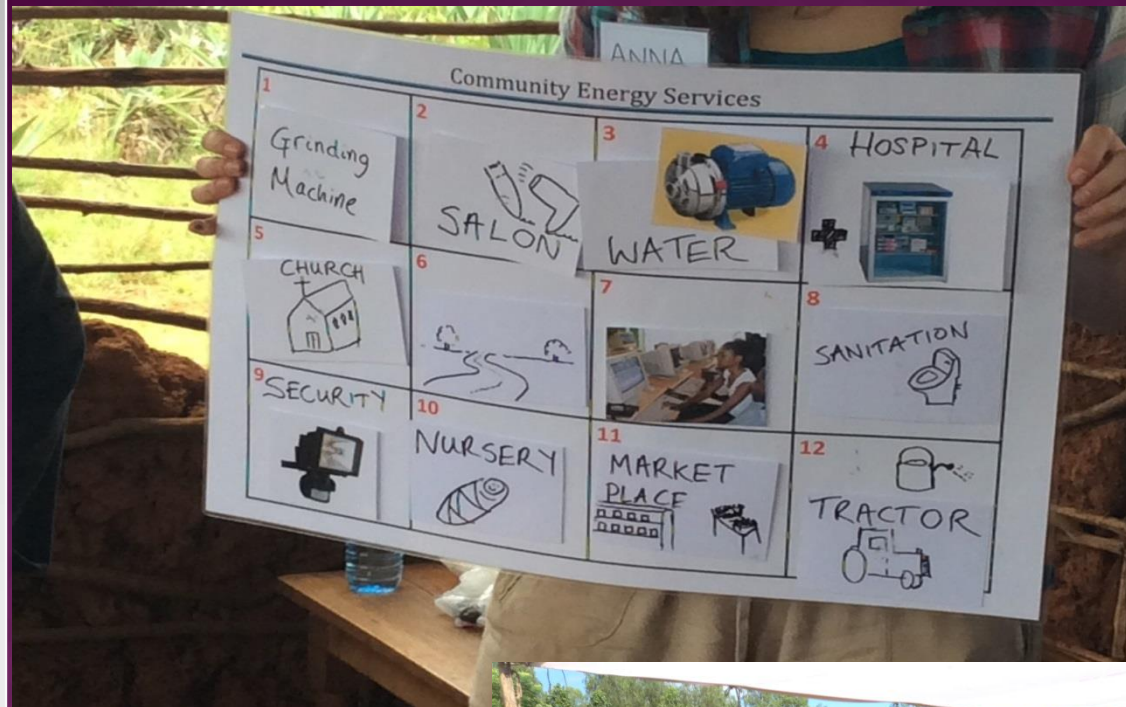


# SOLAR NANOGRIDS (THE SONG PROJECT): CHALLENGES AND SUCSESSES OF ENERGY GOVERNANCE IN OFF-GRID RURAL COMMUNITIES



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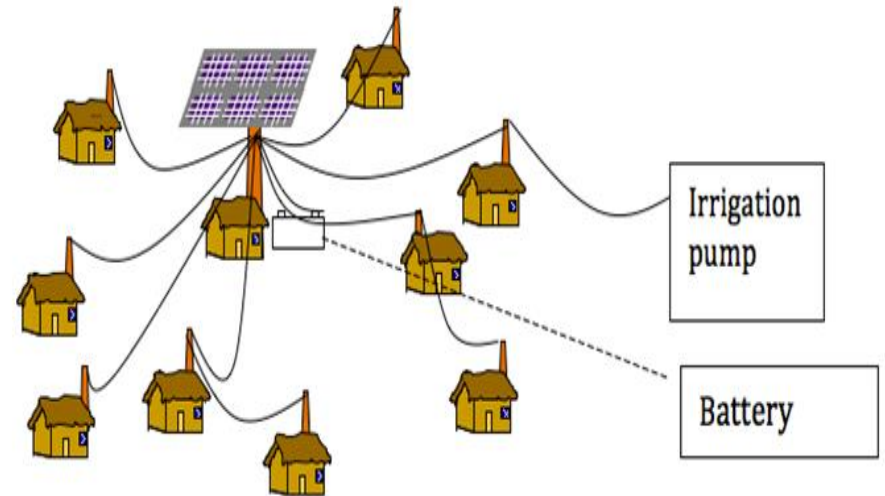
# What is a Solar Nano Grid?

Basically a small -scale cluster of solar panels:

- A concept based on service governance, not a product, with community participation/control
- Meeting the demand of clusters (20-50?) households
- Energy for productive uses, community businesses and services.

## Stakeholders

- ❖ Loughborough University, UK
- ❖ United International University, Bangladesh
- ❖ Grameen Shakti
- ❖ SCODE
- ❖ Nottingham University
- ❖ Oxford Energy and Power Group





# What is DIFFERENT ABOUT THE SONG solar nanogrid?

- ◆ IT'S A METHODOLOGY: energy access provision is insufficient as a driver of development by itself and in some cases actually imposes additional financial burdens.
- ◆ IT'S A TOOL: To provide policy-makers and other stakeholders the means to explore the missing components of standard service provision – ownership, gender, governance, empowerment.

LEADING TO =>

- ◆ A SET OF BESPOKE, FLEXIBLE SOLAR ARRAY POSSIBILITIES: “targeted at enhancing the ability of small-scale solar technologies to provide real economic opportunities for communities to engage in income-generating activities”



# What are the basics of what we have achieved since implementation in 2016?

## Bangladesh:

- 2 Nanogrids working through DC cabling to provide electricity to 53 households (July 2017)
- Household system income stream
- Fragile relationship between communities and in-country partner NGO (Grameen Shakti)
- Household system income stream
- No Village Energy Committees (VEC) yet
- Beginning of small businesses from homes (clothes-making. Phone-charging)
- More households wanting connection



## Kenya:

- 2 Nanogrids working through distributed battery systems to provide electricity to 60 households (Dec. 2017)
- Training of 4 community technicians for maintenance and repair
- Stable relationship between communities and in-country partner NGO (SCODE)
- Household system income stream
- Establishment and legalization of Village Energy Committees (VECs)
- Beginning of small businesses from homes and the hub (phone charging, Mpesa, sale of clean cookstoves)
- Continuing demand for batteries despite grid arrival

# HOW HAVE THINGS GONE WRONG?

## **E.g. Technology:**

Deployment of the wrong batteries in Kenya; use of DC in Bangladesh rules out most AC appliances; wrong incubators and posho mills in Kenya; lack of equipment security in Bangladesh; substandard meters in Bangladesh; difficulty in finding good quality products

## **E.g. Governance:**

Failure to set up VECs in Bangladesh; influence of charismatic/powerful leaders and families in Kenya and Bangladesh; lack of community fund in Bangladesh; dominance of party politics in Bangladesh; problematic initial NGO partner in both countries

## **E.g. Gender:**

Side-lining of women in setting-up the projects in both countries; cultural norms excluding fuller participation in both countries; tendency to push project efforts towards male-dominated activities



# **CAPACITY BUILDING THROUGH ENERGY GOVERNANCE APPROACHES: BANGLADESH**

## **Capacity building in progress**

- Grameen Shakti is building both their technical and managerial capacity.
- UIU is also building their capacity in project governance.
- Both Grameen Shakti and UIU now planning for initiating a VEC and subsequently a community fund.

## **Access to energy**

- In Faitang 60% and in Baroihati 50% of the households have energy access.
- In Baroihati the community is trying a water pump for irrigation; UIU have developed a rice-polishing machine to increase the value of harvests

## **Financial models**

- Household system income streams providing the basis for substantial scaling-up investment
- Small business income streams add value to



# CAPACITY BUILDING THROUGH ENERGY GOVERNANCE APPROACHES: KENYA

## Capacity building in progress

- SCODE is building both their technical and managerial capacity with Loughborough.
- Loughborough, SCODE and VECs now developing business ideas to enhance income and increase community funds for community projects

## Access to energy

- There is a waiting list for batteries in both communities because of the unreliability of the grid supply
- Business plans for further energy use include water pumping, provision for the health centre, an educational partnership with schools

## Financial models

- Household system income streams already provide the basis for substantial scaling-up investment
- Small business income streams add value to investment potential





# How Is Energy Governance The Missing Piece?

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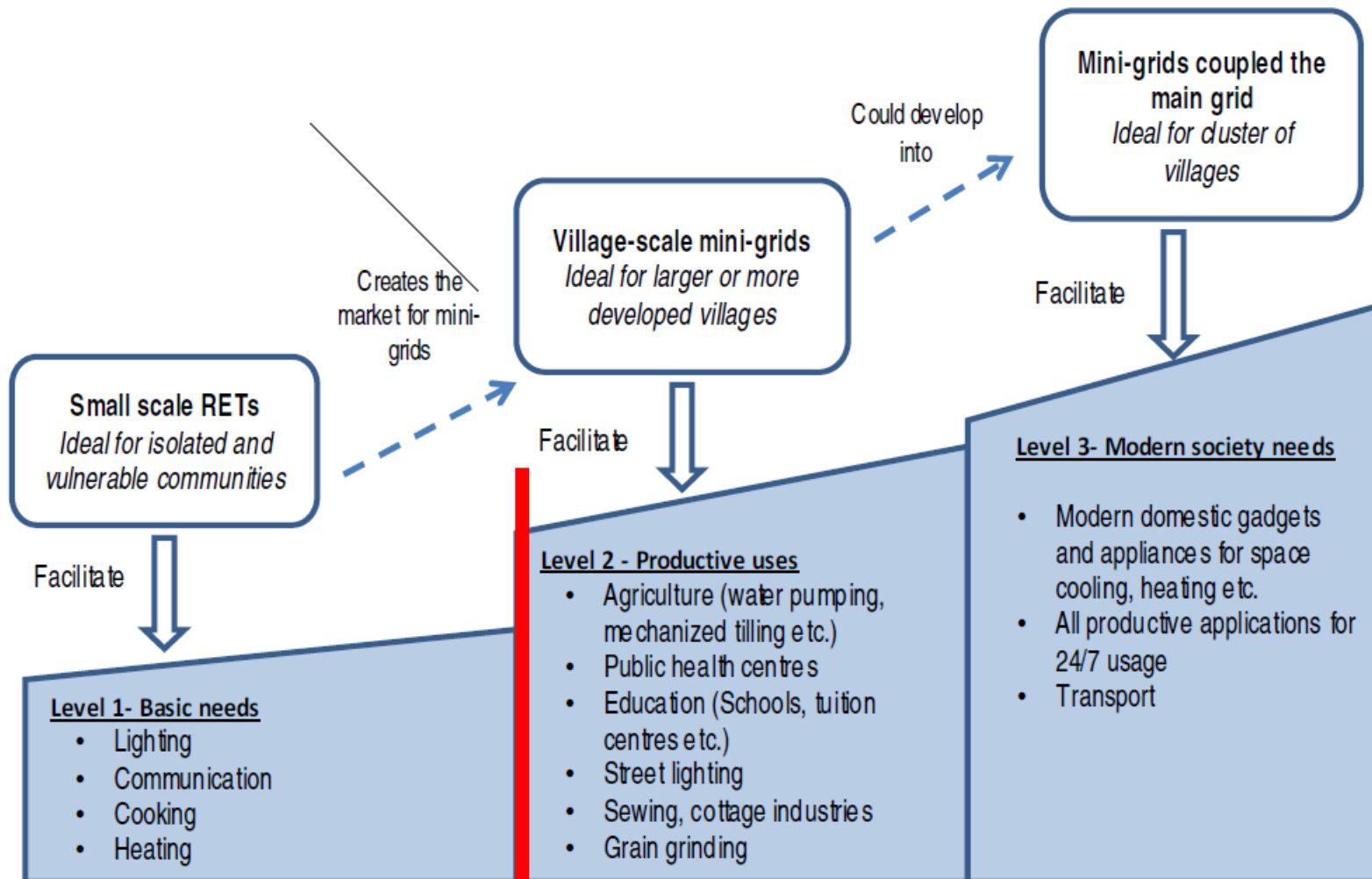
1) Both country experiences demonstrate the importance of effective community management and coordination in promoting energy access, social equality, economic activity and sustainable energy solution for off-grid communities

2) Successes and failures in both countries demonstrate the essential elements of effective energy governance bodies:

1. An ICP organisation with managerial, technical and community partnership experience capacity to run the nano-grid
2. An elected community committee deciding fair use of the nano-grid (Village Energy Committee (VEC) or Panchayat.
3. A community fund for added 'buy-in', transforming energy into a community business



# Framework for Scale up



# The Market for Nanogrids in the Global South

## (Adapted from Hansen et al, 2015)

SONG			
<u>Market segments</u>	<u>Market characteristics</u>	<u>Installed Capacity/size</u>	<u>Owners and buyers</u>
Small pico-systems: lanterns, LED lamps, chargers	Lighting and charging of batteries and mobile phones in mainly non-electrified areas	1–10 Wp	Private (over the counter) consumer devices
Solar home systems (SHS )	Off-Grid electricity demand in private homes in dispersed settlements, in smaller non-electrified villages and on the outskirts of electrified towns and villages far from existing distribution lines.	10–100Wp	Residential SHS (private households), ESCOs
Stand-alone ‘institutional PV systems’	Institutions located in villages without grid or mini-grid, or on the outskirts of grid-electrified villages, in peri-urban and urban areas for grid support	50–500Wp	Government/municipal procurement for public institutions (schools, hospitals, health clinics)
Telecommunications and tourism	Powering telecom base receiver stations(BTS), link sites, and remote tele-centres, and basic electricity supply (mainly lighting) for rural lodges and hotels	0.2–15 kWp	Procurement by commercial companies in the telecom and tourism sectors (e.g. telecom service providers, hotel owners, etc.)
Up to Mini-grids (e.g. hybrid PV-diesel)	villages and towns located far from existing grid	5kW-1MWp	Utilities, cooperatives (community-based),ESCOs (village electrification projects)