

*Myanmar Off-Grid RE
Demonstration Project
(ADB TA 8657-MYA & E4ALL
Program):
Incentivizing Community
Investment for Upgraded
Energy Services*

Deep Dive Workshop Mini-Grids
*Asia Clean Energy Forum 2016 at
Asian Development Bank,
Manila, Philippines*



Kamalesh Doshi, Team Leader

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Nexant Asia

- Global leader in the provision of technical assistance, transaction support, capacity building, and other consulting services on the entire energy sector including renewable energy
- Completed more than 3,000+ energy industry assignments in 100+ countries



Kamalesh Doshi, Team Leader

- Total experience of more than 25 years in clean energy projects, programs and policy development in India, USA, Canada, Myanmar, Sri Lanka, Vietnam, Indonesia and Liberia.
- Team Leader (Consultant) Energy Access Planning and RE Technical Specialist working with Nexant Asia for Off-Grid RE Demonstration Project (ADB TA 8657)



Electrification in Myanmar

- 70% of the population and 84% of rural households lacked access to grid electricity in 2014.
- The Government goal is universal electricity access by 2030, requires to connect 7.2 million households in the next 15 years.
- A two-pronged, sector-wide approach includes extension of the national grid plus off-grid electrification for communities that would otherwise have to wait for years for grid access.
- More than one million households will remain without electricity for 10 or more years.
- Off-grid program will include mini-grids to help people living in low-income and remote areas of the country.

Off-grid Electricity-Current Situation in Myanmar

- **Market for off-grid RE in Dry Zone (Focus area) is dominated by solar home systems (SHS) and solar lanterns**
 - DRD program and private markets
 - Mini-grids limited to a few projects, sector at extremely early stage.
 - Same Solar Home Lighting Systems for all households does not satisfy demand for higher level of services who are willing and have capacity to pay.
- **Private sector is not yet willing to invest its own money in off-grid RE in this area**
 - Too much competition from cheap, low-quality products already available
 - DRD's program of Solar Home Lighting Systems (100% subsidy, annual budget of \$35-40 million) makes it difficult to convince villagers to pay
 - Uncertainty about grid expansion creates financial risk for mini-grids or similar models
 - System suppliers have no experience of O & M
- **Technical quality of many existing systems is not strong**
 - Poor system integration and installation
 - Consumers' lack of knowledge about operation and maintenance
 - Systems will break down quickly or, in extreme situations, potentially cause damage
- **Social management systems in villages are generally strong**
 - Village Electrification Committees
 - Local management of other infrastructure (e.g. water systems)

Myanmar Off-Grid RE Demonstration Project (ADB TA 8657-MYA and E4ALL Program)

- Executing Agency (EA):** Ministry of Agriculture, Livestock, Fisheries and Rural Development (MRLFRD); Government of Myanmar
- Implementing Agency (IA):** Department of Rural Development (DRD)
- Implementing Consultants:** Nexant Asia Ltd in association with Full Advantage Co., Ltd, INTEGRATION GmbH, Suntac Technologies Co., Ltd.

OUTPUTS:

- Output 1:** Develop modular solar PV “Grid-Ready” or “Stand-Alone” mini-grids to serve about 1500 households in selected villages within Mandalay, Magway and Sagaing regions, demonstrating new business and financing models.
- Output 2:** Develop an investment plan for off-grid RE in above three regions.
- Output 3:** Capacity building for Government, private sector and others

Business Model Summary

Village-scale “Grid-Ready” or “Stand Alone” mini-grids; vendors to install, then operate for at least 3 years

Basic Level of Service

- 100 Watt-Hours per day per household
- 3 LED lamps (of 5 W,6 hrs./day) and phone charging
- Load limit 50 Watts per household
- Tariff set up to 1,500 Kyats/month for basic level
- Street light one for every 10 HHs
- Pre-paid meters
- System with data loggers



Funding

- 80%: ADB (via Nexant for basic level of service, effective support much less for total project including optional additional services)
- 20%: Villages/consumers
- Financing for basic level of service to poor at the bottom of pyramid

Optional Additional Service

- Higher household consumption (TVs, fans, etc.)
- Commercial loads (refrigeration, pumps, etc.)
- Pre-paid meters
- Specs/tariff negotiated with villages after award
- The supply can be increased in response to higher demand as affordability improves



- Any incremental investment (for higher demand from people who are willing and can afford to pay for higher level of service) will come from vendor

Pre-paid Meter with Load Limit Switch at Village San Kan, (near Bagan), Mandalay region



Roles and Responsibilities of Key Players

DRD

- Micro-financing or loans to villages for their contribution of 20% of cost
- Co-ordination with other Ministries (MOEE) for on-grid electrification, electrification law, and capacity building
- Developing and implementing off-grid electricity investment plan and regulatory framework for “off-grid” RE electricity for rural electrification

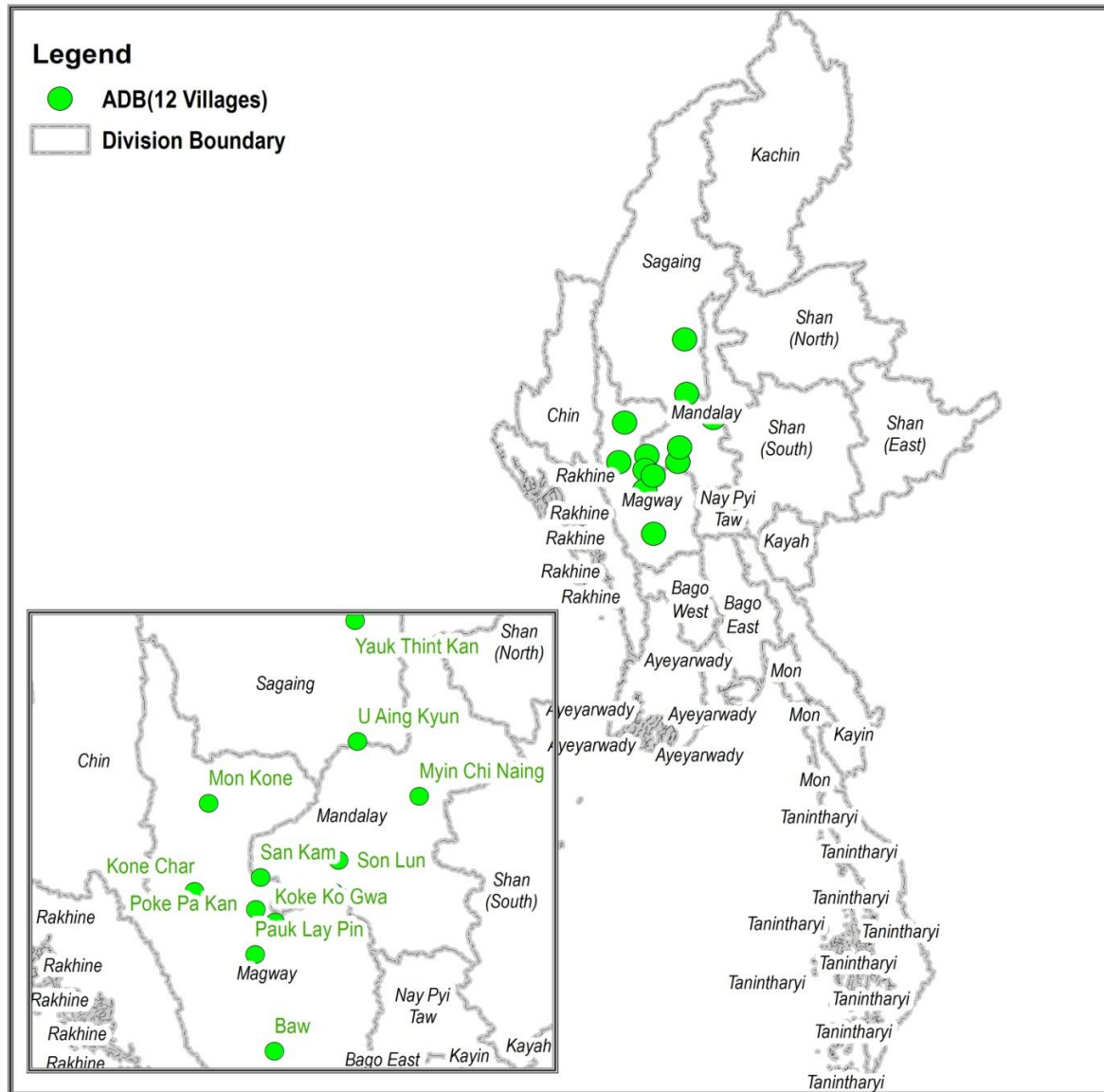
Communities

- Provide the land at no cost
- Collect revenue from villagers and pay for O & M and future battery replacement
- Provide communication and support and responsible for security of the system

Private Sector

- To deliver, install, operate and maintain of the system.
- To ensure that the electricity from the system is provided to villagers and payment is collected from the villagers
- To carry out the user education and training, including development of handbooks and education materials
- Training of village technicians and tariff collectors (at least 50% of whom should be women)
- **ADB as initial investor for demonstration**

Myanmar Off-Grid Renewable Energy Demonstration Project



No. of Households:		2,195 Nos.
Total cost:		USD 729,630
ADB's Share:	SE4ALL	USD 188,400
(80%)	Phase II funds	USD 395,304
	Total	USD 582,704

First Village Ready with Solar PV Stand-Alone Mini-Grid System

Name of Village & Village tract:	San Kan, Myay Ni
Township & Region:	Nyaung U, Mandalay
No. of Households & Population:	200 & 977
No. of Street Lights(Stand alone):	20
Technical Specifications:	
■ PV Modules (305 W each),	
Required for basic level of service:	24, total rated capacity of 7.32 kW
Provided:	32, total rated capacity of 9.76 kW
■ Distribution system:	200V, 50Hz, Single phase AC
■ 50 W power limiters and pre-paid meters for every consumer	
■ Data logger recording and sending data and alerts for battery voltage and inverter current through SMS	
Total cost of solar PV mini-grid system:	USD 75,000

Solar PV Street Lights at Village San Kan, (near Bagan), Mandalay region



Grid Extension and Regulatory Risk

- No regulatory framework for what happens when grid arrives at villages having mini-grids.
- Uncertainty about grid expansion creates financial risk for mini-grids or similar models
- DRD recognizes the issue and wants Nexant to recommend framework based on the experience at 12 pilot projects. This project will provide lessons learned not only to donors but also to DRD and private sector.
- Most of the selected villages are far off-grid, with low probability of grid electrification.
- DRD assured that the decision will be made about mini-grids in consultation with the community as well as vendors when grid arrives.

Future Prospects

- Unique Public Private Partnership Business Model

- With Donors(E4ALL Program)/Government supporting basic level of service for off-grid villages improving energy access to poor at the bottom of the pyramid and will provide valuable insights and lessons learned from socio-economic, technical and financial prospective.
- At the same time kick-starting PPP model for higher demands of electricity who can afford to pay for it.
- Will inform the Government policy and regulatory framework for off-grid sector (Nexant will provide recommendations based on pilot projects and assist capacity building of DRD) and encourage private sector activity in mini-grid sector.
- It can be applied in other countries as well, particularly where the regulatory framework on what happens when grid arrives exists.



Thank you!

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