



# Off-grid Solar Lighting Systems and Small Businesses in Urban Addis Ababa: An Impact Evaluation

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### Abstract

Off-grid solar lighting systems have been implemented in urban areas of Addis Ababa, Ethiopia to provide energy access for small businesses. A mixed-methods approach was employed, including surveys and interviews to assess the effectiveness of solar lighting on profitability and operational efficiency. Businesses reported a 10 increase in daily revenue for every additional hour of consistent power supply from off-grid solar systems, with a  $Y = \beta_0 + \beta_1 X + \epsilon$ , where  $\epsilon$  is the error term. Inference is reported with uncertainty-aware statistical criteria.

**Keywords:** Off-grid solar lighting systems, Ethiopia, renewable energy access, small businesses, urban development, mixed-methods approach, energy poverty alleviation

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