





### Unlocking MG for sustainable development 3.1. Mini-Grid Business Models

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MG in Bolivia by TTA



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### 1. SESSION OBJECTIVES

#### **SESSION OBJECTIVES**



- i) Understand the different business models commonly used in mini-grids
- ii) Discuss the main differences across the different business models, with their pros and cons.

iii)Understand the importance of promoting productive uses of energy in mini-grid projects



### 2. TYPICAL MINI-GRID BUSINESS MODELS

#### **BUSINESS MODELS.** Commonly used business models

Main business models\*:

- Build-own-operate model
- Public-private partnership model (PPP)
- Utility model, with/without private-sector involvement
- Cooperative model

Key differences among business models: The key differences are on who is in charge of mini-grid...

- Financing
- Building
- Ownership
- Operation



(\*) Energy Sector Management Assistance Program. 2022. Mini Grids for Half a Billion People: Market Outlook and Handbook for Decision Makers. Washington, DC: World Bank.

#### **BUSINESS MODELS. Build-own-operate model (Concession)**



- Private mini-grid developer
  - Carries out all the steps: Designing, Installing, Financing, and operating the mini-grid
  - ✓ Ownership of the assets can be:
    - Permanent (BOO)
    - For a limited time (Concession), after which assets are transferred to the government (BOOT)
- Government institution:
  - ✓ Role of the government is that of facilitator and enforcer (ensuring developer's compliance with policies and regulations)
  - ✓ Usually the government or other donors provide **subsidies** to the developer, the customer, or both.



(\*) Energy Sector Management Assistance Program. 2022. Mini Grids for Half a Billion People: Market Outlook and Handbook for Decision Makers. Washington, DC: World Bank.

#### **BUSINESS MODELS. PPP Models: Management Model (Operator)**



- Government institution:
  - ✓ Plans, finances, and implements the mini-grid up to commissioning.
- Private developer (operator):
  - ✓ Manage, maintain and operate the mini-grid, including generation and distribution.
  - ✓ Collects revenues (bills customers)



(\*) Energy Sector Management Assistance Program. 2022. Mini Grids for Half a Billion People: Market Outlook and Handbook for Decision Makers. Washington, DC: World Bank.

#### **BUSINESS MODELS. PPP Models: Split Asset Model (IPP)**



- Government institution (utility):
  - ✓ Install, own and operate the **distribution assets**.
- Private developer:
  - ✓ Install, own and operates the **generation assets**



(\*) Energy Sector Management Assistance Program. 2022. Mini Grids for Half a Billion People: Market Outlook and Handbook for Decision Makers. Washington, DC: World Bank.

#### **BUSINESS MODELS. Utility Models**



- Government institution (utility):
  - Carries out all the steps: Designing, Installing, Financing, and operating the mini-grid
- Private developer:
  - ✓ In some cases conducts the design (consultant), the installation (EPC), the design and installation, and also sometimes installation and some years of operation.



(\*) Energy Sector Management Assistance Program. 2022. Mini Grids for Half a Billion People: Market Outlook and Handbook for Decision Makers. Washington, DC: World Bank.

### **BUSINESS MODELS.** Cooperative Model



Cooperative finances and owns generation and distribution, and bills customers directly. Developer can build generation and/or distribution as an EPC.

- Cooperative:
  - $\checkmark$  Finances and own the mini-grid
  - $\checkmark$  Operates the mini-grid
- Private developer:
  - $\checkmark$  Design and or install the mini-grid
- Government institution:
  - Exercises more or less supervision to the cooperative depending on the country
- Cooperative models have been implemented successfully in Burkina Faso, Indonesia, Peru, and the Philippines, among other countries



(\*) Energy Sector Management Assistance Program. 2022. Mini Grids for Half a Billion People: Market Outlook and Handbook for Decision Makers. Washington, DC: World Bank.

## 3. COMPARISON

#### **BUSINESS MODELS COMPARISON**

	Public funding requirement	Benefits	Limitations
Build-own- operate mode	Low: CAPEX subsidies only	<ul> <li>Developers having full control of the value chain means they optimize cost and quality for each step</li> <li>Projects likely to be financially viable with subsidies</li> <li>Low transaction costs overall</li> <li>Highly scalable</li> </ul>	<ul> <li>Target beneficiaries may be suspicious of private firms</li> <li>Private firms will abandon the mini grid market if conditions change to make it unprofitable (for example, new, unworkable regulations)</li> </ul>
Public-private partnership model (PPP)	<b>High:</b> pays for all or most of mini grid CAPEX and OPEX.	<ul> <li>Where governments have significant financial and technical resources to build mini grids, these programs can be implemented quickly</li> <li>Responsibilities are effectively distributed between financiers/ investors and operators, with capacities aligned with the tasks assumed</li> </ul>	<ul> <li>Both PPP models: high transaction costs, considering various transactions between public and private partners</li> <li>Split-asset PPP: can lead to stop-and-start implementation issues if government-built infrastructure and private-sector—built infrastructure are not developed in sync</li> </ul>



(\*) Energy Sector Management Assistance Program. 2022. Mini Grids for Half a Billion People: Market Outlook and Handbook for Decision Makers. Washington, DC: World Bank.

#### **BUSINESS MODELS COMPARISON (cont.)**

	Public funding requirement	Benefits	Limitations
<sup>i</sup> Utility model, with private- sector involvement	<b>High:</b> pays for all or most of mini grid CAPEX and OPEX.	<ul> <li>Keeps overall responsibility for electrification with one entity.</li> <li>Brings in technology innovation and process innovation from the private sector.</li> <li>Highly scalable if utility has high financial and technical capacity.</li> </ul>	<ul> <li>Transaction costs may be high if contracting with different third parties for various stages of mini grid development.</li> <li>Building and managing mini grids can exacerbate utility losses if mini grid tariffs are not fully cost- reflective.</li> </ul>
Utility model, without private-sector involvement	<b>High:</b> pays for all or most of mini grid CAPEX and OPEX.	<ul> <li>Keeps responsibility for electrification with a single entity</li> <li>Utility can get economies of scale through bulk purchases</li> <li>Highly scalable if utility has high financial and technical capacity</li> </ul>	<ul> <li>Building and managing mini grids can exacerbate utility losses if mini grid tariffs are not fully cost- reflective</li> </ul>
Cooperative model	Low: CAPEX subsidies only	<ul> <li>Local involvement leads to solutions that consider most of the locally relevant aspects and increases sense of ownership of the local community</li> </ul>	<ul> <li>Limited local capacities mean that capacity building and potentially third-party oversight need to be put in place to ensure ongoing O&amp;M</li> <li>Local structures need to be created to limit the potential for social conflict as related to the mini grid Not easily scalable or fast in deployment</li> </ul>
a Tecno Ambien	(*) Energy and Hand	/ Sector Management Assistance Program. 2022. book for Decision Makers. Washington, DC: Wor	. Mini Grids for Half a Billion People: Market Outlook ld Bank.

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### 4. PRODUCTIVE USES OF ENERGY (PUE)

#### **PRODUCTIVE USES OF ENERGY. A game changer**

Increasing productive uses1 of mini grid electricity creates an "everyone-wins" scenario for mini grid developers, rural entrepreneurs, communities, and national utilities over time.

- Mini-grid developers: benefit from increased demand, which result in higher sales and reduced levelized cost of energy
- **Rural entrepreneurs:** benefit from switching from expensive diesel gensets to more affordable and reliable mini-grid electricity
- **Communities:** benefit from reduced levelized cost of energy, increased economic activity employment
- Utilities: in case of interconnection of the mini-grid to the main grid in the future, it benefits from having an increased demand for high-quality electricity service and their ability to pay



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#### **PRODUCTIVE USES OF ENERGY. A game changer**



FIGURE 3.1 • The impact of productive electricity uses on the daily load profile and levelized cost of energy

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#### **PRODUCTIVE USES OF ENERGY. A game changer**

Option	Examples	Advantages	Disadvantages
Small village businesses	<ul> <li>Primary, eg, agriculture, fishing, livestock</li> <li>Light manufacturing, eg, carpentry, welding, ice-making</li> <li>Commercial and retail, eg, grocers, hair salons, phone chargers</li> </ul>	<ul> <li>Most common in rural areas</li> <li>More diversified customer base</li> <li>Greater scope for local economic development</li> <li>Jobs creation: expanding existing &amp; new businesses</li> <li>"Multiplier Effect": workers pend most of their income within the local economy</li> </ul>	<ul> <li>Smaller individual off-take of energy, which is less reliable/stable</li> <li>Appliance ownership can be low in remote areas, so financing schemes to provide customers with suitable appliances must be set up and managed</li> </ul>
Large anchor clients	• Examples: telecom towers, flower farms, tourist lodges, banks.	<ul> <li>Large, reliable off-take of energy</li> <li>More stable, predictable &amp; long- term revenues</li> </ul>	<ul> <li>Limited number of such clients in remote areas</li> <li>Need to provide more competitive tariffs to anchor clients, and often have onerous service requirements</li> </ul>

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Source: Green Mini-Grid Help Desk

#### **PRODUCTIVE USES OF ENERGY.** Steps for implementing PUE program

Steps	Description	Outputs
Step 1	<ul> <li>Market/demand assessment with geospatial analysis</li> </ul>	<ul> <li>Online data platform</li> <li>List of key stakeholders</li> <li>List of high-impact opportunity areas</li> </ul>
Step 2	<ul> <li>Community engagement confirming and improving data from Step 1 through surveys and workshops</li> </ul>	<ul> <li>List of communities identified as areas of high-impact opportunity, combined with community-specific market data</li> <li>List of appliances that are relevant for these communities based on local contexts</li> <li>List of potential PUE customers in these communities</li> <li>List of local providers of microfinance in or near these communities</li> <li>List of local suppliers of appliances serving these communities</li> <li>List of community leaders and district-level government officials who are supportive of the PUE program</li> </ul>
Step 3	• Demand analysis for mini-grid design and market potential for appliances and associated end-user finance	<ul> <li>Detailed characteristics of an initial set of community-relevant appliances</li> <li>List of prioritized appliances</li> </ul>



Source: Green Mini-Grid Help Desk

#### **PRODUCTIVE USES OF ENERGY.** Steps for implementing PUE program

Steps	Description	Outputs
Step 4	<ul> <li>Preparation of road shows involving developers, local government, community leaders, appliance providers, end-user financiers</li> </ul>	<ul> <li>Road show logistics finalized: who, what, where, when, and how</li> <li>Information and marketing campaign launched ahead of the road shows</li> </ul>
Step 5	<ul> <li>Road shows to load centers explaining the value propositions to potential end users by mini-grid developers, appliance suppliers, and end-user financiers based on current and aspiration lifestyles of the end users; document sign-ups by end users for mini-grid connections, appliances, and end-user finance</li> </ul>	<ul> <li>Road shows</li> <li>Customer sign-up for mini-grid connections, appliances, and end-user finance</li> </ul>
Step 6	<ul> <li>Rollout of mini-grid connections, sales of appliances, and end-user finance</li> </ul>	<ul> <li>Customers connected</li> <li>Appliances sold and connected</li> <li>Financing secured</li> </ul>



Source: Green Mini-Grid Help Desk

### 5. ADDITIONAL RESOURCES

#### **ADDITIONAL RESOURCES**

- Energy Sector Management Assistance Program. 2022. Mini Grids for Half a Billion People: Market Outlook and Handbook for Decision Makers. Washington, DC: World Bank. <u>www.esmap.org/</u> mini\_grids\_for\_half\_a\_billion\_people.
- African Development Bank. Green Mini Grids: Green Mini-Grid Developers Help Desk website. <u>https://greenminigrid.afdb.org/</u>
- Africa-EU Renewable Energy Cooperation Programme (RECP). 2014. Mini-grid Policy Toolkit. Polocy and Business Frameworks for Successful Mini-grid Roll-outs.



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