

CrossBoundary Mini-Grid Innovation Labs East Africa, Zambia and Nigeria

The Mini-Grid Innovation Lab works with minigrid developers to identify, test, and scale innovative prototypes that improve the business model.

As part of these efforts, the Lab is running a prototype to help developers test whether appliance financing can increase consumption, and therefore profitably drive revenue and improve the business model. Early results suggest offering appliances on credit to rural mini-grid customers unlocks latent demand for electricity, and therefore increases revenues.



A NEW GRAIN MILL
CONNECTED TO
ELECTRICITY IN
TANZANIA. PHOTO
COURTESY POWERGEN

THE SITUATION

- Today, rural customers' energy use is too low to generate sufficient revenue for developers to sustainably operate mini-grids
- Consumption is limited by how much people can afford and what they can do with the electricity. Without appliances, customers miss out on the full benefits of electrification, and developers can't sustainably serve them
- Appliance financing could solve this, breaking high upfront costs into more manageable monthly payments. To find and scale a commercial model that works, we must have confidence that appliance financing programs will be profitable, and determine which appliances make them most so

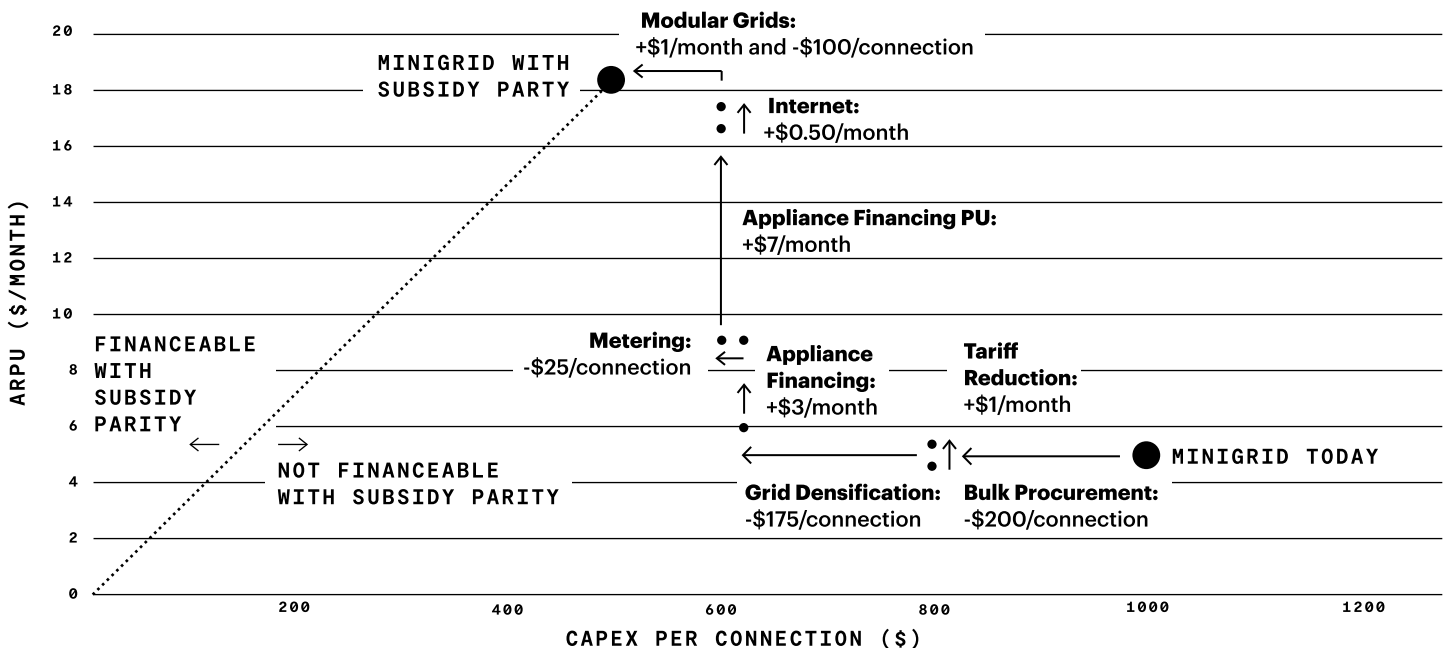
THE SOLUTION

The Lab has three stages of research and pilots on appliance financing, and has sold 663 appliances on credit across 27 sites in East Africa and Nigeria:

- 1.0:** Tests household appliances, such as TVs, fridges, and speakers.
- 2.0:** Tests productive use appliances, such as grain mills and welders, and introduces a payment platform to simplify tracking of loan repayments.
- 3.0:** Tests productive use appliances designed to deliver the output and performance required by rural off-grid customers in Africa, to compete with diesel-powered equivalents.

The Lab has identified eight innovations that together could reduce CAPEX per connection from \$1,000 to \$500 and increase average revenue per user (ARPU) from \$5 to \$17.50 per month

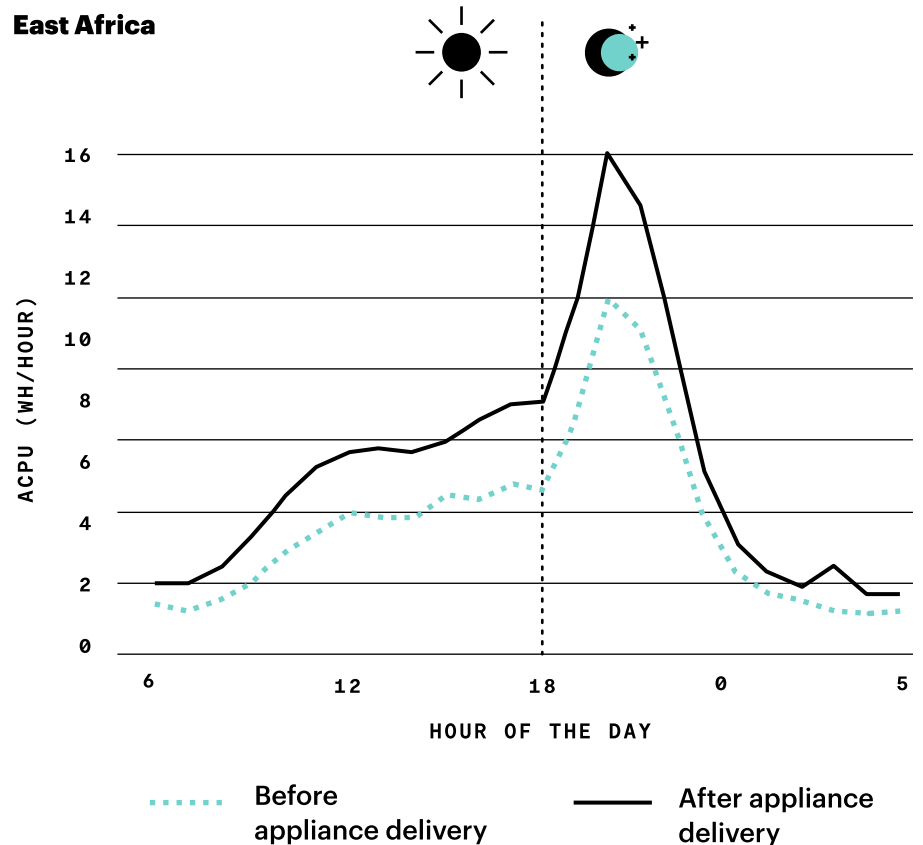
Labs Impact on ARPU and Capex per Connection, by Prototype



THE IMPACTS

- Early results suggest rural minigrid customers are ready to consume more electricity, but don't have the means to put this energy to use. For the first five months following appliance delivery, appliance purchasers in East Africa and Nigeria consumed nearly twice as much electricity
- Household appliances are principally used in the evening, increasing the cost of providing power. Productive use appliances increase daytime load and generate income for users, in turn allowing them to spend more on electricity and appliances
- Provision of accessible finance tapped into a strong latent demand for appliances that shows potential for a much larger-scale positive feedback cycle

Average consumption per user (ACPU) by hour, pre and post appliance delivery, East Africa



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Deploying the Lab’s Appliance Financing prototype has proven to increase energy consumption on site, which has in turn grown our revenues. We previously tried running appliance financing schemes, but never had the tools or resources to scale the programs on our own. With the Lab’s support, we’ve reached more customers and a greater variety of customers, thereby generating more data to understand the impact of the program.

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Olusegun Odunaiya
CEO, Havenhill Synergy



A MINI-GRID CUSTOMER RECEIVING HIS NEW FINANCED APPLIANCE. PHOTO COURTESY POWERGEN

READ MORE ABOUT APPLIANCE FINANCING, AND ALL OF THE LAB'S PROTOTYPES HERE:

www.crossboundary.com/labs

FURTHER READING - OUTPUTS OF THE MINI-GRID INNOVATION LAB

- **MILLING ON MINI-GRIDS: HOW AFRICA'S LARGEST CROP COULD GO DIESEL-FREE**
Learnings from the Lab's second iteration of its Appliance Financing prototype (April 2020)
- **DO SURVEYS FALL SHORT? SOLVING THE CHALLENGE OF PREDICTING MINI-GRID ENERGY USAGE IN AFRICA**
Results from the Lab's machine learning analysis to predict mini-grid customer energy demand (December 2019)
- **LOW ENERGY CONSUMPTION = UNPROFITABLE MINI-GRIDS. IS APPLIANCE FINANCING THE ANSWER?**
Initial results from the Lab's Appliance Financing prototype (August 2019)
- **ARE RURAL CUSTOMERS READY TO CONSUME MORE ENERGY AT THE RIGHT PRICE? NEW MINI-GRID RESEARCH OFFERS INTRIGUING RESULTS**
Initial results from the Lab's Tariff Reduction prototype (May 2019)



ELECTRIFYING ECONOMIES

The Electrifying Economies project

demonstrates the role distributed energy will play in ending energy poverty and catalyzing a green and equitable recovery from the Covid-19 crisis. It draws on the latest data and research from around the world to show how distributed renewables can provide sustainable, affordable, and reliable power for all. The project provides information to support policy makers and investors in taking action today, to realize this potential.



#ElectrifyingEconomies
ElectrifyingEconomies.org