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Impacts of Low-Cost–Connection Offers in Tanzania: Evidence From a Randomized Controlled Trial

Impacts of low-cost–connection offers:

- increased connection rates by 13 percentage points
- increased consumption of grid electricity, total electricity consumption, ownership of electric tools, time spent watching television, and perceived safety
- increased reported illness among children and youth
- reduced poverty, as measured by per capita daily consumption
- had no clear impacts on indoor air pollution or studying

Access to grid electricity does not necessarily result in high connection rates, especially if connection fees are prohibitively high. Indeed, the connection fee was over 90 percent of average monthly household income, according to the results of a recent study of new line extensions in Tanzania funded by the Millennium Challenge Corporation (MCC). To address this concern, low-cost connections were offered at about 20 percent of the normal fee in 27 randomly selected communities out of 178 communities that were chosen to receive the new lines. In this brief we report on estimated impacts of low-cost–connection offers by comparing outcomes of households in communities selected to receive the low-cost offers with outcomes of those in the control communities that were not offered low-cost connections.

CONNECTION RATES

The low-cost–connection offers increased connection rates by 13 percentage points (Figure 1). This estimated impact is similar in magnitude to the estimated impact of the line extensions; this similarity highlights the importance of connection costs as a barrier to the use of grid electricity in the study communities.

As a consequence of greater connectivity, households in the low-cost–connection offers communities used about 1.79 more hours of electricity per day on average. For connected households, this means approximately 13.8 hours per day of electricity use.

ENERGY USE

Low-cost–connection offers increased household electricity consumption by about 33 percent (6.61 kWh). This increased electricity consumption may have resulted from a substitution of non-grid electricity for grid electricity; households in low-cost–connection offer communities consumed about 9.6 more kWh per month in grid electricity and consumed about 2.8 fewer kWh per month

in nongrid electricity. The offers also increased the use of electric tools and appliances and amount of light consumed and reduced mobile phone recharge expenses.

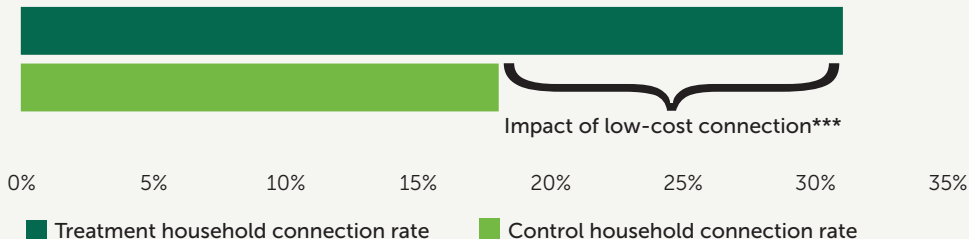
EDUCATION AND CHILD TIME USE

The low-cost–connection offers did not clearly increase the amount of time children spent studying at night or in total, but they did boost the amount of time children spent watching television. We did not find any clear differences for other activities such as collecting fuel and water, performing other household chores, or sleeping.

HEALTH AND SAFETY

The low-cost–connection offers increased reported health problems in the seven days before the follow-up survey of children and youth age 5 to 24 by 7 percentage points. This may be related to the positive impacts on TV watching leading children to stay inside the home longer. Because we did not find any negative impacts on kerosene use, which likely creates pollution in the home, and consequently found no reduction in indoor air pollution, more time spent at home could have

Impact of low-cost–connection offers on connection rates



Source: Tanzania energy sector baseline and follow-up household surveys.
 Notes: The low-cost–connection offers analysis sample includes 4,467 households, with 632 in the treatment group and 3,835 in the control group. Impact estimates are regression-adjusted.
 *** Impact estimate is significantly different from zero at the 0.01 levels using a two-tailed test.

Figure 1

The low-cost–connection offers had no differential impacts by urbanicity, income quartile, gender of the household head, or age of the household head.

caused health problems. We measured perceptions about safety with regard to the amount of light available at night, the sense of security walking at night, the level of crime, and the threat of animals. In the communities that got the offers, 63 percent of respondents felt safe on at least three of the four measures—7 percentage points higher than in the communities that were not connected.

Despite no clear impacts on sleep for children, the offers reduced the amount of time men and women slept by about 8 and 16 minutes, respectively. This perhaps reflects an increase in the number of options for spending time on other activities at night as a consequence of available electricity.

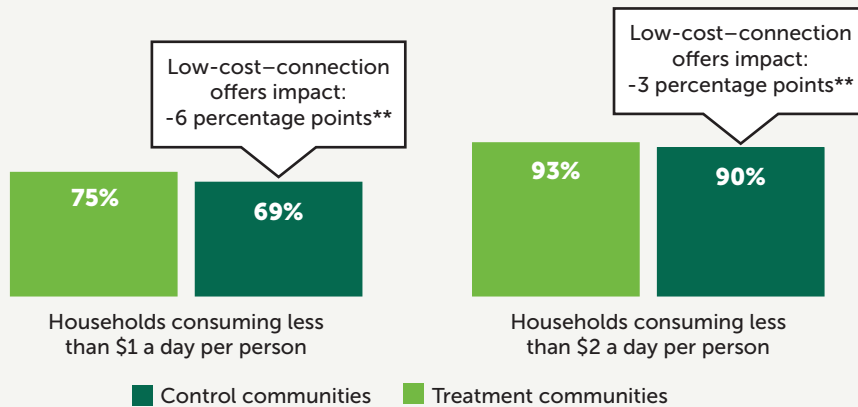
BUSINESS AND ADULT TIME USE

The low-cost–connection offers had no clear impacts on whether the household operated an income-generating activity (IGA) or had an electrified IGA, but they did increase the amount of time adults spent on wage labor and on watching televi-

ECONOMIC WELL-BEING AND COMPOSITION AND MOBILITY

The low-cost–connection offers reduced the percentage of households consuming less than \$1 a day or \$2 a day per person by six and three percentage points, respectively (Figure 2). However, we found no clear impacts on household size or migration patterns.

Impact of low-cost–connection offers on poverty



Source: Tanzania energy sector baseline and follow-up household surveys.
 Notes: The low-cost–connection offers analysis sample includes 4,467 households, with 632 in the treatment group and 3,835 in the control group. Impact estimates are regression-adjusted.
 ** Impact estimate is significantly different from zero at the 0.05 level using a two-tailed test.

Figure 2

For more information, contact Duncan Chaplin at dchaplin@mathematica-mpr.com.

This brief is based on the report, “Grid Electricity Expansion in Tanzania by MCC: Findings from a Rigorous Impact Evaluation” by Duncan Chaplin, Arif Mamun, Ali Protik, John Schurrer, Divya Vohra, Kristine Bos, Hannah Burak, Laura Meyer, Anca Dumitrescu, Christopher Ksoll, and Thomas Cook. Washington, DC: Mathematica Policy Research, February 2017.

