# Powering Small Retailers: The Adoption of Solar Energy under Different Pricing Schemes in Kenya

**Researchers:**

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**Sector(s):** Environment, Energy, and Climate Change

**Location:** suburbs of Nairobi, Kenya

**Sample:** 1,849 small retailers

**Target group:** Entrepreneurs Small and medium enterprises

**Outcome of interest:** Earnings and income Energy access Technology adoption

**Intervention type:** Digital and mobile Renewable energy Pricing and fees

**Partner organization(s):** Angaza, International Growth Center (IGC), SunnyMoney, Yale Savings and Payments Research Fund

The majority of people living in Sub-Saharan Africa do not have access to electricity. Traditional power companies often find it too costly to bring electricity to rural and suburban areas, but in recent years, the cost of alternative energy sources like solar power has fallen dramatically. Providing small businesses with access to reliable electricity through off-grid solar power systems could potentially help small retailers earn more by keeping their businesses open longer and introducing new services. This randomized evaluation tests how price and payment method affect the adoption of off-grid solar power among small retailers near Nairobi and if access to electricity can improve their businesses' performance.

## Policy issue

Nearly 70 percent of people living in Sub-Saharan Africa lack access to electricity. Most traditional power companies find it too costly to extend the electric grid to many rural and suburban areas. Without access to power, households and small businesses typically use kerosene-powered lanterns or candles to provide light at night. Access to electricity could potentially help small retail businesses earn more revenue by extending their hours of operation or offering other services to customers, such as mobile phone charging facilities.

Many have proposed solar power as a way to bring safe and reliable electricity to small businesses and households that cannot access the electric grid. Yet for small retail businesses the cost of off-grid solar power systems may still be prohibitive. How do price and different payment methods affect the adoption and use of off-grid solar power systems among small retailers and how does access to electricity affect their business performance?

## Context of the evaluation

The small businesses participating in this study typically sell food, drink, clothing, or other household goods. Access to electricity could potentially allow them to increase their evening operating hours, offer mobile phone charging services in their stores, and save on their own mobile phone charging costs.

Angaza is a company that markets off-grid solar power systems to consumers and businesses in East Africa. Their main product is an LED light unit with integrated mobile phone charging and a detachable 3-watt solar panel to charge the unit's battery. While

the total cost of this solar power system is often too high for small retailers to purchase all at once, Angaza allows people to purchase the solar unit for a small down payment and then use a mobile money platform to pay for energy output in affordable increments by "topping up" device credit, just like they currently purchase mobile phone airtime. The device can be disconnected if payments are not made. Regular payments are applied towards paying off the full cost of the device, after which it is automatically "unlocked" and can be used without purchasing additional device credits.

A shopkeeper using solar light in Nairobi, Kenya. Photo: Tugela Rid | J-PAL/IPA

Tugela Rid

### Details of the intervention

Researchers are conducting a randomized evaluation in partnership with Angaza and Sunny Money Brains to estimate the impact of different pricing schemes, payment schedules, and enforcement methods on the adoption of off-grid solar power and the impact of access to electricity on small retail businesses' revenue and profits. From a sample of 1,849 small retail businesses operating in the outskirts of Nairobi, researchers randomly assigned some businesses to receive one of four different offers to purchase the Angaza solar power system and some businesses to serve as the comparison group. Those offered the solar power system received marketing visits in which the salesperson read a script describing the features of the solar power system, the payment process, and penalties for late payments. The salesperson then gave the customer a voucher needed to purchase the solar power system from a sales agent, under one of four different payment schemes:

- Offer 1 provides the customer with a pay-as-you-go solar power device at 15 Kenyan shillings (KSH) per hour (about US$0.17) of electricity used. Customers are sent one text message per week to remind them to purchase more solar power time.
- Offer 2 instead allows the customer to make weekly payments of 130 KSH (about US$1.70) for unlimited use of the solar power system. The customers are sent a reminder to pay the day before their next payment is due. If a payment is missed, the solar power system automatically shuts off until the payment and a 50 KSH (US$0.56) penalty are paid.
- Offer 3 is identical to Offer 2 except that while customers are told about the 50 KSH penalties for non-payment during the initial marketing visit, after they receive the solar power system they are told it will not be applied. If customers fail to make a payment, the solar power system will not work until the retailer pays the weekly installment, but no penalty is

charged.

- Offer 4 is identical to Offer 2 except that after customers receive the solar power system, they are told that neither the late payment penalty nor the shutoff will be applied if they fail to pay their weekly bill. Under this condition, there are no penalties for failing to pay and the device continues to work.

### Results and policy lessons

Results forthcoming.