Off-Grid Solar

Economics of solar and solar-hybrid mini-grids

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Sunlabob Renewable Energy
Rural Energy Experts

- **Venture-backed, Mekong-based** renewable energy specialists
- **15+ year track record** in off-grid, remote areas; Myanmar presence since mid-2014
- **Internationally-focused** throughout 30+ countries in ASEAN, Pacific islands, Africa and India
- **Deep experience** in world’s most challenging rural environments
- **Approach to longevity**: high-quality technology paired with local training and capacity building
Situation
- Ban Houaypha, rural village in Luang Prabang Province
- 42 km from nearest grid connection
- 83 households, 498 people
- $41.50 – average household monthly income ($1.38/day)

Solution: Solar PV village grid
- AC coupled 6.5 kWp hybrid
- $1.25 – $3.75 monthly options

Local Training and O&M
- VETs, VEC, maintenance fund

Only possible w/ donor role
Non economic viable II

Situation
- Ban Nam Kha1, rural village in Xienkhuang Province
- 28 km from nearest grid connection
- 92 households, 506 people

Solution: Hybrid village grid
- Hydro/ PV solar/ Gen set (total 35KW)
- Tariff 0.24USD/KWh

Local Training and O&M
- VETs, VEC, maintenance fund

Low load factor
Situation
- Ban Nam Kha II, rural village cluster in Luang Prabang Province
- 28 km from nearest grid connection
- 605 households, 2800 people
- Hydropower Mini-Grid PPA (client EDL)

Solution: 3-phase hydro mini-grid (185 kWp)

Local Training and O&M

PPA tariff too low for micro site
Condition for economic viable Mini grids

- Mini grids have to be implemented under Public -Private -Partnership scheme (at least in SE-Asia),

- An anchor client has to be included (e.g. Telco operator, Resort or Hotel)

- Alliances have to be created (e.g. ESCO, Traders, Capacity provider) for sustainable operation of mini grids

- Only hybrid mini grids are economically viable
Current Barriers for Mini grids I

- **Insufficient household cash** available for monthly tariff payments (low load factor)

- **Mismatch of tariffs** between on and off-grid customers

- Higher **up-front costs** than Pico-PV and SHS solutions (End-user income can’t cover capital costs)

- **Low bankability** in eyes of foreign investors

- Meeting customers’ expectations of **load limits**

- **Grid arrival** – bet for it, or against it?
Current Barriers for Mini grids II

- Underdeveloped electricity laws, frameworks, regulations
- Costly import duties and taxes on solar-related components (batteries, inverters, cables etc)
- Lack of accurate awareness from public, policymakers and potential customers
- Negative perceptions due to previous bad experience with low-quality
- Little chance of longevity without community-based O&M models
Situation
- Hankin village, rural village in Shan State
- 67 km from nearest grid connection
- 154 households,

Solution: Solar PV village grid
- AC grid (15KW)
- 80% of initial investment donor
  20% of initial investment villagers

ESCO collect fixed monthly fees
Situation
- Paotai and Paonuea village, Houphan province
- 118 km from nearest grid connection
- 225 households,

Solution: Solar PV /Hydro village grid
- AC grid ( 80KW in total)
- 70% of initial investment donor
  30% of initial investment ESCO

ESCO collect monthly fees from villagers
Donor pays additional monthly fee to
ESCO for period of three years.
Tower + Community ESCO (Anchor client)

- **Community energy services:** ESCO sells excess energy to nearby communities via Energy Hub or into Village grid

**Benefits**
- Electricity fundamental to economic growth
- Operators/tower co’s viewed as “enabler”
- Increased community trust and improved in-country reputation
- Potential increase in customer base and mobile phone usage
- Risks held by ESCO

Thank You

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