

ENERGY DEMOCRACY IN MYANMAR: SCALING UP RENEWABLE ENERGY SOCIAL ENTREPRENEURS

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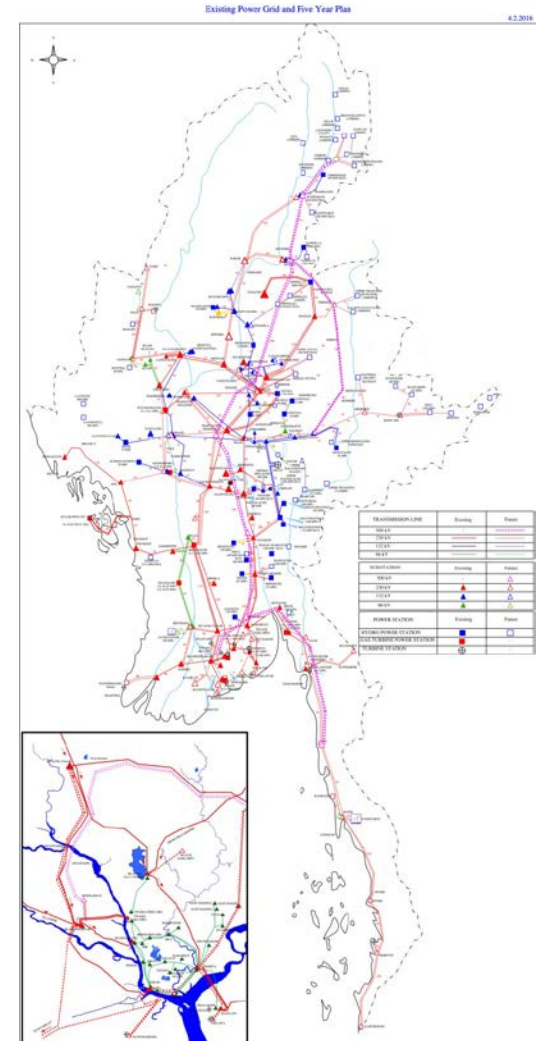
Equity and Energy Justice

UK Low Carbon Energy Development Network (LCEDN) Conference

My Fulbright Public Policy Fellowship

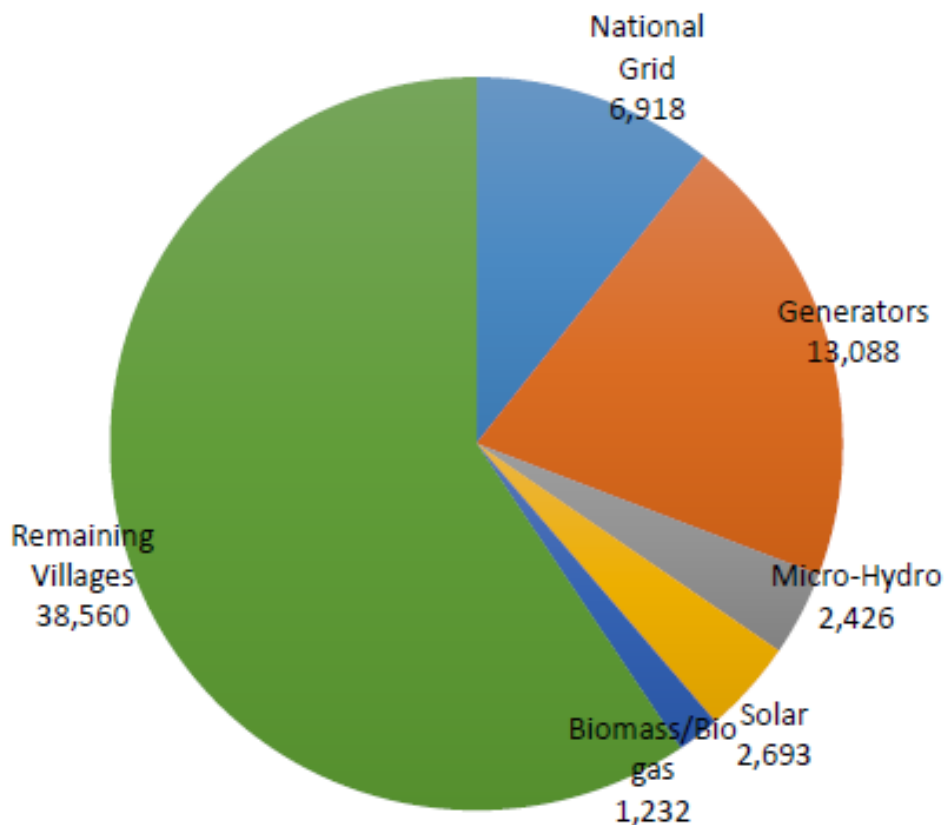
Policy Situation Overview

- National Electrification Plan (NEP)
 - 30% to 100% by 2030
 - \$400M World Bank IDA loan
- Gap to address: Mini-Grid Integration
 - “Least Cost” analysis overlooked RE mini-grids, yet 6000+ RE mini-grids exist.
 - Rural electrification policy
 - Top-down ‘Business as Usual’ instead of Locally-Driven Solutions
 - Heavily subsidized solar home lighting systems
 - Clean coal and massive large hydropower



RE Mini-Grids in Myanmar

~30-years of Experience



Source: Department of Rural Development 2015; World Bank NEP PAD 2015; Consultant Analysis

- **Micro/Mini Hydropower**
 - ▣ 6000+ units below 1 MW for village electrification
- **Biomass Gasifiers**
 - ▣ 10,000+ units powering small-scale rice mills
 - ▣ 500+ units for village electrification

Source: State-wise Statistical Data Collection, Pyi Pyi Thant, Mekong Ecology and Energy Net (MEE Net), July 2017.

Source: Interview, Soe Tint Aung, Royal Htoo Linn Manufacturing, Co, Ltd. August 2017.

Source: Feasibility Study on Rice Husk Power Generation, Mitsubishi Research Institute, 2014.

Myanmar's Unique Progress (*success*)

Lessons for Int'l Development Practitioners

- International development programs **aim to design** programs that can **scale, self-replicate, and sustain.**
- How did **Myanmar's 6000+ mini-grids** (biomass gassifiers and micro/mini hydro) happen?
 - No technology training
 - No international funding
 - No scaled government program or policy
 - **Yet, more mini-grids than any funded program!**
- Opportunity for development partners to *learn from Myanmar* how **locally-driven RE mini-grids** can be **scaled and sustainable.**

Source of Myanmar's Mini-Grid Success

Mini-Grid Social Entrepreneurs



- 20 – 30 years experience
- Self-Financed, Community-Owned
- Productive End Use built-in
- 6000+ mini-grids
- Self-Engineered Technology



A Closer Look at Existing Mini-Grids

PV, Biomass Gasifiers, Micro/Mini Hydro



Solar for Agriculture in Dry Zone

Solar PV Drip Irrigation

- REAM Developer, U Than Htay
 - ▣ 1kW per unit, with drip irrigation, no batteries
- Inclusive Approach
 - ▣ Developer provides 5-year financing to the VEC
 - ▣ If 5-years not enough, financing provided to land owner, under terms that benefit all households of the village.
- Developer's Vision and Need
 - ▣ All villages of the Dry Zone have access to PV Drip Irrigation
 - ▣ Access financing to install 20 mini-grids per quarter



Elephant in the Room

Biomass Gasifiers

- 4 designs, by Royal Htoo Linn Manufacturing Co., Ltd.
 - Up to 500 kW per unit
- Productive End Use installed
 - Village electrification, 145 units
 - Rice Mill, 358 units
 - Irrigation Pumping, 45 units
 - Ice Mills, 69 units
 - Oil and Saw Mills, 116 units
- Vision
 - Upgrade 10,000+ gasifiers → sustain rice small-scale rice farmers
 - *No pollution design* in final round of testing at DRI, MoEducation

Sittwe, Rakhine State



- 1350kW, Biomass-Diesel Hybrid
- 24-hours electricity for entire state capital
- Distributions lines leased from MoEP
- Ran 2010-2015, until national grid arrived
- Other projects, 500kW – 1150kW each

Powering Communities and Small Industry

Micro and Mini Hydropower (<1 MW)

- 5000+ projects, mostly Shan State
 - ▣ Ranging 5kW to 3MW
- Quality Local Fabrication
 - ▣ Francis, Pelton, Turgo turbines
 - ▣ Penstock and Transformers
- Ownership Models
 - ▣ Based on community's strengths
 - ▣ Community, Cooperative, or Developer owned projects
 - ▣ Cooperative of *Local Industry*
- Vision
 - ▣ Provide low-cost, reliable electricity
 - ▣ Tap all micro/mini hydro potential
 - ▣ Contribute to the NEP



Key Conclusion: Empower Communities by Investing in Local Social Entrepreneurs

- Why the NEP would benefit from scaling RE mini-grids?
 - Common Sense
 - Faster to expand existing sector, than build new one → China case!
 - Biomass gasifiers and micro/mini hydro supply lowest cost electricity
 - Priceless value of Myanmar's Local Social Entrepreneurs
 - Local engineering/manufacturing for cost-effective technology
 - Entrepreneurial skills to identify productive end use → Sustainability!
 - Motivation: Empower local communities with long-lived projects
 - Decades of trust and networks built in remote areas
- How to support Local Social Entrepreneurs of Myanmar
 - Selection of least-cost, appropriate technology for each village
 - Concessionary financing for financially viable projects
 - Practical, learning-by-doing assistance for technology upgrade
 - Dual path to financially viable projects: near and far from grid

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