# RE implementation -PV installation program in University of Yangon

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# Objective



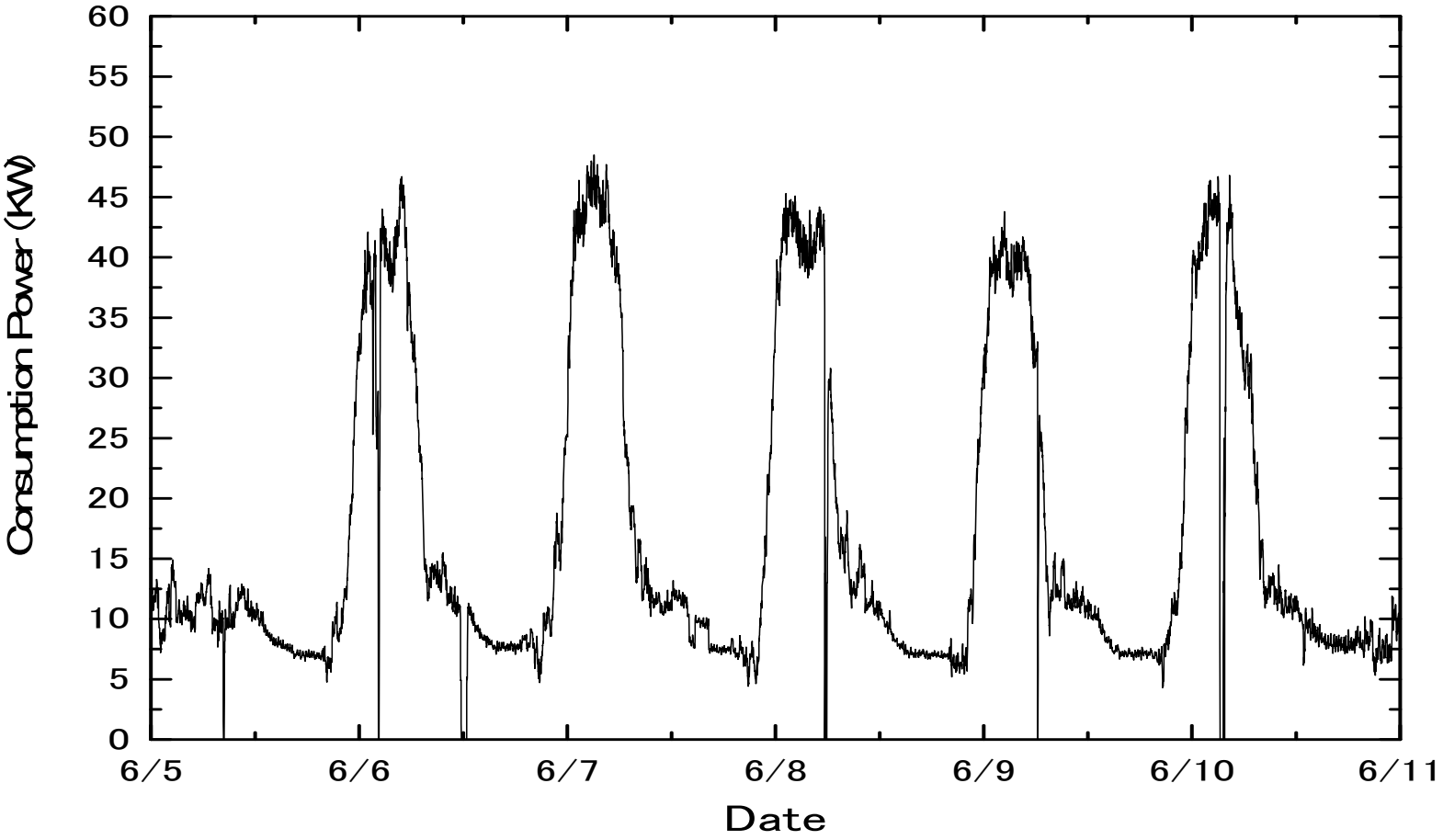
To supply stable electricity by using renewable energy in UY.
*Electricity requirement of the university is about 2 MW (2016).*

A pilot project has been launched for installation of a PV system for a basic research and education in collaboration with KU.
*-A 20 kW grid-tied PV system with 10 kW 3phase Li-ion battery system has been designed and installed in the newly built research compound (in operation in 2017-).*
*-Continuously collect the electricity consumption pattern in the building, the grid stability (not yet….), generated energy to optimize the design of the future PV system (target : 2 MW).*
*-According to the survey, the maximum available capacity is up to 48 kW in the building roof.*

A design work for the additional 30 kW grid-tied PV system.

# Electricity consumption in the Science Building of UY






- a typical electricity consumption pattern from June 5 to 11, **2016**

# Site Map


**Inya Lake**

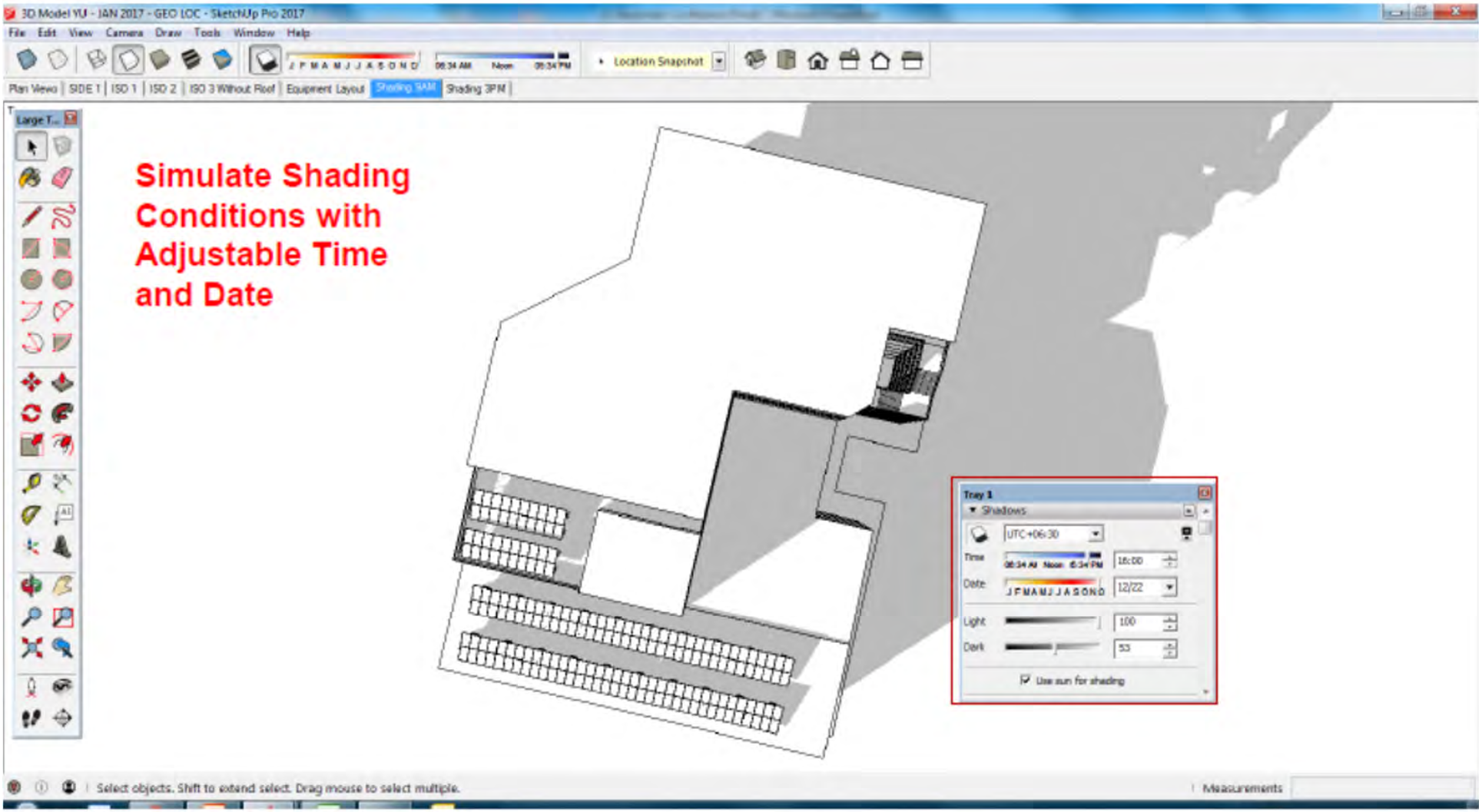
**Yangon University Research Center,**
Latitude: 16.83, Longitude: 96.13

Construction finished in 2017

**Yangon University Convocation Hall**

# Optimization of PV installation space

## (1) Available Roof Space for Solar Installation



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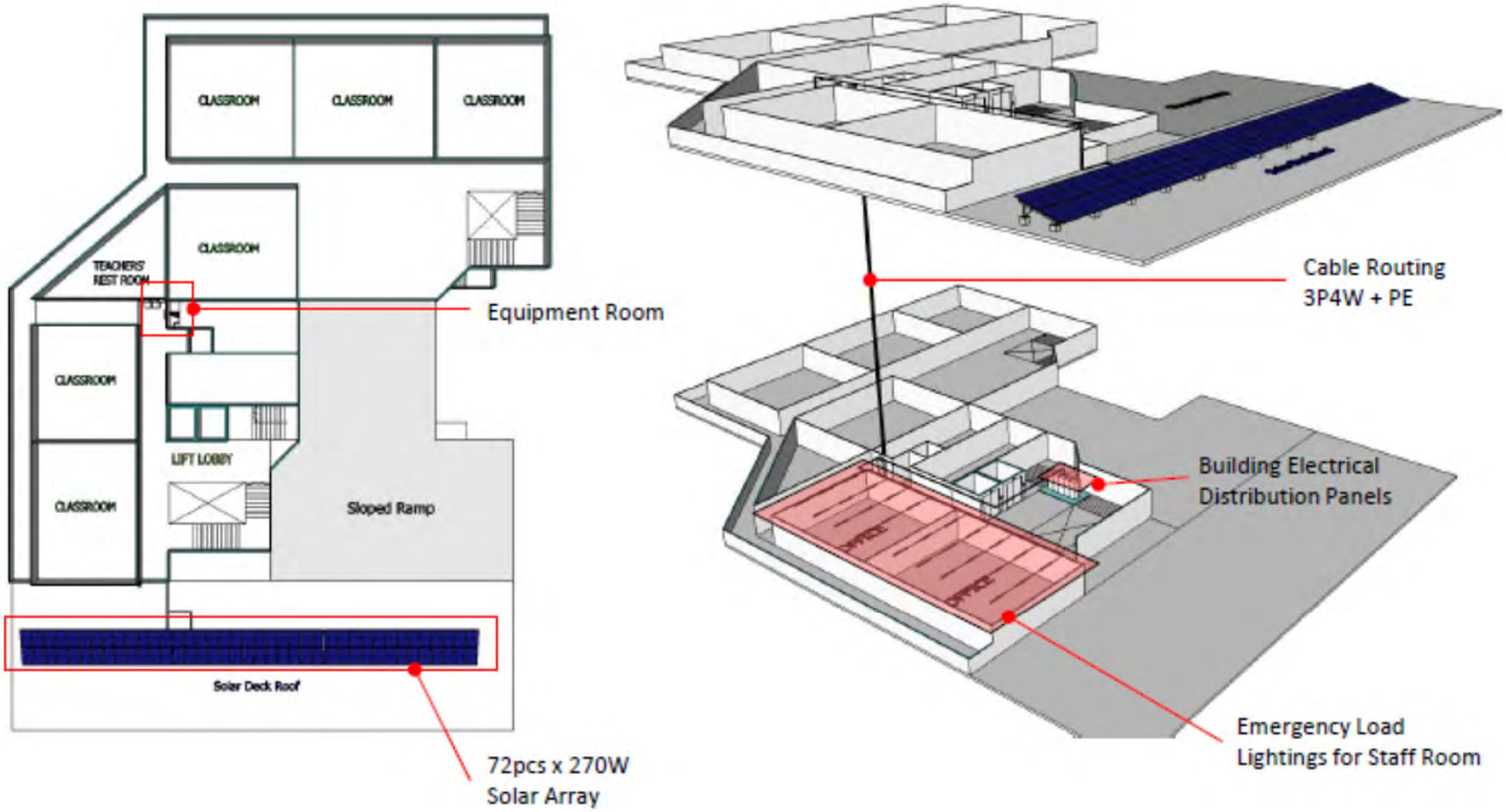
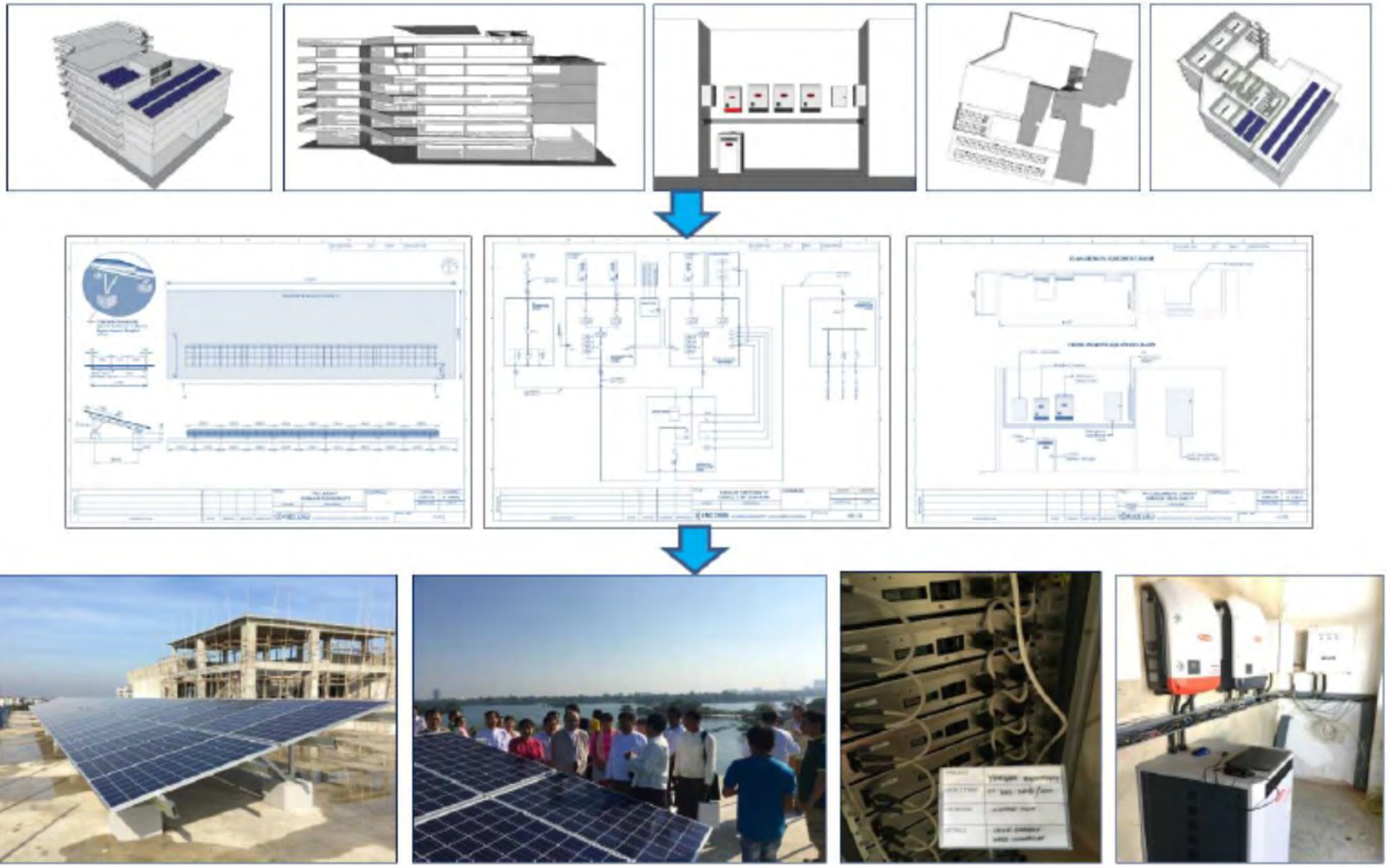


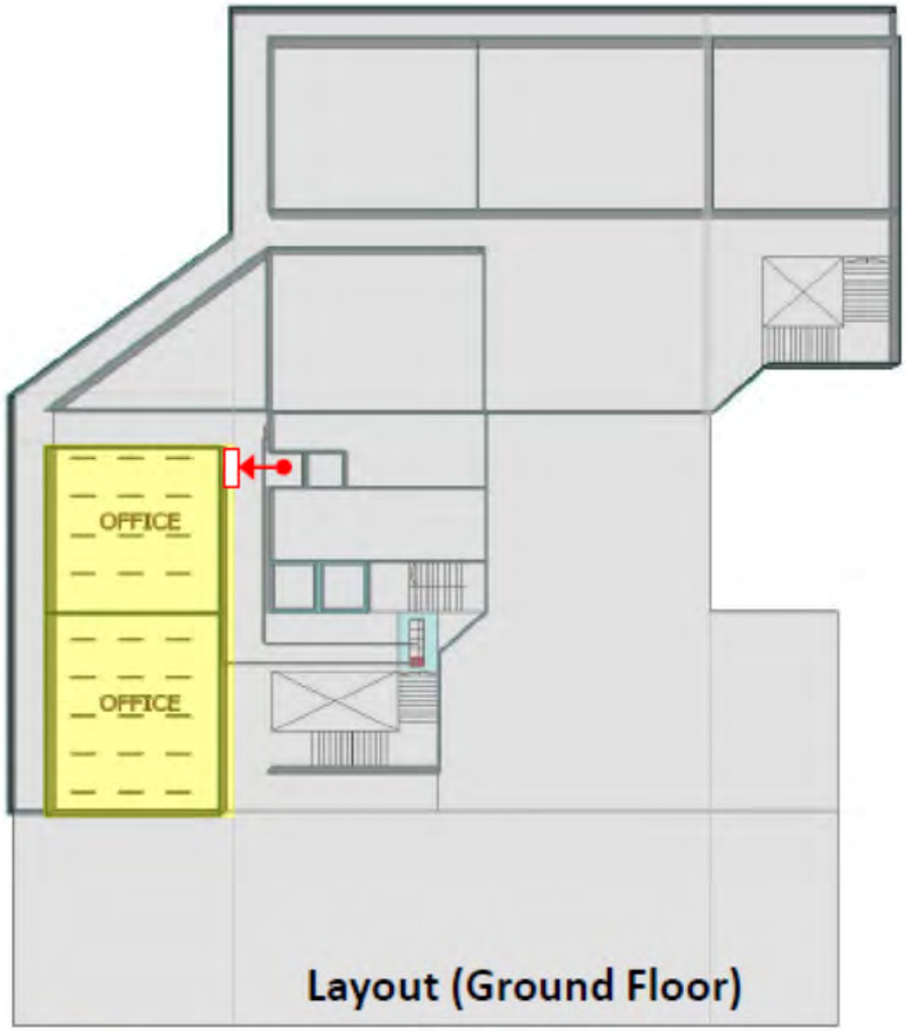
# Optimization of PV installation space



## Design Workflow with 3D Modeling NEW

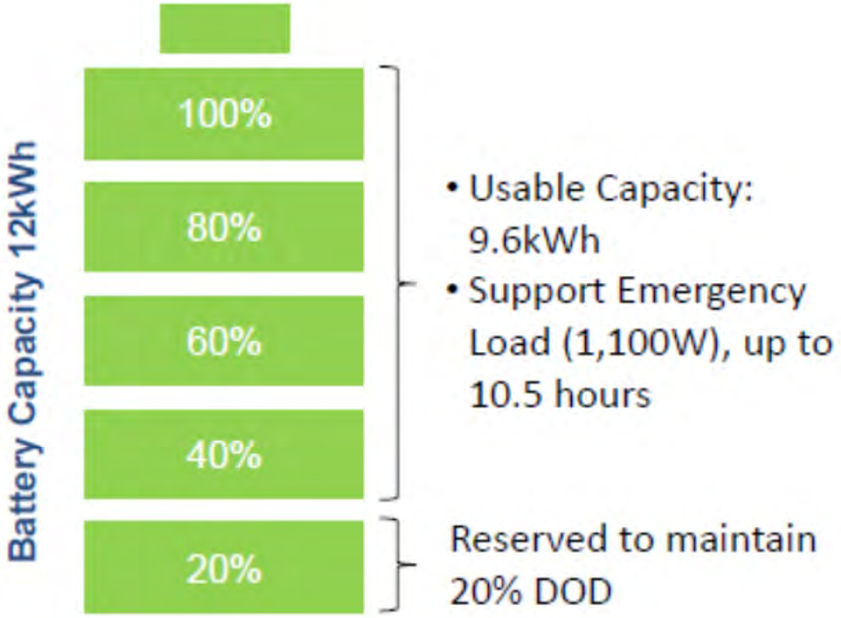


# Concept of installed PV system




| Emergency Load | Qty | Rating (W) | Total (W) |
|---|---|---|---|
| 28 Lighting Points (each point contains 2 x 20W florescent lamp) | 54 | 20 | 1,080 |
| AC Outlet | 2 | - | - |

Total Demand: ~ 1,100W



# System design concept



## (2) On-Grid or Off-Grid System?

Local grid conditions - Occurrence of blackouts during hot season

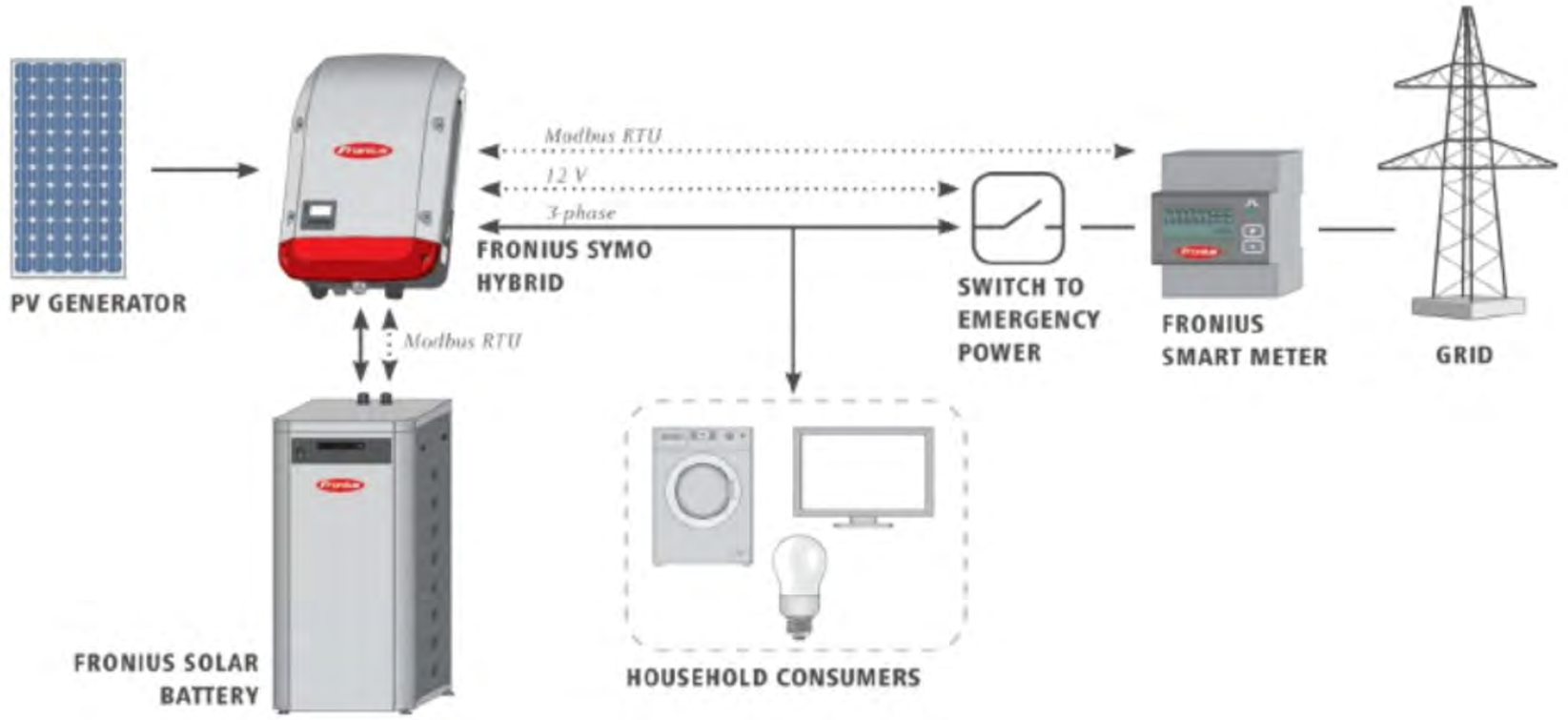
**Result:**

Hybrid Inverter System that operates like a grid-tied system but uses energy storage for later use.

Able to operate as a backup power supply during a blackout.

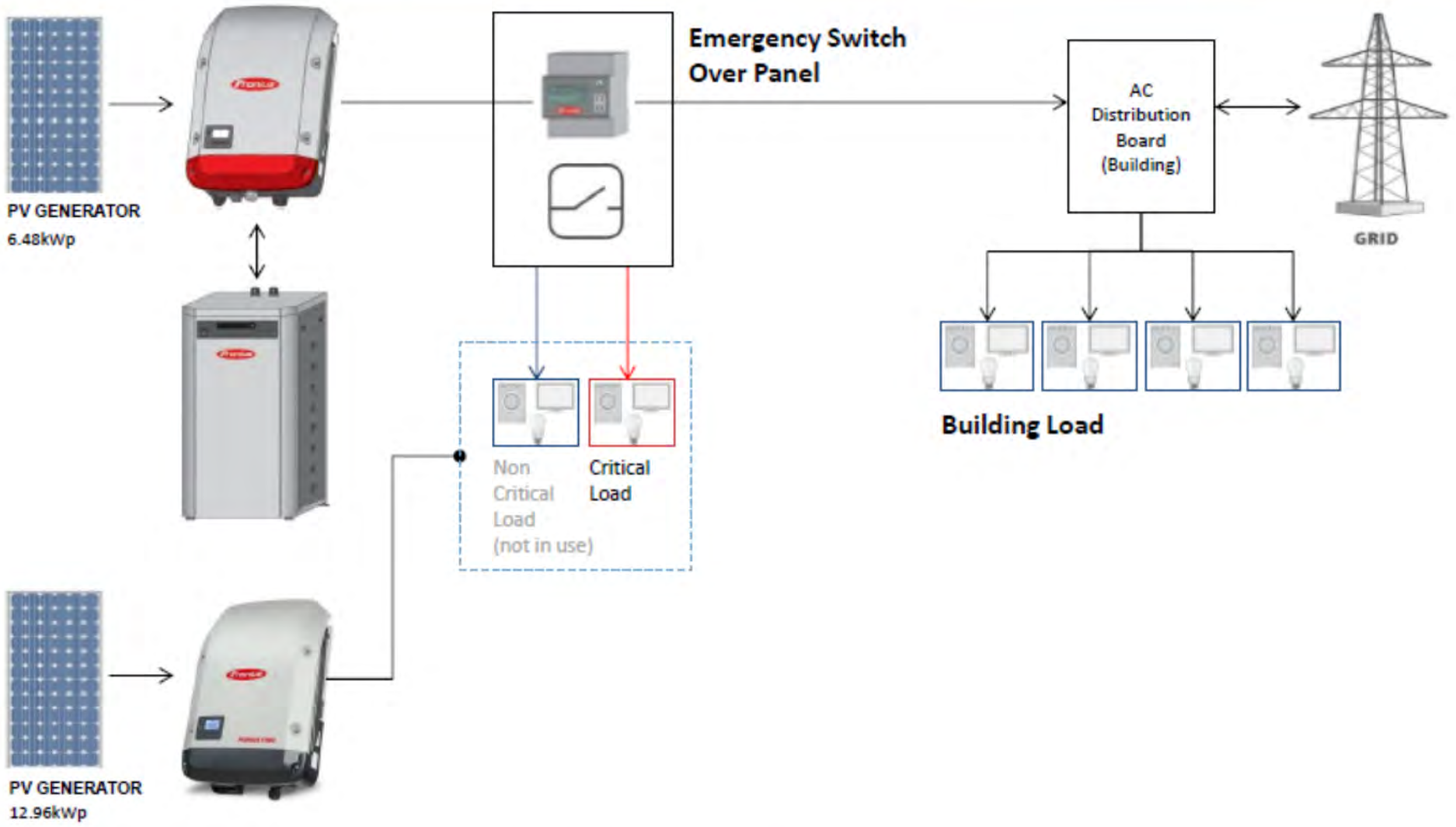
# Standard system design

**Product Feature** – Mainly designed for Residential Use with PV Generation Prioritized to Supply to Load



# Installed PV system (UY design, normal operation)

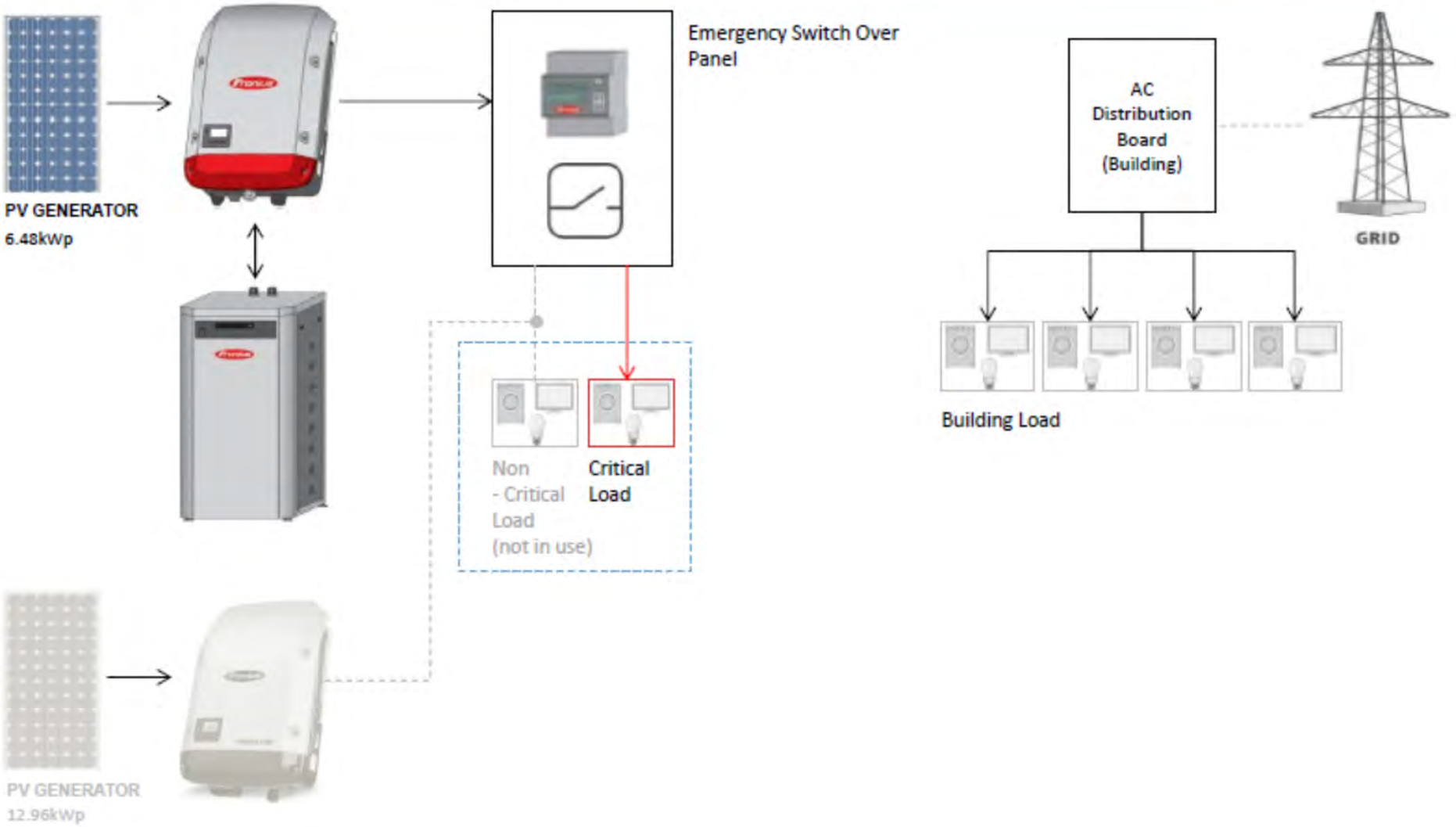





We had to "trick" hybrid inverter that hybrid-load is sufficiently supported

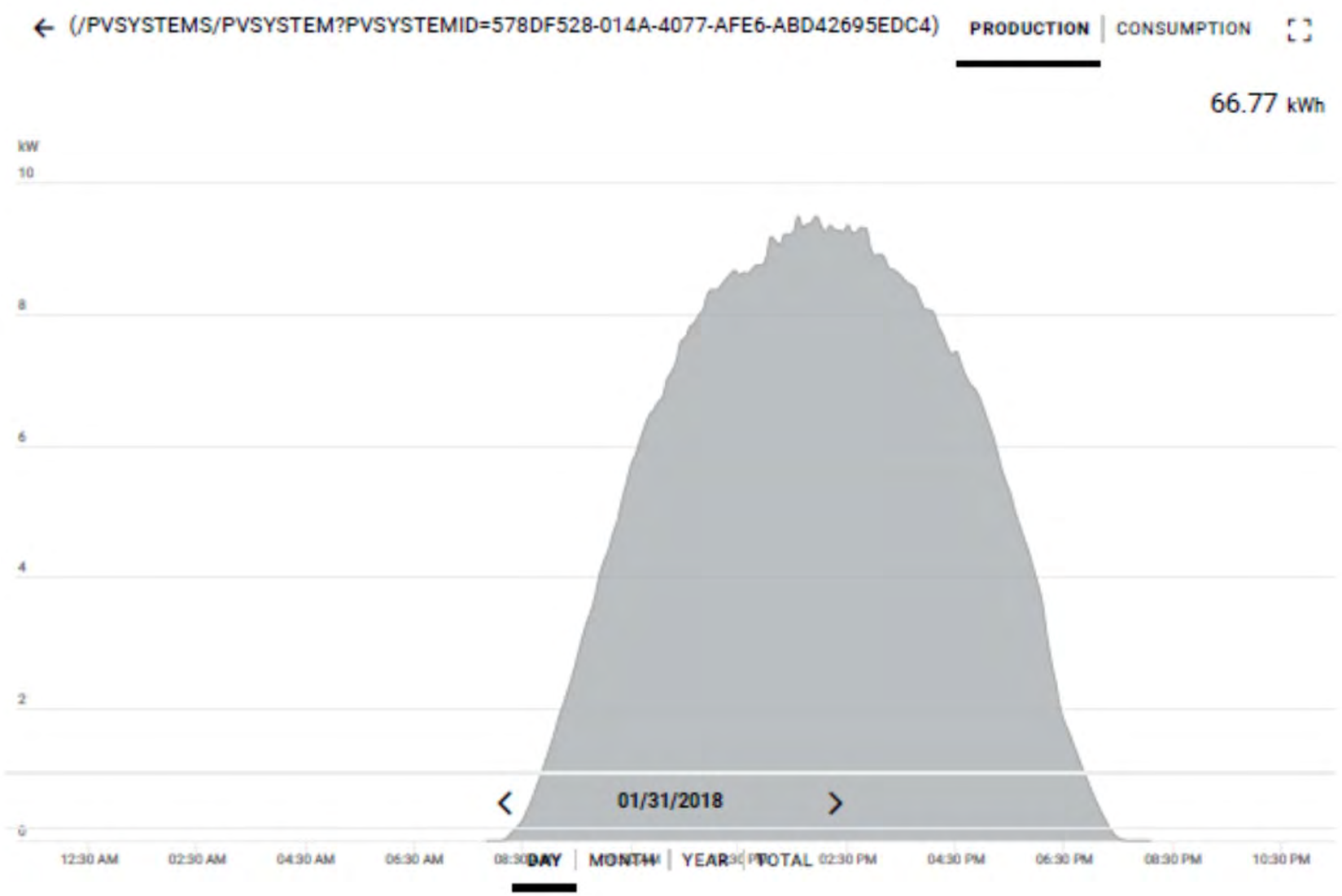
# Concept of installed PV system (UY design, blackout)



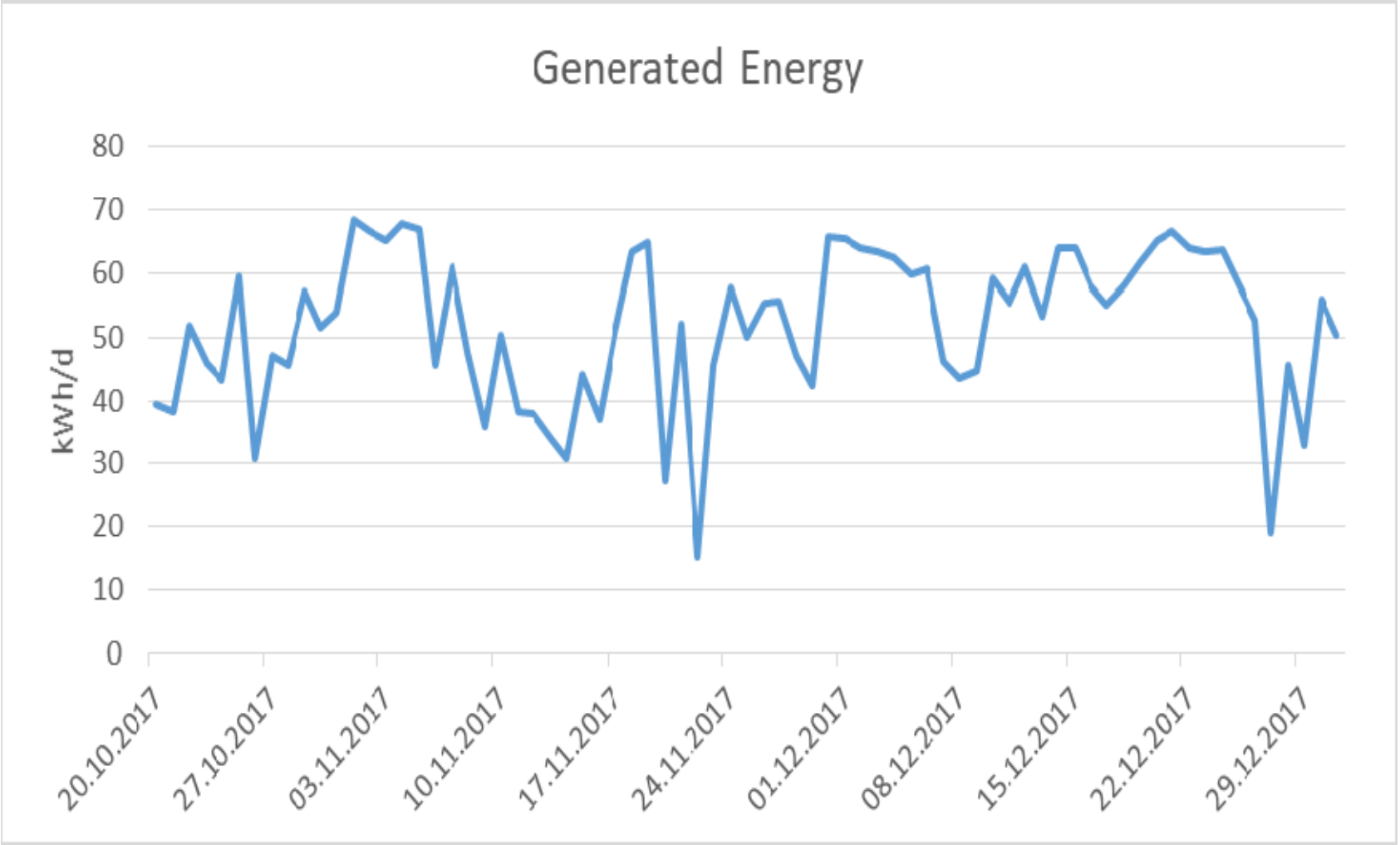


# Generated power





# Generated Energy

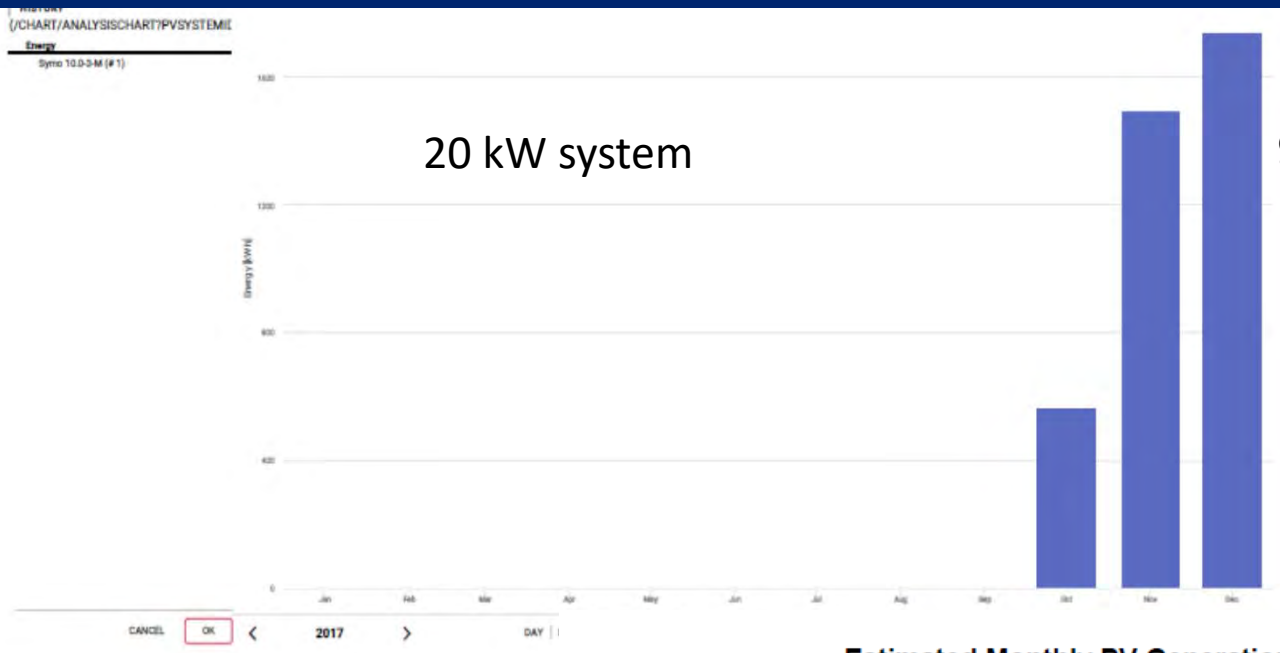



Average : 52 kWh/d

# Generated Energy



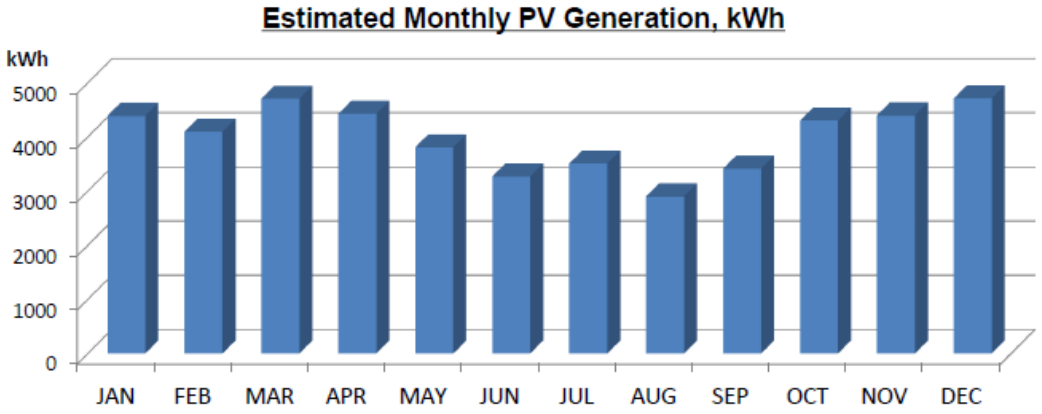
20 kW system




1700 kWh

90% from estimated value

50 kW system

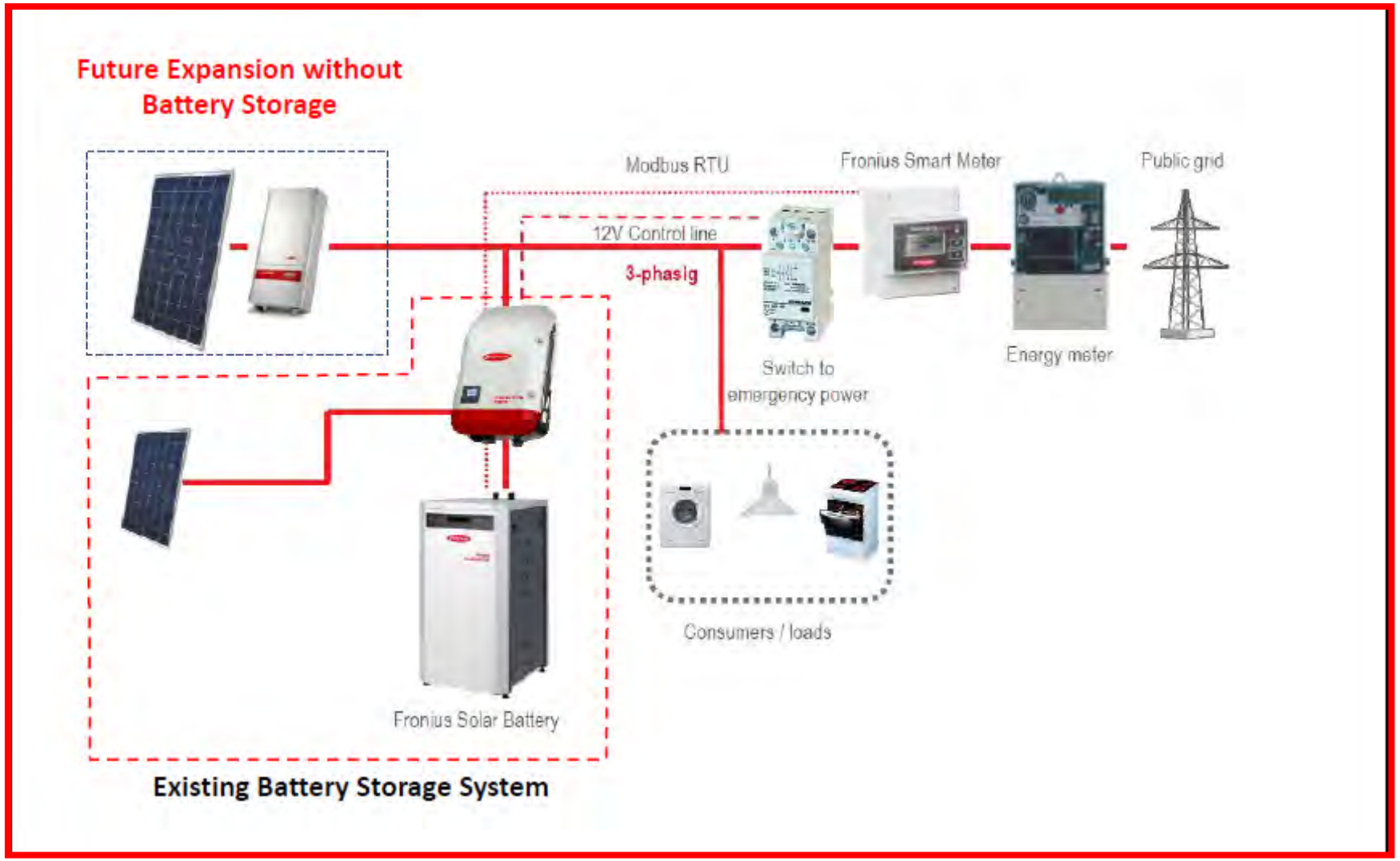



| JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Total, kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4387 | 4091 | 4705 | 4422 | 3807 | 3265 | 3504 | 2897 | 3415 | 4299 | 4391 | 4712 | 47,895 |

** Estimates based on PVSYST (V6.2.3) Simulation, only for reference*

# Upgrade system design





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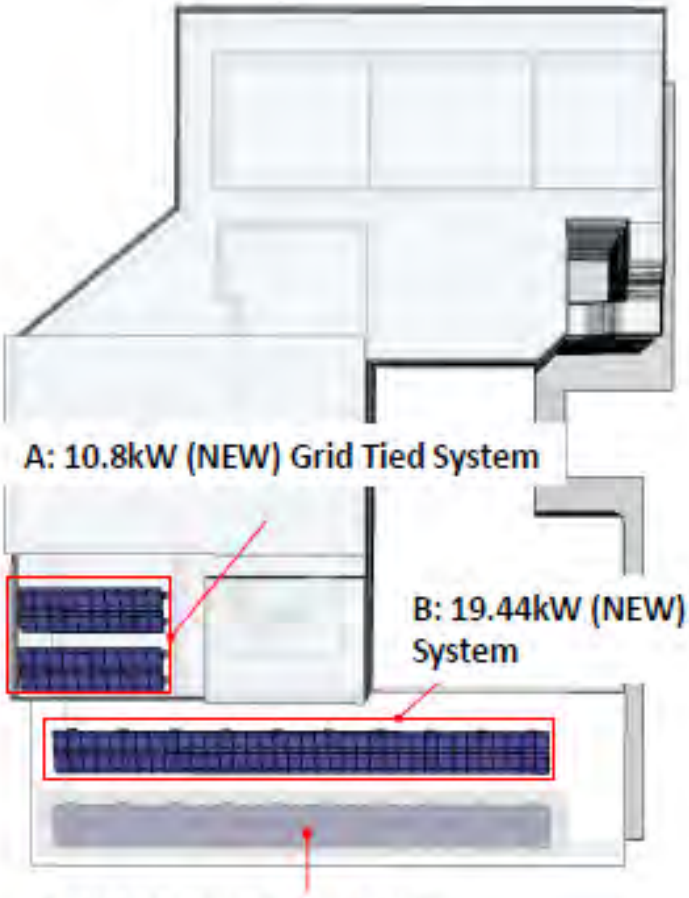



**Additional 30.24kWp of Solar Modules to be Installed**

**(A) Level 6 Roof Area***

- 40 pcs of 270Wp (10.80kW) solar modules is proposed to be installed
- Array structural height will be designed to avoid shading from parapet (1.20m height)

* This area is initially designed with canopy

**(B) Level 5 Roof Area**

- 72ps of 270Wp (19.44kW) solar modules is proposed to be installed

# AUN/SEED-Net RC on EnE, Special Session on PV system

Date: Nov. 11, 2017
Place: Arts Hall, UY


# Summary

- 20 kW PV (13 kW grid tied + 6.5 kW hybrid with battery) has successfully installed in the research building in UY.
- The whole system has started operation since Oct. 2017.
- Upgrade design, 30 kW PV without battery system, has been finished and waiting for budget….
- Myanmar prepares Renewable Energy Policy and JASTIP contributes to advice the finalization.

# Roadmap towards Sustainable Development Goals



2030

**9.3** Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets

7.2.1 Renewable energy share in the total final energy consumption
7.a.1 International financial flows to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems

*Actors: Industries*

*Actors: Government, Academia and Industries*

Development of local PV installation and maintenance business(economics)

Increase Mega solar installation in Myanmar

2020-???: 2 MW installation

Collaboration with industries

Myanmar Renewable Energy Policy

2018-2019: 50 kW upgrade

UY-KU-Kyocera AP-Earth Renewable Energy

**7.a** enhance international cooperation, **12.a, 17.6, 17.7,17.9, 17.16**

2016-2017: JASTIP collaboration research

"RE implementation -PV installation program in University of Yangon"

Collaboration with academia

UY-KU

2014-2015 : UNESCO assist program

"Promotion of Energy Science Education for Sustainable Development in Myanmar"