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Building local climate knowledge

Governance of Solar Mini-grid: A Case Study of ShouroBangla Solar-Diesel Hybrid Mini-grid in Raipura, Narshingdi

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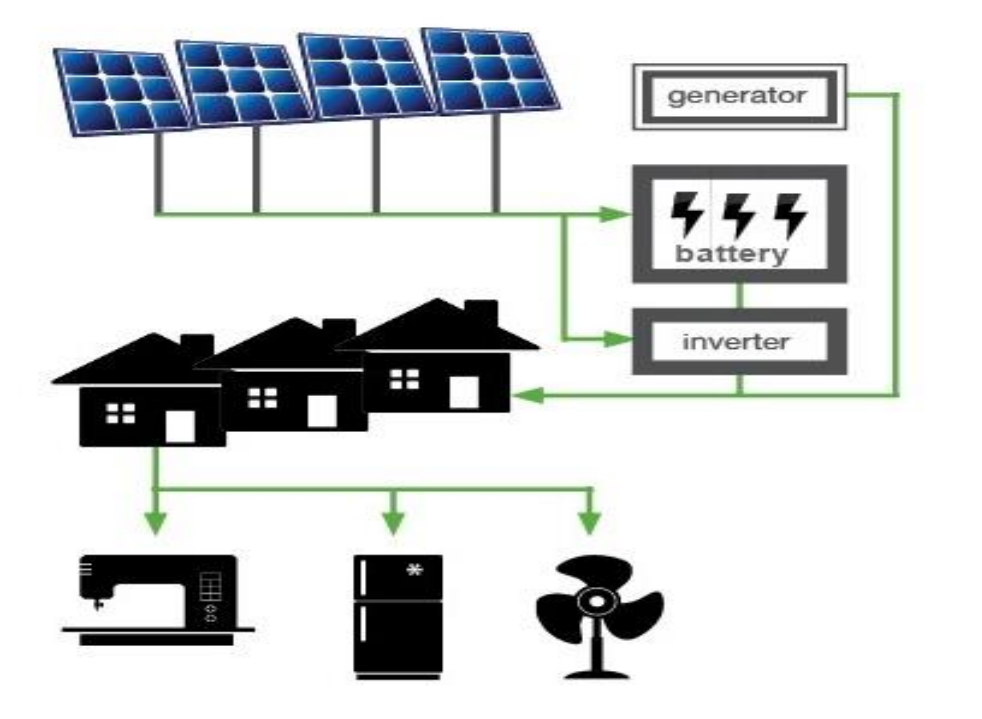
The Context

- With the emergence of new business models and technologies, off-grid electricity markets are growing in Bangladesh. After the success of Solar Home systems, govt. is now initiating many small scale solar energy projects in Public-Private partnership mode with facilitation from IDCOL.

- This study is based on one such solar mini grid project which is commercially operational for last 2 years. The idea is to critically assess this project to identify possible governance issues and scopes of scaling up the current capacity with further improvement in governance system.

What is a solar mini grid?

A solar mini-grid is a small scale electricity network fed by solar energy using solar PV panels. The generated electricity is supplied to clients who are connected to this mini-grid electricity network.



How does a hybrid mini-grid work?

- Solar panels capture sunlight, which is converted to electricity. The electricity then goes to an inverter that converts direct current into alternating current, which is then fed directly or indirectly (via the batteries) into the electricity network.

- A diesel generator is used as a back up for the solar power plant. The generator will feed the network or batteries at times when the solar energy production is insufficient.

Advantages of a solar mini-grid

- provides a higher power level than solar home system
- little maintenance
- no emission of pollutants
- no dependence on the import of diesel and fluctuating energy prices

Study Area

- The study area is located at Paratali Char in Raipura Upazila of Narsingdi district.
- Paratali Char is a river island beside Meghna River with no national grid electricity connection.

Project At a glance

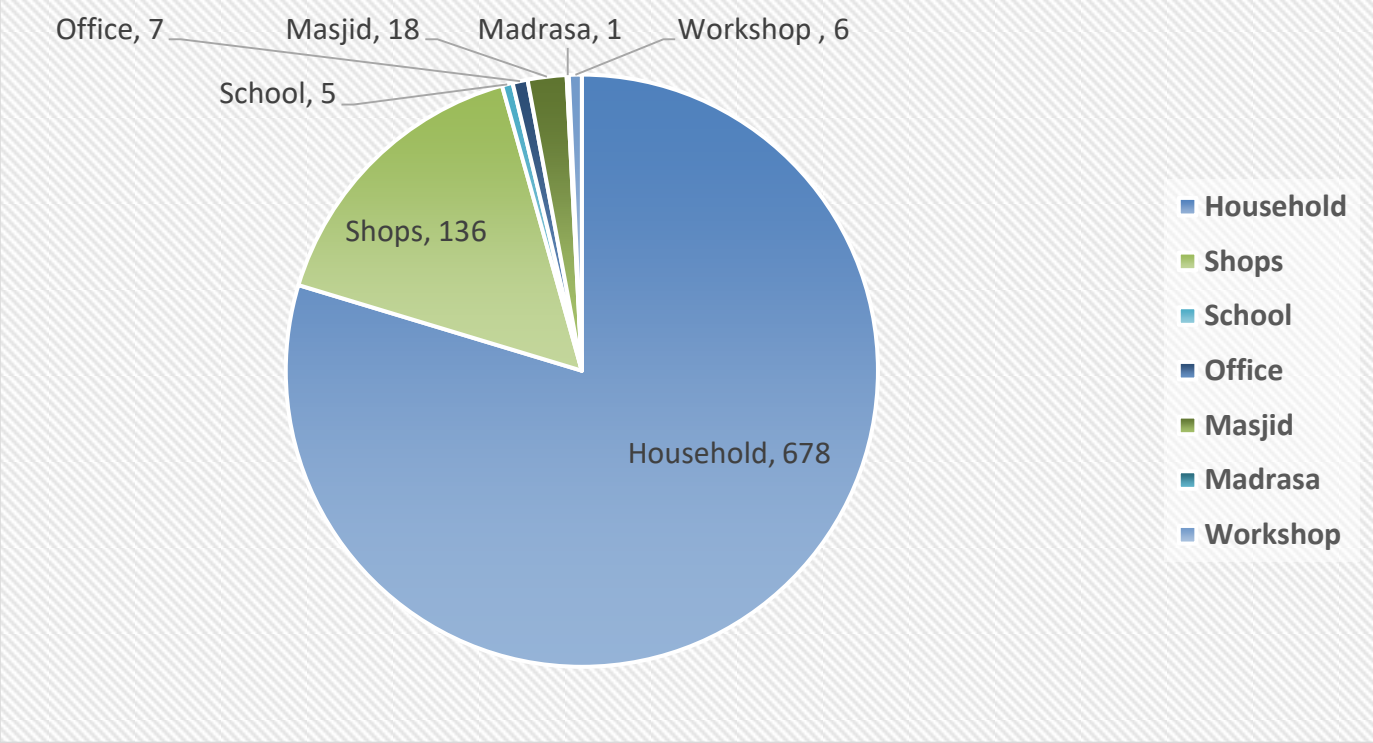
Plant Capacity: 141 KWp
Commercial Operation Date: 20 December, 2015
Project Cost: BDT 66.40 Million
Grant: BDT 33.20 Million (KfW)
Loan: BDT 19.92 Million (The World Bank)
Sponsor: Shouro Bangla Limited
Financer: Infrastructure Development Company Limited (IDCOL)
Technical Adviser: United International University (UIU)

Methodology

- Individual Interview
- Key Informant Interview

Key Findings

- Currently, total number of connection is 851, where initial estimation was 550. The distribution of connection shows both household and commercial users are getting benefitted.



Key Findings

- Connection fee: BDT 5000
- Coverage Area: 12 Km
- Payment Mode: Prepaid recharge system based Meter
- Per Unit Electricity Bill: BDT 30
- Monthly Average Recharge by user: BDT 0.3 Million (Winter- off peak season), BDT 0.6 Million (Summer- Peak Season)
- Miscellaneous Monthly Project Cost: BDT 0.1 Million
- Monthly Diesel Cost for Backup: BDT 0.06 Million (Winter- off peak season), BDT 0.2 Million (Summer- Peak Season)

Governance issues

- Extreme load demand due to surplus connections
- Increased dependency on diesel to meet up the increased demand
- Rise in production cost due to high usage of diesel
- Excessive pressure on the inverter and battery causing efficiency issues

Governance issues

- Inverter gets extremely heated due to longer running hours
- Lack of adequate air ventilation system in the inverter and battery store room
- Incidence of daily 'Load Shedding' to maintain extra load demand
- High risk of system failure due to unplanned load management
- Interruption in regular operation to meet up special demand

Some Critical Observation

- Immediate capacity expansion is required to meet up public demand.
- People uses high electricity consuming appliances like freezer, TV, computer etc., which was not possible using solar home system.
- All the people in the area uses this electricity, although it is 5-6 times expensive compared to grid connection, because they find it sustainable, uninterrupted and they have the opportunity to use high volume of electricity.
- There are some incidents of meter tempering by the customers. Strong monitoring is required for minimizing this kind of system loss.
- Pricing should be more affordable, right now people are bound to buy this electricity at high price because they have no alternative.

In Conclusion

Solar mini grid provides sustainable national grid like electricity and it is the best solution for people in remote areas, but it needs to be more affordable and competitive for being the alternative to grid electricity.

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