
  - Pong Pang Community
  - Mae Sa Nga Community

- Community Context:
  - Hill tribe communities
  - Municipality request electricity for over 20 years.
  - The area is in the forest reserves.

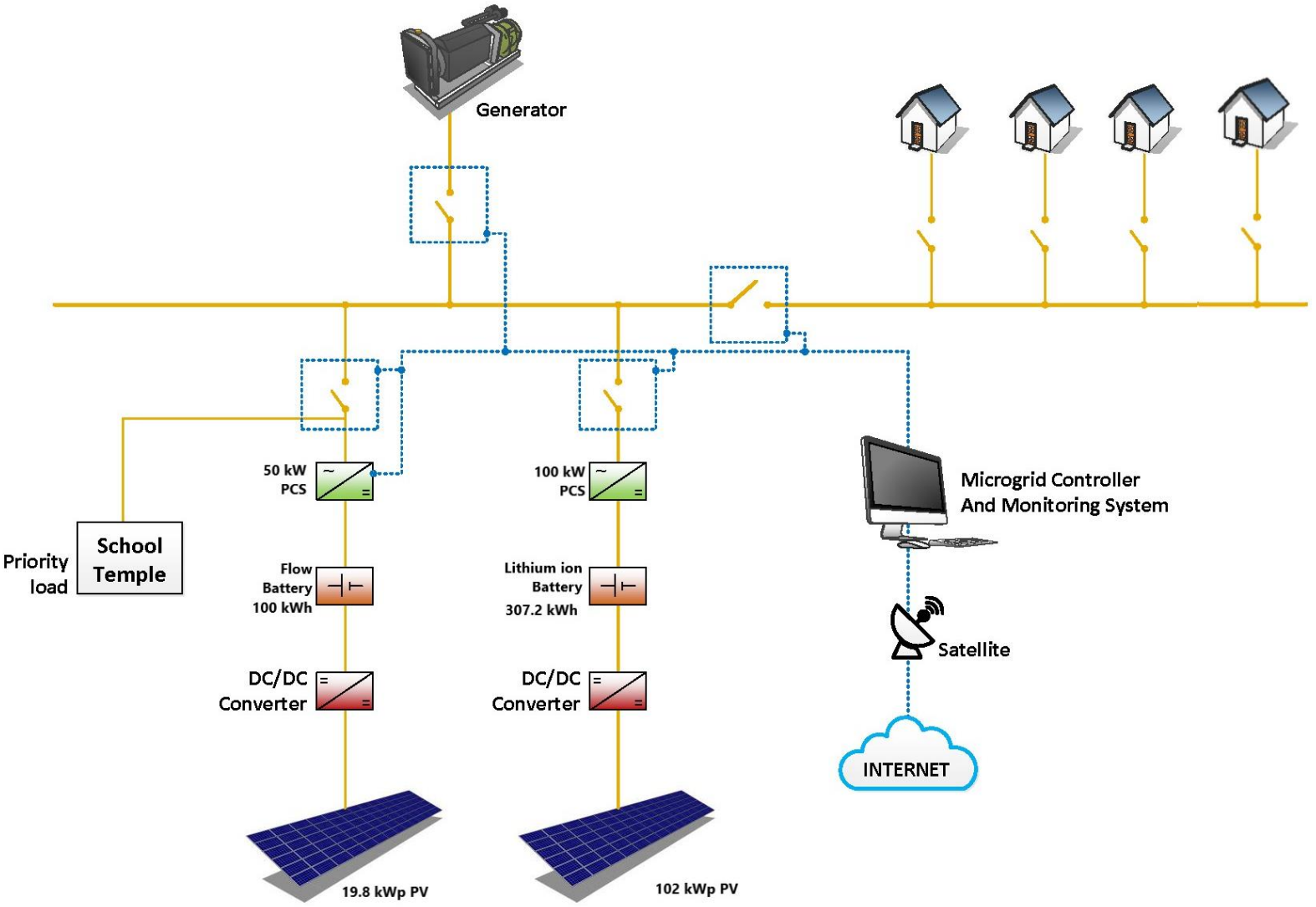

Pha Dan
Ban PA Lao School
(Sakha Pha Dan)
6.4 km
Mae Sa Ngae
Ban Mae
SA-Ngae School
4.4 km
Pong Pang
Ban Pong Phang School
สพย.
RESA

Rural Village Electrification – Off-Grid Microgrid

Site	Community Context		System			
	Population	Household	PV	Battery	Generator	Microgrid
Pha Dan	542	184	102	Lion 307.2 kW-hr	50 kVA	1,900 m with street lighting
			19.8	Flow Battery 100 kW-hr		
Mae Sa Ngae	329	90	102	Lion 307.2 kW-hr	50 kVA	1,400 m with street lighting
Pong Pang	328	92	102	Lion 307.2 kW-hr	50 kVA	1,000 m with street lighting



Microgrid Model for Rural Village Electrification at Pha Dan, Lamphun



Microgrid Model for Rural Village Electrification at Pha Dan, Lamphun

Microgrid Model for Rural Village Electrification

<<< Pha Dan

Mae Sa Ngae >>>

Pong Pang >>>

<<< Lithium-ion batteries

Zinc-bromine flow batteries >>>

(Pha Dan)

Generator 50kVA


Community Grid


Chang

Current Status of 3 sites

- Project operation and stability evaluation
- RESA MOU with Takat Municipality, Lamphun Technical College and the Community.
  - For capacity building of student, lecturers, civil servants of municipality and community – operation/maintenance of microgrid system
- Lamphun Technical College will be responsible for connecting microgrid to the households

System & Community Sustainability?

- Power management and microgrid system maintenance for system efficiency is the aim to achieve sustainability.
- Limit each household to 500 W ~ 2-3 unit/day at 6 baht/kW
- Set up - Community Power Fund with Community Committee to have funding for system administration
- Research/Demonstration Site area for University and Private Sectors to see the effect of microgrid system on rural communities
  - Effect on jobs, production cost, increase yield, increase income, live in harmony with the forest according to sufficiency economy concept

Conclusion

- Smart Community Concept: “Renewable Energy and Green Technology for Local Community”
  - Integrate with Community Resources - Ways of Living
  - Sufficiency Economy + Green Technologies (RE & EE)
  - Microgrid as Infrastructure for Green Community Development
- Community Microgrid
  - DC Microgrid is possible for decentralized power application.
  - Must educate users/ Concern about safety – DC compatible appliances
  - DC microgrid should be used for lightings and mounted appliances.
  - Must used sockets/plugs designed for DC
  - How can DC microgrid be integrated with AC microgrid?
- Moving Forward
  - Appropriate Technology; Monitoring/Optimization
  - Integration with Social Development and Economic Development
  - **Create awareness/ Share best practices/ Demonstrations Sites/ Community Implementation**

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www.adicet.cmru.ac.th

worajit@cmru.ac.th, worajit@gmail.com

www.facebook.com/adicetfan

Sai.Setthapun

+6689-839-8049