Supplementary Appendix for Online Publication

"Appliance Ownership and Aspirations among Electric Grid and Home Solar Households in Rural Kenya"

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Table A1—Difference between kerosene and home solar households

	Kerosene	Home solar	p-value of diff.
	(1)	(2)	(3)
Panel A: Household head (respondent) characteristics			
Female (%)	63.1	60.1	0.40
Age (years)	52.5	50.6	0.12
Completed secondary schooling (%)	12.1	26.3	< 0.01
Married (%)	64.9	76.8	< 0.01
Not a farmer (%)	22.1	26.3	0.19
Basic political awareness (%)	10.7	18.7	< 0.01
Has bank account (%)	16.0	42.4	< 0.01
Panel B: Household characteristics			
Number of members	5.2	6.0	< 0.01
Youth members (age $\leqq 18$)	3.0	3.3	0.04
High-quality walls (%)	14.3	34.8	< 0.01
Land (acres)	1.9	2.8	< 0.01
Distance to transformer (m)	356.8	353.8	0.77
Monthly (non-charcoal) energy (USD)	5.42	6.53	< 0.01
Monthly kerosene (USD)	3.90	3.41	0.06
Panel C: Household assets			
Bednets	2.2	3.0	< 0.01
Sofa pieces	5.6	10.1	< 0.01
Chickens	6.5	12.1	< 0.01
Radios	0.41	0.55	< 0.01
Televisions	0.16	0.45	< 0.01
Sample size	2,091	198	

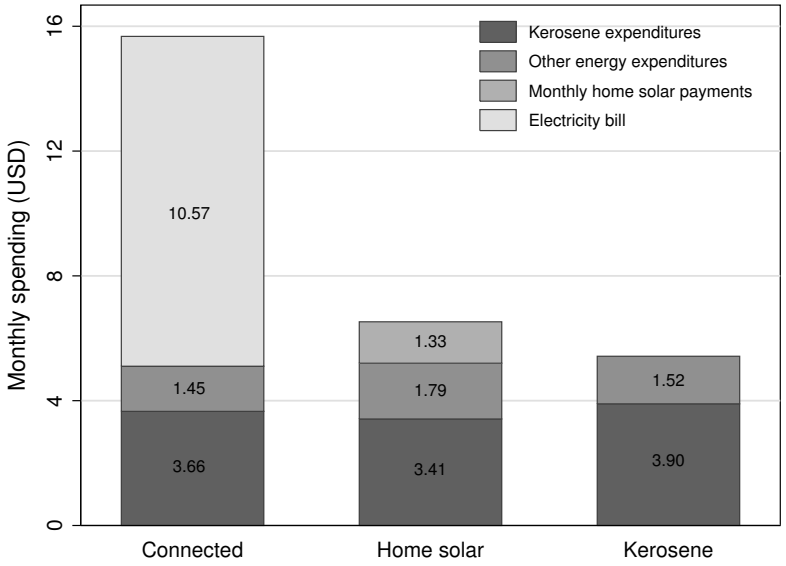
Notes: Columns 1 and 2 report sample means for unconnected households that primarily rely on kerosene and home solar at the time of the survey. Column 3 reports p-value of the difference between the means. Basic political awareness indicator captures whether the household head was able to correctly identify the presidents of Uganda, Tanzania, and the United States. Monthly (non-charcoal) energy expenditures includes kerosene expenditures.

Table A2—Current and future installed capacity in Kenya

(in MW)	2014	%	2031*e*	%
Hydro	827	36.0	1,039	5.3
Diesel	751	32.8	1,955	10.0
Geothermal	593	25.9	5,530	25.6
Gas turbine	60	2.6	2,340	11.9
Wind	26	1.1	2,036	10.4
Nuclear	0	0.0	4,000	20.4
Coal	0	0.0	2,720	13.9
Other	38	1.7	0.0	0.0
Total	2,295	100.0	19,620	100.0
Fossil	*811*	*35.3*	*7,015*	*35.8*
Non-fossil	*1,484*	*64.7*	*12,605*	*64.2*

Notes: Breakdown of 2014 installed capacity is obtained from the website of Kenya's Energy Regulatory Commission. Breakdown of 2031 installed capacity is based on the Government of Kenya's *Vision 2030: Least Cost Power Development Plan*. Fossil fuel energy sources include coal, gas turbines (LNG), and diesel. In the planning documents, an additional 2,000 MW of electricity will be imported through regional interconnections with Uganda, Tanzania, and Ethiopia in 2031. These imports will consist primarily of hydroelectric power sources from Ethiopia and Uganda.

Figure A1—Monthly spending on all energy sources (excluding charcoal)



Notes: Other energy expenditures includes batteries, car battery charging, fuel for generators, and mobile charging. Monthly amounts for kerosene and other energy expenditures are estimated based on household responses to total spending amounts over the last seven days.

Note A1—Additional notes for Figure 1

Based on a survey of 2,504 connected and unconnected households in Western Kenya. Households are divided into three categories: (1) *connected* to the grid ($n = 215$), (2) unconnected to the grid but using *home solar* (e.g. solar lanterns or solar home systems) ($n = 198$), and (3) *unconnected* to the grid with no home solar ($n = 2,091$). For each item, the bars indicate the proportion of households in each group declaring that they either own (dark grey) or desire (light grey) the appliance. Electrical appliances are divided into two categories based on required wattages. Low-wattage appliances can be powered using most solar home products. High-wattage appliances require higher power systems or connections to the grid. In addition, "torch" refers to rechargeable lanterns, "music" includes stereo systems and electronic musical instruments, "kitchen" includes blenders, kettles, microwaves, toasters, water coolers, and food processors, and "income" includes large appliances that are typically used for income-generating purposes, including posho mills, welding machines, blowdryers and shavers, water pumps, and battery chargers.

Note A2—Data sources for Figure 2

In this note, we summarize the data sources used to construct Figure 2.

I. Newly Industrialized Countries (NICs)

All estimates of installed capacity, non-fossil fuel generation and population are obtained from The World Factbook. The list of NICs includes China (CHN), India (IND), Indonesia (IDN), Brazil (BRA), Mexico (MEX), Philippines (PHL), Turkey (TUR), Thailand (THA), South Africa (ZAF), and Malaysia (MYS). Estimates for installed capacity range in date from 2012 to 2014.

II. Sub-Saharan Africa (SSA)

We focus on the top ten electricity producers in Sub-Saharan Africa based on The World Factbook's 2012 rankings. The list of SSAs include Nigeria (NGA), Ethiopia (ETH), Democratic Republic of the Congo (COD), Kenya (KEN), Ghana (GHA), Mozambique (MOZ), Cote dIvoire (CIV), Angola (AGO), Zambia (ZMB), and Zimbabwe (ZWE). For the NICs, we rely solely on The World Factbook estimates. For the SSAs, we examine current and future installed capacities more closely, referring to all types of publicly available sources online. Population estimates are obtained from The World Factbook.

a) Nigeria (NGA)

There are a variety of estimates for recent installed capacity and non-fossil fuel generation. These include USAID Power Africa, which estimates 6,000 MW of current installed capacity and non-fossil fuel generation of 20-30%. We use an alternative, more detailed source, energypedia.info, which provides a list of grid-connected power plants in Nigeria. We exclude the 2015 plant from the list and estimate 2014 installed capacity to be 6,713 MW with 16.19% coming from non-fossil fuel sources. However, it should be noted that in Nigeria, there is a discrepancy between installed capacity and actual capacity due to gas shortages. For future installed capacity, we use the estimates on energypedia.info that cite "The Presidency of the Federal Republic of Nigeria, August 2013, Roadmap for Power Sector Reform, Revision1, p. 24-25." We could not find the original source.

b) Ethiopia (ETH)

We refer to USAID Power Africa for estimates of 2015 installed capacity and non-fossil fuel generation. These estimates are dated to 2015 and cite the "Ethiopian Ministry of Water, Irrigation and Energy (2015)." We could not find the original source. For future installed capacity, we note that according to USAID Power Africa, "Ethiopia aspires to have a total installed generation capacity of 37,000 MWs and become a major power exporter [by 2037]." There are many sources that state that Ethiopia is targeting 37,000 MW by 2037. However, we could not find the Government of Ethiopia's "Power System Expansion Master Plan" which we assume provides the breakdown of future installed capacity. In the news, we find that hydropower covers some 80 per cent of total energy the country plans to generate, followed by geothermal sources ((Article #1), and that "according to the EEPCo, Ethiopia has a potential to produce some 45,000 megawatts of electricity from hydro-power alone" (Article #2). This leads us to the assumption that the majority of (if not all) new capacity will come from non-fossil sources. Furthermore, in a presentation by the Ministry of Water and Energy, delivered in 2013, the next 9,000 MW of capacity will come from hydro, wind, and geothermal. In Figure 2, we assume that all new capacity will come from non-fossil fuel sources.

c) Democratic Republic of the Congo (COD)

Estimates for 2012 installed capacity and non-fossil fuel generation are based on The World Factbook. We could not find any government projections for future installed capacity.

d) Kenya (KEN)

Estimates for 2014 installed capacity are obtained from the Energy Regulatory Commission (ERC) website. Estimates for 2031 installed capacity are based on Kenya Vision 2030. In 2031, non-fossil fuel sources will consist of geothermal, nuclear, wind, and hydro. Fossil fuel sources will consist of coal, gas turbines (LNG), and diesel. These figures are also confirmed on the ERC Least Cost Power Development Plan. We exclude the 2,000 MW of imports that are shown in these figures, since we are primarily interested in installed capacity.

e) Ghana (GHA)

Estimates for 2014 installed capacity are obtained from the Ghana Energy Commission. Current non-fossil fuel generation is based on the list of power plants provided on energypedia.info. In the Ministry of Energys Energy Sector Strategy and Development Plan, there is a target of 5,000 MW by 2015 with 10% coming from (non hydro) renewable sources by 2020. According to USAID Power Africa, the 5,000 MW capacity is targeted by 2016, not 2015. There is no breakdown provided for the 5,000 MW of future capacity. In Figure 2, we assume that 10% of the 5,000 MW will come from renewable sources, and the remainder will come in the same proportion as the existing portfolio. We assume a target year of 2020.

f) Mozambique (MOZ)

Estimates for 2014 installed capacity are obtained from energypedia.info. Estimates of future installed capacity are obtained from news articles citing the Government of Mozambique's (2015-2019) 5-Year Plan (Article #1). We assume that the 3,600 MW of new capacity will consist entirely of hydro sources .

g) Cote dIvoire (CIV)

Estimates for 2012 installed capacity and non-fossil fuel generation are based on The World Factbook. Estimates for 2030 are based on a slide citing CI-ENERGIES 2013. The figure also appears here. We could not locate the original source.

h) Angola (AGO)

Estimates for 2012 installed capacity and non-fossil fuel generation are based on The World Factbook. Future installed capacity based on a Bloomberg article citing 9,000 MW of installed capacity by 2025. We assume that all of this new capacity will be hydro, based on the Energy Information Agency, which states that "Angola has also set an ambitious long-term goal of increasing hydropower capacity to 9,000 megawatts by 2025 by build-

ing up to 15 new plants, with the help of foreign investment."

i) Zambia (ZMB)

Estimates for 2014 and 2018 installed capacity and non-fossil fuel generation are obtained from the Zambia Energy Regulation Board. We assume that the target completion year for the Kafue Gorge Lower Hydropower Project is 2018 based on this source.

j) Zimbabwe (ZWE)

Estimates for 2012 installed capacity and non-fossil fuel generation are based on The World Factbook. We could not find any government projections for future installed capacity.