

Solar DC nano-grids:

A promising low-cost approach to village electrification

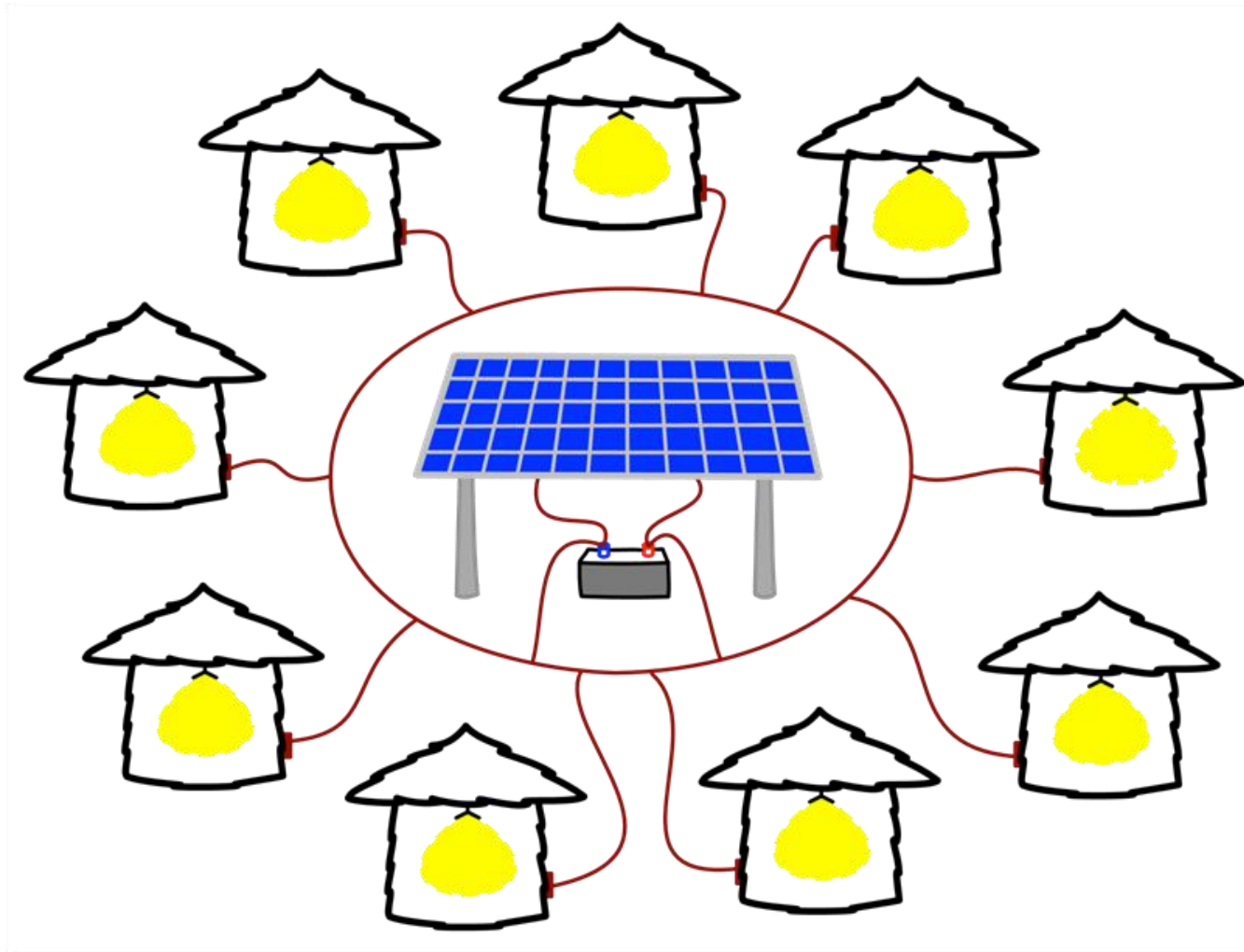
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Overview

The solar DC nano-grid concept



Project team



Site selection

□ Criteria

- Close to Dhaka (< 1 hour drive)
- Low penetration of Solar Home Systems
- (Difficult to find in Bangladesh, especially near to Dhaka)



Government housing project

Gangaprashad, Manikganj District

- ❑ 24 new huts, 5 apartments per hut, 120 families
- ❑ Built for people whose land was washed away by the river



Government housing project



Government housing project



Technical aspects

Of our solar DC nano-grids

- ☐ Technology designed for basic energy needs
- ☐ Highest efficiency loads
- ☐ 12 V DC distribution => 48 V later
- ☐ Provide energy services at lowest cost
- ☐ Smart system monitoring and communication to meters
- ☐ Allows variable tariffs
- ☐ Gives a price signal to encourage daytime usage
- ☐ Productive use (daytime) can be included inexpensively

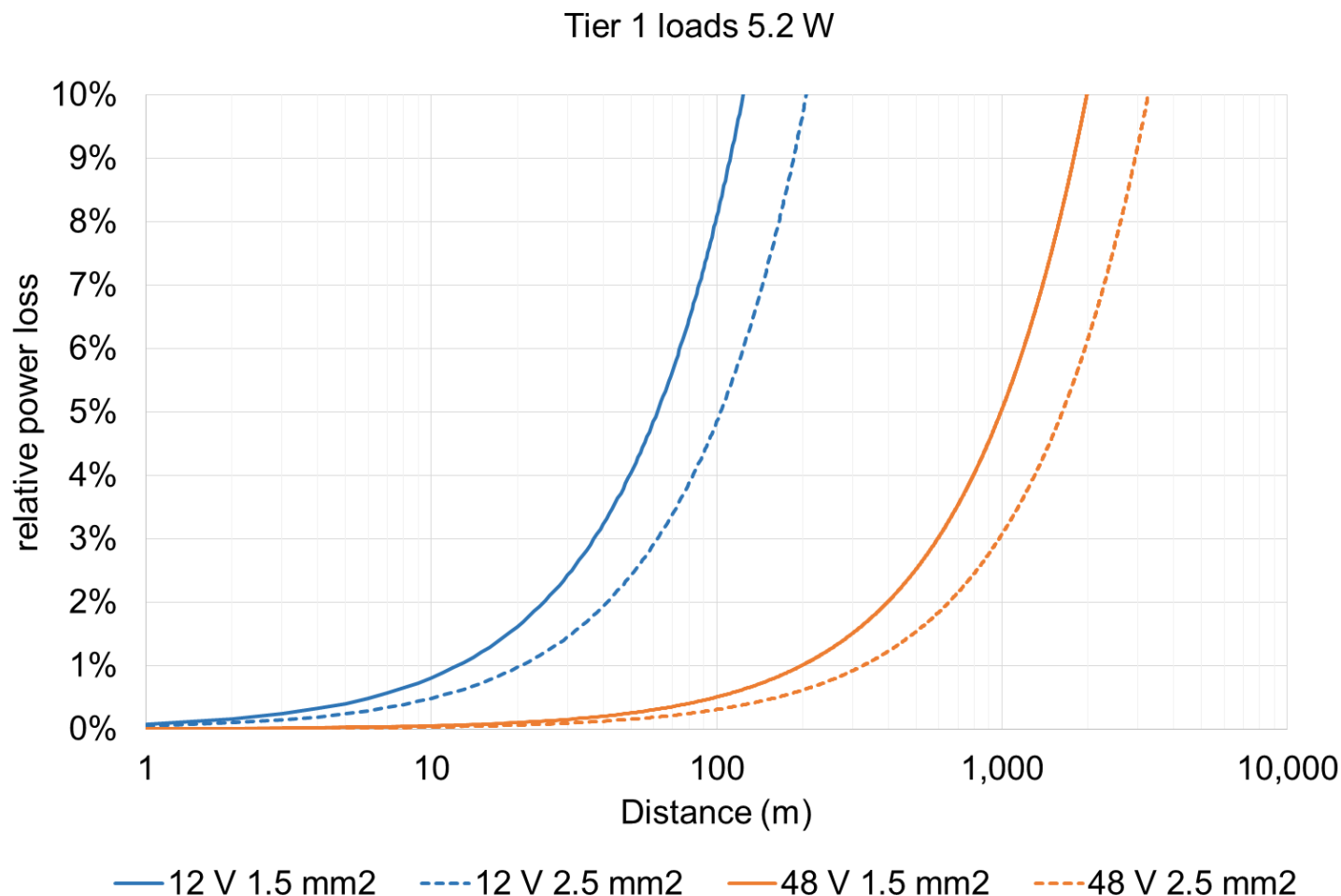
Highest efficiency loads

provided with the nano-grid

Tier 1			
Load	Peak power (W)	Usage time (hours/day)	Energy consumption (Wh/day)
LED light 100 lm	1	6	6
LED light 100 lm	1	6	6
USB charger	3	2	6
Radio	0.2	3	0.6
	5.2		18.6
Tier 2			
Load	Peak power (W)	Usage time (hours/day)	Energy consumption (Wh/day)
2 × LED light 100 lm	2	12	12
2 × LED light 200 lm	4	12	24
USB charger	3	2	6
Radio	0.2	3	0.6
TV	6	4	24
	15.2		66.6

Resistive losses

For low-voltage DC distribution



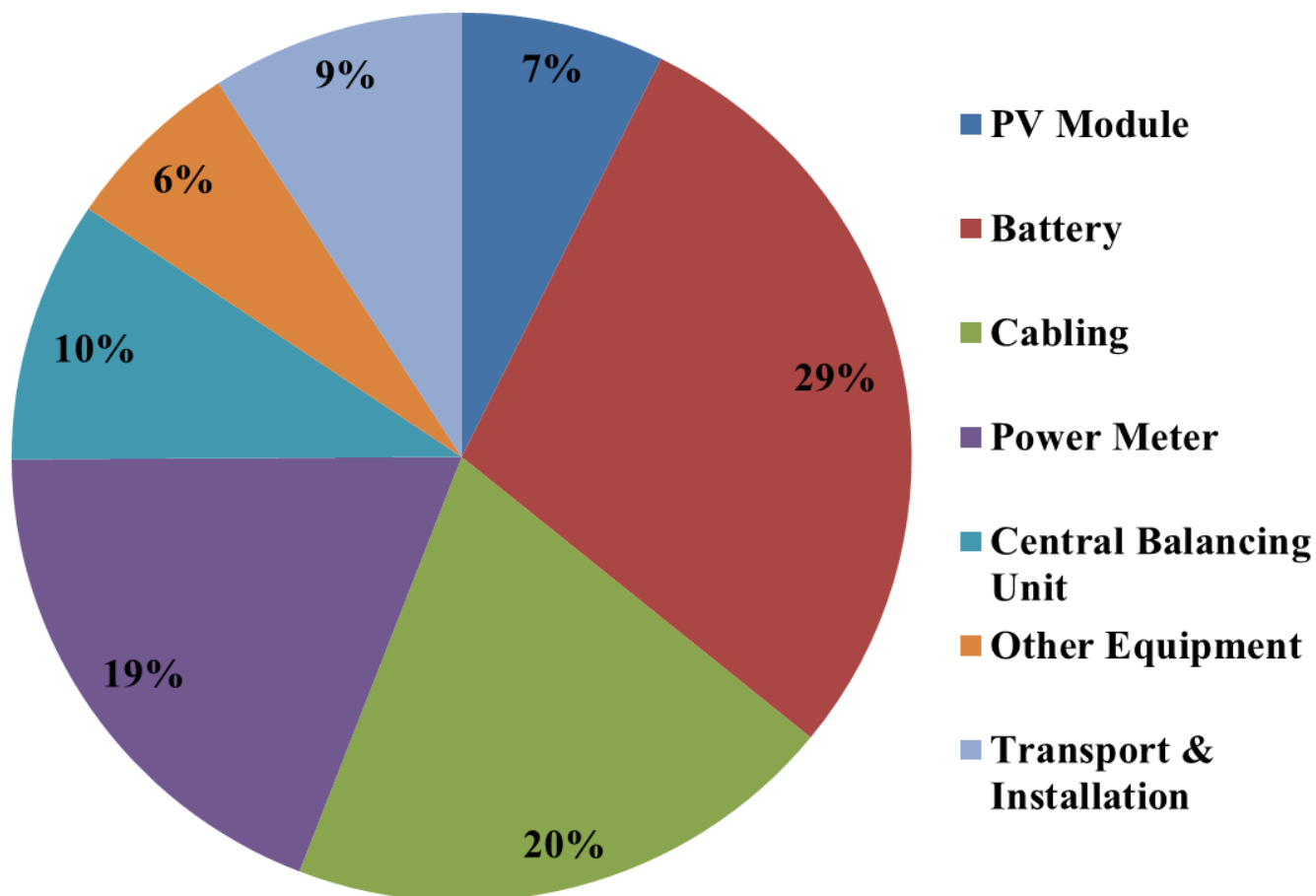
Business aspects

of our solar DC nano-grids

- ☐ Sell the energy service, not the kWh
- ☐ Infrastructure is partially owned and managed locally
- ☐ Fixed fee structure per tier of services
- ☐ Fees are collected locally, door-to-door
- ☐ No complex centralized payment infrastructure is required
- ☐ Maximum of one loan per village is required
- ☐ Risk of default is spread over all users
- ☐ Amortization period of < 2 years at kerosene prices
- ☐ Future profits can be used for maintenance or expansion
- ☐ The profitability of a mini-grid enterprise makes it “bankable”

Cost breakdown

of hardware components



Social aspects

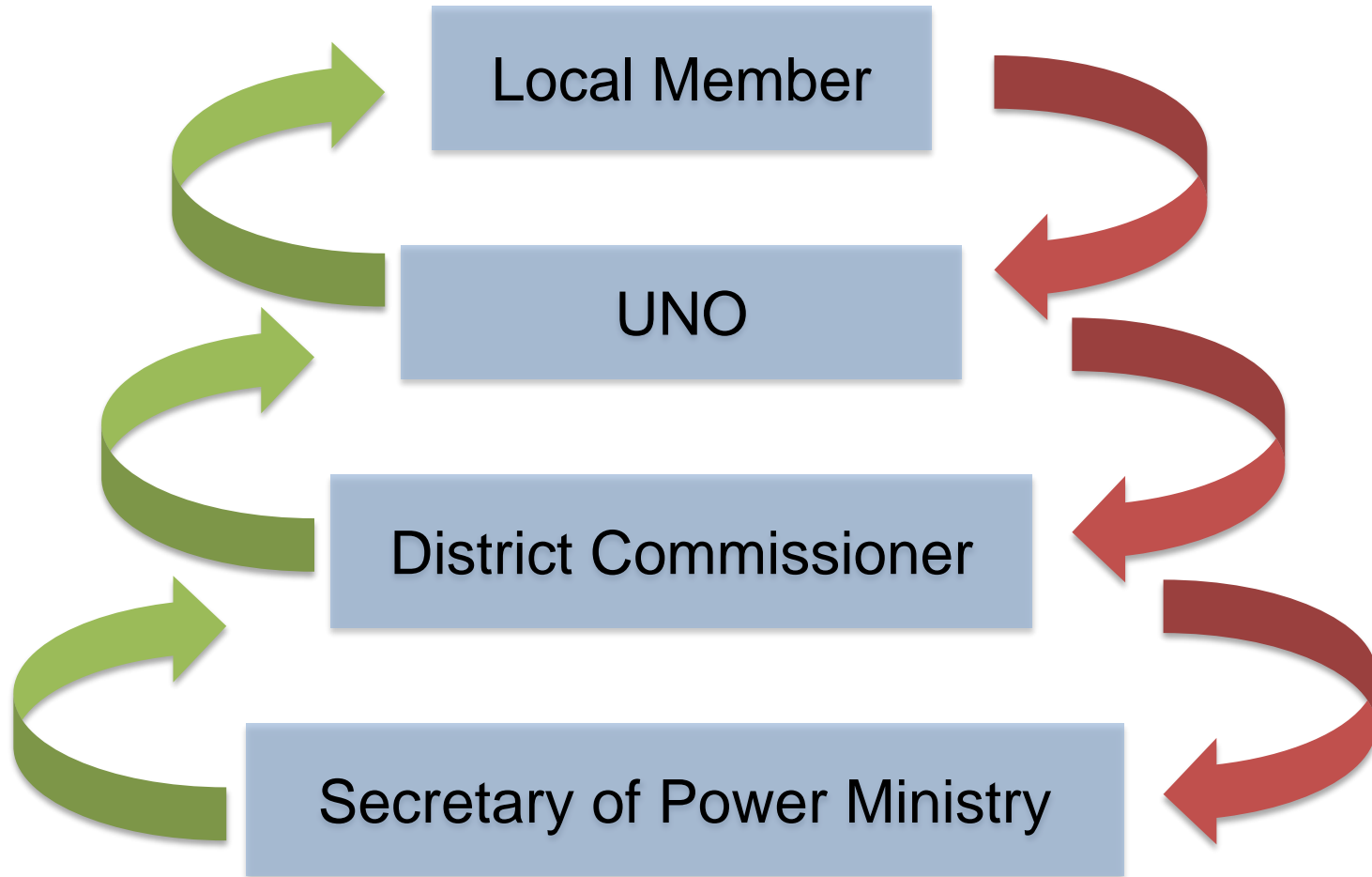


Community Leaders Meeting

Aricha

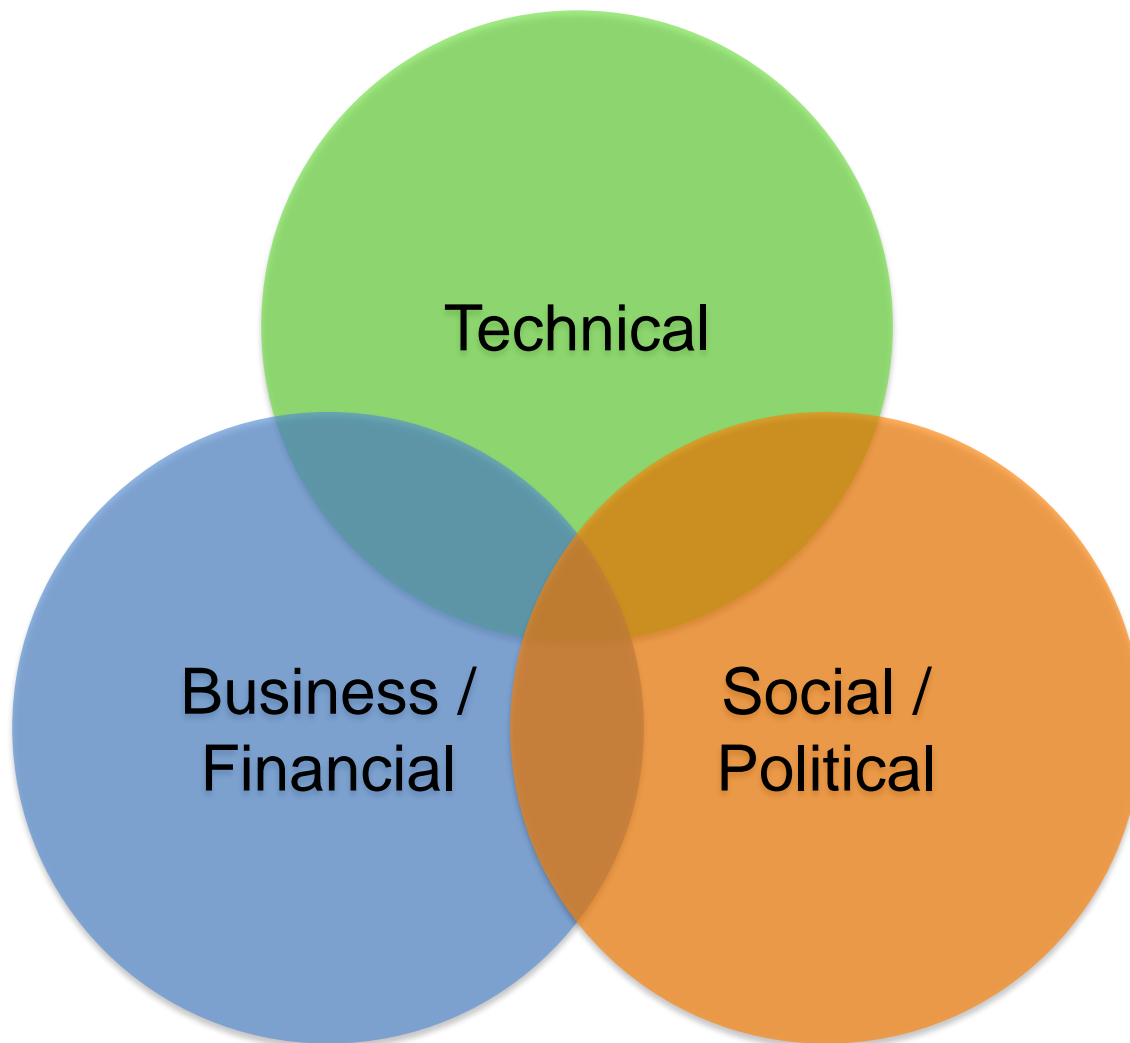


Political “approvals”



Conclusion

Three aspects required for a successful nano-grid



Thank you for your attention!

For more information, contact me
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