

National Electrification Forum: Mini-grid action learning event

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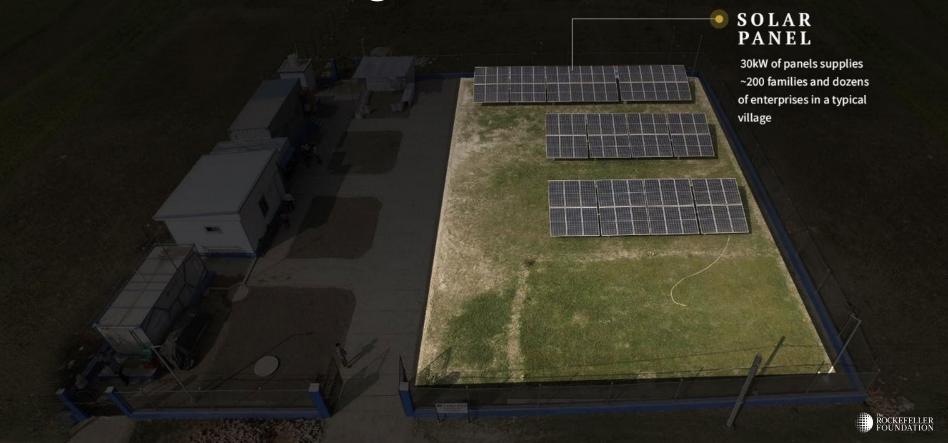


## To End Poverty, We Must End Energy Poverty













## CONTROL & • BATTERIES

The control room contains a bank of batteries, power electronics and an energy management system

#### SOLAR PANEL

30kW of panels supplies ~200 families and dozens of enterprises in a typical village

#### WATER TREATMENT UNIT

A five stage filtration unit which can produce 1,000 liters per hour of safe drinking water

## DISTRIBUTION LINES

These lines carry electricity to homes and businesses within a 3 km radius



## Mini Grids:

## **Connecting Rural Communities**

## CONTROL & • BATTERIES

The control room contains a bank of batteries, power electronics and an energy management system

#### COLD STORAGE • UNIT

Refrigerated space to preserve perishable crops

#### SOLAR PANEL

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**Smart Power India Has Developed Best-in-Class** Mini-Grid Evidence & Analytics





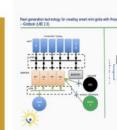


BUSINESSES

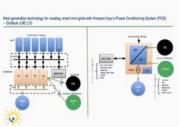




10 types of customers and 5 appliances account for 90% of total daily (300 units) electricity dema



New energy-efficient appliances are appearing on the Indian market, but still too expensive







PEOPLE





#### Tata Power & The Rockefeller **Foundation Launch Breakthrough Enterprise** To Power 25 million

TATA POWER TO LIGHT UP RURAL HOMES IN TIE-UP WITH ROCKEFELLER **FOUNDATION** 

**Business Standard** 

Tata Power and The

Tata Power, Rockefeller Foundation Plan 10,000 India Microgrids

**Bloomberg** 

**Tata Power** Aims to Boost **Electricity for** Rural India

INDIA MICROGRIDS: A BLUEPRINT FOR **PROVIDING CLEAN ENERGY TO THE GLOBAL POOR?** 

ROCKEFELLER AND TATA WANT TO REPLACE **INDIA'S DIESEL GENERATORS** 

**Rockefeller Foundation** Announce Breakthrough **Enterprise to Empower** Millions of Indians with Renewable Microgrid Electricity

BUSINESS **INSIDER** 

**Forbes** 

devex

THE ECONOMIC TIMES

Tata Power creates new arm to set up 10,000 microgrids in India

THE TP RENEWABLE MICROGRID WOULD BE SET UP IN COLLABORATION WITH ROCKEFELLER FOUNDATION

POWER, INDIA'S LARGEST INTEGRATED POWER COMPANY, HAS PARTNERED WITH ROCKEFELLER FOUNDATION TO SET UP 10.000 MICROGRIDS

Rockefeller Foundation, Tata Power partner for 10,000 microgrids in rural India



FINANCIAL TIMES

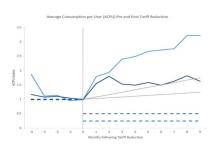


## The Innovation Lab field tests 8 innovations across more than 70 sites in rural Africa to improve the mini-grid business model

Financing programs for energyefficient productive use appliances



2 Assessing the price sensitivity of rural customers



3 Competing with the arrival of the main grid



4 Providing internet services alongside electricity



Deploying larger, denser grids in anticipation of customer



Testing smart meter technologies



Negotiating lower equipment price through bulk



Testing smart inverters and other modular technology

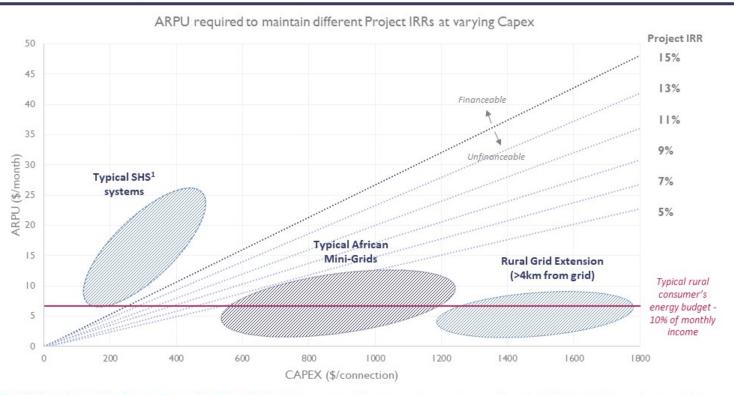


## Mini Grids Are Preferred by Households and Businesses





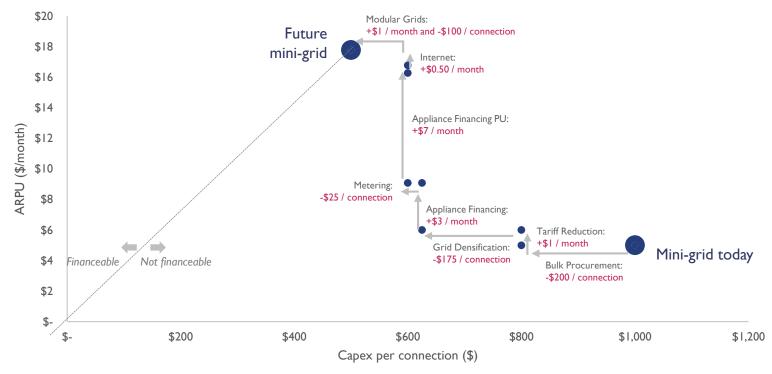
## All means of rural electrification require subsidy to achieve universal access: solar home systems, mini-grids, and main grid extensions



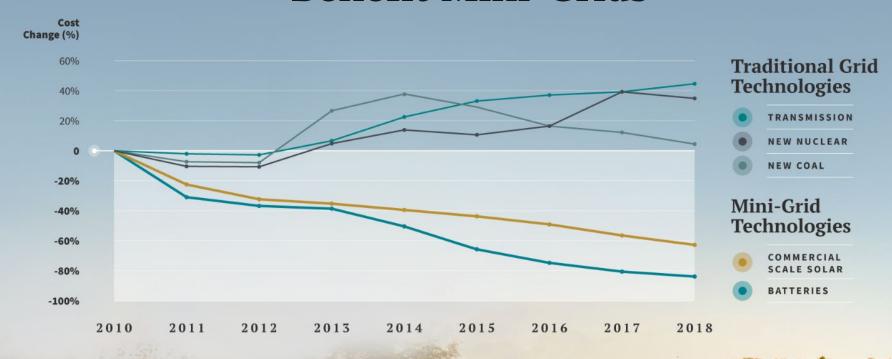
Sources: World Bank, McKinsey Power Africa Report, Tanzania Rural Energy Authority. Tanzania Rural Electrification Expansion Program. Note: 1. ESMAP Tier 2 SHS providing General lighting and Phone Charging and Television

## Mini-grid innovation has the potential to reduce the amount of subsidy needed by reducing the capex per connection and increasing Average Revenue per User (ARPU)





### Dramatic Cost Reductions Benefit Mini-Grids





# The Product Development Cycle of Mini-Grids is Accelerating

		MINI-GRID V1.0 2016	MINI-GRID V2.0 2019	MINI-GRID V3.0 2020
Ease of Setup	Easy Procurement Process	×	<b>✓</b>	✓
	Low Installation Time	×	✓	✓
	Modular Design	×	×	✓
Cost Effective Management	Integration of Generation Assets (EMS)	×	✓	✓
	Real-Time Monitoring and Control	×	✓	✓
	Advanced Smart Meters	×	×	✓
	Lithium Ion Battery	×	×	✓
	Initial Capex (per watt)	\$4.20	\$1.80	\$1.60
	Opex per watt	\$3.80	\$3.10	\$2.00
	Average tariff	.40¢	.22¢	.15¢



#### AGRICULTURE-ENERGY NEXUS

ECONOMIC MOBILITY FOR HUNDREDS OF MILLIONS OF FARMERS
DEPENDS ON ENERGY NOW MORE THAN EVER BEFORE

