

Micro Grids in Rural Areas

Bangladesh Program

Ansar Energy LLC- Micro Grid
Presentation
Partners in Energy

MicroGrid Overview

- Ansar Energy LLC in conjunction with Partners in Energy, a Bangladeshi company, and a local leading NGO, conceptualized, defined and prepared a business plan to improve the quality of life for villagers through provision of electricity in the rural areas of Bangladesh.
- The MicroGrid concept was shown to be viable at pricing levels acceptable to villagers with attractive rates of return to investors.
- Through the creation of innovative “MicroGrids”, miniature electrical grids serving 600-800 households in off-grid areas, the program hopes to significantly improve quality of life and provide a springboard for development of Bangladesh.
- Ansar Energy LLC is seeking equity partners to implement the program on a sustained basis.

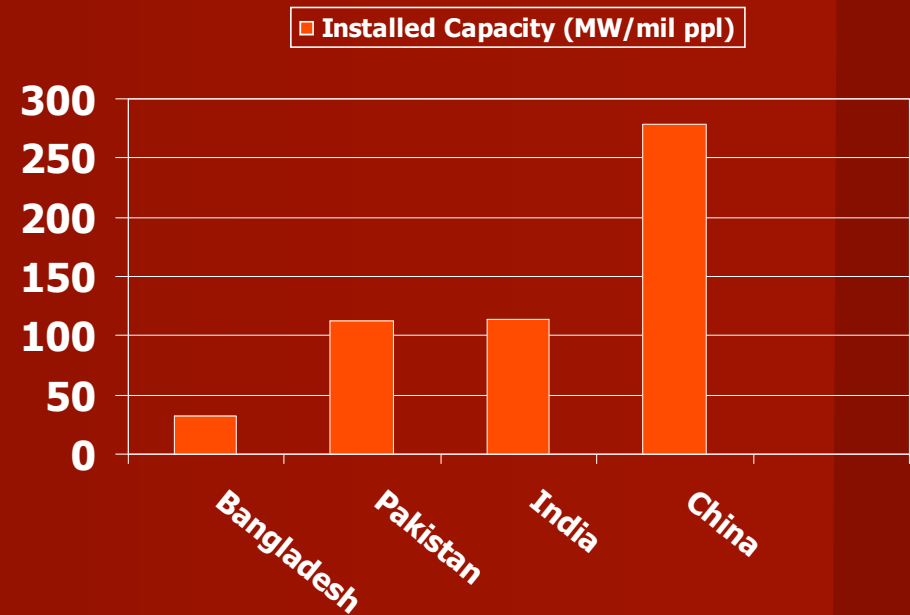
5 year plan aims for 10% market penetration with total investment of US\$ 350 million

- Unelectrified Villages: 33,000
- Poorly Supplied Villages: 15,000
 - Assuming 1/3 of current REB villages lack proper service
- **Total Market: 48,000**
- The goal is to create a product that uses simple, local technology and can be replicated quickly in many villages in the country.
- **Partner with multiple MFIs, on regional basis**

Year	# Projects	Installed KW	# Customers	# borrowers	Total Invest ment (US\$)
1	1	50	800	5	70k
1	10	500	8,000	50	700k
1	100	5,000	80,000	500	7 mil
2	1,000	50,000	800,000	5,000	70 mil
5	5,000	250,000	4 mil	25,000	350 mi

Per Capita Installed Capacity in Bangladesh is among the lowest in the World

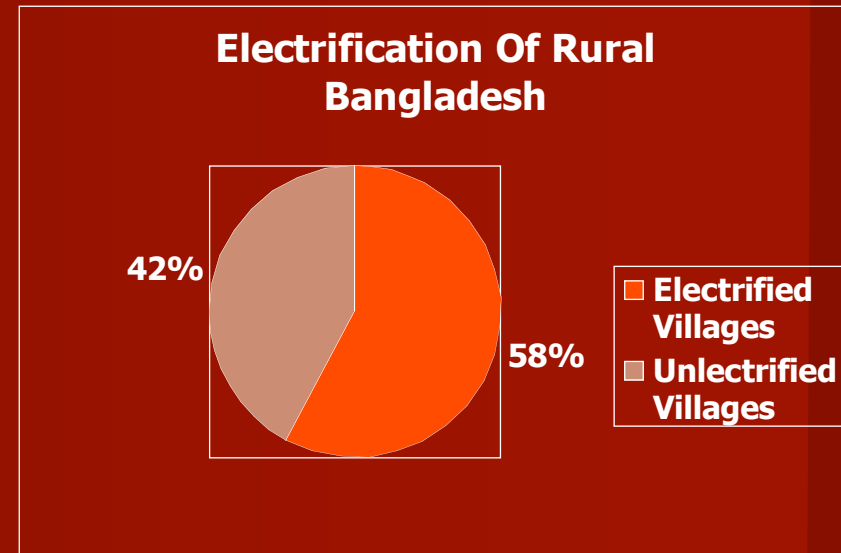
Country	Pop (mil)	Installed capacity (MW)	MW/ mil ppl
Bangladesh	140	4,500	32
Pakistan	160	18,000	112.5
India	1,100	126,000	114.5
China	1,400	390,000	278.6
United States	300	1,075,000	3,583



- Bangladesh's Per Capita installed Electrical capacity is $\frac{1}{4}$ of Pakistan and India, and $\frac{1}{8}$ of China
- Access to electricity has proven to be an important driver for development

The Rural Electrification Board (REB) has established electricity connections to 60% of rural villages

- REB Cooperatives (PBSs) currently operating in Bangladesh: 70
- Number of Villages in Bangladesh: ~78,000
- Number of electrified villages: 45,000
- Number of unelectrified villages: 33,000



Current REB Supply is often unreliable due to lack of power generation

- Moratorium on building new transmission lines due to inability to handle current power demand
- PDB power is often curtailed due to lack of generating capacity
- Typical REB customer receives 4-5 hours of electricity
- Electricity is not normally supplied after dusk in many rural areas

Note: lack of continuous reliable electricity has an economic cost as well as quality of life costs

“MicroGrids” can serve the large portions of Bangladesh that are underserved in the current environment

- MicroGrids, consisting of electricity generation and distribution, can be created to serve groupings of 500-800 “households”
- Small Generators: 25kw to 50kw
- Average Load per Household: 60w
- MicroGrid would be organized and managed at village level
- Use microcredit to partially finance the grid
- Approximate investment required per MicroGrid: US\$70,000 (50 Lakh Taka), with a loan period of at least 4 years
- Borrowers per MicroGrid: 10
- Customers per Borrower: ~80

MicroGrids directly create job opportunities at the village level

■ Borrowers/Entrepreneurs

- Each Microgrid will employ 5 Co-op Member
- Each Co-op Member will take a Taka Loan to partially finance initial investment
- Co-op Member will be responsible for collecting payments from customers
- Co-op Member commission: ~ 5,000 taka per month for services rendered.
- MFI Franchise Supervisor will collect payments from Co-op Member on a bimonthly basis

■ MicroGrid Service Staff

- Micro Grid will employ 3 service staff to maintain technical aspects of the grid
- 2 Operators
 - Responsible for proper operation and maintenance of MicroGrid
- 1 Electrician
 - Responsible for electrical aspects of MicroGrid operation and maintenance

■ Total Number of Jobs per MicroGrid: ~8

■ The above personnel will be trained by PIE

Micro Grids can be a multifaceted tool for development

- Electric Energy Supplier
- MFI Institutional Growth Vehicle
 - Tool for national development
- Cooperative Venture for underserved communities
 - Villages and Slums
- Mobilize additional sources of finance (internal and external)
- Encourage Entrepreneurship
 - Seed new business opportunities
 - Presence of electricity leads to new opportunities
 - “Borrowers” as service providers
- Potable Water Supply

The provision of electricity creates opportunities for a number of entrepreneurial activities

- Water supply
- Sale of appliances and bulbs
- Ice machine
- Refrigeration services
- Battery charging
- Irrigation
- Movie showings
- Power tool rental
- Ice cream machine
- Welding shop
- Woodworking machine shop
- Electric Sewing machines

Summary of Recent Efforts

- Reviewed multiple communities in North Bangladesh
- Appears that many communities are interested in exploring installation of MicroGrids
- Have begun preparations for multiple initial projects
- Community level leadership and organizing capability appears to be critical factors in success of developing MicroGrids
- The scale of each installation is so small such that existing power sector laws are not applicable
- A focused, structured and planned program has been prepared

Potential Joint Effort With MFIs

- Partnership with specific MFI for defined region
- MFIs and other financial institutions provide partial financing for the micro grid
- MFI provides on going administrative management and monitoring of micro grids
- Ansar Energy LLC/Partners in Energy provides program definition and plans
- Ansar Energy LLC/Partners in Energy manages micro grid design, procurement, installation and startup
- Ansar Energy LLC/Partners in Energy assists in on-going micro grid technical operation and maintenance

Implementation- Product Planning

- Planned an overall program with a 2-5 yr horizon
 - Village level plans
 - District level plans
 - Regional plans (expect to divide Bangladesh into a minimum of 5 regions)
 - Financing plans
 - Installation Plan
- Established a 1 yr program
 - Village level plans
 - District level plans
 - Regional plans
 - Financing plans
 - Installation Plan
- Established minimum size of investment to start the program.