

RESEARCH BRIEF

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Electricity as a Clean Cooking Option: Lessons from India, Nepal, Kenya, Ethiopia, and Nigeria

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Research question

What policies are needed to scale electric cooking in low and middle income countries?

Key Messages

- Electricity reliability is the strongest determinant of electric cooking adoption across all study countries.
- Access alone is not enough—dependable, affordable and good-quality power supply is essential.
- Urban, wealthier, and better-educated households are far more likely to adopt electric cooking.
- Incompatible household electricity infrastructure is a key qualitative barrier to electric cooking adoption.
- Policy reforms must improve grid reliability, household electricity infrastructure, and other socioeconomic barriers to scale electric cooking.

Background and Methodology

Nearly 2.8 billion people are still dependent on traditional biomass fuels such as firewood and charcoal. The resulting exposure to household air pollution contributes to severe health outcomes and environmental degradation. While access to electricity has expanded rapidly across developing countries, the adoption of electricity as a clean cooking fuel remains

very low. This gap between access and use represents a missed opportunity for achieving clean energy and climate goals.

This policy brief draws evidence from India, Nepal, Kenya, Ethiopia, and Nigeria to understand why electric cooking adoption remains limited despite growing electricity access. The analysis identifies key demand- and supply-side factors—including electricity reliability, affordability,

household characteristics, and household electricity infrastructure—that influence adoption. The findings offer practical insights for designing effective policies to accelerate electric cooking transitions as part of broader clean energy and climate strategies.

The study adopts a mixed-methods approach combining nationally representative household surveys with qualitative discussions. Quantitative data are drawn from the India Residential Energy Survey (IRES, 2019–20), the World Bank’s Multi-Tier Framework (MTF) surveys for Nepal (2017–18), Kenya and Ethiopia (2016–17), and the Nigeria Living Standards Survey (NLSS, 2018–19). These datasets provide information on electricity access, reliability, household characteristics, the use of electric cooking appliances, and other related variables. Econometric models were used to identify the correlates of electric cooking adoption across countries.

To complement this analysis, qualitative data were collected through interviews with households, retailers, and other stakeholders to capture perceptions, constraints, and contextual barriers that quantitative data may not reveal. Together, these methods provide a comprehensive cross-country understanding of both the structural and behavioral factors influencing electric cooking uptake.

Results

The results reveal that electricity reliability is the most consistent determinant of electric cooking adoption. Households with longer and more predictable electricity supply are significantly more likely to use electric cookstoves across our study countries. Urban, wealthier, and better-educated households exhibit higher adoption rates. Despite widespread electricity access, fuel

stacking—the simultaneous use of electricity alongside LPG, firewood, or charcoal—remains common, indicating that households continue to rely on multiple fuels for reasons of cost, convenience, or habit.

Qualitative insights highlight several persistent barriers: poor voltage quality, frequent power cuts, inadequate household electricity infrastructure (Figure 1), and high appliance costs limit adoption. In Kenya, Ethiopia and Nigeria, high electricity tariffs further discourage households from adopting. Behavioral factors—such as preferences for traditional cooking methods, perceptions of taste, and lack of familiarity with new technologies—also influence choices. On the supply side, electric cooking appliances are generally available in local markets or through online platforms with local delivery, but high prices, counterfeit products, and a lack of repair shops or spare parts remain key barriers.

Figure 1. Inadequate electricity infrastructure in households



Source: Picture taken by the first author in Tamilnadu, India (June 2023)

Policy Suggestions

- **Move beyond electricity access:** Focus on improving grid supply, maintaining voltage stability, and

reducing outages, while ensuring electricity tariffs are affordable for households.

- **Improve affordability:** Support low-income households to overcome high upfront set up costs; including compatible household electrical infrastructure to support high capacity electric cooking appliances.
- **Promote awareness and behavior change:** Strengthen information campaigns to highlight the economic, health, and time-saving benefits of electric cooking, encouraging adoption and sustained

use.

- **Integrate into clean energy strategies:** Embed electric cooking initiatives within national clean energy and climate policies, leveraging carbon finance mechanisms to reward emission reductions from decreased biomass use.

The Environment for Development initiative is a capacity-building program in environmental economics focused on international research collaboration, policy advice, and academic training. It consists of centres in Central America, Chile, China, Colombia, Ethiopia, Ghana, India, Kenya, Nigeria, South Africa, Sweden (University of Gothenburg), Tanzania, Vietnam, Uganda, and the US (Resources for the Future). Financial support is provided by the Swedish International Development Cooperation Agency (Sida).