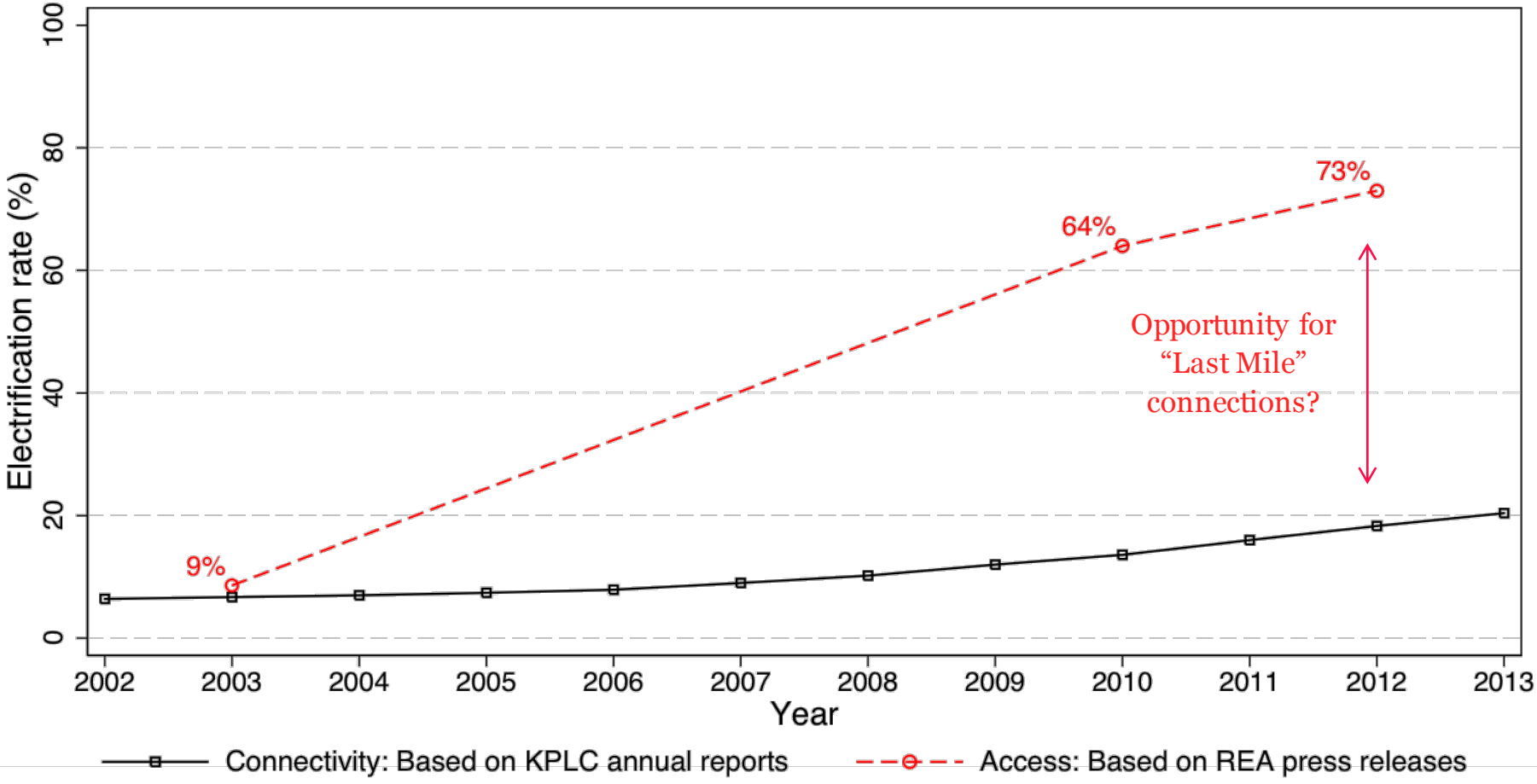
The Problem

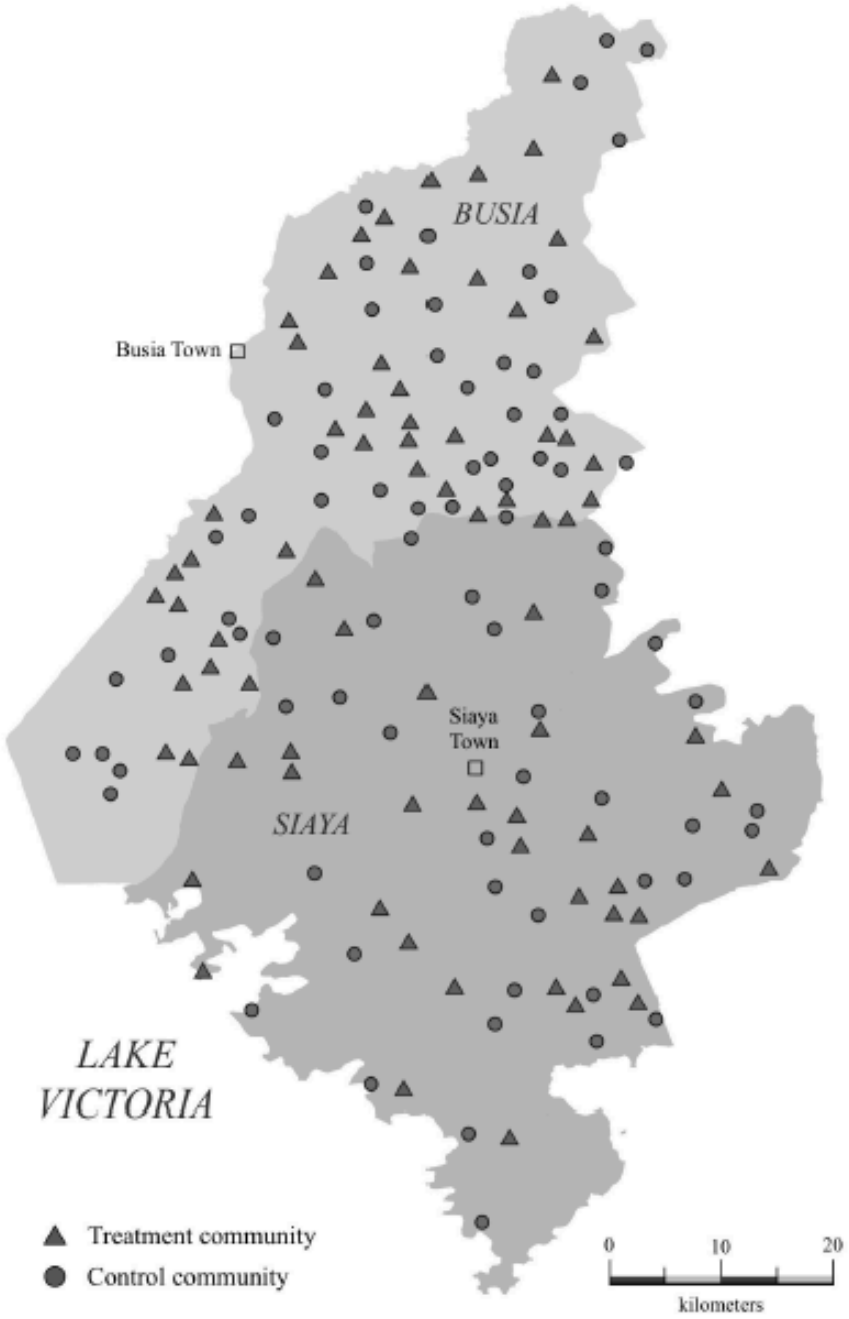
In May 2012, Kenyan newspapers reported that “73% of the population in the rural areas [now had] access to electricity," with “access” defined as living within 1.2km of a low-voltage line.



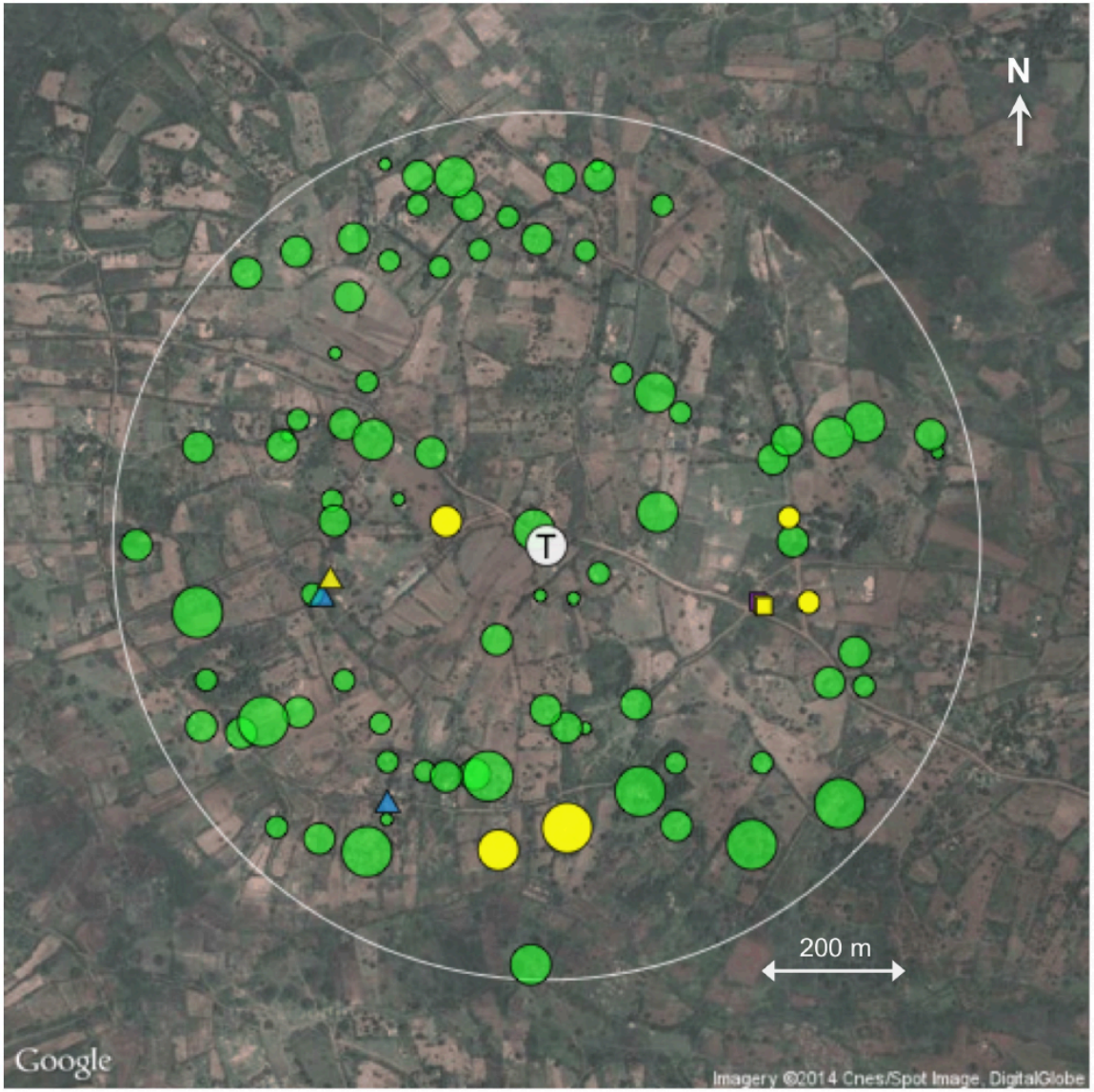
Field experiment

In September 2013, we partnered with Kenya's Rural Electrification Authority (REA) to identify a sample of 150 rural "transformer communities" in Western Kenya.

We followed a selection procedure to ensure that our sample is representative of "under grid" communities in rural Busia and Siaya counties.

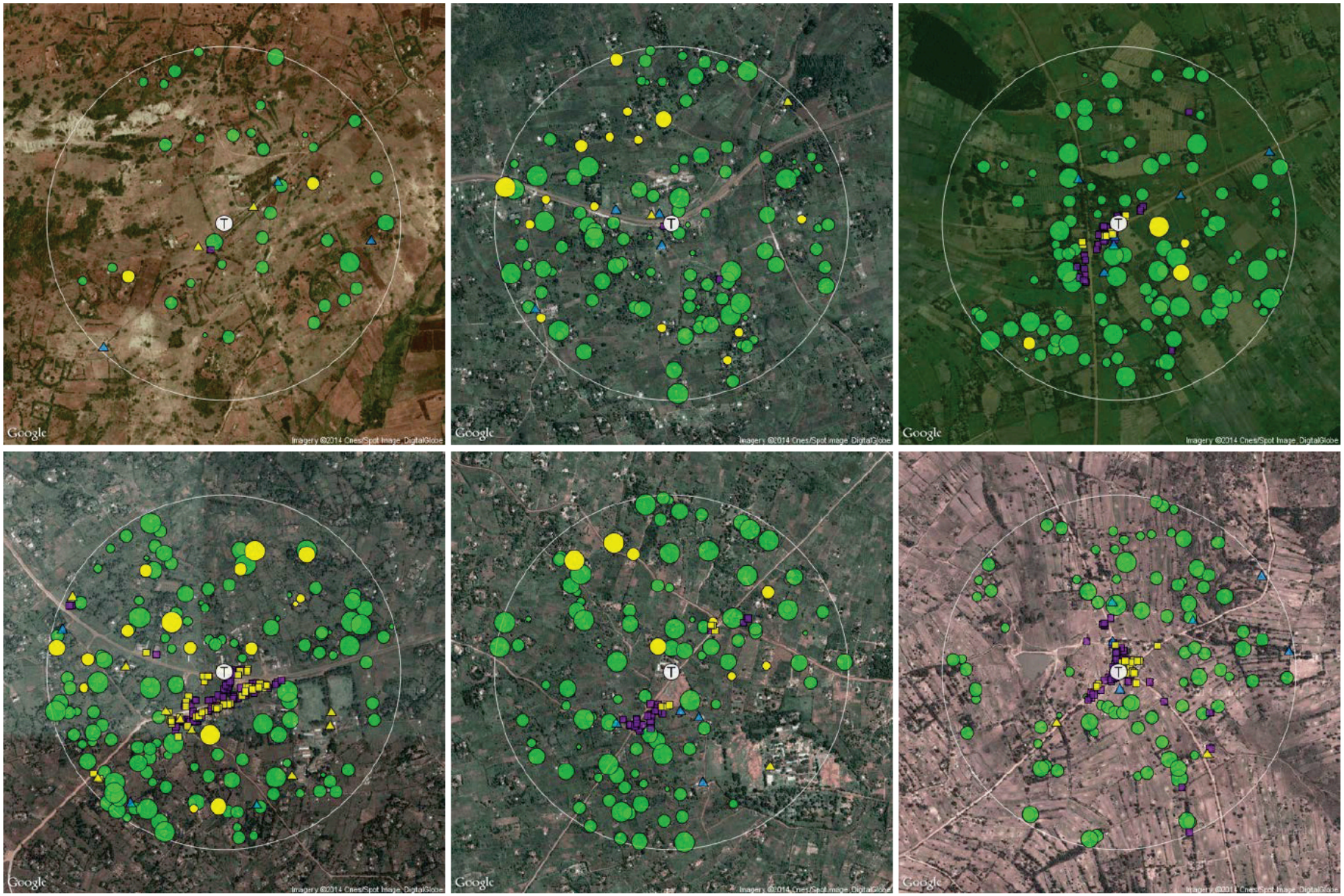


Example of a “transformer community”

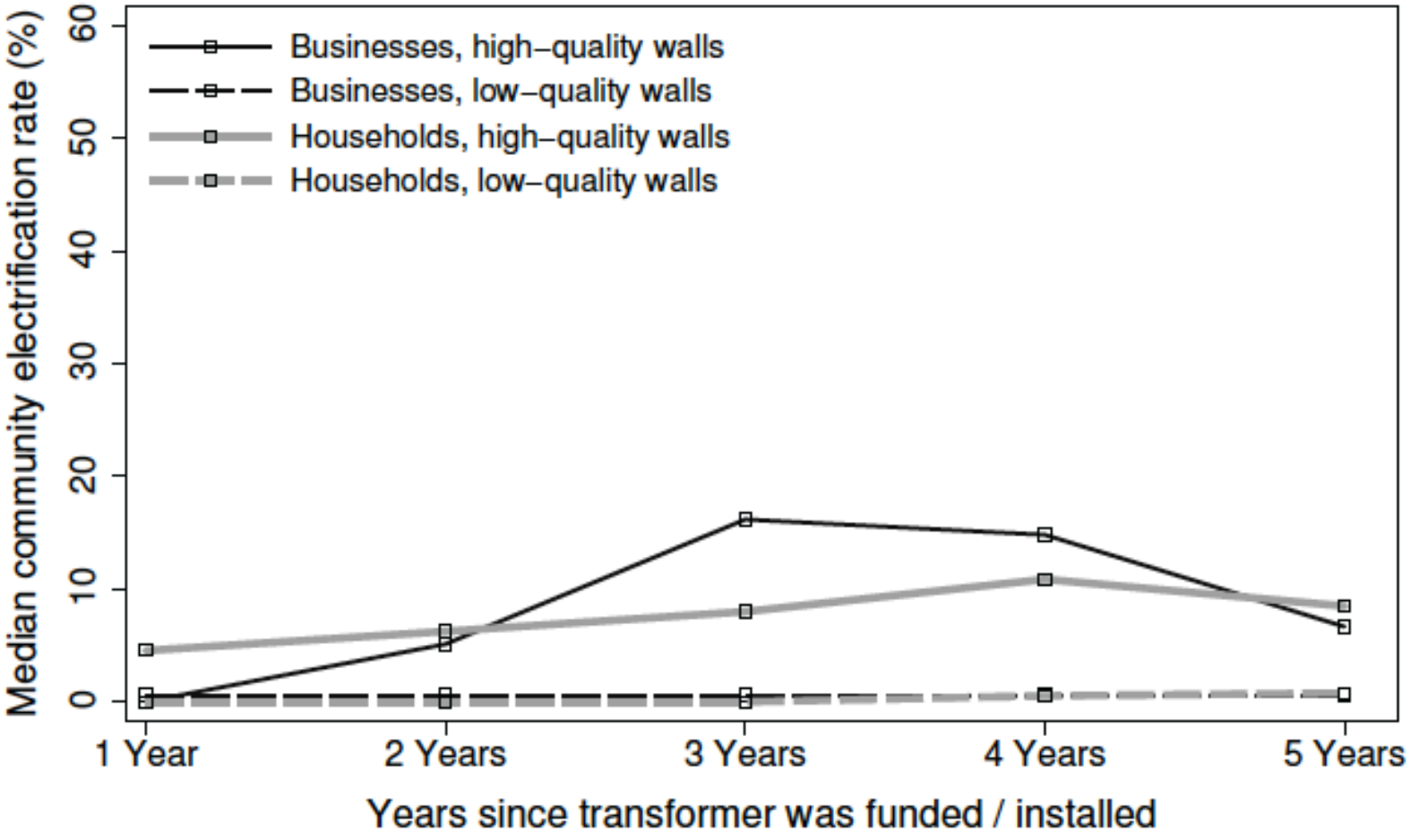


Legend

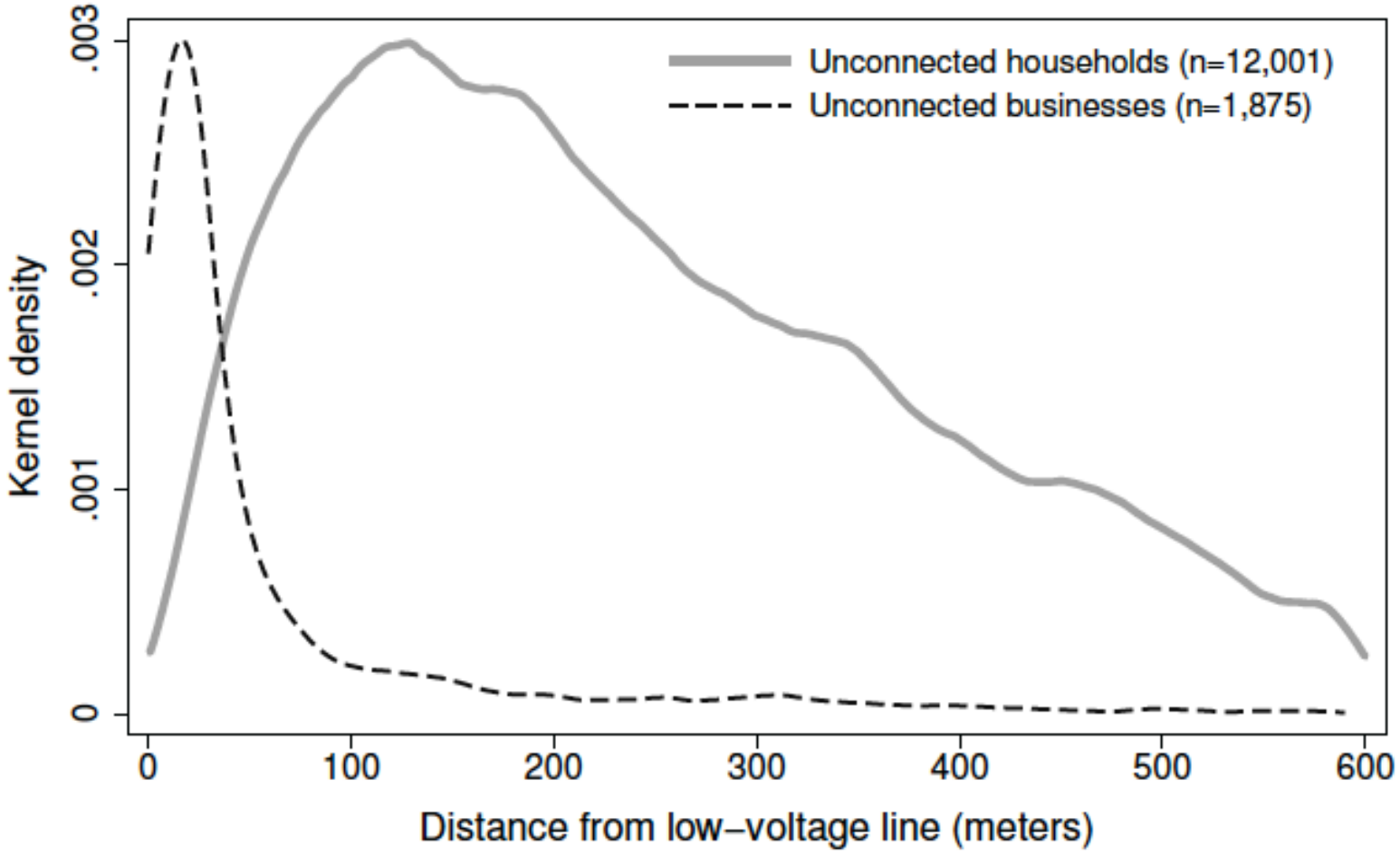
- Transformer & 600 meter radius
- Households (scaled by household size)
- Businesses
- Public facilities (e.g. schools, health)
- Electrified households
- Electrified businesses
- Electrified public facilities



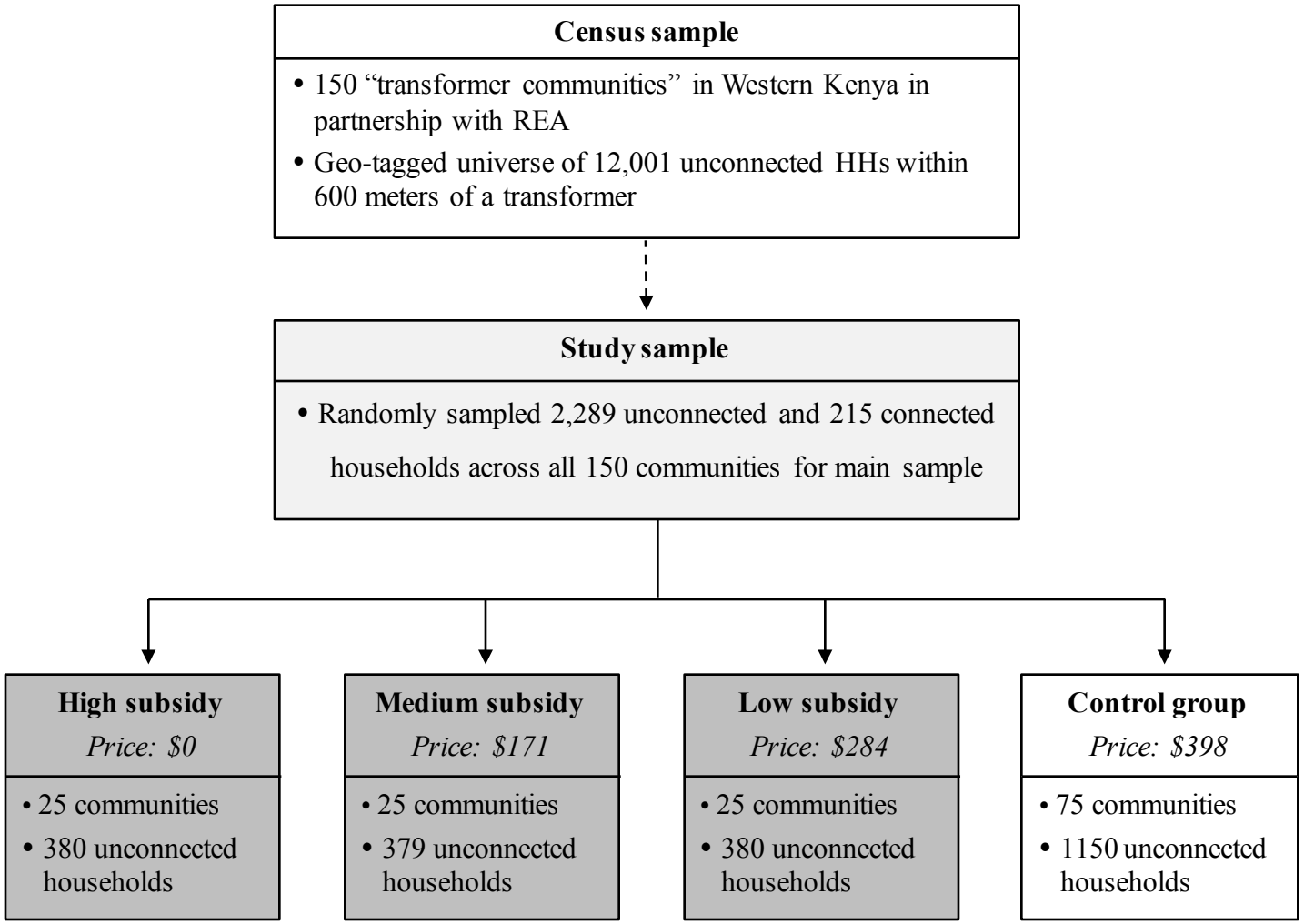
Despite large investments in the rural grid, electrification rates remain low.



Half of the unconnected households in the study are “under grid.”



Experimental design

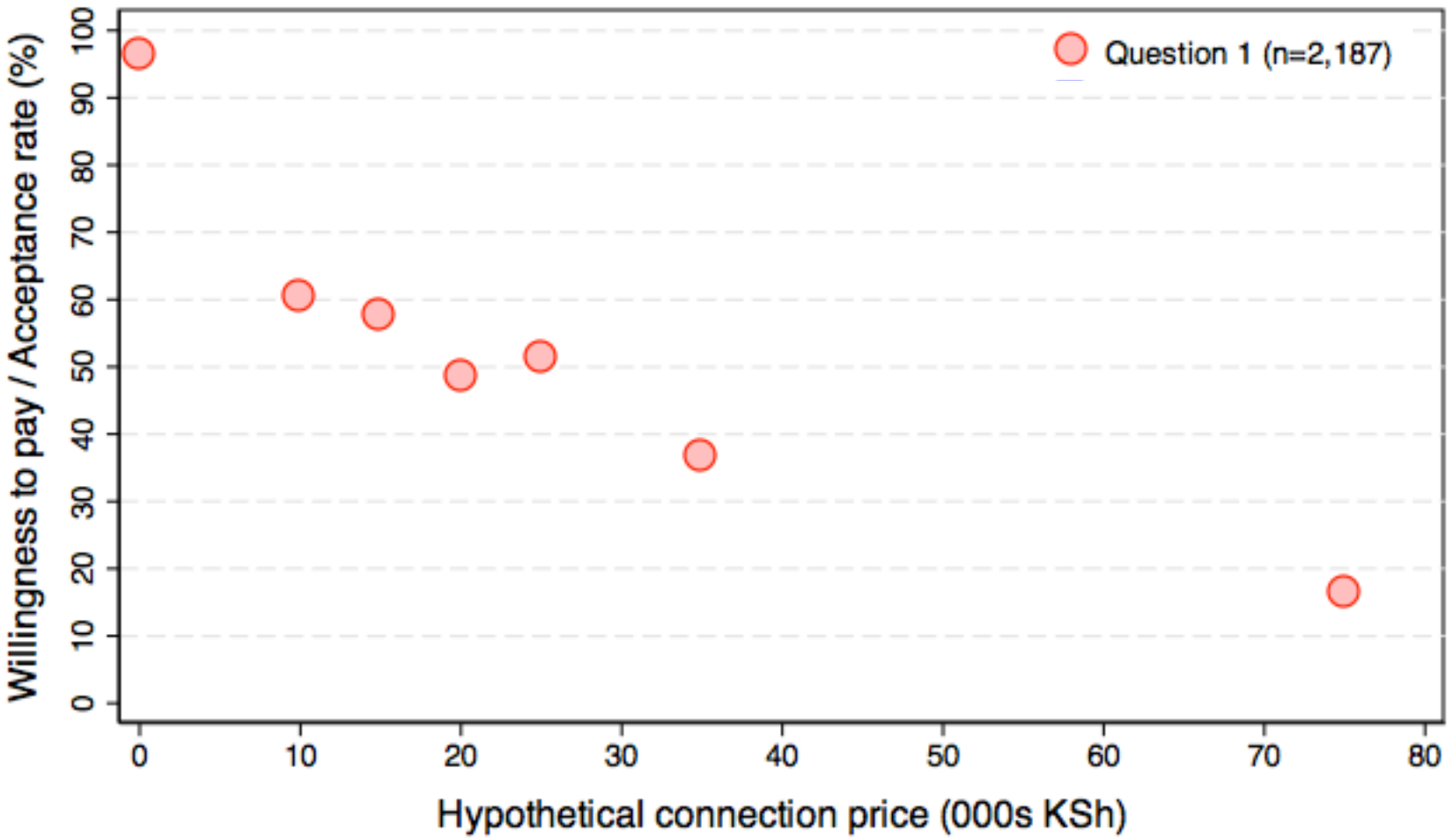


Key Finding 1

1. What is the demand for grid connections?

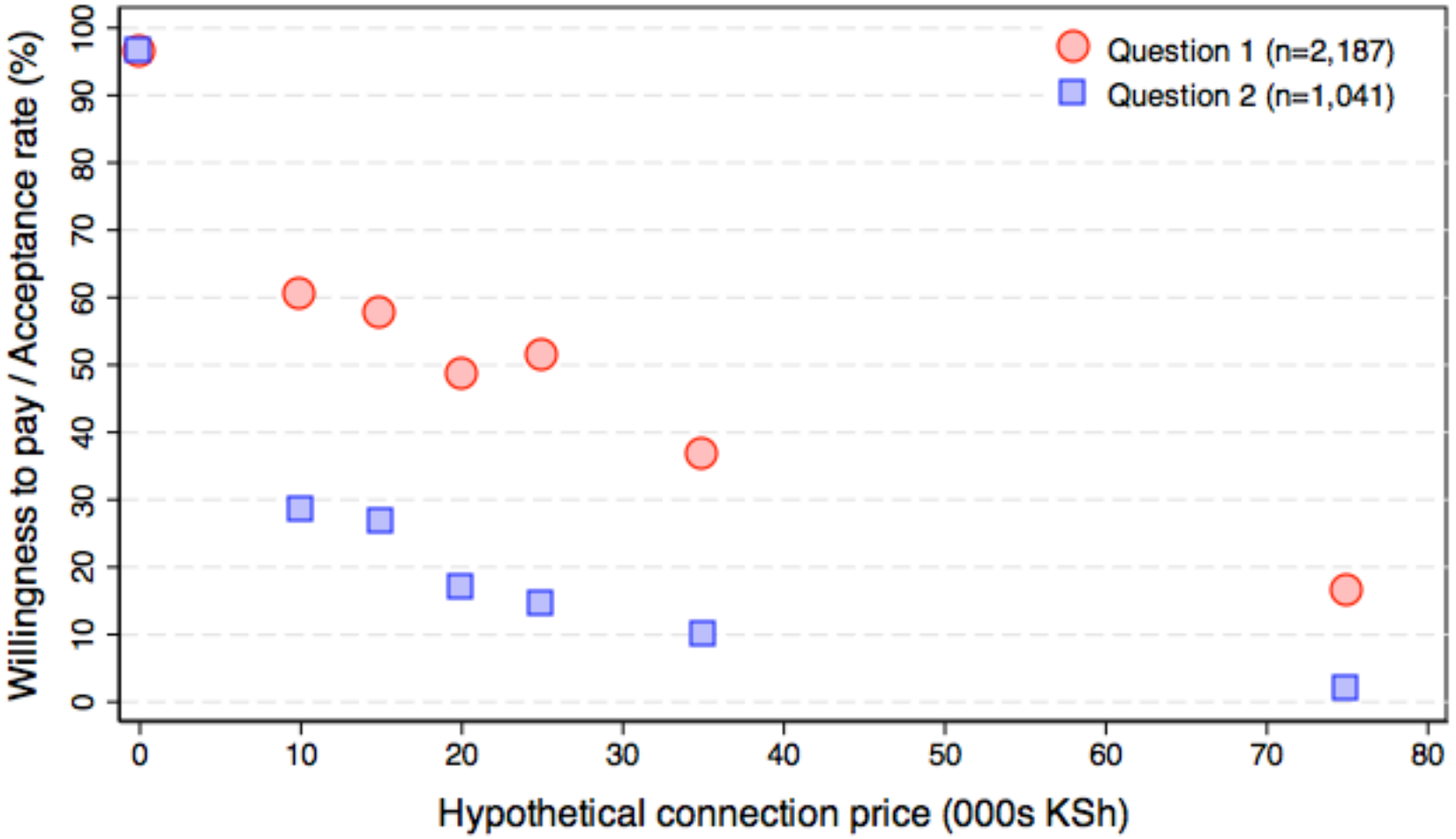
Willingness to pay for electricity connections

Q1. Would you be willing to pay [AMOUNT] KSh for an electricity connection?



Willingness to pay for electricity connections (cont'd)

Q2. Imagine that you were offered an electricity connection at this price today, and you were given 6 weeks to complete the payment. Would you accept the offer?



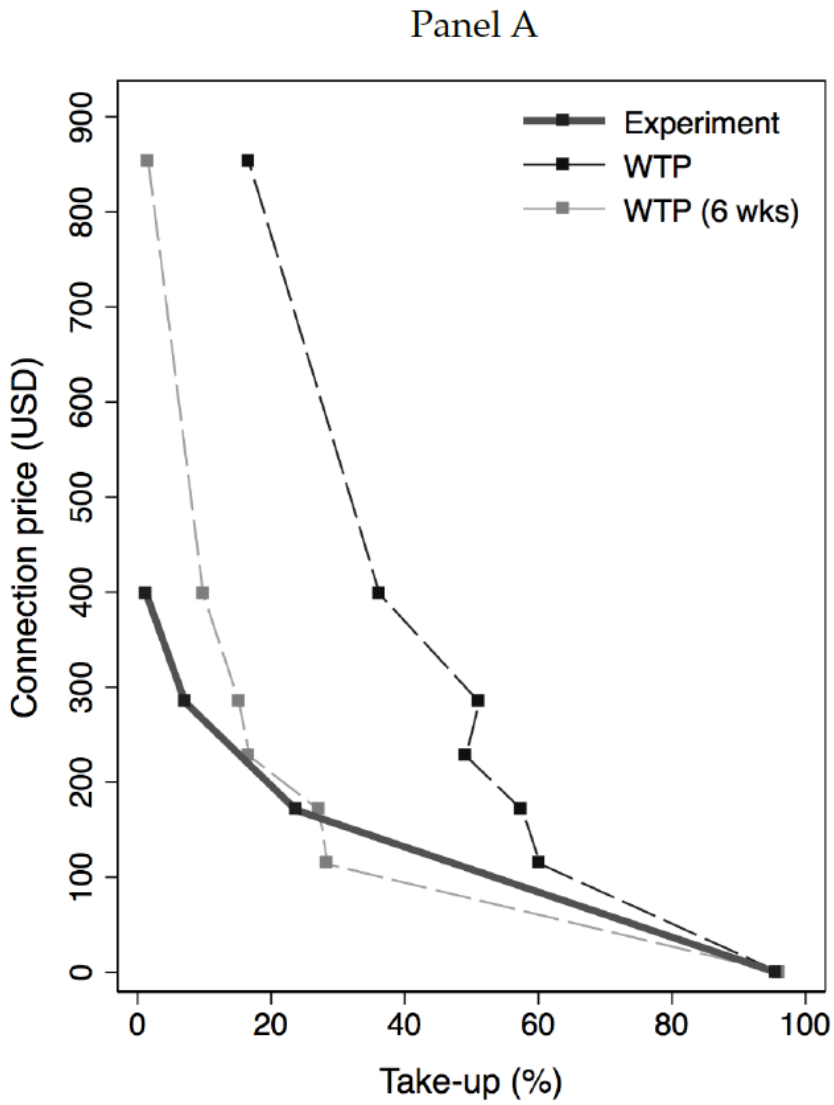
What is the take up rate at Ksh 15,000?

A. 10%
B. 20%
C. 30%
D. 40%
E. 50%

What is the take up rate at Ksh 25,000?

A. 10%
B. 20%
C. 30%
D. 40%
E. 50%

Stated willingness to pay results



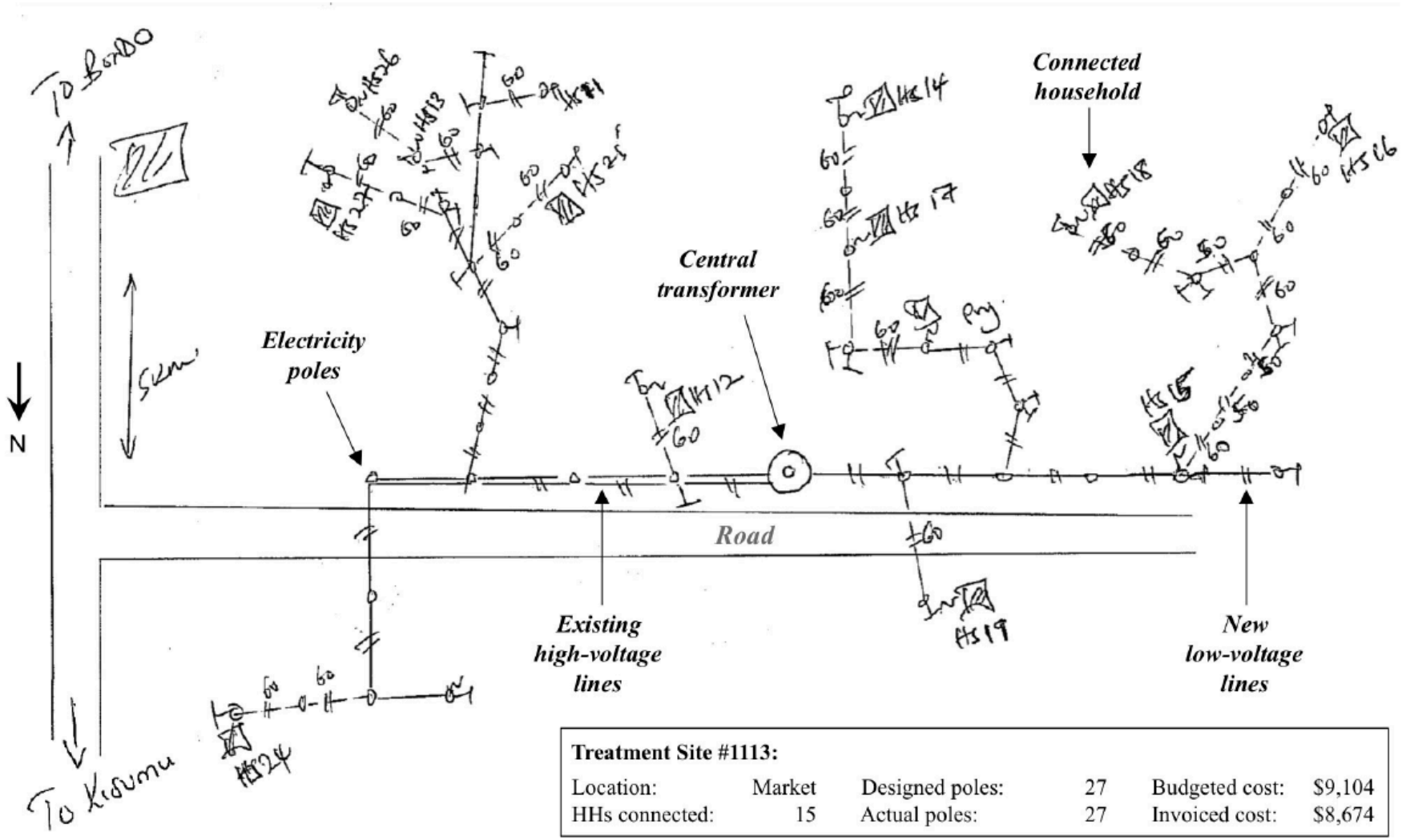
Key Findings (cont'd)

1. What is the demand for grid connections?

Demand declines rapidly with price and is lower than expected by policymakers (or us).

2. Are there economies of scale in mass connections?

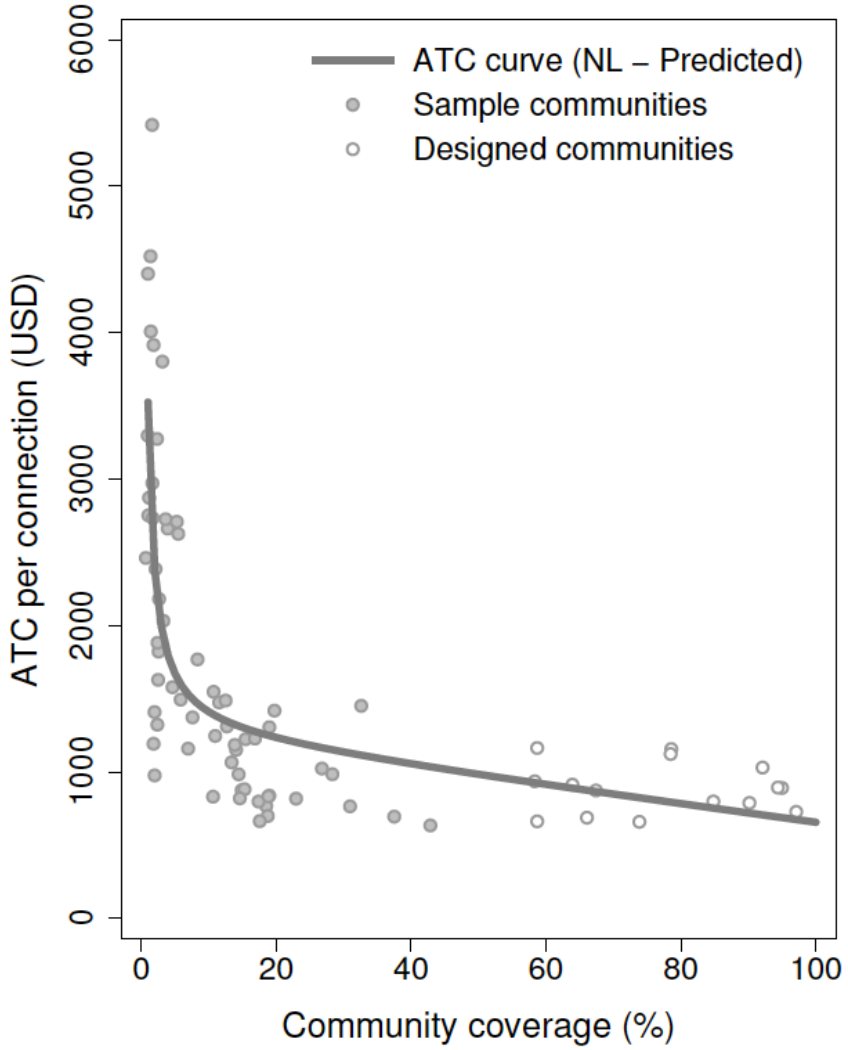
Figure A9—Example of a REA design drawing in a high subsidy treatment community



Treatment Site #1113:					
Location:	Market	Designed poles:	27	Budgeted cost:	$9,104
HHs connected:	15	Actual poles:	27	Invoiced cost:	$8,674

Notes: After receiving payment, REA designers visited each treatment community to design the local low-voltage network. The designs were then used to estimate the required materials and determine a budgeted estimates of the total construction cost. Materials (e.g. poles, electricity line, service cables) represented 65.9 percent of total installation costs. The community in this example is the same as that shown in Figure 2.

Figure 5—Experimental evidence on the costs of rural electrification



The above figures plot budgeted estimates of the average total cost (ATC) per connection per various levels of community coverage (i.e., electrification) for both sample and design communities.

Results (cont'd)

1. What is the demand for grid connections?

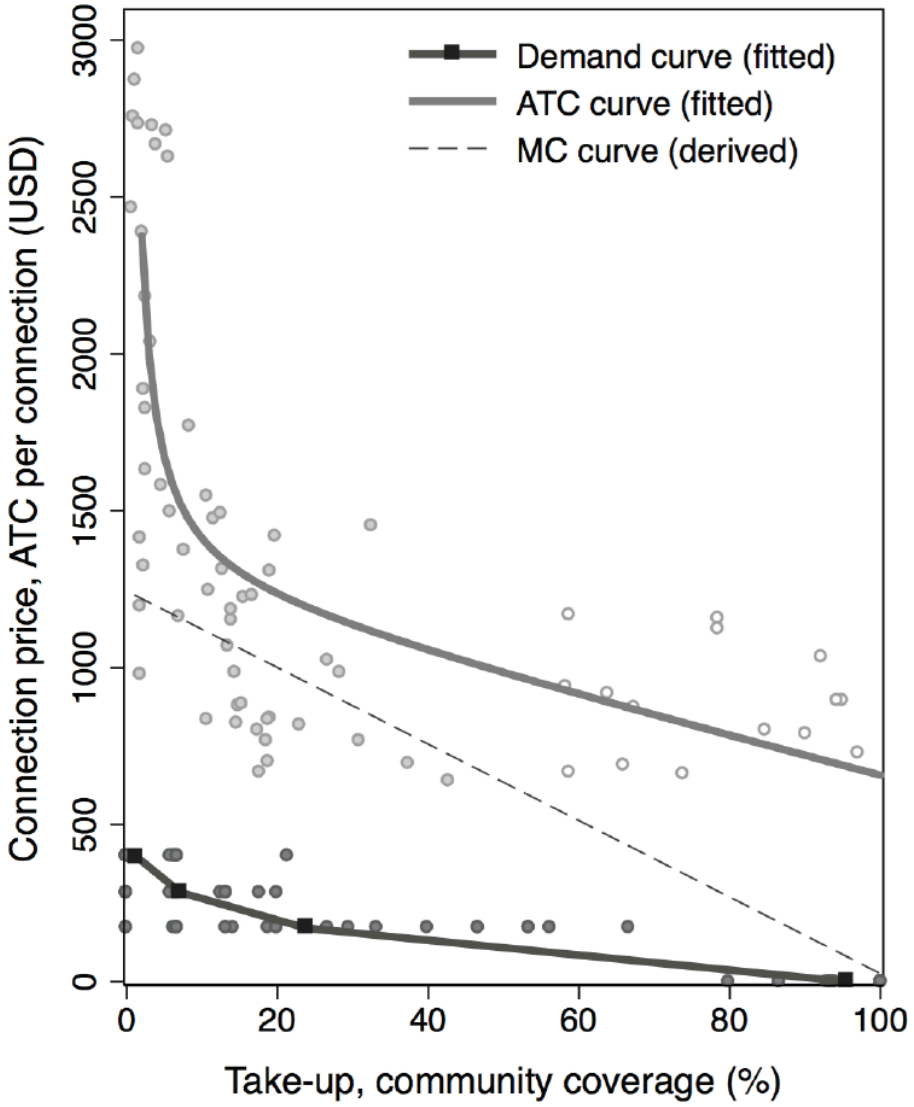
Demand declines rapidly with price and is lower than expected by policymakers (or us).

2. Are there economies of scale in mass connections?

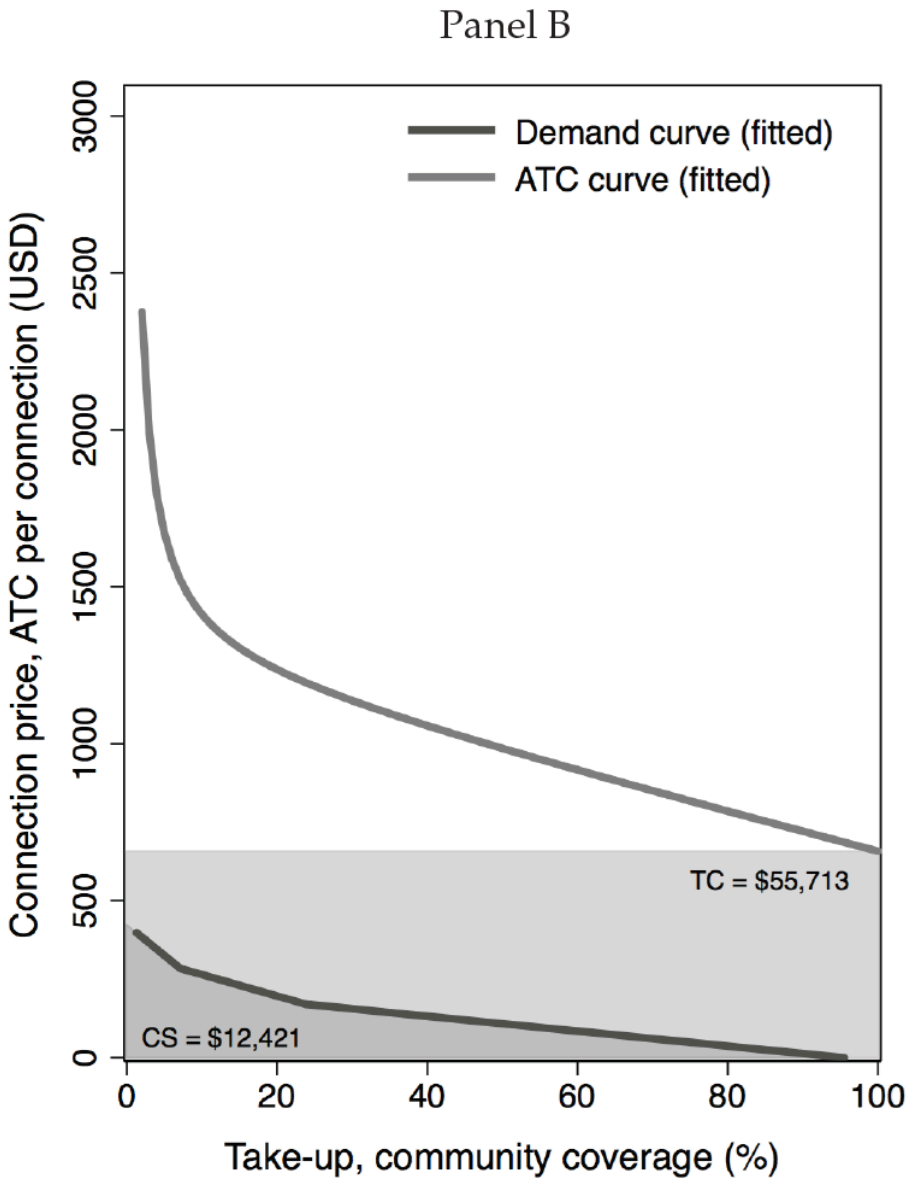
Using actual electrical utility cost data, strong evidence for declining average costs in the range of coverage in the sample (0-40%), up to 100% coverage in communities with designs.

3. What are the welfare implications of a mass household electrification program?

Panel A


Demand curve (fitted)
ATC curve (fitted)
MC curve (derived)
Connection price, ATC per connection (USD)
0
500
1000
1500
2000
2500
3000
0
20
40
60
80
100
Take-up, community coverage (%)

Free mass electrification case



→ **Total Cost 4.5x Consumer Surplus**

→ **Need welfare gains of $511 per household**

Results (cont'd)

1. What is the demand for grid connections?

Demand declines rapidly with price and is lower than expected by policymakers (or us).

2. Are there economies of scale in mass connections?

Using actual electrical utility cost data, strong evidence for declining average costs in the range of coverage in the sample (0-40%), up to 100% coverage in communities with designs.

3. What are the implications of a mass household electrification program?

The price that a consumer is willing to pay for an electricity connection if far less than the actual cost of connecting that consumer.

Comprehensive socio-economic impacts of electrification

Outcomes of interest:

A. Children's education
B. Health
C. Political awareness
D. Social cohesion
E. Household assets
F. Employment
G. Household roster
H. Land and agriculture
I. Energy
J. Markets
K. Time use

Thank you

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