

# **AFO ENERGY WORKING GROUP**

MAYNMAR

Aung Thet Paing

Myanmar Engineering Society (MES)

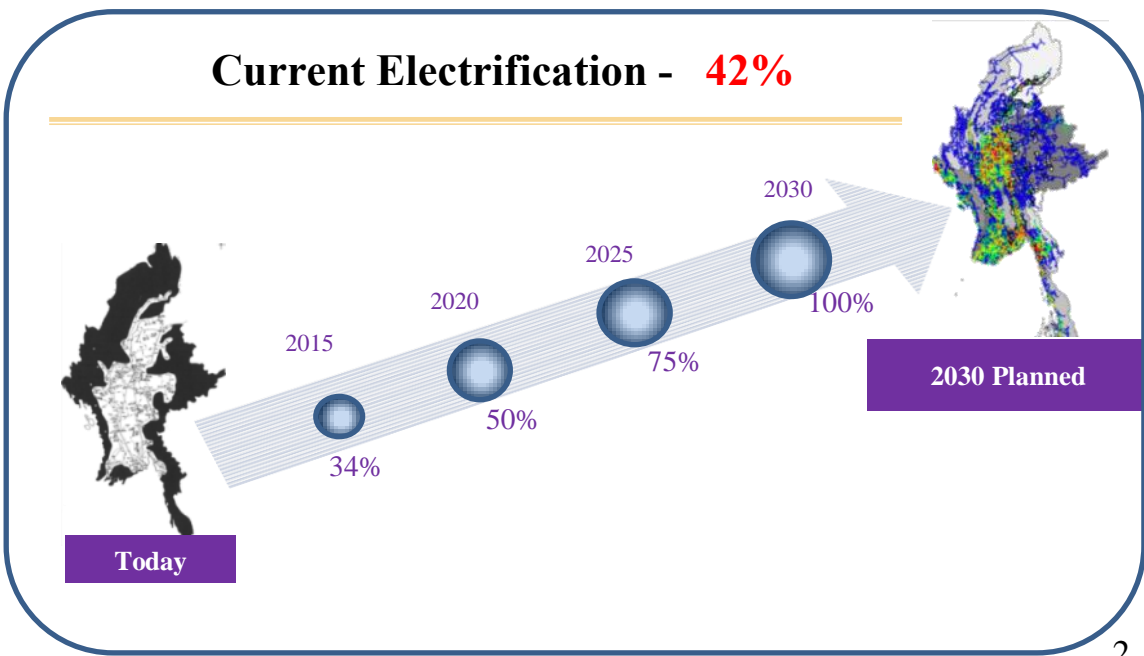


# Brief Introduction

- Myanmar is the member of ASEAN
- Located in South East Asia
- Population – about 51 millions
- Total Area – 676,552 sq.km  
(Total international boundary - 5860 km)  
(Coastal strip - 2833 km)



Map of Myanmar





# National Electricity Master Plan (Previous Version)

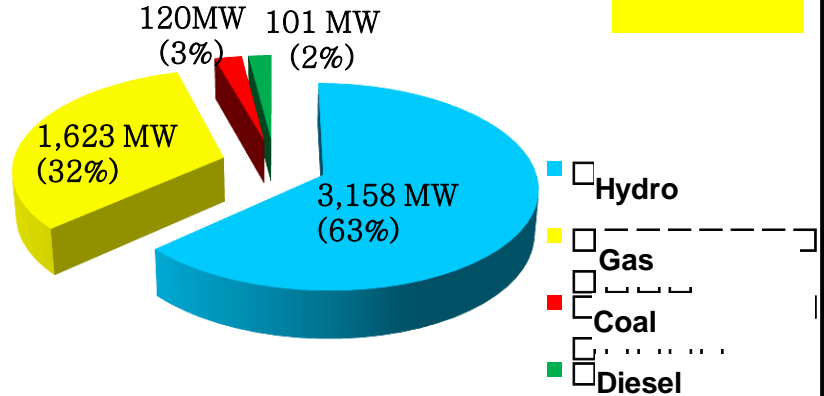
conducted by the assistance of JICA

## Target

- 50% to be Electrified in 2020
- 75% to be Electrified in 2025
- 100% to be Electrified in 2030

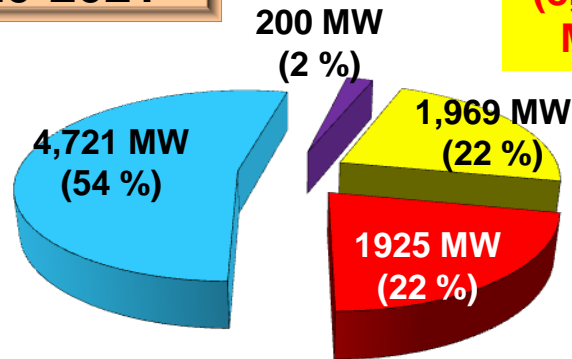
2015-2016

(5029)



2020-2021

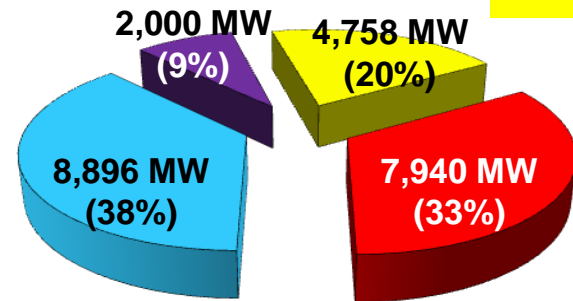
(8,815) MW



- Hydro
- Gas
- Renewable
- Coal

2030-2031

(23,594) MW



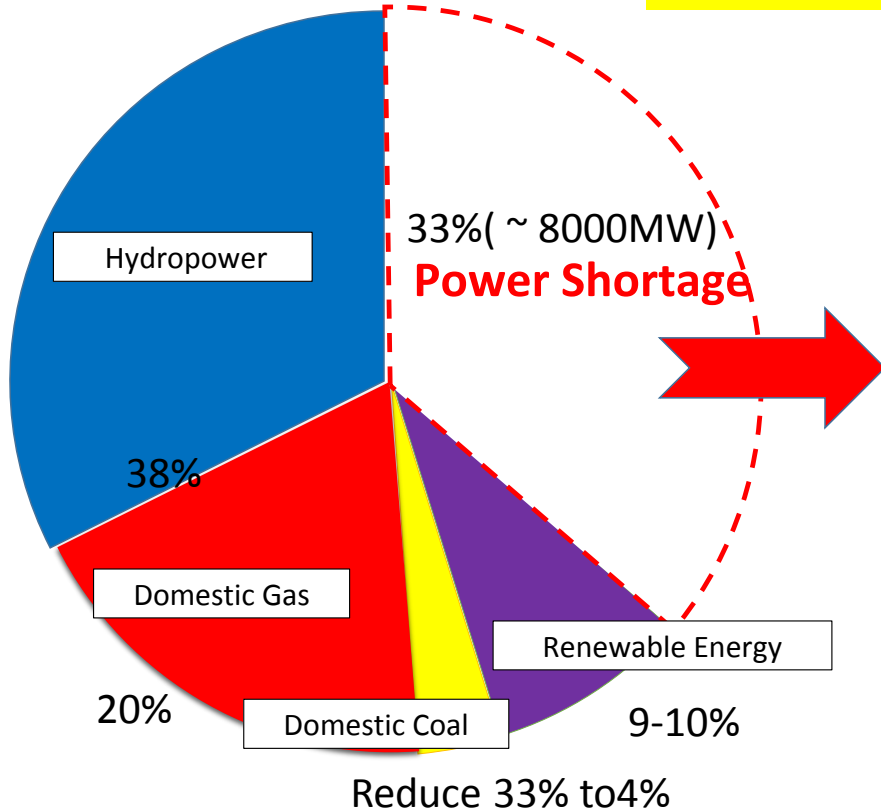
- Hydro
- Gas
- Renewable
- Coal

MOEE and JICA are reviewing on NEMP to be inline with current situation.



# Generation Mix and RE

Power Demand in 2030 (23,594) MW



To achieve System stable and Secure energy

Which resources should be filled or suitable?  
 Can RE generate to Full fill Power shortage?  
 If can, Is Power System stable?  
 If not, may it need realistic Generation Mix?  
 Do Import Power from neighbouring Country?

## Legal Framework

- Electricity Regulatory Authority (ERA) was not founded.
- Tariff Regulation was not established yet.
- Renewable Energy Policy was not established yet.
- Feed-in-Tariff ?

## Technical

- Intermittent condition
- Myanmar National Grid System is not strong
- Prior to solve to put into grid
- Need new Based Load Power Stations and T/L & S/S.

## Tariff

- Government Subsidize
- Difficult to Increase Tariff
- Tariff proposed could be high comparing to the current tariff.



# Policies and Plans

## Master Plan

- Myanmar Energy Master Plan (ADB + MOE(NEMC)).
- National Electricity Master Plan (JICA+MOEE) (Currently under updating)

## National Electrification Plan

- Approved on November 2015 (WB + MOEE).
- To electrify the whole country in 2030-31
- Implement solar home(500000 HH)and mini grid(35000HH) up to 2020-2021

## Policies for Power Sector

- To utilize the available energy resources in power generation to meet our demand
- To generate power using Renewable Energy( solar, wind) for ensuring the stability and reliability of power system and lowering the cost of generation
- To encourage Private-participation in power generation and distribution

## Strategic Environmental Assessment(SEA)

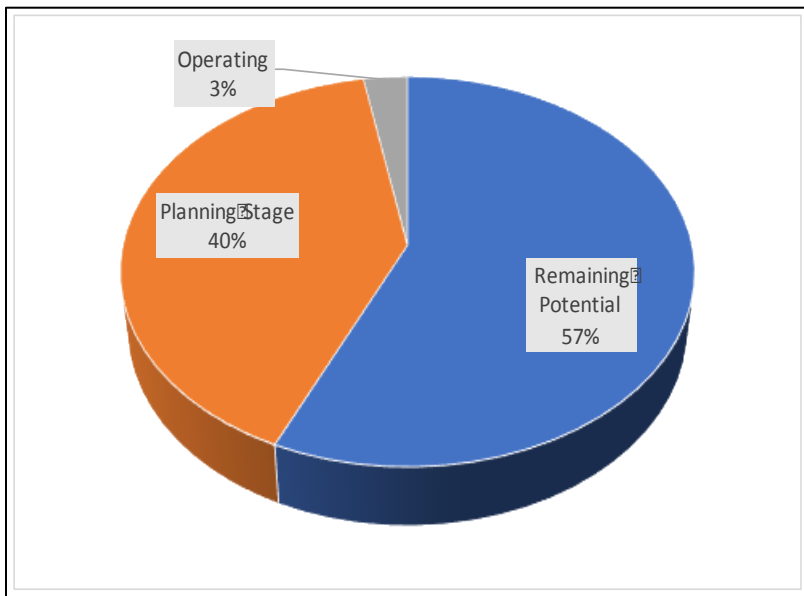
- SEA for Hydropower Sector ( MOEE+MONREC+ IFC)

## International Solar Alliance (ISA)

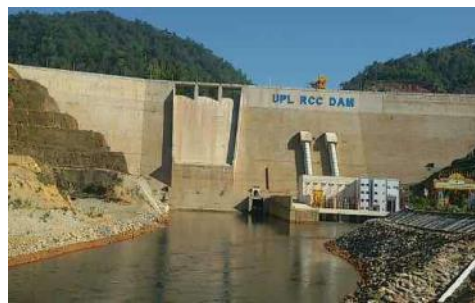
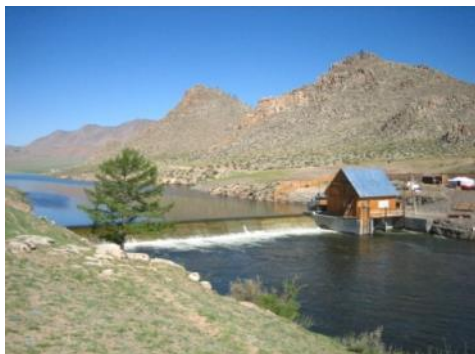
- India and France invite to sign ISA
- Now, Member of ISA



# Development of Renewable Energy (Hydropower)



<b>Existing Potential</b>	<b>108000.00 MW</b>
Operating	3221.00 MW
Planning	46330.55 MW
Remaining Potential	64890.45 MW





# Development of Renewable Energy (Solar)

## Large Scale Solar Projects

Nabuaing Solar Project (150MW)

Minbu Solar Project (170MW)

Wundwin Solar Project (150MW)

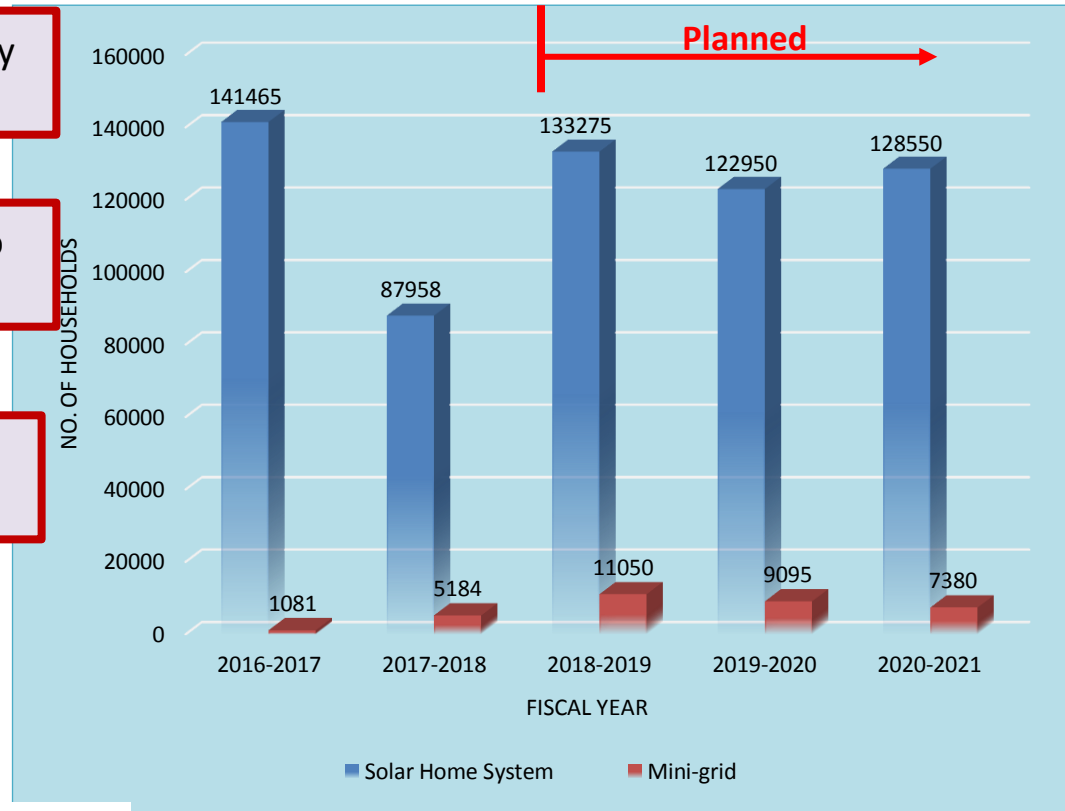
Sagaing, Mandalay 880 MW

Shwemyo 10 MW

Thapyaysan 100 MW

**solarGIS**  
<http://solarGIS.info>

## Rural Electrification With Solar



**On Going Projects (470 MW)**

**Under Investigation (990 MW)**

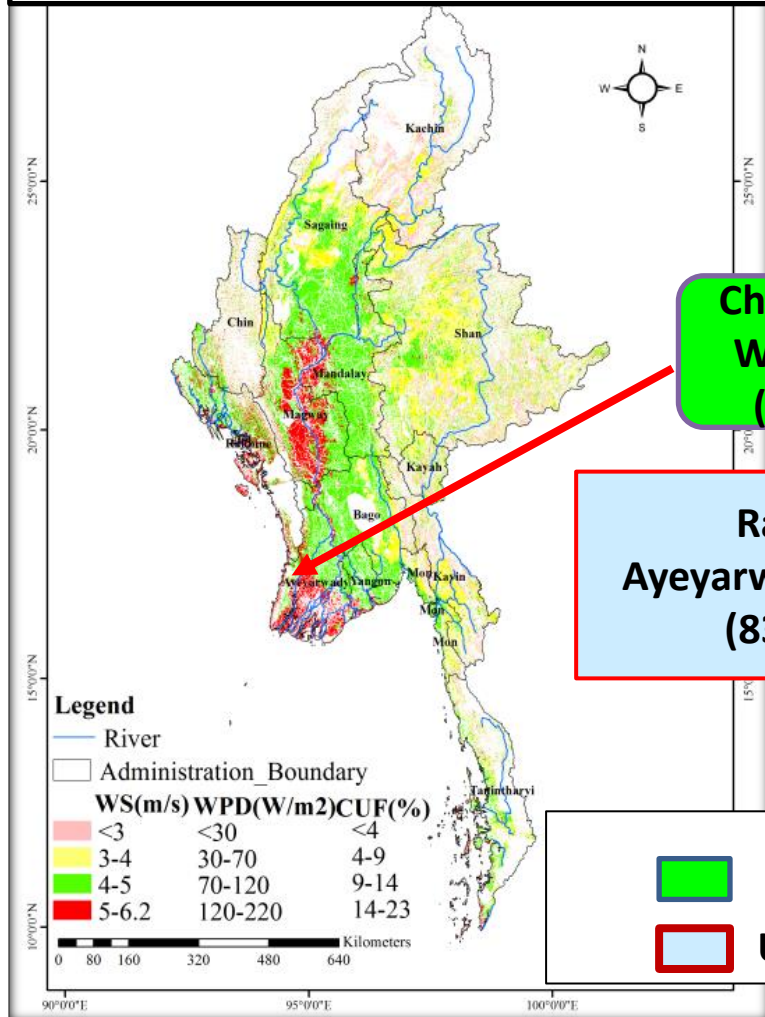
**Solar Total: 1460 MW**



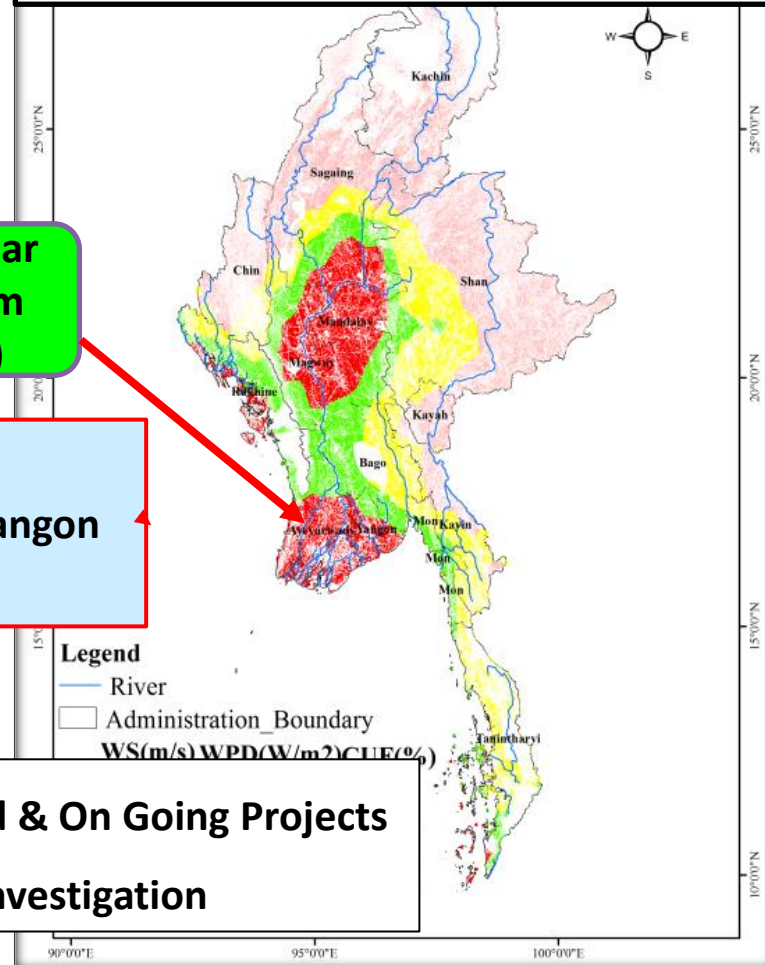


# Development of Renewable Energy (Wind)

## Wind Power Potential Map at 80m AGL



## Wind Power Potential Map at 120m AGL



**Chaung Thar  
Wind Farm  
(30 MW)**

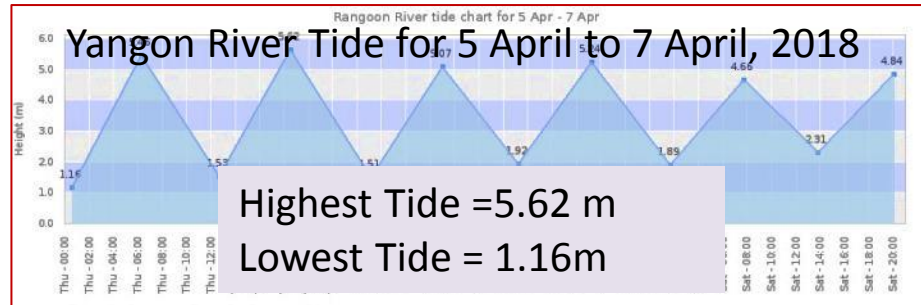
**Rakhine,  
Ayeyarwaddy, Yangon  
(830 MW)**

**Planned & On Going Projects**  
**Under Investigation**





# Development of Renewable Energy (Tidal)

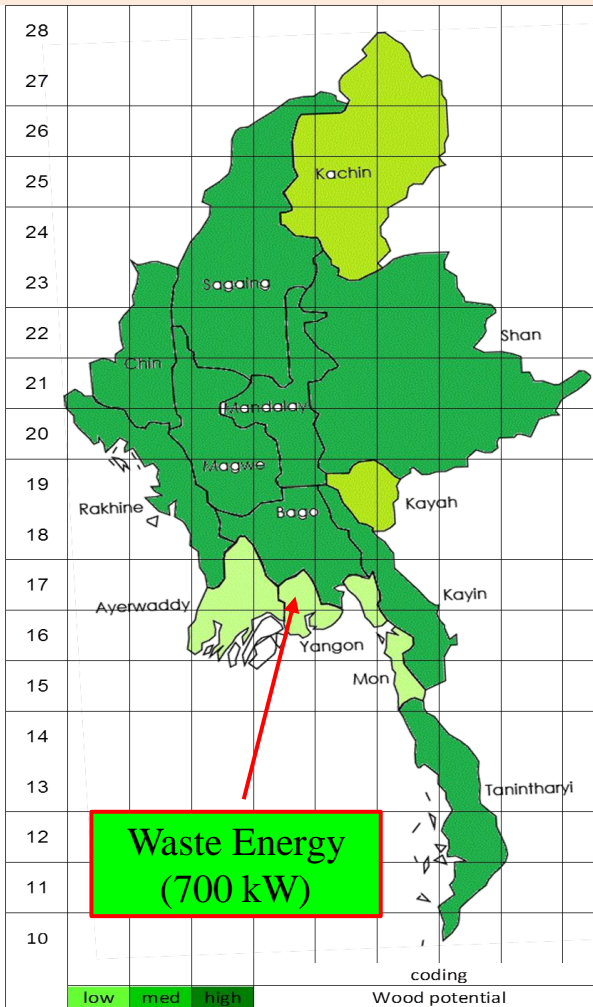


- Average Tide Fluctuation is about 5 m
- Huge Potential of Tidal Energy along the Coast and Estuaries
- Suitable for Rural Electrification of Coastal Area and Archipelagoes.



# Development of Renewable Energy (Biomass)

## Zones of Wood Potential



☐ 47% of total land area covered with forest  
 potential available annual sustainable yield of wood fuel 19 million Cubic Ton

## Other Bio-energy Resources

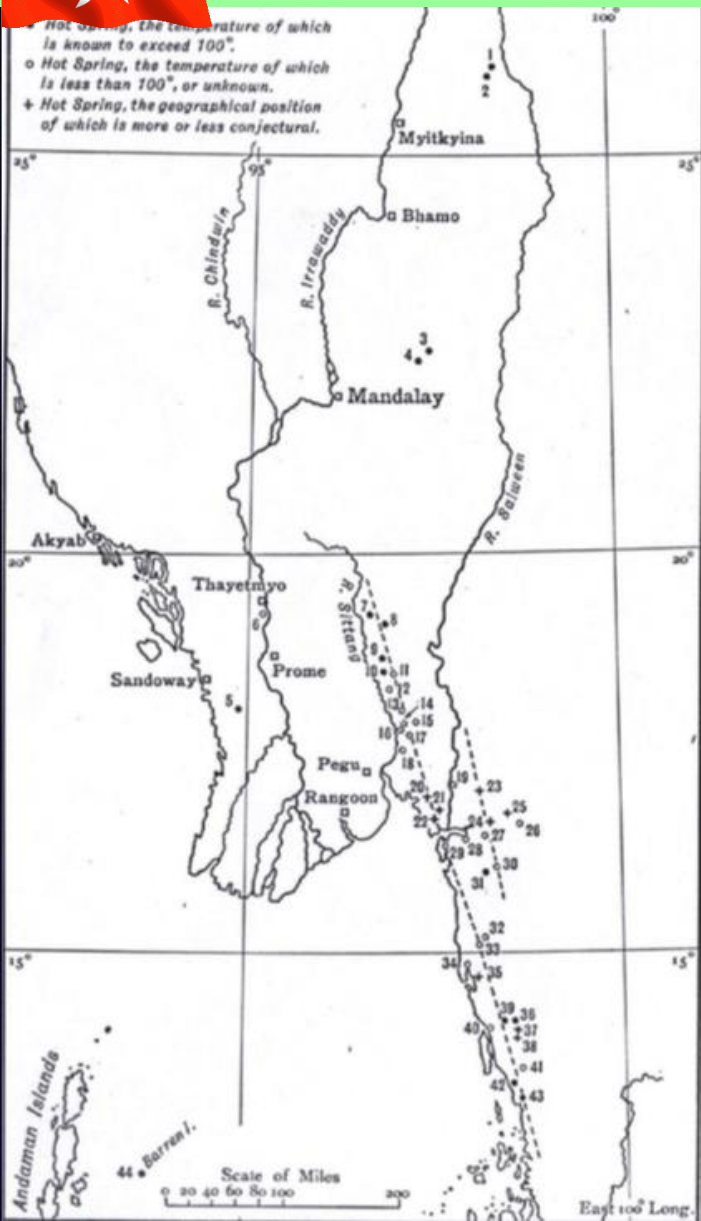
Type	Quantity
Rice Husk	4.4 M ton/year
Lumber Waste	1.5 M ton/year
Bagasse	2.1 M ton/year
Livestock	34.4 M ton/year

## Pilot Project (Waste Energy 700kW)

- Yangon creates about 1,600 tones of garbage every day
- Yangon City Development Committee (YCDC) built a small waste-to-energy plant
- Located in Shwepyithar Township, Yangon
- Commission in March, 2017



# Development of Renewable Energy (Geothermal)



Sr. No.	State/Region	No. of Hot Springs	Average Surface Temperature Degree C	PH Number
1.	Kachin State	2	-	
2.	Kayah State	5	-	
3.	Kayin State	15	48.61(37.78-61.67)	
4.	Sagaing Region	10	32.41(29.44-48.89)	7.8
5.	Taninthayi Region	19	51.46 (37.78-51.67)	-
6.	Magway Region	5	40.78 (32.22-48.89)	7.6
7.	Mandalay Region	3	36.65 (30.56-40.00)	6.5
8.	Mon State	19	51.08 (37.78-65.8)	7.7
9.	Rakhine State	1	-	-
10.	Shan State	17	43.50 (27.8-61.7)	6.9



## Conclusion

- ❖ MOEE has a great pressure to fulfill high-rising **electricity demand**
- ❖ Need to fulfill the **generation** and **transmission** facilities
- ❖ Current application of renewable energy is very **initial stage**
- ❖ Present National Grid System covers **only urban areas** and **small number of rural areas**
- ❖ **Promote renewable energy** integration to National Grid System and mini grids to achieve 2030 goal
- ❖ Encourage **Private Sector** Participation



# THANK YOU For Your Attention

For more information;

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