Off-grid Rural Applications

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Off-grid Technologies

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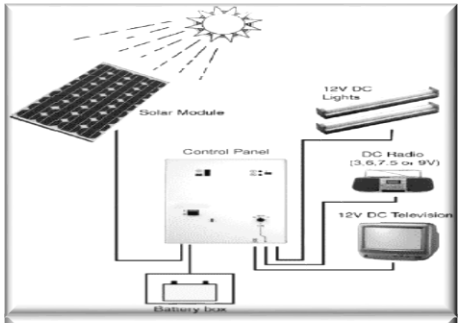
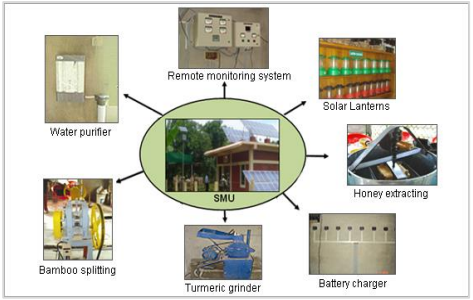
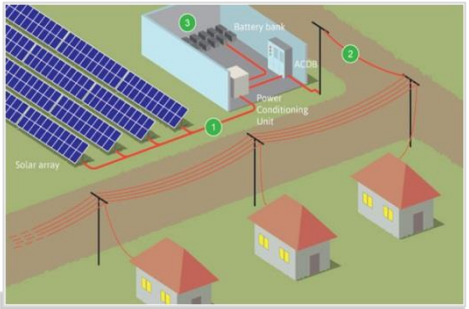
Solar Charging Stations



Solar Home Systems



Solar Multi Utility



Solar Micro Grids - AC/DC

Off-grid/Mini-grid: Key Issues

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- What is off-grid & does it have relevance
  - **While most Govts have ambitious RE target, grid is also being expanded at a fast pace in most of them**
- Should we focus on minimalist approach or also on aspirational demand
  - **Pricing of electricity will vary**
- Are we looking towards isolated systems or interconnected systems
  - **Design architecture will depend accordingly**
- Replication & Scaling up potential
  - **Why scaling up not taking place beyond pilots which are mostly grant supported**

Where are unconnected households?

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- Households in remote villages where extending grid may not be techno-economically feasible
- Households in unconnected hamlets/habitations of grid connected villages
- Un electrified households in villages where electric grid is existing
  - Depending on type viability of mini-grids or SHS will be based
  - Viability from producer and consumer perspective

The Energy Access Continuum

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Scaling up basic lighting

LEVEL 1: BASIC HUMAN NEEDS

Ligting, health, education, communication, community services, Modern cooking etc.

LEVEL 2: PRODUCTIVE USES

Agriculture, water pumping, mechanized tilling, cottage industry energy needs etc.

LEVEL 3: MODERN SOCIETAL NEEDS

Domestic appliances, cooling heating, transportation etc.

Grey Areas

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- **Various Act & Policies do not**
  - Clarify service area overlaps – uncertainty in expanding grids
  - Clarify tariff for Off-grid/Mini-grids – Tariff Harmonisation?
  - Provide for subsidy option
  - Regulate quality of supply or consumer disputes for stand alone systems
  - Send any clear signal about off-grid regulatory arrangements.
  - Situation of grid extension in rural and remote areas
  - Interconnection business models and requirements

Mini-grid intervention options

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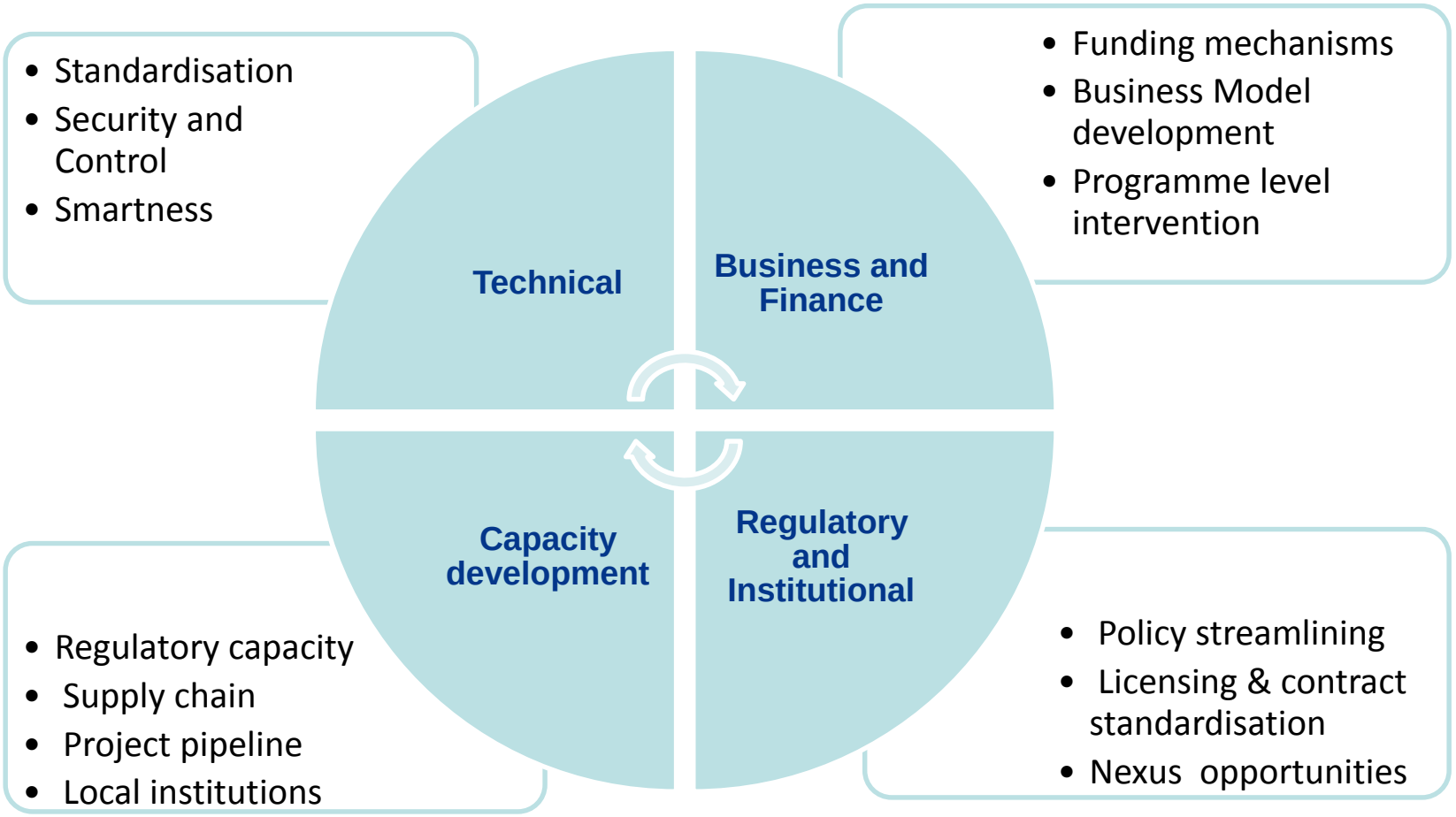

What policies are required

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- Approach - One size do not fit all (e.g. AC/DC grid)
- A robust governance structure is a pre-requisite
- Clear rules of the game are essential/policy certainty
- Strategic and locally adapted support to off-grid electrification is key (e.g. Smart / targeted subsidies)
- An enabling policy environment is crucial
- Capacity development incl. handholding is required
- Eco-system of off-grid electricity/Value chain development
- Clustering and bundling of initiatives help scale up
- Organised delivery for scaling-up and replication

Framework for Mini Grid