



Myanmar Mini-grid Overview

Up scaling Mini-Grid Workshop



Naypyitaw, Myanmar
February 9, 2017



Chris Greacen, Ph.D.

Overview

- + Mini-grids in Myanmar – what kinds and how many?**
 - Diesel
 - Hydro
 - Biomass gasifier
 - Solar & solar/diesel
- + Mini-grids and Myanmar's National Electrification Program**
- + Drivers**
- + Challenges**
 - Financing
 - Technology
 - Regulatory framework

Diesel



Diesel

13,000 villages

2,400 if counting only villages where it electrifies at least 70% households

Census: 1,013,000 households powered by private generator



Micro-hydropower



Micro-hydropower

2400 villages

1,200 if counting only villages where it electrifies at least 70% households

Census: 178,000 households powered by private “water mill”



3MW Nam Khun, Kyaing Tong

Kyi Thien Family Co. & Kyaing Tong Energy Co., Ltd.



Biomass gasifier



Biomass gasifier

1,200 villages

472 if counting only villages where it electrifies
at least 70% households



Solar mini-grid



Solar mini-grid

150 villages

counting only villages where they electrify at least 70% households



Quality varies



VS.



Challenges

+ Technology

- Generators: inefficient, old, poor voltage & frequency regulation
- Distribution networks – inadequate wire size, poor splices, rot-prone poles
- Metering: none

+ Financing

- Loans, where available, at difficult terms: 1 year, 40% interest
- Limited equity investors

+ Regulatory framework

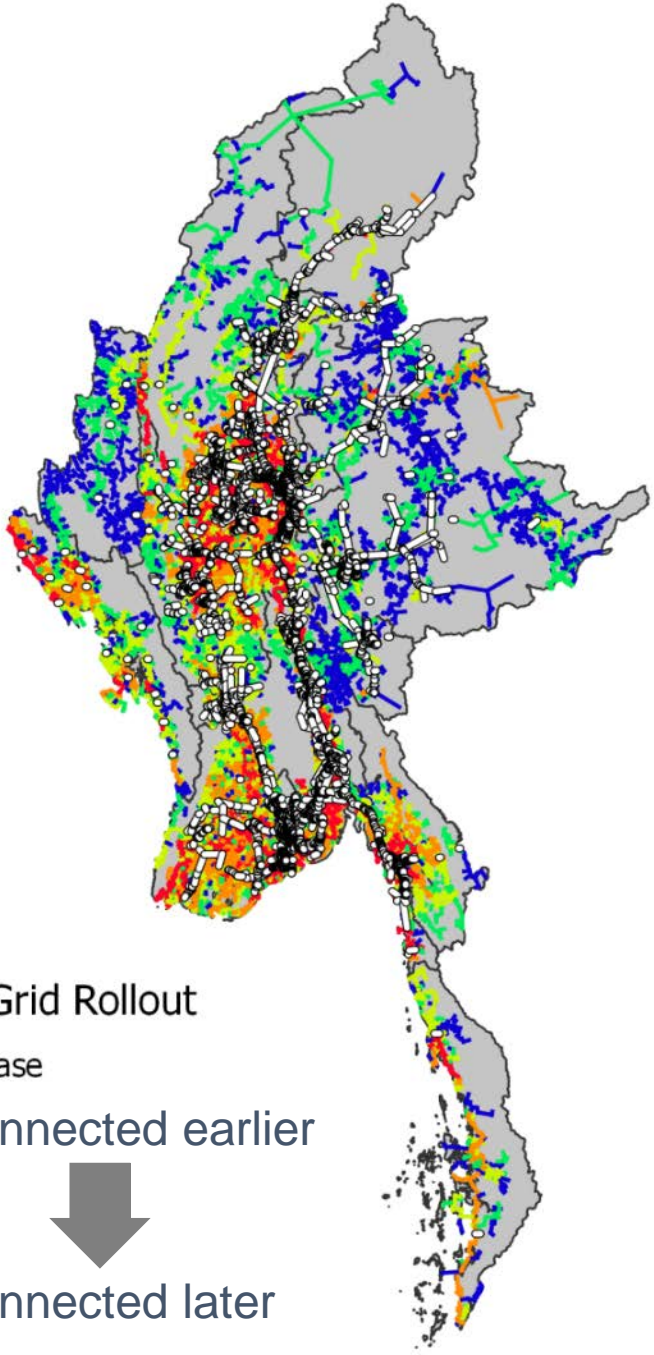
- Licensing
- Protection when main grid arrives
- Certainty in tariffs
- Quality standards

Opportunities

Mini-grids and the National Electrification Plan (NEP)

- + **Department of Rural Development (DRD) under the Ministry of Agriculture, Livestock and Irrigation (MOALI)**
 - Lead off-grid agency
 - Provides mini-grid funding under NEP for:
 - Portion of feasibility studies
 - Portion of capital cost
 - Capacity building
- + **Screening criteria include:**
 - >10 miles from grid lines
 - Community demonstrates ability to manage
- + **About a dozen mini-grids in the pipeline**

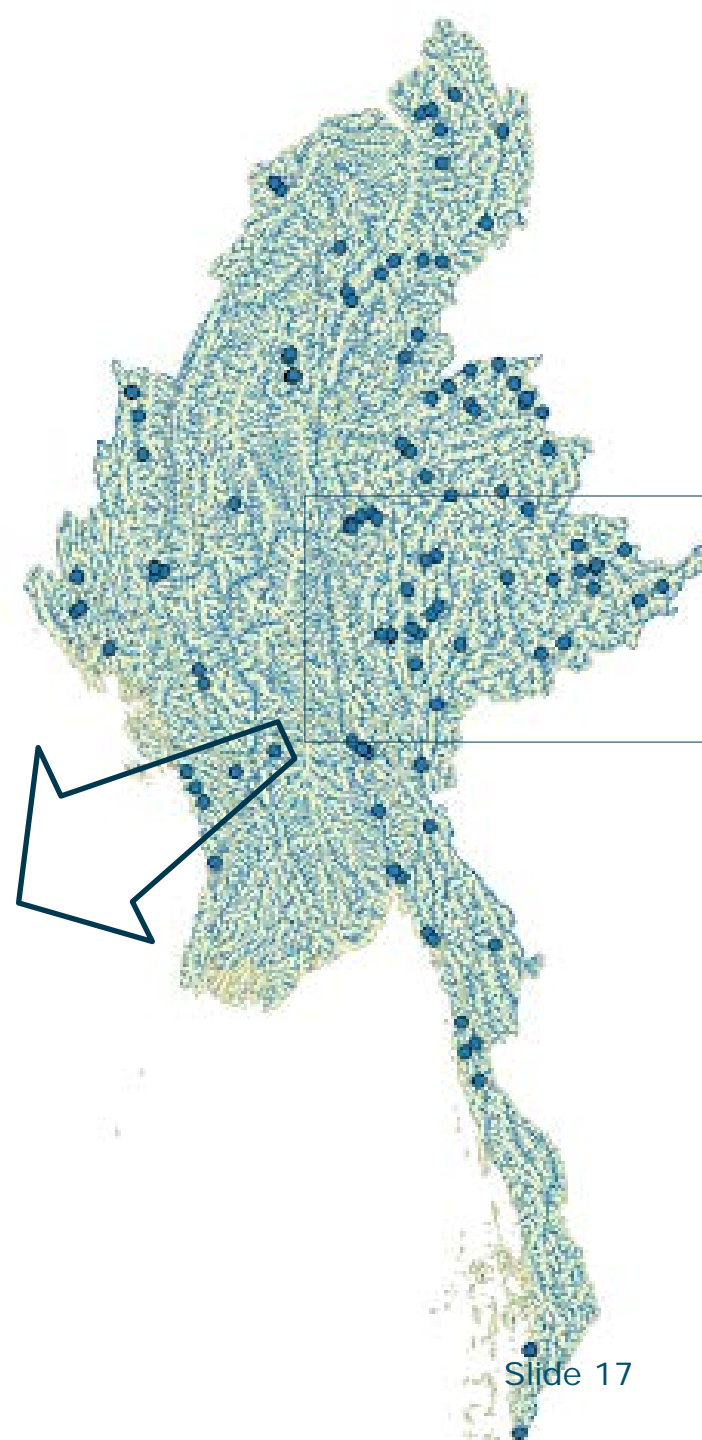
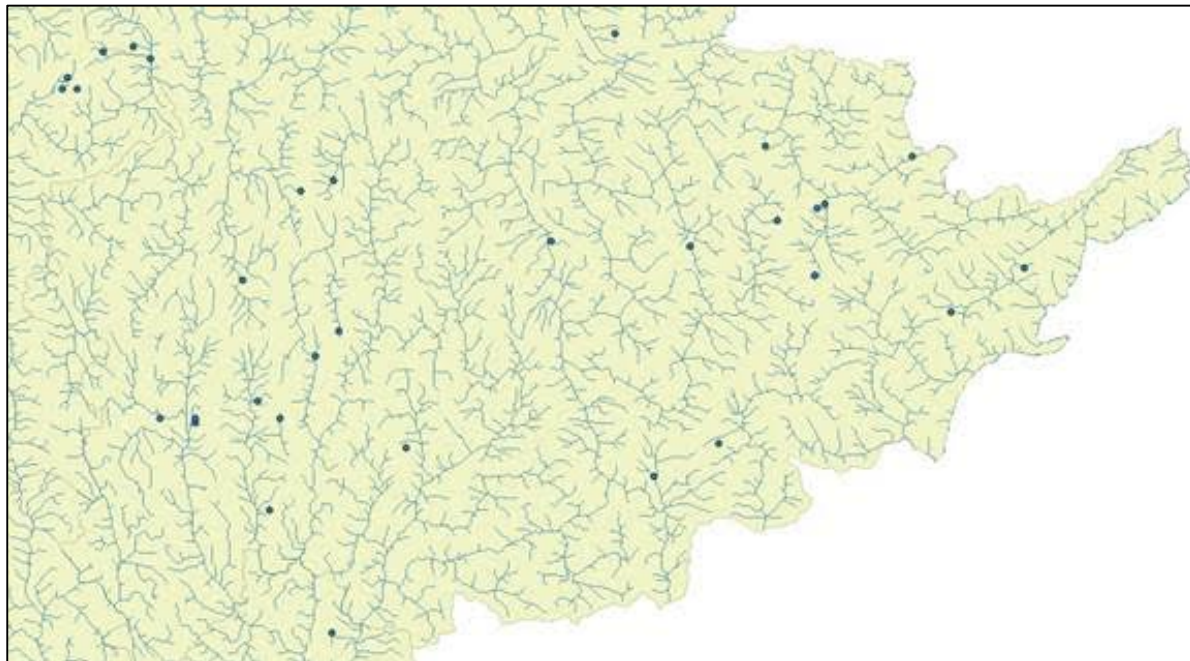
Recommended Sequencing of Grid Roll-out proceeds from low-cost to high-cost connections



- National MV Grid Rollout
- Equal MV Per Phase
- Phase 1 Connected earlier
 - Phase 2
 - Phase 3
 - Phase 4
 - Phase 5 Connected later
 - Existing MV and HV Substations

Small Hydro potential

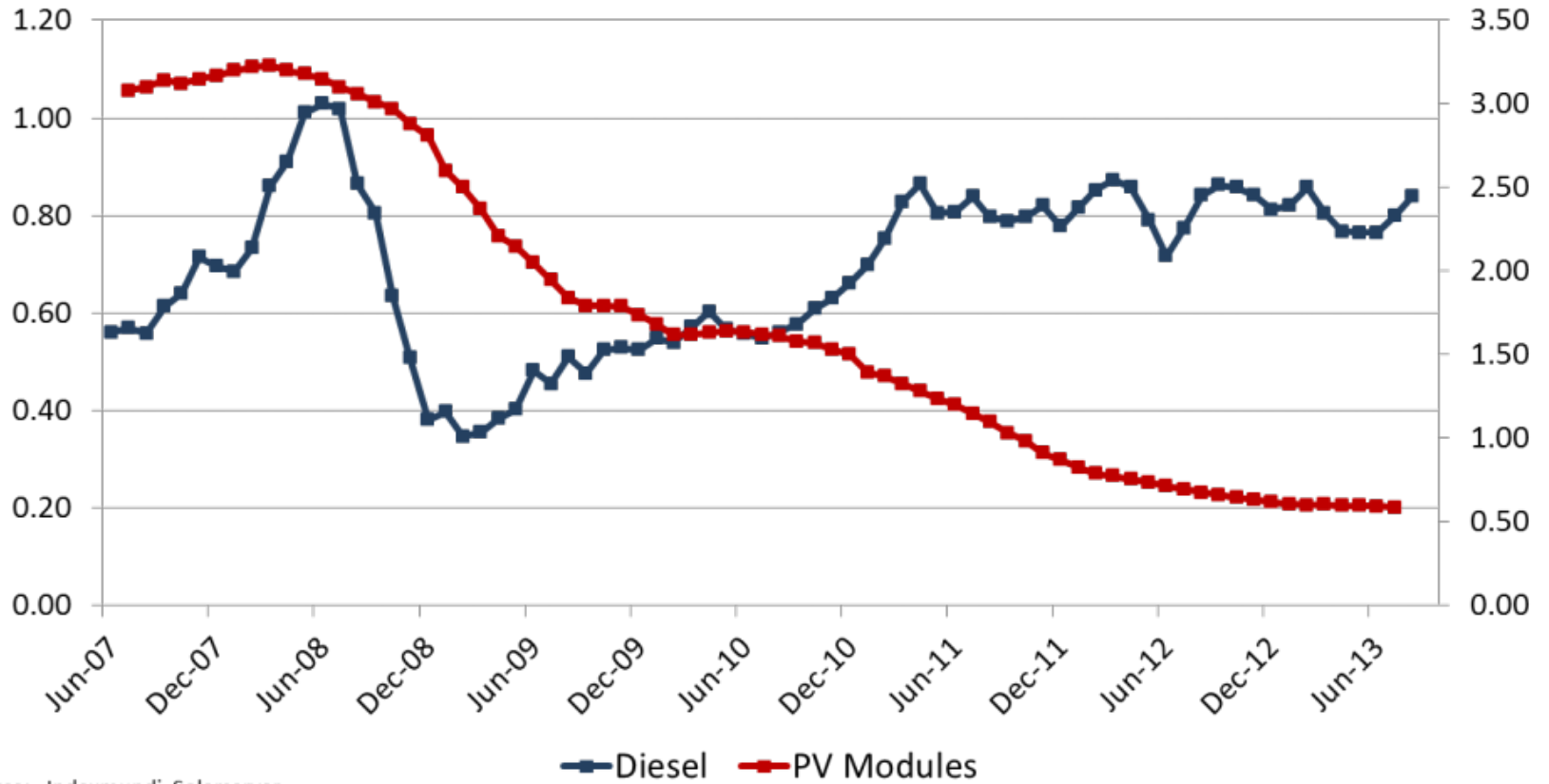
- + 100 projects < 1 MW identified
- + Many more exist, as yet unidentified...



Diesel
(\$ / liter)

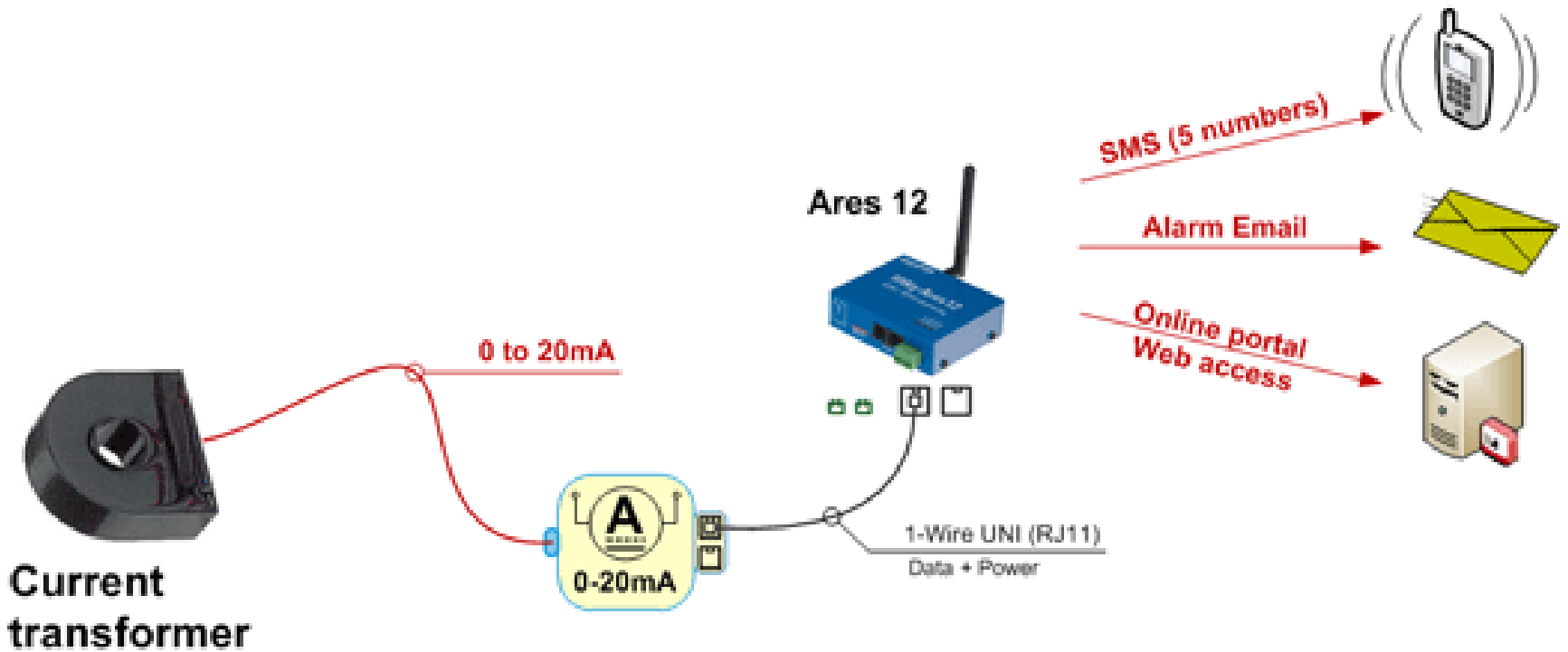
Price of Diesel and PV Modules

PV
(EUR / Wp)



Source: Indexmundi, Solarserver





M-PESA

10:35A

- 1 Send money
- 2 Withdraw C...
- 3 Buy airtime
- 4 **pay Bill**
- 5 Buy Goods

Select

SAMSUNG

Back

Age Adult

Personal business

- Shop Kiosk
- Salon
- Cafe
- Fish
- Water
- Food stall
- Fruit/veg
- Hawk
- Other
- Business



Thank you!



February 2017 | Conference Edition

ROLE OF MINI-GRIDS FOR ELECTRIFICATION IN MYANMAR

SWOT ANALYSIS AND A ROADMAP FOR SCALE UP



Chris Greacen

chrisgreacen@gmail.com

DRD DATA			CENSUS DATA			
Generation Type (DRD data)	Villages (DRD Jan 2015)	Villages with 70% Households Electrified (end FY2015/16)	Main Source of Lighting	Households		
				Rural	Urban	Total
Generator	13,088	2,407	Generator (private)	835,840	177,309	1,013,149
Mini-or micro-hydropower	2426	1215	Water mill (private)	151,721	25,786	177,507
Biomass/gas	1232	472		N/A	N/A	N/A
Solar mini-grid		150		N/A	N/A	N/A
Total	16,746	4,244		987,561	203,095	1,190,656