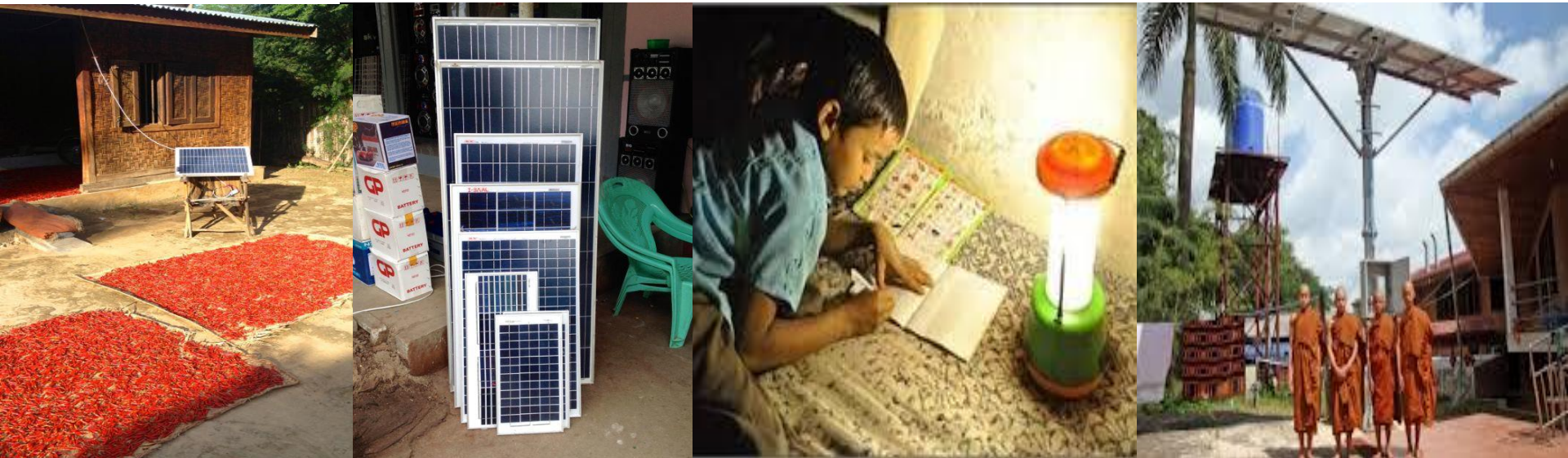




# Off-Grid Renewable Energy Program in Myanmar



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# ADB Off-grid Renewable Energy Program

## Phase 1: (October 2013 – June 2014)

- Pilot Regions: Mandalay and Chin State
- Outputs
  - a. Design and implement off-grid energy solutions for community infrastructure in 20 off-grid villages.
  - b. Geospatial maps and energy access plan for Mandalay region.
  - c. International Investor forum in Nay Pyi Taw in March 2014.
- Current Status: Scoping study of Mandalay region completed – Chin State in Progress.

## Phase 2: USD 2 million Grant ( February 2014 – December 2015)

- Ministry of Livestock, Fisheries and Rural Department
- Coverage: Dry Zone, Chin State, Kayah State and Rakhine State
- Outputs
  - a. Design and implement off-grid energy solutions for public and community infrastructure in 50 off-grid villages.
  - b. Geospatial maps and energy access plan

## Phase 3: Proposed Off-grid Renewable Energy Investment Program

- Tentative inception date in Q3, 2105

# Guiding Principles for Phase 1

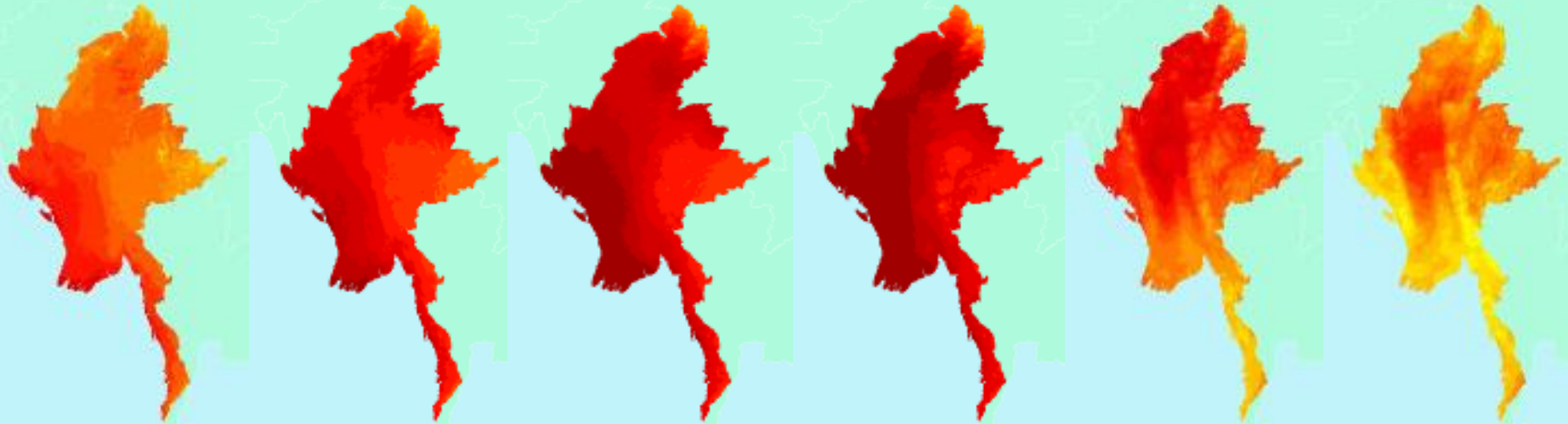


1. Responsive to government 's request for immediate deployment of RE based solutions
2. Adopt sustainable delivery approach
  - a. >5km from Grid
  - b. Resource availability
  - c. Scaled up in phase 2 & 3
  - d. Promote private sector participation
  - e. Bring ADB experience in service delivery models.
  - f. Leverage ADB's Energy for all Program
3. Stock taking of off-grid villages: energy poverty, affordability and willingness to pay, links to government plans, community participation and technology suppliers.

# Why solar based applications?

## Monthly Solar Radiation- Myanmar

ADB



Jan

Feb

Mar

Apr

May

June



July



Aug



Sep



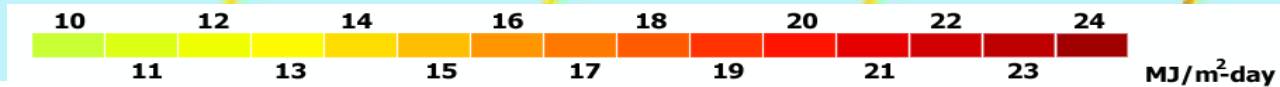
Oct



Nov



Dec



# Mandalay Region – Assessment

1. Townships visited: 7
  - a. Mandalay - Meikhtila, Kyaukse, Thazi, Kyauk Da Daung, Mying Yan and Madaya.
  - b. Nay Pyi Taw - Pyaw Ywa and Pe Tauk Gone are located in Tauk Gone Township
2. Villages covered: 22 villages.
3. Households: 3,867.



# Range of Household Monthly Spending on Lighting and Wealth Classification

Source of Electricity and Energy for Lighting	Range of Monthly Spending		Percent of Households	Classification of Wealth
	Low	High		
Solar PV Home System	n/a	n/a	11%	Very High
Diesel mini grid	2700	5400	14%	High
Dry cell batteries power LED light and some candle	2750	3450	37%	Medium
Car battery power T4 size fluorescent tube or CFL or LED light	2200	4000	5%	Medium
Candle and some dry cell batteries power LED light or small battery	3750	4375	7%	Medium
Candle & wick lamp	1000	6000*	15%	Low
Candle	2000	7000**	10	Very Low
Solar lantern	n/a	n/a	0.30%	n/a

# Affordability and Willingness

1. Diesel Based mini-grids: 3 hrs/day @ 2000 Kyats per point
  - a. The total electricity usage for 20 watts CFL for 30 days amounts to only 1.8 kWh. Cost of electricity per kWh is about 1,111 Kyats or about US\$1.23 per kWh.
  - b. Average household owns two lamps and some with small 9 inches television. Means maximum total electricity consumed by the household is less than 6 kWh per month, which the households pay about 5,000 Kyats for 2 lights and one television. Average cost of electricity delivered to the household through the grid is estimated to be around 833 Kyats per kWh or approx US\$0.85

*(Electricity tariff for diesel mini grid usually provide a discount for two lights: 2,000 Kyats for one light, or 3,000 Kyats for two lights)*

2. Poor households which account for about 25 percent of all households in 22 selected villages could spend between 1,000 to 2,000 Kyats per month.
3. For households with medium wealth which account for about 49 percent of all households, their affordability range from 2,200 to 4,375 Kyat per month.

*Clearly, alternative sources of electricity that would cost more than these ranges of affordability would require some subsidy or innovative delivery approaches to make it affordable.*

# Challenges and Opportunities

## 1. Challenges

- a. Road map for rural electrification need to be strengthened (ADB supporting development of a Rural Elec law)
- b. Difficult terrain
- c. Low affordability and financial reach
- d. Lack of technology awareness among villagers
- e. Lack of reach of private RE suppliers at village level and after sales support mechanism

## 2. Opportunities

- a. Government commitment and government reach at village level
- b. Community based organizations in place
- c. Community interest and willingness to accept change
- d. SHSs are in use in several villages and help to provide a demonstration effect



# Proposed Interventions – Mandalay region

1. Solar Lantern charging stations and selling points
2. Solar/hybrid mini grids to replace or complement diesel powered local grid.
3. Solar home solutions(SHS) for lighting and TV application
4. Solar water pumps for drinking water
5. Output Based Aid(OBA) to incentivize private suppliers



# Output-Based Aid: OBA

1. A results-based approach to increasing access to basic services like electricity.
2. It link subsidy with delivery of “outputs” like installation of SHS at required standards and condition set by project.
3. ADB will pilot OBA project in Mandalay and Chin state to expand the use of SHS - will not only enhance SHS market but also help establishing standards and quality of equipment as well as assist and educate households/consumers.
4. SHS sellers will be eligible for subsidy, if comply with following:
  - a. Prequalified according to minimum technical standards set by ADB
  - b. Extended warranty of 2 years
  - c. After independent third party verification subsidy will be released ensures that funds are paid only after the services or outputs have been satisfactorily delivered.
5. Provide an incentive to private supplier to explore and compete in rural markets.
6. Brings competition to lower prices, new service delivery models and set TORs for quality solutions.
7. Evaluate options for scale up by creating an OBA fund – Bangladesh model.

# Chin State – Assessment (in progress)



1. Total town ships 9, villages: 1404
2. Electrified: 361, 3 biomass & 358 mini hydro.
  - a. Supply 4hrs in townships
3. Off-grid villages: 1043
4. Nearest national grid: 58 miles from Hakka

## **Preliminary Findings:**

1. Solar street lights
2. Solar water heater for public facilities i.e. hospital
3. Solar Home solutions
4. Mini hydro retrofitting
  - a. Generation side
  - b. Demand side - load management
  - c. Business model - revised tariff system

Thank you

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# Current Sources for Lighting

