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Photo: Christopher D. Gore

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Abstract

What happens to political participation when people first get access to electricity? In 2014, less than half of the population of Kenya had access to electricity; by 2023, nearly 80% of the population had some form of access. The state has an ambitious goal of increasing access to 100% by 2030, relying solely on renewable sources. We ask, do people with access to the grid participate differently than those without? Does gaining electricity change patterns of participation? Does engagement vary based on the amount or quality of electricity they receive? In principle, citizens with ready access to electricity participate more, as electricity enables access to political information, frees time that can be used for political engagement, and facilitates political mobilization. We use original survey and focus group discussion data from Kenya to show that electricity grid access decreases some in-person participation, but that this is offset by increased digital participation. The volume of electricity a person has also matters: access to greater quantities of electricity enables communication and information technologies that increase participation.

"You do not have to vie for a post to be a politician, nowadays many people participate in politics through these electric gadgets." Focus group participant, March 2024.

1. Introduction

Over the past several decades, unprecedented technological advancement has changed citizens' political participation around the world. The rollout of digital technology, while not always equitable, can expand citizens' access to the state and other means of political participation. Scholars in both political science and communications disciplines have explored how the internet, social media, and other technology have changed the ways in which people participate politically (Boulianne, 2020; Kubin and von Sikorski, 2021). However, most of this research focuses on high-income countries. In such places, technology can lower the cost of engaging with the state (through activities like emailing elected representatives, making appointments online, or digitally submitting tax returns).

However, less is known about how access to technology affects political participation in lower income countries, where communication technologies like mobile phones are common, but many people lack access to basic electricity services. A recent analysis focused on African countries suggests that access to electricity could actually reduce political participation among most citizens, excepting those who were already active in civil society organizations (CSOs) (Brass et al., 2021). But this earlier research was unable to pinpoint whether African citizens' participation was dimishing, or whether people were instead participating in new, digital ways that were not captured by available survey data.

The impact of electricity on political participation is particularly important in countries that are moving rapidly toward universal electricity access. In Kenya, for example, only about 40 percent of the population had access to electricity in 2015, but by 2023 nearly 80 percent had some form of access, with the goal of universal access by 2030 (World Bank, 2024). We know little about how this rapid service provision rollout will affect people's political behavior.

To further complicate matters, "access to electricity" is not a simple binary construct in lower-income countries (Gore et al., 2025). While uptake of electricity is generally high, there exist "Tiers of Access" (ESMAP, 2014), where people in lower tiers may only have enough electricity to light a single bulb or charge a phone. Those in a middle tier might have power for a television and perhaps an electric kettle, while those in the highest tier can access nearly unlimited quantities of high-quality electricity, and power outages are rare. Consumption remains low for most people (Lenz et al., 2017) due to inadequate financial resources, insufficient generation capacity (Ngowi et al., 2019), or limited output from off-grid sources (Lee et al., 2016). In such contexts, electricity outages are also common

and voltage can fluctuate, making for variation in quality. Scholars have not examined how variation in the quantity and quality of electricity access shapes political behavior.

We thus ask a series of related questions: Do people with electricity access participate differently than those without access? Do people who recently gained electricity participate differently than those who remain without? Does gaining access change individuals' participation behavior? And for each of the above three questions, does the quantity or quality of electricity access correspond with differences in participation? In this paper, we primarily examine access to the national grid, although some analyses also include access to solar and minigrids.

We use a mixed methods approach to answer these questions. In 2023, we surveyed 2530 randomly selected individuals from three Kenyan counties where electricity access was rapidly expanding, using a novel survey instrument designed to capture nuances in electricity use and political behaviors.[1] We were able to locate and re-survey 1388 of those individuals in 2024, during which time eleven percent of them gained access to Kenya's electricity grid. We use these data (accounting for attrition) to examine the relationship between various forms of electricity access and peoples' reported political behaviors.[2] To explore the causal mechanisms underlying these results, in 2024 we held 13 focus group discussions about politics and electricity access with 150 Kenyans.

We find that having or gaining electricity access is correlated with a shift away from in-person forms of participation (like town halls) and toward digital forms (like posting on social media). Consuming higher quantities of electricity, however, correlates with increased participation in both digital *and* face-to-face forms of participation. Focus group discussions suggest that this is driven by improved access to communication and information technology that helps people know when and where to participate and informs them about public issues. The relationship between quality of services and political participation is inconclusive, but focus group discussions reveal that dissatisfaction with services may be an important driver of Kenyans' political participation. Focus groups also revealed that inequities in electricity access can exacerbate participation inequality.

This research is important for practical and theoretical reasons. Political leaders and the international community often rely on arguments about "modernization" pathways, assuming that expanding access to public services like electricity brings societal and political advancement (c.f., Lerner, 1958). Electricity is also understood to provide tangible benefits, like refrigeration for

[1] This paper draws on research supported by the Social Sciences and Humanities Research Council of Canada and the Tobias Center for International Development at Indiana University.

[2] We also ran nearly identical models on a national sample of Kenyans from a phone survey we conducted in December 2020 and repeated in January 2022, and results were similar.

medicines, improved lighting, and access to electricity-powered economic inputs, but also less tangible but politically relevant benefits, like access to information, ideas, and communication infrastructure (Welland, 2017; Bernard, 2012).

However, very few studies have tested these assumptions, and existing evidence from more than two dozen African countres suggests they may not hold (Brass et al., 2021). These relationships are particularly important to explore in places like Kenya, where inequitable access to electricity may amplify political inequalities and contribute to protests (Gore et al., 2025). Theoretically, this research also improves understanding of the more general relationship between service provision and political participation, drawing particular attention to the interplay between service provision and technology as it pertains to citizen-state engagement.

2. Theory

A sizable line of research examines the relationship between service provision and political participation. Studies from Africa have shown, for example, that people who receive education from the state are more likely to join and campaign for a political party (Wantchekon et al., 2015), contact officials (Mattes and Mughogho, 2009),[3] or engage in a range of political activities like registering to vote, voting, or participating in collective action (MacLean, 2011). Parents whose children attend state schools are more likely to campaign or vote (Bleck, 2015). Likewise, those receiving state services more generally (Bodea and LeBas, 2016), and electricity specifically (Blimpo et al., 2018), are more likely to pay their taxes – another means of political participation.

Moreover, modernization theorists have long held that "modern" infrastructure helps create and strengthen a middle class that demands greater democratic participation (Lipset, 1959). In a classic depiction of this, Lerner (1958) shows that when roads, radio, and electricity from Ankara reached the formerly isolated village of Balgat, Turkey in the 1950s, people became more engaged, and democratic values triumphed over deference to the chief. Drawing implicitly on modernization theory, practitioners often assume that giving people access to electricity will spur an increase in political participation (Bernard, 2012; Welland, 2017). Systematic review evidence also shows that electricity-enabled technology leads to increased participation (Lorenz-Spreen et al., 2023, 78).

[3] Mattes and Mughogho focus on formal schooling, some of which may be provided by nonstate actors, so we include this example cautiously.

In this paper, we start with an overarching hypothesis that posits a positive relationship between electricity access and political participation.[4] For this initial hypothesis, we operationalize electricity as a person reporting that their household has electricity from the national grid, and we define political activity broadly, including electoral participation, contacting officials, mobilizing others, attending rallies and town halls, and engaging in political speech in-person, online, or on radio programs.

H1: People with grid access will participate in more political activities, *ceterus paribus*.

Because our survey asks about a wide range of political activities, we can also explore the possibility that electricity might cause a shift in *how* people participate, reducing traditional, face-to-face forms of political participation while enabling new, online forms of participation. Our second hypothesis is:

> **H1a: People with grid access are less likely to participate in face-to-face political activities, but more likely to participate in digital political activities than people without electricity.**

The above hypothesis focuses on differences in between grid-connected and grid-excluded individuals at a given moment in time. To better isolate the relationship between grid access and political participation, our next two hypotheses exploit Kenya's recent, rapid electrification efforts to explore changes in political participation among those who have gained access to the grid. We hypothesize:

> **H1b: Among people who *gain* grid access, political activity is more likely to shift from face-to-face to digital forms of participation compared to those who did not gain access (controlling for those with access in both time periods).**[5]

To make more of a causal claim that grid access affects political participation, we focus our attention narrowly on those who gained grid access between our two rounds of data collection, positing:

> **H1c: When individuals *gain* grid access, their political activity shifts from face-to-face to digital forms of participation compared to their activity before gaining electricity.**

2.1 Does the Quantity or Quality of Electricity Matter?

[4] It is also possible for service provision to reduce participation. In one of the few studies to tackle the question of electricity and participation directly, Brass et al. (2021) find a statistically significant and *negative* relationship between electricity access and contacting government officials and engaging in collective action. Others have also found that the introduction of modern amenities have a demobilizing effect (Arsenault, 1984; Trippett, 1979). Trippett, for example, found the introduction of air conditioning in the US "seduced families into retreating into houses with closed doors and shut windows, reducing the commonality of neighborhood life and all but obsoleting the front-porch society whose open casual folkways were an appealing hallmark of a sweatier America" (Trippett, 1979). Gentzkow (2006) likewise showed that people substituted away from political coverage toward other media when television was introduced in the US, resulting in decreased political knowledge and voter turnout (cf. Prior, 2005; Putnam, 2000).

[5] Hypotheses H1a and H1b do not posit causal links between grid access and political participation; in both cases, there could be confounding factors.

Scholarship has yet to explore whether the quantity or quality of electricity services affect political participation. Probing variation in quantity and quality allows us to begin to explore the underlying mechanisms in the relationship between electricity access and political participation. Here, it may be helpful to draw a distinction between electricity access as public service infrastructure the state invests in and extends to citizens versus electricity as an enabling technology, providing "connective power" (Jacobson, 2007) through appliances or information and communication technologies (ICT) that may be used once someone is connected to that infrastructure. In practice, people tend to experience grid access and use of new tools nearly simultaneously, so it is impossible to observe these as entirely separate phenomena. However, we argue that these different ways to conceptualize access to the grid give rise to different mechanisms related to electricity quantity and quality in how they may change behavior.

2.1.1 Quantity

Scholars have shown that that individuals' quantity of electricity matters for economic (Chakravorty et al., 2014) and socioeconomic outcomes (Aklin et al., 2017). The same may be true for political outcomes. Having more access to electricity or electronic appliances is likely to increase *political* participation as it enables increasing use of technology that provides access to politically actionable information and news through radio, TV, the Internet, and phones, as well as ways to communicate views to the state and mobilize others. Information technology has been called "liberation technology" (Diamond, 2010) that creates a more "connected" or informed citizenry (Jacobson, 2007; World Bank, 2008), which can also be a more "critical citizenry" (Mattes and Shenga, 2007; Mishler and Rose, 1997; Moehler, 2008; Norris, 2001). "Connective" devices, moreover, are usually among the first items purchased when people gain electricity access in Africa (Lenz et al., 2017).[6] They increase urban-rural linkages (Jacobson, 2007), as well as internet and phone use (Baffour Gyau et al., 2026).

Research has shown that people with greater access to information are more likely to participate as citizens (Gottlieb, 2013). Targeted radio campaigns have been shown to increase female voting in the West Bank (Heywood, 2021), and radio exposure in Uganda has been associated with increased self-reported political participation as people became more knowledgeable about politics (Conroy-Krutz, 2018). Higher rates of listening to radio news have also been associated with higher voting levels across African countries (Kuenzi, 2011). And a meta-analysis reviewing more than 300

[6] When asked which appliances they purchased first, our survey respondents said mobile phone, followed by radio, TV, and lighting.

studies found a positive effect of digital media access on offline participation over time (Boulianne, 2020).

Studies about the specific effects of television on political behavior have shown that the introduction of television in Norway increased political knowledge and participation (Sørensen, 2019); that the introduction of Fox News in the US increased voter turnout (DellaVigna and Kaplan, 2007); that viewing information-oriented television, news media, or certain types of internet engagement increased political participation (Prior, 2005; Quintelier and Vissers, 2008); and that gaining television access has been shown to increase women's autonomy in India (Jensen and Oster, 2009).[7]

Increasing people's access to electrical appliances may also save them time (Gurung et al., 2011), enabling people to participate more in politics. Specifically, electricity-powered appliances can increase labor productivity (Kirubi et al., 2009; Radley and Lehmann-Grube, 2022), decreasing laboring hours (Chakravorty et al., 2014; van de Walle et al., 2017).[8] Research in the US has shown that individuals with more free time, such as retirees, participate more in politics, while people with little free time, like those who work multiple jobs, participate less (Verba et al., 1995; Campbell, 2003).

Combining these findings with Kenya's status as an emerging democracy and its strong traditions of political discussion, we hypothesize that:

H2a: Individuals with access to greater quantities of electricity are more likely to engage in political activities than those with less access.

H2b: As individuals gain access to greater quantities of electricity, their political activities are likely to shift from face-to-face to digital forms of participation.

2.1.2 Quality

Electricity can also be seen as public service infrastructure, and the *quality* of public services is known to impact political participation. Poor service quality may increase participation in certain activities, such as protests, when expectations for service provision are not met or quality is low (Bedasso and Obikili, 2016; Harris and Hern, 2019). This line of research highlights the interplay between peoples' expectations of the state and the state's ability to deliver on those expectations. Social contract theory suggests that political participation sometimes occurs when people are dissatisfied with public services

[7] Others have argued that television may weaken democratic participation and social connectivity. Television can be used to frame political information so as to demobilize individuals (Delli Carpini, 2004; Iyengar, 1991). It may also isolate individuals, resulting in decreased social interaction, social capital, and political capital, or reducing the time they participate politically (Quintelier and Hooghe, 2011; Putnam, 2000).

[8] A systematic review by Radley and Lehmann-Grube (2022), however, cites nine studies showing that people expanded their working hours with electricity, which they refer to as "heightened capacity for self-exploitation."

and wish to demand change from the state, through activities like protesting, voting against the incumbent, contacting civil servants or politicians, attending or speaking at a relevant town hall, or calling into a local political radio show

For electricity, specifically, people who face frequent power outages or who have unreliable voltage have different impetuses for participation than those with more consistent voltage to their homes (MacLean, 2026). Given that electricity provision in Africa has historically been seen as the province of the state, despite nearly half of Africans south of the Sahara lacking electricity access (ESMAP, 2023), grid-connected people might perceive their needs to be met and have less incentive to voice concerns (Hirschman, 1970). Indeed, improvements in services in South Africa are associated with lower levels of protest (Fransman and von Fintel, 2023).[9] Based on this research, our final hypothesis is:

H3: Among individuals with electricity access, those with lower quality services are more likely to engage in political activity.

3. Data and Methods

3.1 Case Selection and Descriptions of Data

We use a mix of quantitative and qualitative data from a panel survey and focus groups with Kenyan adults. We focus on Kenya in part because politics and political participation is highly salient, and people discuss politics regularly and openly. Although not a consolidated democracy, the country holds regular and competitive elections and has vibrant media and civil society sectors. This means that Kenyans are likely to respond truthfully to survey questions about political behavior. Kenya is also rapidly expanding electricity access, particularly in the regions we surveyed. This meant that we were likely to find a significant number of respondents who gained access to electricity between the first and second wave of data collection.

To answer our research questions about whether electricity access affects participation, we designed surveys to ask nuanced questions about access to electricity from the national grid and other sources, such as solar home systems and localized minigrids, alongside a range of demographic controls. The surveys also incorporated questions that are rarely part of standard surveys, including questions about multiple dimensions of political participation, such as electricity-enabled forms of

[9] Poor quality public services has also been shown to correspond with citizens disengaging from the state between elections, partly out of frustration or apathy and partly because they lack the infrastructure to effectively engage the state (Bleck and Michelitch, 2015, 620). In electoral authoritarian regimes, there may even be a negative relationship between public service quality and political engagement (Croke et al., 2016).

political communication.[10] We implemented two waves of this in-person survey in three counties in Kenya in 2023 and 2024.[11]

The in-person survey focused on Kakamega, Trans Nzoia, and Uasin Gishu counties, which were all located in the focal area of Kenya's main electricity expansion initiative – the Last Mile Connectivity Project – during this time period. These counties are representative of Kenya as a whole in two ways. First, they are all within one standard deviation of the national average on poverty level, fertility, population density, and registered voter coverage. Second, they correspond with the spectrum of historic political affiliations, ensuring representative political variation.[12] The counties also border one another, making it logistically feasible to conduct surveys and focus groups.

All surveys were implemented in partnership with Trends and Insights for Africa (TIFA), a Nairobi-based research firm. TIFA researchers randomly selected 2530 individuals in our three study counties for the first round of the in-person survey in 2023 and then returned to the same households for a follow-up survey in 2024. 1388 of these individuals completed the second round in 2024 (See Appendix for more information on and analysis of attrition). The in-person survey took approximately one hour, and respondents received approximately $2.50 in compensation upon completion of the second survey.[13]

To avoid ethical questions that could arise from interfering directly in how Kenya provides services, we made use of the ongoing Last Mile Connectivity Project happening during this period, which had the goal of achieving universal electricity access. Eleven percent of respondents in our survey gained connection to the electricity grid between 2023 and 2024 during this project.

Although respondents who did and did not gain access to the grid are not identical, nearly all differences are substantively minor. For example, those who gained access to the grid are statistically

[10] Baldwin et al. (2022) highlight that surveys often define political participation in narrow terms (e.g., contacting and voting) that fail to capture emergent and electricity-enabled political activities, and call on researchers to use more nuanced measures of political participation.

[11] We asked similar, but less extensive questions in a nationwide phone survey conducted in December 2020 and January 2022 as a robustness check, and to explore whether results from our three-county survey are generalizable to Kenya as a whole. We do not report these findings due to the timing of the survey during the Covid-19 pandemic, which almost certainly affected responses in December 2020. But the findings are similar, and are available upon request.

[12] Selecting average counties on political affailiation would have made them all swing or competitive counties, which is not actually representative, and may have biased measures on the dependent variables. Note as well that political affiliation correlates with level of electricity access in the first year. Uasin Gishu is the ancestral home to the sitting President at the time of the survey, and to the longest-serving former president; it also has the highest electricity access rates among the three counties. Kakamega voted decisively for the opposition in the past several elections and has relatively low electricity access rates. And Trans Nzoia is a competitive county during elections, with a median level of electricity access.

[13] This amount was chosen carefully, following extensive discussions about the ethics of compensation among among North American and Kenyan co-authors and the Kenyan research firm we worked with to implement the survey (Porisky and MacLean, 2025).

younger, better educated, and have fewer children, on average, but both groups average between 35 and 44 years of age, have finished primary school or started, but not finished secondary school, and have 2 or 3 children, on average (See Appendix Table A2). There is no difference in the groups on income.

The only substantial difference is that respondents who gained access to the grid were more often men, although this is expected due to government requirements for land ownership. The absence of substantive baseline differences outside of gender reduces our concern about static selection. When combined with focus group discussion data, this allows us to make suggestive claims about causality.

Following the second round of surveys, we conducted thirteen focus group discussions (FGDs) to understand the mechanisms of how and why electricity access changes people's lives, including their political participation. We spoke with 150 people in March and April 2024 in the three surveyed counties. We held two focus groups in each county in a rural area and two in an urban area. Of these, one group was comprised of participants aged 40 or younger with the other over-40.[14] Participant selection was limited to those with electricity access, as we were seeking to understand how electricity had changed their experiences. FGD participants explained their experiences gaining electricity access, variation in lived experience depending on sources of access (e.g., how quality of power varies between solar and grid electricity), and whether and how electricity has changed their lives, among other things.

Table 1. Source of Electricity among Focus Group Participants

Electricity Source	***Urban Participants***	***Rural Participants***
National Grid	62%	38%
Small Solar System or Batteries	6%	19%
Both Solar and Grid	26%	17%
Did not Identify	6%	26%

3.2 Modeling

We use three different modeling approaches that align with our first three research questions. In our first set of models, we explore whether respondents who had grid access in 2023 participate differently

[14] The first FGD was an exception to this and was age-inclusive, rural, and in Uasin Gishu.

from those who did not. For these models, we use cross-sectional data from the full 2530 respondents surveyed in 2023 to examine correlations between grid access and various forms of participation.[15]

In our second set of models, we examine whether those who *gained* grid access participate differently than those who did not. For these models, we focus on the 1388 respondents who completed both waves of the survey. We create a dummy variable denoting those who gained access between the two survey rounds and again analyze the data cross-sectionally, this time focusing on political behavior in 2024, but exploring whether the recent electricity grid-gainers participate differently from others. These models are weighted to account for non-random attrition between the two survey rounds.

In our third set of models, we examine whether individuals who gained access participate differently than they did before they were grid-connected. In these models, we again restrict our focus to the 1388 individuals who repeated both surveys and use fixed effects models to show how grid access affects political individual-level participation.[16] Compared to the other two modelling strategies, these models come closest to providing causal estimates of the effect of electricity on participation, although we cannot rule out the possibility that there may be confounding factors that correlate with both electricity access and political participation.

Across all three modeling strategies, we explore nuance in both the dependent and independent variables, summarized here and described in more detail below. To explore questions about whether grid access is associated with changes in the way people participate, we run models with multiple iterations of the dependent variable, including both face-to-face and electricity-enabled forms of participation. To explore questions about whether the quantity or quality of electricity matters, we use iterations of the independent variable that explore nuance in quality or quantity of electricity. To explore whether our results are sensitive to our choice to define "electricity access" as "grid access," we run additional models that define electricity more broadly to include access from solar home systems or minigrids and report these model results in the Appendix. Depending on the structure of the dependent variable (e.g., continuous or binary), models use either negative binomial or logistic regressions. Qualitative analysis of focus group discussions supplements the models by allowing us to probe the mechanisms by which changes happen.

3.3 The Dependent Variables: Political Participation

[15] We ran these models using the sample of 1388 respondents who completed both rounds of the survey, and results were nearly identical to those presented here.

[16] Fixed effects models are preferable to random effects models, given the likelihood of omitted variables, the strong assumptions required for random effects, and the results of Hausmann tests.

Our dependent variables measure people's political participation. Respondents were asked if they had done the following in the past year: 1) contacted a civil servant, 2) contacted a politician, 3) mobilized others for a cause, 4) attended a rally, 5) attended a protest, 6) attended a town hall (known locally as a *baraza*), 7) spoken at a town hall (*baraza*), 8) called into a radio show for political reasons, 9) posted political content on social media (including WhatsApp groups), 10) responded to political content on social media, and 11) registered to vote.[17] In all of our analyses, we start with an aggregate measure of political participation that adds these individual activities into a continuous additive dependent variable. However, this additive measure may obscure shifts in individual behaviors. To explore these shifts, we also run a series of models that use binary indicators of individual political activities as dependent variables.

3.4 Explanatory Variables

Our primary independent variable of interest is access to the national grid. In both survey rounds, we asked people whether they had electricity access in their home, and, if so, what the source(s) were (e.g., the grid, a localized minigrid, a solar home system, or a solar lantern). Based on their responses, we generated two binary variables, one denoting grid access and one denoting access through a solar energy or a minigrid.[18]

We focus our primary analysis on the binary "grid access" variable. Depending on the modeling strategy, some models used this variable directly, while in other models we generated a binary change variable (called "no elec to grid" in tables) indicating whether an individual gained access to the grid during our study period.[19] Since some people have electricity from things like a solar home system, a solar lantern, or from multiple sources, we include a binary "solar or minigrid in year 1" variable as a control variable in many of our models, which allows us to isolate differences among those who had a non-grid form of electricity in the first period and those with no electricity access from any sources. While our primary research questions and hypotheses focus on grid access, not access via off-grid solutions, our modeling strategies allows us to explore whether these more limited

[17] We use registered to vote rather than actually voting because there were no elections between the survey rounds. We found that in 2023, 85% of respondents said they were registered to vote. 86% said they voted in the 2022 elections. Since the vast majority of Kenyans vote, this measure may primarily add noise to the aggregate measure. We include it based on comments on prior versions from discussants at conferences.

[18] For sensitivity analyses presented in the Appendix, we created a third variable measuring whether the person has access to electricity from any source.

[19] Between the survey waves, respondents' access to the national grid rose from 37 to 51 percent. Increases are largely due to the government's Last Mile Connectivity Project that was started in the mid-2010s and continued into 2024 (Kenya Power, 2024).

forms of access affect political participation in the same way as grid access. We discuss these implications briefly in the discussion section and in the Appendix.

To address our questions about whether the quantity of electricity matters, we use a measure that proxies for quantity of access by measuring the number of electricity-powered devices and appliances (max = 15) that respondents report having in their home. While we recognize that this is an imperfect measure of access because device ownership is not perfectly correlated with electricity usage, we also note that this variable is not highly correlated with income (Pearson's correlation = 0.37). More importantly, it allows us to operationalize the tiers of access framework (ESMAP, 2014). In our 2023 data, about 50% of people owned two or fewer devices; about 40% owned three to five devices, about 10% owned six or more devices, and fewer than 1% owned more than 10 of the devices listed. This measure allows us to see whether having or gaining access to greater *quantities* of electricity affects political participation. This is important since peoples' actual level of access varies significantly in Kenya, even among people with grid access in their home.

Finally, to address our questions about whether the quality of access matters, we also have proxies for quality of access. First is the number of days or change in days that a respondent reports having experienced a power outage within the past month. More days of outages correspond to lower quality. Because only people with access to the electric grid answered this question, however, we also use a measure of respondents' subjective assessments of satisfaction with their electricity services.

In our cross-sectional models, we control for gender, education, age, county of residence, community organization engagement, income, and self-reported interest in current events. We also control for access to solar electricity in the first year in most models. Doing so means that results are cleanly about gaining access to grid electricity; without the control, models do not distinguish between respondents who have no electricity at all in year one and those who have access to a solar home system or solar lantern in year one. Our fixed effects models use a more parsimonious modeling strategy that minimizes the use of time-invariant control variables.

Table 2. Mean and Standard Deviation for Variables Used in Analyses, by Year[20]

	Full Sample								**Never Had Grid**				**Gained Grid**				**Always Had Grid**			
	2023				**2024**				**2023**		**2024**		**2023**		**2024**		**2023**		**2024**	
	(N = 2,530)				(N = 1,388)				(N = 614)		(N = 614)		(N = 233)		(N = 233)		(N = 473)		(N = 473)	
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Dependent Variables																				
Participation Index	2.93	2.09	0.00	11.00	3.22	2.26	0.00	11.00	3.00	1.92	3.16	2.14	2.99	2.20	3.44	2.52	3.22	2.35	3.29	2.31
Contact Civil Servant	0.44	0.50	0.00	1.00	0.49	0.50	0.00	1.00	0.51	0.50	0.50	0.50	0.39	0.49	0.45	0.50	0.50	0.50	0.51	0.50
Contact Politician	0.22	0.41	0.00	1.00	0.26	0.44	0.00	1.00	0.23	0.42	0.24	0.43	0.20	0.40	0.21	0.41	0.27	0.44	0.30	0.46
Mobilize Others for a Cause	0.18	0.39	0.00	1.00	0.27	0.44	0.00	1.00	0.21	0.41	0.27	0.44	0.18	0.39	0.27	0.45	0.21	0.41	0.28	0.45
Attend Party / Candidate Rally	0.40	0.49	0.00	1.00	0.25	0.43	0.00	1.00	0.43	0.50	0.22	0.42	0.45	0.50	0.31	0.46	0.43	0.50	0.26	0.44
Attend Protest / Demonstration	0.04	0.20	0.00	1.00	0.05	0.21	0.00	1.00	0.01	0.11	0.03	0.18	0.05	0.21	0.08	0.27	0.06	0.24	0.04	0.21
Attend Town Hall	0.29	0.46	0.00	1.00	0.36	0.48	0.00	1.00	0.34	0.47	0.41	0.49	0.36	0.48	0.35	0.48	0.28	0.45	0.33	0.47
Speak at Town Hall	0.16	0.37	0.00	1.00	0.20	0.40	0.00	1.00	0.19	0.39	0.23	0.42	0.17	0.37	0.23	0.42	0.16	0.37	0.16	0.37
Call Radio re: Politics	0.04	0.19	0.00	1.00	0.05	0.22	0.00	1.00	0.03	0.17	0.05	0.22	0.03	0.18	0.07	0.25	0.04	0.19	0.04	0.20

[20] 68 people in the sample lost access between 2023-2024. We do not focus on them in this analysis.

Post Politics on Social Media	0.13	0.34	0.00	1.00	0.16	0.37	0.00	1.00	0.08	0.27	0.12	0.32	0.13	0.34	0.24	0.43	0.16	0.37	0.19	0.39
Responded on Social Media	0.17	0.38	0.00	1.00	0.23	0.42	0.00	1.00	0.12	0.32	0.17	0.38	0.17	0.37	0.31	0.46	0.23	0.42	0.27	0.45
Registered Voter	0.85	0.36	0.00	1.00	0.90	0.30	0.00	1.00	0.86	0.35	0.90	0.30	0.85	0.36	0.92	0.27	0.88	0.33	0.90	0.31
Voted in 2022	0.86	0.35	0.00	1.00	.	.	.	.	0.88	0.32	.	.	0.84	0.37	.	.	0.87	0.34	.	.
Independent Variables																				
Electricity Access	0.61	0.49	0.00	1.00	0.74	0.44	0.00	1.00	0.43	0.49	0.49	0.50	0.37	0.48	1.00	0.00	1.00	0.00	1.00	0.00
Grid Access	0.37	0.48	0.00	1.00	0.51	0.50	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Elec Quantity (# Appliances)	2.99	1.86	0.00	14.00	3.78	2.35	0.00	15.00	2.24	0.99	2.36	1.01	2.18	1.17	5.15	2.40	4.39	1.92	5.15	2.46
Elec Quality (Satisfaction)	3.16	1.17	1.00	5.00	3.31	1.20	1.00	5.00	2.87	1.18	2.64	1.23	3.13	1.14	3.57	1.05	3.57	1.05	3.63	1.05
Elec Quality (Outages/Month)	5.21	4.95	0.00	30.00	5.69	5.30	1.00	30.00	.	.	.	.	.	.	6.05	5.27	5.37	5.12	5.51	5.32
Elec Quantity Change	.	.	.	.	0.72	2.48	-10.00	14.00	.	.	0.12	1.25	.	.	2.97	2.71	.	.	0.77	2.78
Elec Quality Change (Satisfaction)	.	.	.	.	0.06	1.49	-4.00	4.00	.	.	-0.16	1.62	.	.	0.44	1.51	.	.	0.06	1.35
Elec Quality Change (Outages/Month)	.	.	.	.	0.14	6.30	-27.00	30.00	.	.	.	.	.	.	.	.	.	.	0.14	6.30
Controls																				

Education	3.96	1.66	1.00	7.00	4.06	1.74	1.00	7.00	3.46	1.52	3.51	1.59	4.07	1.64	4.16	1.72	4.48	1.62	4.64	1.73
# CSOs	3.12	2.41	0.00	11.00	4.01	2.42	0.00	11.00	3.25	2.21	3.82	2.44	3.65	2.62	4.50	2.52	3.23	2.50	4.03	2.37
Age	4.15	2.76	1.00	10.00	4.62	2.67	1.00	10.00	4.88	2.85	5.19	2.76	3.78	2.59	4.15	2.44	3.86	2.60	4.18	2.54
Gender	0.61	0.49	0.00	1.00	0.61	0.49	0.00	1.00	0.64	0.48	0.64	0.48	0.55	0.50	0.55	0.50	0.61	0.49	0.61	0.49
Income	2.36	2.02	1.00	20.00	2.87	2.11	1.00	16.00	2.14	1.92	2.22	1.59	2.02	1.45	3.59	2.13	2.73	2.05	3.45	2.48
Interest in Current Events	4.85	2.82	0.00	7.00	5.26	2.41	0.00	7.00	5.11	2.75	5.03	2.60	4.40	2.91	5.25	2.14	5.48	2.42	5.65	2.15

*Note – these columns do not account for respondents' access to solar lanterns, solar home systems, or minigrids, as these also change across the years. For example, of the 233 people who gained access to the grid during our study, 66 owned a solar home system in 2023, and 46 owned such a system in 2024. In models depicted in Figure B, we report effects only for people who had no electricity from any source in 2023 and grid access in 2024. Note also that models using both years were run on a restricted sample with weights for attrition.

4. Results

4.1 Do People with Electricity Access Participate Differently than Those Without Access?

We begin by examining whether people with access to electricity participate differently than those without access. Cross-sectional analyses of participants in 2023 show that people with access to the national grid report engaging in fewer aggregate political activities than those without access to the grid, although this difference is not statistically significant (Figure A, left panel, top row). When we disaggregate political activities, however, Figure A (left panel, remaining rows) shows that people with electricity are significantly less likely to attend rallies or town hall meetings, but more likely to participate digitally by both posting on social media and responding to posts. The average marginal effects of grid access on participation are non-trivial. On average, those with grid access are 7% less likely to attend rallies or town halls, but 4% more likely to post or respond to posts on social media.

Turning to quantity of electricity, higher quantities are associated with very small, but significant, increases in aggregate participation. On average, an addition of one appliance is associated with a .09 increase in the number of participation activities reported (Figure A, middle panel, top row). However, given that the median respondent who gained access to electricity between the two survey waves also gained three appliances, in aggregate and across the full population, this could amount to significant increases in participation.

For example, grid-connected individuals with more appliances are significantly more likely to engage in several *specific* forms of participation, both in-person and electronically, including contact civil servants and politicians, mobilize others, and participate in social media political exchanges. The probability of doing these activities increases by 1% or 2% across these measures for each additional appliance owned. For the median respondent who added three appliances, these individuals are 3% more likely to contact a politician or 6% more likely to engage in social media use.

Turning to quality, there is no statistical and substantively significant relationship between the number of outages a person experiences and participation (Figure A, right panel, and see Appendix Table B3). There is likewise no clear relationship between self-reported electricity quality and most forms of participation, although those who reported more satisfaction with electricity services were significantly less likely to vote in the 2022 national elections (average marginal effect ~2%).

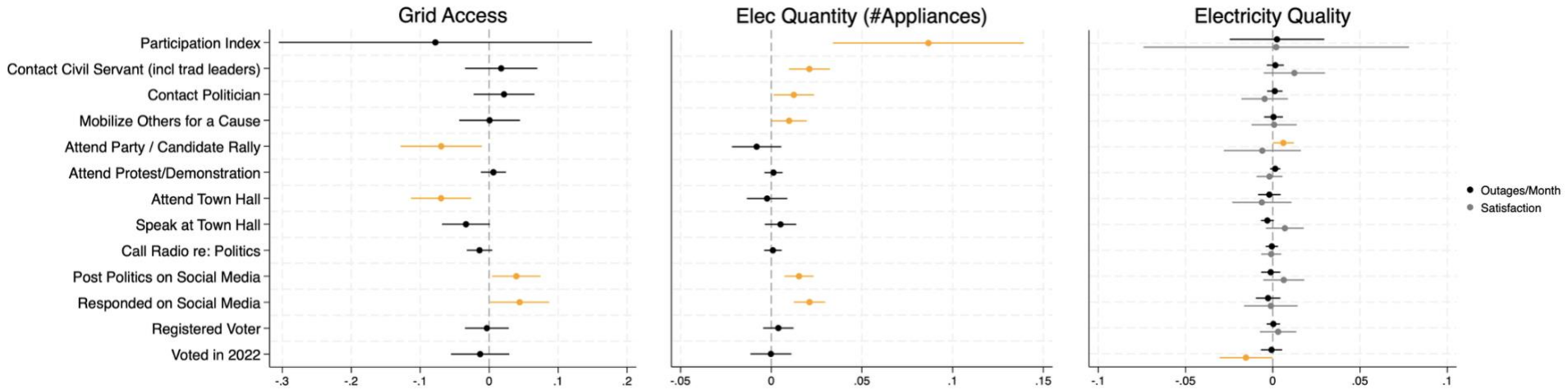
4.2 Do People Who Recently Gained Electricity Participate Differently than Others?

Here, we look at whether, on average, people who have gained grid electricity within the past year behave differently than those who did not. Results again show no relationship with aggregate levels of participation (Figure B, left panel, top row; see also Appendix Table B5), and there appear to be

limited relationships with individual measures of participation.[21] People who gained electricity during this period are about 11% less likely to contact a politician than those who did not.

[21] Results of models comparing people who recently gained electricity to people who did not are rather sensitive to the construction of the variable (which sources of electricity are included) and the control group. We explore this variation in another paper, and focus specifically on gaining access to the grid in this paper.

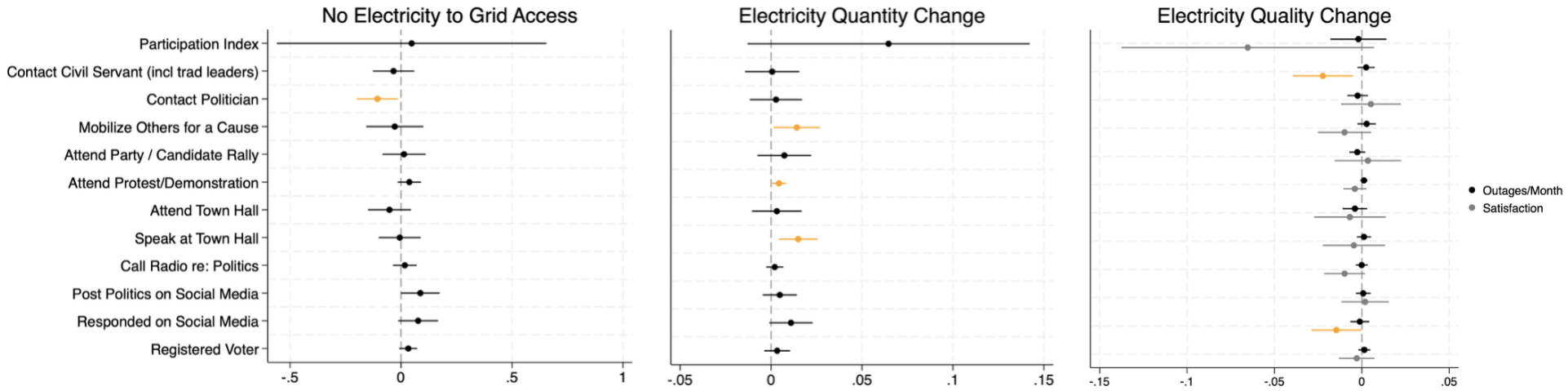
Figure A. Difference in Participation for People with Grid Access, More Electricity, and Higher Quality Electricity



*Note – Whiskers show average marginal effects and 95% confidence intervals. Colored whiskers are significant at the p>0.05 level.

Full regression results for Figure A are available in the Appendix, Tables B1 – B4

Figure B. Differences in Participation for People who Gained Grid Access, More Electricity, or Better Quality Electricity between Survey Rounds, Compared with People Who Did Not Gain Access



*Note – Whiskers show average marginal effects and 95% confidence intervals. Colored whiskers are significant at the p>0.05 level.

Full regression results for Figure B are available in the Appendix, Tables B5 – B8. Figure B includes controls for those who had grid access in both years, and for having had off-grid electricity at baseline, along with a standard range of socio-economic controls.

Turning now to quantity (Figure B, middle panel), we again find no association with aggregate participation for gaining additional appliances. Increased quantities of appliances were significantly and positively correlated, however, with mobilizing others for a cause, speaking at a town hall meeting, and responding to social media posts. While each individual appliance has only a small average marginal effect on participation (~0.5% to 2% increase, see Appendix Table B6), as people gain access to more appliances and thus use greater quantities of electricity, their likelihood of participating increases. For example, the median increase in appliances for those who gained grid access was three, meaning that they were about 5% more likely to engage in political social media than those who did not gain electricity.

As with the first set of models, among those with electricity, those who reported more outages over time were no more or less likely to participate than those reporting fewer outages (Figure B, right panel; see also Appendix Table B7). Those who reported being more satisfied with their electricity services in 2024 than they were in 2023 were ~2% less likely to contact a civil servant or respond to others on social media.

4.3 Does Gaining Access to Electricity Change Individuals' Participation Behavior?

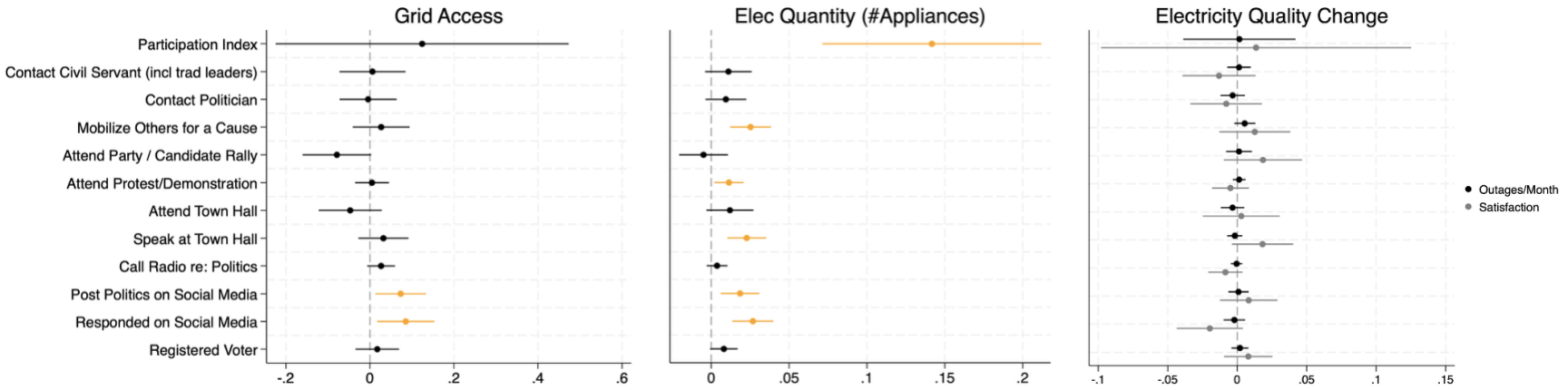
Here, we use fixed effects models to examine whether gaining electricity access between the two rounds is correlated with individual-level changes in political behavior. Since fixed effects models already control for time-invariant variables, we use a more parsimonious set of control variables that change over time and are known to be strongly correlated with participation (income and the number of civil society organizations (CSOs) in which one is a member).

Our results (Figure C) show patterns that are similar to the first two sets of models. Grid access does not affect aggregate measures of participation or decrease in-person participation, but individuals who gained access to grid electricity from 2023 to 2024 are significantly more likely to participate politically on social media. Average marginal effect size here is more sizable, with an approximately 7-9% increase for these individuals.

Consistent with findings for our first research question, we find that individuals who increase their quantity of access to electricity are significantly more likely to participate in aggregate and are more likely to participate in a range of ways, including mobilizing others for a cause, protesting, speaking at a *baraza* and engaging in politics on social media. An increase of one appliance is associated with a 1-3% increase in the likelihood of participating, depending on the specific form of participation (Figure C, center panel; Appendix Table B10), implying that individuals who add multiple appliances are much more likely to participate.

Finally, we do not find any evidence that changes in the quality of electricity matters at individual levels. There is no statistically significant relationship between changes in the number of outages a person experiences or their reported satisfaction with their electricity and their participation levels across all measures (Appendix Tables A11 and A12).

Figure C. Differences in Participation at the Individual Level from 2023 to 2024 (Fixed Effects Models)



*Note – Whiskers show regression coefficients and 95% Confident Intervals. Full regression results for Figure C are available in the Appendix, Tables B9-B12. The left panel of Figure C includes a control for having had off-grid electricity at baseline, income, and the number of CSOs the person belonged to.

4.4 Grid vs Off-Grid Sources of Electricity

While not part of our primary research questions, our results suggest that these same patterns may not hold for those who get their electricity from solar lanterns, solar home systems, or a localized minigrid. Those with solar power in our sample had very small solar home systems, or even just solar lanterns for lighting. Although they are equally likely to own a mobile phone, they were less likely to own computers (4% versus 12% for those with grid access), tablets (3% versus 9%), or televisions (52% versus 81%). Controlling for people with grid access, people with electricity only from these off-grid sources tended to participate less in key ways (contacting politicians, attending or speaking at town hall meetings, and calling radio programs about political issues) compared to those with no electricity at all (See Appendix Tables B1 and B4).[22]

We also note also that those who only have access from solar or a minigrid and are less satisfied with their electricity participate more in a range of ways. While our primary results shows that those who have grid access offset diminished in-person participation through increased participation via social media, electricity access via off-grid sources had no significant relationship with social media use. This negative correlation between off-grid electricity access and political participation was consistent across multiple modeling strategies and dependent variables (See Appendix Tables B1, B2, and B4). We find only one exception to this general pattern: off-grid electricity use was significantly and positively correlated with registering to vote.

We explore these differences further in sensitivity analyses in Section C of the Appendix, which show that results are sensitive to how electricity access is defined. By this, we mean that in sensitivity analyses, our independent variable of interest is whether or not a person has (or gained) electricity from any source, i.e., solar lanterns, solar home systems, minigrids, or the national grid. Using this broader definition of "access," some results are consistent, but others are less so. We interpret this to mean that the source of electricity matters.

4.5 Understanding Causal Mechanisms and Exacerbated Inequalities through Focus Group Discussions

Data from focus group discussions (FGDs) with 150 Kenyans provide potential causal mechanisms by which electricity access changes political participation. They also provided new insights into how electricity access may exacerbate inequalities of participation. Participants emphasized four things: 1) that electricity has facilitated greater access to more reliable political information; 2) that electricity

[22] We note that it is not because they are less likely to own radios; a higher proportion of respondents with electricity only from solar or a minigrid owned a radio in 2023 compared to grid accessors (85% versus 76%).

provides a new infrastructure for digital participation – both for politicians to reach citizens and for citizens to reach government actors; 3) a logic for why we see some types of participation decrease with electricity; and 4) that areas left behind in electrification efforts may be doubly affected by concomitant losses in opportunities to participate.

First, electricity increases direct access to political information for citizens, as they gain access to news, especially televised news,[23] social media, and messaging platforms.[24] As one participant said, "also, we get news very fast unlike back then when it would take so long for information to reach us."[25] Another noted that receiving first-hand information has reduced the spread of misinformation.[26] FGD participants emphasized that having electric lights in the evenings has also facilitated in-person information sharing and political meetings by extending possible indoors meeting hours and increasing safety at night.[27]

Second, most FGDs reinforced our finding that people are increasing digital participation, explaining that electricity provides new digital participation infrastructure in both rural and urban areas.[28] Participants agreed that digital gatherings or phone-based communication increasingly replace in-person meetings and town halls, where attendance has declined.[29] Indeed, one person explained that new, widespread electricity connection in the area translates to widespread participation, saying "you do not have to vie for a post to be a politician, nowadays *many* people participate in politics through these electric gadgets."[30] Further in line with our quantitative results about electricity quantity, some FGDs emphasized that that messages from TVs or "gadgets" encourage people to participate *both* digitally and in person, rather than completely replacing in-person participation.[31]

People explained that electricity facilitates easier access to politicians through digital means,[32] and that, in some places, politicians are more accessible digitally than in person.[33] FGD participants

[23] FGD1-URM-18; FGD4-KRU-11; FGD6-TRO-6, 8; FGD7-TUU-18, 19; FGD10-KRO-11; FGD11-KUU-1, 2, 4, 10, 19. Citations in the format FGD#-XXX-# indicate that the citation comes from a specific, numbered focus group discussion (FGD#) and provide relevant information about that focus group. The middle letters identify the county location (K, T or U), whether it was urban or rural (U or R) and whether group members were 40 or under, over 40 years of age, or a mix of ages (U, O, or M). The final number indicates the transcript page on which the data is located.
[24] FGD1-URM-18; FGD3-UUU-7; FGD5-KUO-5, 6, 9; FGD10-KRO-11.
[25] FGD6-TRO-9; c.f. FGD7-TUU-19.
[26] FGD13-TUO-13.
[27] FGD4-KRU-9; FGD2-URO-5; FGD10-KRO-3.
[28] FGD4-KRU-8-9.
[29] FGD5-KUO-7; FGD8-URU-5; FGD13-TUO-2.
[30] FGD5-KUO-5.
[31] FGD1-URM-18; FGD1-URM-37; FGD6-TRO-7.
[32] FGD5-KUO-6; c.f. FGD2-URO-7; FGD7-TUU-18; FGD10-KRO-11.
[33] FGD5-KUO-7.

repeated that many politicians now mobilize constitutents digitally, saying things like, "With electricity came technology, and so most of our young politicians mobilize through social platforms like Facebook, WhatsApp, and Telegram through group formation."[34] People spelled out mechanisms for mobilization: a post will instruct people to mobilize 10 people, who will do so using electricity-powered phones, and those people will also get another 10 easily.[35]

Digital participation does not just facilitate downward information flow from politicians to citizens, but also citizen information upward, as well as providing some accountability mechanisms. Participants in multiple FGDs explained that national- and/or local-level elected representatives communicate service distributions, invite citizen feedback or information, and respond to citizen demands through social media apps, especially WhatsApp.[36] One participant even said, "I need it [electricity] to supervise the government" (FGD5-KUO-9). Others concurred, saying that information provided through electricity-enabled TVs, radios, etc. allows citizens to hold politicians accountable, because they are better able to assess politicians' claims (FGD10-KRO-11).

Third, focus group discussions provided some explanations for why we found lower or decreasing participation levels for some activities among those with electricity. They said that, while people with electricity "watch the news and read the posts on social media platforms," they may not fully engage because of how people tend to engage with social media. Instead, they might see that there is a post, but not fully absorb the information in it, as they "just swipe without going through the content and probably forget about it."[37] They argued that people without electricity participate based on real developments and in-person engagement and not social media influence.[38] People also repeatedly suggested that, for those with electricity, social capital may be decreasing, as people have less need to leave the house for entertainment, such as going to neighbors' homes to watch television or gathering with others to share stories.[39] It is well documented that decreasing social capital can reduce political participation.

Fourth, in addition to explaining causal mechanisms found in quantitative analysis, FGDs also drew attention to the downsides of uneven electrification, which may exacerabate existing inequalities or inequities in participation. As one person explained,

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[34] FGD5-KUO-6.
[35] FGD9-UUO-20.
[36] FGD2-URO-6; FGD5-KUO-6-7, FGD6-TRO-8, FGD7-TUU-19, 20.
[37] FGD8-URU-17.
[38] FGD8-URU-18; FGD9-UUO-20.
[39] FGD1-URM-11; FGD2-URO-2; FGD8-URU-3-4; FGD10-KRO-3; FGD12-TRU-8.

> If [government officials] have decided to announce something, people from a place with electricity will be aware and they will go to that place much earlier or they would show up in large quantities. Those who come from an area that doesn't have electricity will not be aware maybe because they lack the know-how or they don't have a way of finding out because it was reported using TV, which uses electricity.[40]

Likewise, it appears that urban residents with electricity connections have better access to politicians – while they reported access to politicians directly through WhatsApp, some rural respondents said that their national- or local-level elected officials do not pass information through social media.[41] Others noted that people without electricity are simply getting left behind.[42]

Many respondents noted that the government is moving toward requiring citizens to engage with the state through a digital platform, e-Citizen. While e-Citizen has facilitated participation for those with reliable electricity, participants in some focus groups were keenly aware of how it could exacerbate issues for the poor (who lack electricity) or the elderly (who may lack the skills to make use of the electricity, even if they have it), and that end-user fees disproportionately affect those without access to the electricity-enabled platform.[43]

Finally, people in most FGDs noted that politically well-connected individuals were also much more likely to have power initially connected or quickly restored when there was a blackout.[44] This suggests that political access and electricity access can be mutually reinforcing.

5. Discussion

In this section, we discuss the results of our hypothesis tests, draw on FGD data to explore underlying causal mechanisms behind these results, and discuss the implications of our findings for the broader discussion about how public goods provision affects relationships between citizens and the state.

Our first hypothesis tests modernization theory. If the theory holds, we expect to see a positive relationship between electricity access and aggregate political behavior. Our results resoundingly reject this hypothesis. Across all three modeling strategies, access to the grid has no significant impact on people's aggregate political behaviors; and access to electricity via solar home systems or minigrids is significantly *negatively* correlated with aggregate political participation. This finding shows that it is

[40] FDG7-TUU-18; c.f. FGD11-KUU-4.
[41] FGD4-KRU-10; FGD9-UUO-19.
[42] FGD9-UUO-19.
[43] FGD12-TRU-11; FGD9-UUO-19; FGD5-KUO-9, 11.
[44] e.g. FGD1-URM-33-36; FGD5-KUO-13; FGD4-KRU-14; FGD7-TUU-3, 17.

naïve to assume that access to public goods will automatically lead to increased democratic participation.

However, this does not necessarily imply no relationship. Our next set of hypotheses draws on this idea by positing that grid access may prompt a shift from in-person to digital forms of participation. Our results support this hypothesis, with some caveats. People with grid access are significantly less likely to attend in-person political events than those without access (Figure A), but this effect does not hold when we compare the behaviors of recent gainers with others (Figure B) or with their own pre-access behaviors (Figure C). This suggests that grid access may prompt a hybrid approach to participation, with online engagement combined with diminishing face-to-face engagement, but that these political behaviors change slowly. The single year between survey rounds may not have been sufficient to capture the change.

Meanwhile, our results provide clear and unambiguous support for the idea that grid access increases political participation via social media. Across all models, the electricity-havers and the electricity-gainers report greater use of social media platforms for political purposes, a finding that is confirmed by participants in our FGDs. Electricity access thus may decrease some forms of traditional participation, but it opens up new avenues that have been embraced by citizens, politicians, and civil servants. At the same time, however, some of this online participation may not actually be meaningful, but merely "swipe participation." This has been common in the West, where critiques of "slacktivism," – nominal participation in low-cost online forums that is not reinforced by additional engagement offline – have proliferated. In our FGDs, participants had mixed reports about whether online participation is as meaningful as its more traditional counterparts. Some participants reported greater access to politicians, political discussions, and opportunities to mobilize others, but other participants suggest that social media participation can be far more cursory.

Our next set of hypotheses asserts that greater quantities of electricity correlate with greater overall participation, alongside a shift from in-person to digital forms of participation. These hypotheses recognize that people experience different tiers of access, based on a combination of service availability and socio-economic status. Here, our results show that tiers of access matter – people with access to greater *quantities* of electricity not only have higher aggregate participation, they also have higher in-person *and* online forms of participation.

Focus group discussion participants provided evidence of a causal mechanism behind this result: televisions and phones gave them access to information and communication tools that supported their ability to engage politically and mobilize others. Through these information channels,

they gained information about when and where politicians would be holding rallies, and they gained knowledge that helped them speak up. In rural areas, electricity also provides people with well-lit and safe spaces to gather to discuss politics after dark. People with access to very limited quantities of electricity engage in different behaviors than those who have greater access to electricity and to the information and communication tools electricity enables. This finding emphasizes the need to look at electricity access as a continuum, not a binary.

Our final hypothesis draws on ideas about citizen-state relations and posits that people with lower quality service are more likely to participate politically because their dissatisfaction prompts them to make more demands on the state. Here, our results are inconclusive. When we measured quality by the number of outages people experienced, we found no support for this hypothesis. When we measured quality in terms of people's self-reported, subjective satisfaction with their services, however, satisfaction was negatively correlated with some forms of political participation, although these correlation patterns were inconsistent across our three modeling approaches (See Appendix Table B8).

Compared to our first two hypotheses, it is difficult to draw firm conclusions about the meaning of these results. It may be the case that our subjective question about electricity quality measures some combination of actual electricity quality, individual psychology, and expectations of the state. Our findings do speak to ideas about service provision and the social contract, suggesting that where the state upholds its end of the social contract – providing services in exchange for loyalty – people have less to complain about and less reason to participate. However, this relationship may vary based on individuals' expectations of the state.

In addition to testing our hypotheses, our results shed some light on the differences between grid access and off-grid electricity sources, such as solar lanterns, solar home systems, or a localized minigrid. These off-grid options are often promoted by donors, NGOs, and solar entrepreneurs, or used by communities as a stop-gap solution when grid access is not available or affordable. There are lively debates about whether these off-grid solutions are a viable long-term electrification strategy. In our study population, people who relied on off-grid energy solutions were in a lower tier of access than their grid-connected counterparts, reporting significantly lower use of appliances like televisions, tablets, and computers. They were also less likely to engage in most forms of political participation. While grid access seems to shift political participation toward digital sources and appliance use seems to bolster both in-person and online forms of participation, people who rely on off-grid electricity

sources experienced a decrease in in-person forms of political participation that was not offset by an increased use of social media to engage in political discourse.

What explains this difference in participation among on-grid and off-grid users? Since we control for education and income, our results suggest that these differences are not simply due to on-grid users having more resources or capabilities to participate. Instead, we offer two possible explanations. First, it may be that that grid access simply allows people to use more information and communication technologies than off-grid solutions, which tend to provide small quantities of electricity. Alternatively, it may be the case that off-grid technologies are more likely to be distributed in marginalized communities where access to the state is weak.

6. Conclusions

Overall, our study shows that connection to the electricity grid alone does not necessarily increase or decrease political participation, but instead shifts it toward digital participation. Connectivity enables the use of electricity-powered information and communication devices that appear to have a significant and positive impact on people's ability to engage in politics. For some participation behaviors, however, people with better quality electricity participate less.

These results have real-world implications. Donor representatives we spoke to prior to implementing the surveys were concerned with the negative correlation between electricity access and political participation that Brass et al. (2021) found, particularly donors who support expanding political and civic freedoms in Africa. It remains to be seen what the effects of digital participation will be, but these results will be of interest to donors funding both democracy and infrastructure developments, especially as the Last Mile Connectivity Project continues, with plans to cover the southeastern portion of the country in the next phase. If decisionmakers want to ensure that electricity access expands people's ability to engage in politics, it may be helpful to provide support or incentives that strengthen politicians' and citizens' ability to access communication devices and use them for political purposes.

Our study also draws attention to inequities in the ways Kenyans access electricity. Survey results and focus group discussions both demonstrate that Kenyans experience a wide range of access, with some able to access only minimal electricity while others can power multiple appliances. In addition, our FGDs show that Kenyans perceive what might be called tiers of priority: in a world where the grid is not yet universal and outages are common, Kenyans perceive that wealthy individuals and neighborhoods are prioritized for grid extension and repair (c.f., Gore et al., 2025). Such inequities warrant further scrutiny, not only in Kenya, but in all countries experiencing rapid electrification.

Policymakers and donors must acknowledge that access is not "have" or "have not." Not doing so risks exacerbating inequality, especially with rapid technological development and change.

The results also provide a cautionary tale about path dependency for scholars. Particularly in lower-income, data-poor contexts, researchers often default to repeating familiar survey questions or using existing datasets. Although there are often good reasons for doing so, one downside is that they can fail to capture important change in political and social realities over time. For example, part of the impetus of this study was to revisit the surprising findings from a paper published using pooled cross-sectional analyses of the prevailing cross-national survey data from Afrobarometer, which showed a robust negative relationship between access to electricity and political participation (Brass et al., 2021).

Our more detailed measures of electricity access and political participation reveal that those findings were flawed because the *means of participating* have changed in ways that were not included in the Afrobarometer surveys. This issue is compounded by the common, but outdated, perception that Africans do not participate digitally, which we have been told at conferences repeatedly. Yet, we find that nearly 20% of respondents in Kenya report doing so. The World Bank reported an average of nearly 30% internet penetration in sub-Saharan Africa by 2020 (Seuyong et al., 2023) and 35% of Kenyans with access by 2024 (World Bank, 2024). Without updating, scholars risk misestimating political behavior. It is time to update our understanding of modes of African participation in the 21st Century, given rapid technology change across the continent.

Still, there may be limits to the generalizability of our findings. Kenyans have a rich tradition of voting and engaging in politics, and nearly all Kenyans use digital mobile money tools for everyday financial transactions (World Bank, 2025). In this context, it should not be surprising that citizens and politicians alike have also moved to WhatsApp and other digital tools in ways that enhance political life. In places where people cannot talk openly about politics, or in the limited contexts where digital penetration remains low, access to information and communication channels might not have the same effect. Our findings are likely most generalizable to wealthier, low-income and low-middle income countries with at least moderate political freedoms.

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Appendix: Does Increasing Electricity Access Affect Political Participation? Evidence from Rapid Electrification in Kenya

This appendix provides supporting materials related to data selection and description (Section A), result visualizations in the main body of the text (Section B), and sensitivity analyses on our analyses (Section C).

Section A. Data

Attrition from Round 1 (2023) to Round 2 (2024)

Although all efforts were made to have a complete panel of data for both 2023 and 2024, we experienced higher levels of attrition (45%) than were expected (25%) by the implementing survey firm based on past experiences. All 2530 people who participated in the first round were contacted at least three times to re-survey them, and they were told they would receive 250 Kenya Shillings (about $2.50 at the time of implementation) at the competition of the second survey round. Fifty-five percent of respondents completed both rounds.

Because of the high attrition rate, we compared key socioeconomic characteristics of those who did and did not complete both rounds. Table A1 reports the results of this comparison, and we note several key differences. People who dropped out of the survey were, on average, less likely to have any form of electricity, younger, members of fewer civil society organizations (CSOs), more likely to have enough money to meet their needs, had fewer kids, and read the news fewer days each week.

Although most of these differences were small (e.g., reading the news on average 4.5 days per week instead of 5.1 days per week), we adjusted our analyses using inverse probability weights created using the significant factors in the table below, following Fitzgerald et al. (1998).

Table A1: Comparison of Those Who Did and Did Not Participate in Survey Round 2

Variable	Mean: Completed Both Rounds	Mean: Dropped Out after Round 1
Has Electricity from Any Source (percent of respondents who said yes)	64%	57%***
Gender (percent of respondents who are female)	61%	61%
Age Band (a 4 represents people aged 35-39 years; 5 is 40-44 years, etc.)	4.3	4.0**
Education Band (4 represents having completed some but not all of secondary school)	4	4
Member of this number of civil society organizations	3.3	2.9***
Number of kids in household	2.3	2.0**
Has enough money to meet their needs (percent of respondents saying yes)	10%	15%***
Number of days read the news in a week	5.1	4.5***

Stars indicate significant difference. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Are Respondents Who Did Not Have Grid Access in 2023 and Did/Did Not Gain Grid Electricity Between 2023 and 2024 Roughly Equivalent?

Of the 1388 people who completed both survey rounds, 847 started the first round without access to the grid. Of these, 233 gained grid access and 614 did not. Because we do not believe that it is ethical for high income researchers to interfere in service provision in lower income countries, we did not randomize receipt of electricity. Instead, the Last Mile Connectivity Project proceeded without any attempt at intervention, and we checked for differences among those who did and did not gain access to the grid. Table A2 shows the two groups were fairly well balanced on key socioeconomic features at the start of the study.

Although there are some statistical differences between the two groups, most of these differences were not substantive. For example, there is not a substantial difference between being 35 to 39 or 40 to 44 years old. And there is not a lot of difference between having finished primary school and having started but not finished secondary school. In both cases, the primary school certificate is the highest education completed. The only sizable difference between the two samples is gender (where 0 = male; 1 = female). Those who received the grid are much more likely to be men. We control for gender in all analyses in the paper.

Table A2: 2023 Baseline Comparison of People Who Started without the Grid and Did or Did Not Gain Access

Variable	Mean: Started without Grid and Did Not Gain Access	Mean: Started without Grid and Gained Access
Age Band (a 4 represents people aged 35-39 years; 5 is 40-44 years, etc.)	4.88	3.78***
Education Band (4 represents having completed some but not all of secondary school)	3.46	4.07***
Income	2.14	2.02
Gender (percent of respondents who are female)	0.64	0.55***
Member of this number of civil society organizations	3.25	3.65**
Number of kids in household	2.61	2.07***
Had Solar or Minigrid Electricity	0.43	0.36
Number of days read the news in a week	5.11	4.40***
N	614	233

Stars indicate significant difference. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Section B. Regression Tables Related to Results Section of Main Text

Below, we provide detailed regression results related to the results for each of our three questions in the main paper. First, we present tables associated with Question 1 – do people with electricity access (or more or higher quality access) participate differently than those without? These full regression tables correspond to the whisker plots in Figure A.

Tables B1 through B4 show results for our first question, concerning whether people with electricity (or more electricity, or better quality electricity) participate differently than those without/less/lower quality electricity. Results are for the full 2530 people who responded in 2023 and show average marginal effects. Findings are nearly identical when looking only at the 1388 people who completed both rounds of the survey.

Table B1 shows regression results comparing people who did or did not have grid access in 2023. Table B2 shows regression results for increasing quantity of electricity. Tables B3 and B4 show regression results examining varying levels of electricity quality.

Table B1. Grid Access Regression Results - Average Marginal Effects (2023 Data Only)

	(1) Participat'n Index	(2) Contact Civil Servant	(3) Contact Politician	(4) Mobilize Others for a Cause	(5) Attend Party / Candidate Rally	(6) Attend Protest/ Demonst'n	(7) Attend Town Hall	(8) Speak at Town Hall	(9) Call Radio re: Politics	(10) Post Politics on Social Media	(11) Responded on Social Media	(12) Registered Voter	(13) Voted in 2022
Grid Access	-0.078	0.017	0.022	0.001	-0.070**	0.006	-0.070**	-0.034*	-0.014	0.039**	0.044**	-0.003	-0.013
	(0.116)	(0.027)	(0.022)	(0.022)	(0.030)	(0.009)	(0.022)	(0.018)	(0.009)	(0.018)	(0.022)	(0.016)	(0.022)
Education	0.161***	0.005	0.005	0.014**	0.023**	0.002	0.011*	0.012**	0.002	0.038***	0.042***	0.017***	0.008
	(0.025)	(0.008)	(0.006)	(0.005)	(0.007)	(0.003)	(0.007)	(0.006)	(0.003)	(0.005)	(0.006)	(0.004)	(0.006)
# CSOs	0.267***	0.038***	0.030***	0.037***	0.034***	0.008**	0.038***	0.029***	0.004**	0.016***	0.013***	0.013***	0.018***
	(0.021)	(0.006)	(0.004)	(0.004)	(0.006)	(0.002)	(0.004)	(0.003)	(0.002)	(0.002)	(0.003)	(0.004)	(0.005)
Age	0.096***	0.031***	0.011**	0.008**	-0.004	-0.006**	0.022***	0.017***	-0.003*	-0.016***	-0.023***	0.061***	0.015***
	(0.016)	(0.005)	(0.004)	(0.003)	(0.004)	(0.002)	(0.004)	(0.003)	(0.002)	(0.003)	(0.004)	(0.005)	(0.004)
Gender	-1.099***	-0.158***	-0.100***	-0.094***	-0.153***	-0.030***	-0.169***	-0.144***	-0.036***	-0.104***	-0.087***	-0.019	-0.068***
	(0.097)	(0.021)	(0.021)	(0.019)	(0.022)	(0.009)	(0.021)	(0.015)	(0.010)	(0.014)	(0.014)	(0.015)	(0.018)
Income	-0.022	-0.009**	-0.003	-0.003	-0.011**	-0.000	-0.007	-0.005	0.001	0.003	0.008**	0.000	-0.007*
	(0.022)	(0.004)	(0.005)	(0.004)	(0.005)	(0.002)	(0.006)	(0.004)	(0.002)	(0.003)	(0.004)	(0.004)	(0.004)
Kakamega	0.209	-0.053	-0.022	-0.007	0.046	0.000	0.102**	0.083***	-0.001	-0.011	0.054**	0.014	-0.010
	(0.208)	(0.043)	(0.037)	(0.035)	(0.054)	(0.013)	(0.037)	(0.024)	(0.012)	(0.019)	(0.027)	(0.022)	(0.026)
Uasin Gishu	0.385**	0.032	0.016	0.018	0.114**	0.012	0.075**	0.018	0.002	-0.012	0.040*	0.040**	-0.035
	(0.188)	(0.043)	(0.040)	(0.032)	(0.052)	(0.014)	(0.035)	(0.018)	(0.012)	(0.018)	(0.022)	(0.020)	(0.025)
Solar / Minigrid	-0.312**	0.000	-0.035	-0.018	-0.062*	-0.017*	-0.062**	-0.049**	-0.021**	0.001	-0.018	-0.002	-0.013
	(0.103)	(0.033)	(0.026)	(0.024)	(0.033)	(0.011)	(0.022)	(0.015)	(0.008)	(0.019)	(0.024)	(0.019)	(0.024)
Interest in Current Events	0.076***	0.013***	0.005*	0.010**	0.020***	-0.001	0.006*	0.009**	0.004**	0.002	0.008**	0.001	-0.001
	(0.014)	(0.004)	(0.003)	(0.003)	(0.004)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
N	2258	2268	2268	2268	2268	2268	2268	2268	2268	2268	2268	2258	1915

Standard errors in parentheses
Observations from Year 1 only. Standard errors clustered at sublocation level.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Table B2. Electricity Quantity Regression Results - Average Marginal Effects (2023 Data Only)

	(1) Participat'n Index	(2) Contact Civil Servant	(3) Contact Politician	(4) Mobilize Others for a Cause	(5) Attend Party / Candidate Rally	(6) Attend Protest / Demonst'n	(7) Attend Town Hall	(8) Speak at Town Hall	(9) Call Radio re: Politics	(10) Post Politics on Social Media	(11) Responded on Social Media	(12) Registered Voter	(13) Voted in 2022
Elec Quantity (# Appliances)	0.087**	0.021***	0.012**	0.010**	-0.008	0.001	-0.002	0.005	0.001	0.015***	0.021***	0.004	-0.000
	(0.027)	(0.006)	(0.006)	(0.005)	(0.007)	(0.003)	(0.006)	(0.004)	(0.002)	(0.004)	(0.004)	(0.004)	(0.006)
Education	0.133***	0.000	0.003	0.011**	0.021**	0.002	0.008	0.009	0.001	0.034***	0.038***	0.015**	0.008
	(0.025)	(0.008)	(0.006)	(0.005)	(0.007)	(0.003)	(0.007)	(0.006)	(0.003)	(0.005)	(0.006)	(0.005)	(0.007)
# CSOs	0.263***	0.037***	0.030***	0.036***	0.035***	0.008**	0.039***	0.028***	0.004**	0.015***	0.012***	0.013***	0.018***
	(0.021)	(0.006)	(0.004)	(0.004)	(0.006)	(0.002)	(0.004)	(0.003)	(0.002)	(0.002)	(0.003)	(0.004)	(0.005)
Age	0.098***	0.031***	0.011**	0.008**	-0.004	-0.006**	0.023***	0.018***	-0.003*	-0.015***	-0.023***	0.061***	0.015***
	(0.016)	(0.005)	(0.004)	(0.003)	(0.004)	(0.002)	(0.004)	(0.003)	(0.002)	(0.003)	(0.004)	(0.005)	(0.004)
Gender	-1.095***	-0.157***	-0.099***	-0.093***	-0.155***	-0.030***	-0.171***	-0.145***	-0.036***	-0.102***	-0.085***	-0.019	-0.068***
	(0.094)	(0.020)	(0.021)	(0.019)	(0.022)	(0.009)	(0.021)	(0.014)	(0.010)	(0.014)	(0.014)	(0.014)	(0.018)
Income	-0.045**	-0.014**	-0.006	-0.006	-0.011**	-0.000	-0.009	-0.008*	0.000	-0.000	0.003	-0.001	-0.007*
	(0.023)	(0.005)	(0.005)	(0.004)	(0.005)	(0.002)	(0.006)	(0.004)	(0.002)	(0.004)	(0.004)	(0.004)	(0.004)
Kakamega	0.237	-0.050	-0.022	-0.005	0.054	-0.000	0.112**	0.090***	0.001	-0.011	0.054**	0.015	-0.008
	(0.204)	(0.042)	(0.036)	(0.034)	(0.054)	(0.013)	(0.038)	(0.024)	(0.012)	(0.019)	(0.026)	(0.022)	(0.025)
Uasin Gishu	0.373**	0.031	0.016	0.017	0.110**	0.012	0.072**	0.016	0.001	-0.011	0.039*	0.039*	-0.036
	(0.186)	(0.042)	(0.039)	(0.032)	(0.052)	(0.015)	(0.035)	(0.018)	(0.012)	(0.019)	(0.022)	(0.020)	(0.025)
Solar / Minigrid	-0.264**	-0.006	-0.043**	-0.017	-0.031	-0.020**	-0.033	-0.036**	-0.016**	-0.016	-0.034*	-0.001	-0.006
	(0.094)	(0.027)	(0.022)	(0.020)	(0.029)	(0.009)	(0.022)	(0.015)	(0.007)	(0.017)	(0.020)	(0.017)	(0.020)
Interest in Current Events	0.064***	0.011**	0.004	0.009**	0.020***	-0.001	0.005	0.007**	0.004*	0.001	0.006**	0.001	-0.002
	(0.015)	(0.004)	(0.003)	(0.003)	(0.004)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
N	2258	2268	2268	2268	2268	2268	2268	2268	2268	2268	2268	2258	1915

Standard errors in parentheses
Observations from Year 1 only. Standard errors clustered at sublocation level.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Table B3. Electricity Quality (Outages) Regression Results - Average Marginal Effects (2023 Data Only)

	(1) Participat'n Index	(2) Contact Civil Servant	(3) Contact Politician	(4) Mobilize Others for a Cause	(5) Attend Party / Candidate Rally	(6) Attend Protest / Demonst'n	(7) Attend Town Hall	(8) Speak at Town Hall	(9) Call Radio re: Politics	(10) Post Politics on Social Media	(11) Responded on Social Media	(12) Registered Voter	(13) Voted in 2022
Elec Quality (Outages / Month)	0.002	0.001	0.001	0.000	0.006**	0.001	-0.002	-0.003*	-0.001	-0.001	-0.003	0.000	-0.001
	(0.014)	(0.002)	(0.002)	(0.003)	(0.003)	(0.001)	(0.003)	(0.002)	(0.002)	(0.003)	(0.004)	(0.002)	(0.003)
Education	0.210***	0.024*	0.021*	0.019**	0.024**	0.010**	0.010	0.013	0.006*	0.043***	0.039***	0.016**	0.002
	(0.052)	(0.014)	(0.011)	(0.009)	(0.009)	(0.005)	(0.012)	(0.011)	(0.004)	(0.009)	(0.009)	(0.007)	(0.010)
# CSOs	0.273***	0.039***	0.030***	0.040***	0.032***	0.010**	0.032***	0.029***	0.001	0.021***	0.020***	0.019**	0.019**
	(0.027)	(0.009)	(0.006)	(0.006)	(0.008)	(0.003)	(0.005)	(0.003)	(0.002)	(0.005)	(0.006)	(0.006)	(0.007)
Age	0.101**	0.040***	0.018**	0.010**	-0.007	-0.012**	0.021***	0.019***	-0.003	-0.022***	-0.029***	0.070***	0.020**
	(0.033)	(0.009)	(0.007)	(0.005)	(0.008)	(0.004)	(0.006)	(0.004)	(0.003)	(0.006)	(0.008)	(0.012)	(0.008)
Gender	-1.274***	-0.150***	-0.134***	-0.094**	-0.172***	-0.040**	-0.191***	-0.138***	-0.056***	-0.113***	-0.133***	-0.032	-0.096**
	(0.149)	(0.028)	(0.031)	(0.033)	(0.032)	(0.015)	(0.031)	(0.025)	(0.016)	(0.017)	(0.023)	(0.031)	(0.039)
Income	-0.051	-0.011*	-0.005	-0.016**	-0.018**	-0.002	-0.013	-0.010**	-0.000	0.006	0.007	0.003	-0.011*
	(0.034)	(0.006)	(0.009)	(0.006)	(0.007)	(0.004)	(0.009)	(0.004)	(0.002)	(0.005)	(0.005)	(0.006)	(0.006)
Kakamega	0.278	-0.076	-0.007	0.051	0.073	0.024	0.050	0.030	0.005	0.014	0.057	0.034	0.017
	(0.310)	(0.053)	(0.060)	(0.046)	(0.075)	(0.023)	(0.047)	(0.032)	(0.014)	(0.043)	(0.050)	(0.046)	(0.050)
Uasin Gishu	0.467*	0.031	0.026	0.060	0.180**	0.020	0.091**	0.006	-0.004	-0.012	0.041	0.020	-0.046
	(0.243)	(0.044)	(0.051)	(0.042)	(0.061)	(0.019)	(0.043)	(0.023)	(0.015)	(0.031)	(0.037)	(0.030)	(0.029)
Interest in Current Events	0.097***	0.012*	0.002	0.005	0.025***	-0.000	0.008	0.010*	0.006	0.012**	0.013**	0.002	-0.004
	(0.028)	(0.007)	(0.005)	(0.005)	(0.007)	(0.003)	(0.006)	(0.005)	(0.004)	(0.006)	(0.006)	(0.005)	(0.006)
N	842	843	843	843	843	843	843	843	843	843	843	842	709

Standard errors in parentheses
Observations from Year 1 only. Standard errors clustered at sublocation level.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Table B4. Electricity Quality (Satisfaction) Regression Results - Average Marginal Effects (2023 Data Only)

	(1) Participat'n Index	(2) Contact Civil Servant	(3) Contact Politician	(4) Mobilize Others for a Cause	(5) Attend Party / Candidate Rally	(6) Attend Protest / Demonst'n	(7) Attend Town Hall	(8) Speak at Town Hall	(9) Call Radio re: Politics	(10) Post Politics on Social Media	(11) Responded on Social Media	(12) Registered Voter	(13) Voted in 2022
Quality (Satisfaction)	0.002	0.012	-0.005	0.001	-0.006	-0.002	-0.006	0.007	-0.001	0.006	-0.001	0.003	-0.015**
	(0.039)	(0.009)	(0.007)	(0.007)	(0.011)	(0.004)	(0.009)	(0.006)	(0.003)	(0.006)	(0.008)	(0.005)	(0.008)
Education	0.157***	0.006	0.006	0.014**	0.019**	0.002	0.007	0.010*	0.001	0.040***	0.044***	0.016***	0.007
	(0.025)	(0.008)	(0.006)	(0.005)	(0.007)	(0.003)	(0.007)	(0.006)	(0.003)	(0.005)	(0.005)	(0.004)	(0.006)
# CSOs	0.267***	0.038***	0.030***	0.037***	0.035***	0.008**	0.039***	0.029***	0.004**	0.015***	0.013***	0.013***	0.018***
	(0.021)	(0.006)	(0.004)	(0.004)	(0.006)	(0.002)	(0.004)	(0.003)	(0.002)	(0.002)	(0.003)	(0.004)	(0.005)
Age	0.096***	0.031***	0.011**	0.008**	-0.004	-0.006**	0.023***	0.018***	-0.003*	-0.016***	-0.024***	0.061***	0.015***
	(0.016)	(0.005)	(0.004)	(0.003)	(0.004)	(0.002)	(0.004)	(0.003)	(0.002)	(0.003)	(0.004)	(0.005)	(0.004)
Gender	-1.100***	-0.157***	-0.100***	-0.094***	-0.155***	-0.031***	-0.171***	-0.144***	-0.036***	-0.103***	-0.087***	-0.020	-0.069***
	(0.097)	(0.021)	(0.021)	(0.020)	(0.022)	(0.009)	(0.021)	(0.015)	(0.010)	(0.014)	(0.015)	(0.014)	(0.018)
Income	-0.024	-0.009**	-0.003	-0.003	-0.013**	0.000	-0.009*	-0.006	0.000	0.004	0.008**	-0.000	-0.007*
	(0.022)	(0.005)	(0.005)	(0.003)	(0.005)	(0.002)	(0.005)	(0.004)	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)
Kakamega	0.220	-0.057	-0.025	-0.008	0.057	-0.000	0.113**	0.088***	0.001	-0.016	0.049*	0.014	-0.006
	(0.207)	(0.042)	(0.037)	(0.035)	(0.054)	(0.013)	(0.038)	(0.023)	(0.012)	(0.019)	(0.028)	(0.022)	(0.025)
Uasin Gishu	0.380**	0.028	0.019	0.017	0.112**	0.013	0.074**	0.014	0.002	-0.013	0.042*	0.038*	-0.029
	(0.188)	(0.042)	(0.040)	(0.032)	(0.053)	(0.014)	(0.034)	(0.018)	(0.012)	(0.018)	(0.023)	(0.020)	(0.025)
Solar / Minigrid	-0.275**	-0.001	-0.047**	-0.018	-0.034	-0.020**	-0.036	-0.033**	-0.016**	-0.017	-0.041**	0.001	-0.015
	(0.091)	(0.027)	(0.021)	(0.021)	(0.030)	(0.009)	(0.023)	(0.015)	(0.007)	(0.016)	(0.020)	(0.018)	(0.021)
Interest in Current Events	0.075***	0.013**	0.006**	0.010***	0.019***	-0.001	0.004	0.008**	0.004**	0.003	0.009**	0.001	-0.001
	(0.014)	(0.004)	(0.003)	(0.003)	(0.004)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
N	2258	2268	2268	2268	2268	2268	2268	2268	2268	2268	2268	2258	1915

Standard errors in parentheses
Observations from Year 1 only. Standard errors clustered at sublocation level.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Next, we present tables associated with Question 2 – do people who recently gained electricity participate differently than others? These full regression tables correspond to the whisker plots in Figure B and related text in the main paper.

Tables B5 through B8 show results for the 1388 people who completed both rounds of the survey. Table B5 shows regression results comparing people who gained electricity access between survey rounds to those who did not gain access to the grid. Table B6 shows regression results for increasing quantity of electricity. Tables B7 and B8 shows regression results of increasing levels of electricity quality.

Table B5. Change from No Electricity to Grid Access Regression Results - Average Marginal Effects

	(1) Participat'n Index	(2) Contact Civil Servant	(3) Contact Politician	(4) Mobilize Others for a Cause	(5) Attend Party / Candidate Rally	(6) Attend Protest / Demonst'n	(7) Attend Town Hall	(8) Speak at Town Hall	(9) Call Radio re: Politics	(10) Post Politics on Social Media	(11) Responded on Social Media	(12) Registered Voter
No Elec to Grid	0.048	-0.034	-0.106**	-0.028	0.013	0.037	-0.052	-0.006	0.017	0.087*	0.077*	0.033
	(0.310)	(0.048)	(0.047)	(0.066)	(0.050)	(0.027)	(0.049)	(0.048)	(0.027)	(0.044)	(0.046)	(0.021)
Education	0.007	-0.004	0.006	-0.007	-0.002	0.005	-0.008	-0.003	-0.008*	0.009	0.015**	0.005
	(0.032)	(0.009)	(0.007)	(0.007)	(0.007)	(0.004)	(0.007)	(0.006)	(0.004)	(0.007)	(0.007)	(0.005)
# CSOs	0.362***	0.047***	0.038***	0.049***	0.043***	0.009***	0.054***	0.040***	0.012***	0.022***	0.032***	0.013***
	(0.027)	(0.005)	(0.005)	(0.006)	(0.004)	(0.002)	(0.005)	(0.004)	(0.003)	(0.004)	(0.005)	(0.004)
Age	0.032	0.016**	0.010*	0.009**	-0.009**	-0.003	0.005	0.012**	-0.003	-0.013**	-0.014**	0.022***
	(0.022)	(0.005)	(0.005)	(0.004)	(0.004)	(0.002)	(0.005)	(0.004)	(0.002)	(0.004)	(0.005)	(0.005)
Gender	-1.050***	-0.156***	-0.105***	-0.078**	-0.149***	-0.007	-0.135***	-0.149***	-0.041**	-0.102***	-0.086***	-0.040**
	(0.122)	(0.031)	(0.023)	(0.025)	(0.024)	(0.016)	(0.029)	(0.022)	(0.016)	(0.023)	(0.023)	(0.015)
Income	0.056*	-0.013*	0.009	0.006	0.006	-0.001	-0.010	-0.003	0.002	0.018***	0.027***	0.006
	(0.031)	(0.007)	(0.006)	(0.006)	(0.006)	(0.002)	(0.007)	(0.005)	(0.003)	(0.004)	(0.005)	(0.004)
Kakamega	0.069	-0.074*	-0.038	-0.010	0.001	0.027	0.111**	0.084**	-0.015	-0.024	0.006	0.008
	(0.187)	(0.044)	(0.038)	(0.036)	(0.030)	(0.022)	(0.038)	(0.031)	(0.015)	(0.033)	(0.048)	(0.017)
Uasin Gishu	-0.100	-0.010	0.028	-0.014	-0.004	0.019	0.012	0.044	-0.033**	-0.068**	-0.017	-0.033*
	(0.211)	(0.043)	(0.048)	(0.038)	(0.035)	(0.019)	(0.041)	(0.033)	(0.014)	(0.026)	(0.042)	(0.020)
Solar/MG in Year 1	-0.257**	-0.030	-0.070**	0.027	-0.038**	-0.017	-0.079**	-0.044*	-0.017	0.005	-0.014	0.029*
	(0.105)	(0.039)	(0.022)	(0.035)	(0.019)	(0.013)	(0.031)	(0.025)	(0.016)	(0.020)	(0.020)	(0.015)
Interest in Current Events	0.026	0.007	0.011*	0.005	-0.003	-0.005**	0.008	0.000	0.004	-0.005	-0.002	0.004
	(0.026)	(0.005)	(0.006)	(0.004)	(0.005)	(0.002)	(0.005)	(0.004)	(0.003)	(0.004)	(0.005)	(0.003)
Electricity Both Years	0.148	0.045	-0.002	0.061*	0.001	0.002	-0.008	-0.037	-0.007	0.051**	0.031	0.021
	(0.129)	(0.033)	(0.034)	(0.034)	(0.025)	(0.014)	(0.027)	(0.023)	(0.013)	(0.023)	(0.026)	(0.015)
N	1304	1306	1306	1306	1306	1306	1306	1306	1306	1306	1306	1304

Standard errors in parentheses
Observations from Year 2 only. Standard errors clustered at sublocation level.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Table B6. Electricity Quantity Change Regression Results - Average Marginal Effects

	(1) Participat'n Index	(2) Contact Civil Servant	(3) Contact Politician	(4) Mobilize Others for a Cause	(5) Attend Party / Candidate Rally	(6) Attend Protest / Demonst'n	(7) Attend Town Hall	(8) Speak at Town Hall	(9) Call Radio re: Politics	(10) Post Politics on Social Media	(11) Responded on Social Media	(12) Registered Voter
Elec Quantity Change	0.065	0.001	0.003	0.014**	0.007	0.004**	0.003	0.015**	0.002	0.005	0.011*	0.003
	(0.040)	(0.008)	(0.007)	(0.007)	(0.008)	(0.002)	(0.007)	(0.005)	(0.002)	(0.005)	(0.006)	(0.004)
Education	0.011	-0.004	0.006	-0.006	-0.001	0.005	-0.008	-0.002	-0.007*	0.009	0.015**	0.005
	(0.033)	(0.009)	(0.007)	(0.007)	(0.007)	(0.004)	(0.007)	(0.006)	(0.004)	(0.007)	(0.007)	(0.005)
# CSOs	0.355***	0.047***	0.037***	0.047***	0.042***	0.009***	0.054***	0.039***	0.012***	0.021***	0.031***	0.013***
	(0.028)	(0.005)	(0.005)	(0.006)	(0.004)	(0.002)	(0.005)	(0.004)	(0.003)	(0.004)	(0.005)	(0.004)
Age	0.035	0.016**	0.011**	0.010**	-0.008**	-0.003	0.006	0.013**	-0.004	-0.014***	-0.014**	0.021***
	(0.023)	(0.005)	(0.005)	(0.004)	(0.004)	(0.003)	(0.005)	(0.004)	(0.002)	(0.004)	(0.005)	(0.005)
Gender	-1.041***	-0.156***	-0.102***	-0.077**	-0.148***	-0.006	-0.134***	-0.146***	-0.041**	-0.103***	-0.085***	-0.040**
	(0.121)	(0.031)	(0.023)	(0.026)	(0.024)	(0.016)	(0.029)	(0.022)	(0.016)	(0.023)	(0.023)	(0.015)
Income	0.037	-0.013*	0.005	0.001	0.004	-0.002	-0.012	-0.008	0.001	0.018***	0.025***	0.006
	(0.034)	(0.007)	(0.007)	(0.006)	(0.007)	(0.002)	(0.008)	(0.006)	(0.003)	(0.004)	(0.005)	(0.005)
Kakamega	0.043	-0.075*	-0.042	-0.015	-0.002	0.026	0.108**	0.076**	-0.016	-0.023	0.005	0.007
	(0.189)	(0.044)	(0.038)	(0.036)	(0.031)	(0.022)	(0.037)	(0.031)	(0.015)	(0.033)	(0.048)	(0.018)
Uasin Gishu	-0.136	-0.012	0.020	-0.024	-0.008	0.018	0.007	0.033	-0.034**	-0.066**	-0.019	-0.033*
	(0.204)	(0.043)	(0.047)	(0.036)	(0.035)	(0.019)	(0.040)	(0.031)	(0.013)	(0.026)	(0.041)	(0.019)
Solar / MG in Year 1	-0.226**	-0.027	-0.062**	0.036	-0.035*	-0.016	-0.074**	-0.035	-0.017	0.001	-0.014	0.028*
	(0.110)	(0.038)	(0.023)	(0.035)	(0.020)	(0.013)	(0.031)	(0.025)	(0.016)	(0.020)	(0.021)	(0.015)
Interest in Current Events	0.023	0.007	0.011*	0.005	-0.003	-0.005**	0.007	-0.000	0.004	-0.005	-0.003	0.004
	(0.026)	(0.005)	(0.006)	(0.004)	(0.005)	(0.002)	(0.005)	(0.004)	(0.003)	(0.004)	(0.005)	(0.003)
Electricity Both Years	0.144	0.052*	0.023	0.069**	-0.001	-0.007	0.004	-0.034	-0.010	0.031	0.014	0.014
	(0.112)	(0.028)	(0.029)	(0.031)	(0.025)	(0.012)	(0.025)	(0.023)	(0.012)	(0.023)	(0.023)	(0.013)
N	1304	1306	1306	1306	1306	1306	1306	1306	1306	1306	1306	1304

Standard errors in parentheses
Observations from Year 2 only. Standard errors clustered at sublocation level.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Table B7. Electricity Quality (Outages) Change Regression Results - Average Marginal Effects

	(1) Participat'n Index	(2) Contact Civil Servant	(3) Contact Politician	(4) Mobilize Others for a Cause	(5) Attend Party / Candidate Rally	(6) Attend Protest / Demonst'n	(7) Attend Town Hall	(8) Speak at Town Hall	(9) Call Radio re: Politics	(10) Post Politics on Social Media	(11) Responded on Social Media	(12) Registered Voter
Elec Quality Change (Outages)	-0.002	0.002	-0.002	0.003	-0.003	0.001	-0.004	0.001	-0.000	0.001	-0.001	0.001
	(0.008)	(0.003)	(0.003)	(0.003)	(0.002)	(0.001)	(0.004)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
Education	0.076	0.001	0.014	0.007	0.006	0.008	-0.005	0.010	-0.005	0.017	0.029**	0.002
	(0.056)	(0.015)	(0.013)	(0.011)	(0.013)	(0.005)	(0.014)	(0.012)	(0.008)	(0.014)	(0.011)	(0.007)
# CSOs	0.433***	0.062***	0.050***	0.045***	0.051***	0.009**	0.066***	0.041***	0.015***	0.031***	0.044***	0.022***
	(0.045)	(0.010)	(0.008)	(0.009)	(0.007)	(0.003)	(0.013)	(0.009)	(0.004)	(0.008)	(0.008)	(0.006)
Age	0.053	0.016*	0.014	0.019**	-0.005	-0.014*	0.015*	0.015**	-0.005	-0.016	-0.022***	0.039***
	(0.036)	(0.009)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.005)	(0.005)	(0.010)	(0.006)	(0.011)
Gender	-0.992***	-0.096**	-0.095**	-0.047	-0.133***	-0.013	-0.098**	-0.134***	-0.040*	-0.135**	-0.129***	-0.070**
	(0.184)	(0.040)	(0.035)	(0.039)	(0.036)	(0.018)	(0.035)	(0.036)	(0.023)	(0.043)	(0.032)	(0.033)
Income	0.080**	-0.013	0.015*	0.008	0.002	-0.003	-0.009	0.002	0.003	0.023***	0.036***	0.005
	(0.036)	(0.009)	(0.008)	(0.008)	(0.008)	(0.003)	(0.010)	(0.007)	(0.004)	(0.005)	(0.008)	(0.005)
Kakamega	-0.337	-0.128*	-0.106	-0.037	0.064	0.004	0.066	-0.001	-0.052	-0.083*	-0.044	-0.062
	(0.282)	(0.071)	(0.073)	(0.085)	(0.058)	(0.026)	(0.058)	(0.044)	(0.038)	(0.048)	(0.053)	(0.040)
Uasin Gishu	-0.165	-0.011	-0.017	0.003	-0.003	0.004	0.045	0.046	-0.022	-0.091	-0.064	-0.062**
	(0.269)	(0.049)	(0.044)	(0.066)	(0.055)	(0.027)	(0.066)	(0.039)	(0.016)	(0.060)	(0.043)	(0.028)
Grid Access & Another Elec Source	0.312	0.124**	0.055	0.001	-0.007	-0.037*	0.125**	0.072	0.001	-0.012	-0.018	0.027
	(0.217)	(0.041)	(0.050)	(0.055)	(0.053)	(0.021)	(0.058)	(0.046)	(0.019)	(0.043)	(0.049)	(0.027)
Interest in Current Events	0.011	-0.007	0.010	0.005	0.004	-0.000	0.005	0.014*	0.003	-0.012	-0.007	0.002
	(0.039)	(0.011)	(0.012)	(0.011)	(0.011)	(0.004)	(0.009)	(0.008)	(0.007)	(0.008)	(0.009)	(0.006)
Electricity Both Years	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
N	442	443	443	443	443	443	443	443	443	443	443	442

Standard errors in parentheses
Observations from Year 2 only. Standard errors clustered at sublocation level.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Table B8. Electricity Quality (Satisfaction) Change Regression Results - Average Marginal Effects

	(1) Participat'n Index	(2) Contact Civil Servant	(3) Contact Politician	(4) Mobilize Others for a Cause	(5) Attend Party / Candidate Rally	(6) Attend Protest / Demonst'n	(7) Attend Town Hall	(8) Speak at Town Hall	(9) Call Radio re: Politics	(10) Post Politics on Social Media	(11) Responded on Social Media	(12) Registered Voter
Elec Quality Change (Satisfaction)	-0.065*	-0.022**	0.005	-0.010	0.003	-0.004	-0.007	-0.005	-0.010*	0.002	-0.015**	-0.003
	(0.037)	(0.009)	(0.009)	(0.008)	(0.010)	(0.003)	(0.010)	(0.009)	(0.006)	(0.007)	(0.007)	(0.005)
Education	0.040	0.000	0.014*	-0.000	-0.000	0.007	-0.007	0.003	-0.009*	0.006	0.021**	0.004
	(0.039)	(0.008)	(0.007)	(0.009)	(0.008)	(0.005)	(0.009)	(0.008)	(0.005)	(0.007)	(0.008)	(0.005)
# CSOs	0.369***	0.050***	0.039***	0.047***	0.042***	0.008***	0.055***	0.040***	0.012***	0.025***	0.038***	0.015***
	(0.029)	(0.007)	(0.006)	(0.007)	(0.005)	(0.002)	(0.007)	(0.006)	(0.003)	(0.005)	(0.005)	(0.004)
Age	0.047*	0.017**	0.009	0.014**	-0.009*	-0.006*	0.012**	0.018***	-0.004	-0.015**	-0.014**	0.026***
	(0.028)	(0.006)	(0.006)	(0.005)	(0.005)	(0.004)	(0.006)	(0.005)	(0.003)	(0.005)	(0.006)	(0.006)
Gender	-0.990***	-0.147***	-0.075**	-0.063**	-0.162***	-0.004	-0.101***	-0.137***	-0.041**	-0.130***	-0.101***	-0.035**
	(0.126)	(0.035)	(0.027)	(0.029)	(0.030)	(0.019)	(0.030)	(0.026)	(0.017)	(0.029)	(0.025)	(0.016)
Income	0.061*	-0.016**	0.006	0.008	0.006	-0.002	-0.010	-0.002	0.003	0.021***	0.029***	0.008
	(0.034)	(0.008)	(0.007)	(0.007)	(0.006)	(0.003)	(0.008)	(0.006)	(0.003)	(0.004)	(0.006)	(0.005)
Kakamega	-0.160	-0.129***	-0.087**	-0.005	-0.011	0.023	0.088**	0.050*	-0.031**	-0.050	0.002	0.002
	(0.173)	(0.031)	(0.038)	(0.044)	(0.031)	(0.028)	(0.037)	(0.029)	(0.016)	(0.034)	(0.063)	(0.026)
Uasin Gishu	-0.423**	-0.064**	-0.034	-0.045	-0.023	0.018	-0.041	-0.008	-0.041**	-0.083**	-0.040	-0.041**
	(0.186)	(0.030)	(0.043)	(0.039)	(0.035)	(0.023)	(0.040)	(0.031)	(0.015)	(0.029)	(0.048)	(0.021)
Solar / MG in Year 1	-0.130	-0.007	-0.057*	0.016	-0.044*	-0.021	-0.018	-0.004	-0.014	0.006	-0.009	0.013
	(0.139)	(0.042)	(0.030)	(0.040)	(0.025)	(0.014)	(0.040)	(0.030)	(0.022)	(0.024)	(0.030)	(0.020)
Interest in Current Events	0.032	0.005	0.014**	0.000	0.001	-0.004	0.008	0.001	0.007**	-0.004	0.000	0.003
	(0.024)	(0.007)	(0.007)	(0.006)	(0.007)	(0.003)	(0.005)	(0.004)	(0.003)	(0.005)	(0.005)	(0.003)
Electricity Both Years	-0.144	0.008	0.062*	0.075*	-0.016	-0.021	-0.070*	-0.105**	-0.029*	-0.001	-0.030	0.007
	(0.191)	(0.034)	(0.034)	(0.039)	(0.037)	(0.017)	(0.040)	(0.038)	(0.016)	(0.034)	(0.032)	(0.019)
N	961	963	963	963	963	963	963	963	963	963	963	961

Standard errors in parentheses

Observations from Year 2 only. Standard errors clustered at sublocation level.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Finally, we present tables B9 through B12, which are associated with Question 3 – does gaining access to electricity change individuals' participation behavior? These full regression tables correspond to the whisker plots in Figure C and related text. These analyses use linear regression analysis with fixed effects for individuals, rather than logistic regression. Results are, therefore, not average marginal effects in these tables.

Tables B9 through B12 show results for the 1388 people who completed both rounds of the survey. Table B9 shows how gaining access to electricity affected individual-level participation. Table B10 shows regression results for individuals increasing quantity of electricity. And Tables B11 and B12 show regression results for individuals increasing levels of electricity quality.

Table B9. Grid Access Fixed Effects Regression Results

	(1) Participat'n Index	(2) Contact Civil Servant	(3) Contact Politician	(4) Mobilize Others for a Cause	(5) Attend Party / Candidate Rally	(6) Attend Protest / Demonst'n	(7) Attend Town Hall	(8) Speak at Town Hall	(9) Call Radio re: Politics	(10) Post Politics on Social Media	(11) Responded on Social Media	(12) Registered Voter
Grid Access	0.124	0.006	-0.004	0.027	-0.079*	0.005	-0.047	0.032	0.027	0.073**	0.085**	0.017
	(0.178)	(0.040)	(0.035)	(0.035)	(0.042)	(0.021)	(0.038)	(0.030)	(0.017)	(0.031)	(0.035)	(0.026)
Income	0.048	0.001	0.007	0.014**	-0.017**	-0.002	0.000	-0.001	0.002	0.011**	0.023***	0.007
	(0.031)	(0.007)	(0.007)	(0.007)	(0.008)	(0.004)	(0.007)	(0.006)	(0.003)	(0.005)	(0.006)	(0.004)
# CSOs	0.276***	0.034***	0.022***	0.047***	0.030***	0.012***	0.041***	0.033***	0.005*	0.020***	0.022***	0.011**
	(0.027)	(0.006)	(0.005)	(0.005)	(0.006)	(0.003)	(0.006)	(0.005)	(0.003)	(0.004)	(0.005)	(0.004)
Constant	1.958***	0.357***	0.151***	0.015	0.304***	-0.000	0.211***	0.054**	0.005	0.007	0.026	0.822***
	(0.138)	(0.030)	(0.026)	(0.028)	(0.031)	(0.016)	(0.029)	(0.025)	(0.014)	(0.023)	(0.026)	(0.018)
N	2562	2567	2567	2567	2567	2567	2567	2567	2567	2567	2567	2562

Standard errors in parentheses
Standard errors clustered by ID.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Table B10: Electricity Quantity Fixed Effects Regression Results

	(1) Participat'n Index	(2) Contact Civil Servant	(3) Contact Politician	(4) Mobilize Others for a Cause	(5) Attend Party / Candidate Rally	(6) Attend Protest / Demonst'n	(7) Attend Town Hall	(8) Speak at Town Hall	(9) Call Radio re: Politics	(10) Post Politics on Social Media	(11) Responded on Social Media	(12) Registered Voter
Elec Quantity (# Appliances)	0.142***	0.011	0.009	0.025***	-0.005	0.011**	0.012	0.023***	0.004	0.018**	0.027***	0.008*
	(0.036)	(0.008)	(0.007)	(0.007)	(0.008)	(0.005)	(0.008)	(0.006)	(0.003)	(0.006)	(0.007)	(0.004)
Income	0.006	-0.002	0.004	0.007	-0.018**	-0.006	-0.005	-0.007	0.001	0.008	0.017**	0.005
	(0.032)	(0.007)	(0.007)	(0.007)	(0.008)	(0.004)	(0.008)	(0.006)	(0.003)	(0.006)	(0.006)	(0.004)
# CSOs	0.257***	0.032***	0.021***	0.043***	0.030***	0.010**	0.039***	0.030***	0.005*	0.018***	0.019***	0.010**
	(0.026)	(0.006)	(0.006)	(0.005)	(0.006)	(0.003)	(0.006)	(0.005)	(0.003)	(0.004)	(0.005)	(0.004)
Constant	1.708***	0.337***	0.130***	-0.028	0.288***	-0.022	0.171***	0.018	0.007	-0.007	-0.001	0.811***
	(0.145)	(0.031)	(0.027)	(0.028)	(0.032)	(0.019)	(0.031)	(0.027)	(0.015)	(0.025)	(0.026)	(0.018)
N	2562	2567	2567	2567	2567	2567	2567	2567	2567	2567	2567	2562

Standard errors in parentheses
Standard errors clustered by ID.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Table B11. Electricity Quality (Outages) Fixed Effects Regression Results

	(1) Participat'n Index	(2) Contact Civil Servant	(3) Contact Politician	(4) Mobilize Others for a Cause	(5) Attend Party / Candidate Rally	(6) Attend Protest / Demonst'n	(7) Attend Town Hall	(8) Speak at Town Hall	(9) Call Radio re: Politics	(10) Post Politics on Social Media	(11) Responded on Social Media	(12) Registered Voter
Elec Quality (Outages / Month)	0.002	0.001	-0.003	0.005	0.001	0.001	-0.003	-0.002	-0.000	0.001	-0.002	0.002
	(0.021)	(0.004)	(0.004)	(0.004)	(0.005)	(0.002)	(0.004)	(0.003)	(0.002)	(0.004)	(0.004)	(0.003)
Income	0.014	0.008	0.012	0.012	-0.033**	-0.006	-0.006	0.001	-0.004	0.008	0.018*	0.006
	(0.045)	(0.010)	(0.011)	(0.010)	(0.010)	(0.005)	(0.011)	(0.008)	(0.004)	(0.008)	(0.009)	(0.005)
# CSOs	0.306***	0.044***	0.030***	0.033***	0.042***	0.010	0.035***	0.034***	0.011*	0.019**	0.031**	0.017**
	(0.050)	(0.010)	(0.009)	(0.010)	(0.010)	(0.007)	(0.010)	(0.008)	(0.006)	(0.009)	(0.011)	(0.006)
Constant	2.049***	0.292***	0.140**	0.053	0.270***	0.027	0.213***	0.050	0.016	0.083*	0.104**	0.797***
	(0.237)	(0.048)	(0.046)	(0.050)	(0.049)	(0.030)	(0.052)	(0.039)	(0.025)	(0.042)	(0.046)	(0.029)
N	1157	1158	1158	1158	1158	1158	1158	1158	1158	1158	1158	1157

Standard errors in parentheses
Standard errors clustered by ID.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Table B12. Electricity Quality (Satisfaction) Fixed Effects Regression Results

	(1) Participat'n Index	(2) Contact Civil Servant	(3) Contact Politician	(4) Mobilize Others for a Cause	(5) Attend Party / Candidate Rally	(6) Attend Protest / Demonst'n	(7) Attend Town Hall	(8) Speak at Town Hall	(9) Call Radio re: Politics	(10) Post Politics on Social Media	(11) Responded on Social Media	(12) Registered Voter
Quality (Satisfaction)	0.014	-0.013	-0.008	0.013	0.019	-0.005	0.003	0.018	-0.009	0.008	-0.020	0.008
	(0.057)	(0.013)	(0.013)	(0.013)	(0.014)	(0.007)	(0.014)	(0.011)	(0.006)	(0.011)	(0.012)	(0.009)
Income	0.047	0.001	0.008	0.017**	-0.024**	-0.004	-0.001	-0.000	0.001	0.011*	0.023***	0.013**
	(0.034)	(0.007)	(0.007)	(0.007)	(0.008)	(0.004)	(0.008)	(0.006)	(0.004)	(0.006)	(0.007)	(0.005)
# CSOs	0.278***	0.039***	0.020**	0.040***	0.034***	0.012**	0.037***	0.033***	0.007*	0.022***	0.027***	0.009*
	(0.033)	(0.007)	(0.006)	(0.006)	(0.007)	(0.004)	(0.007)	(0.006)	(0.004)	(0.005)	(0.006)	(0.005)
Constant	2.012***	0.393***	0.181***	-0.001	0.235***	0.024	0.202***	0.012	0.040	0.011	0.117**	0.795***
	(0.241)	(0.053)	(0.048)	(0.051)	(0.056)	(0.027)	(0.053)	(0.045)	(0.025)	(0.042)	(0.048)	(0.034)
N	2214	2219	2219	2219	2219	2219	2219	2219	2219	2219	2219	2214

Standard errors in parentheses
Standard errors clustered by ID.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Section C. Sensitivity Analyses and Robustness Checks

Sensitivity Analyses for 2023-2024 Data

Scholars interested in green energy and electricity access may be particularly interested in sensitivity analyses focused on how "access to electricity" is defined. Here, we present results of models using different specifications of our independent variable. Results suggest that the source of electricity matters, as results presented here that define electricity access as having electricity from any source (e.g., grid, solar home system, solar lantern, minigrid, generator, etc.) are different from those in the main body of the paper, where we define electricity as specifically grid access.

For example, with this more expansive definition of "access to electricity," we look at cross-sectional data for the baseline year, 2023, to see whether people without electricity participate differently than those with electricity. Results, presented in Table C1, show that some results are similar using either definition of access (Figure A in main paper; Appendix Table B1). Table C1 shows that people with access to electricity from any source are less likely to attend political rallies and attend or speak at town hall meetings, which is the same as when electricity access is limited to electricity grid access. However, while people with grid access are statistically more likely to use social media for political reasons, the same is not true when access to electricity is defined as being from any source of electricity.

Next, Table C2 shows whether people who gained access to electricity from any source participate differently than those who did not, controlling for those who had access in both periods. Results suggest that those who gained access attended and spoke at more town hall meetings on average, compared to people who did not gain access. These can be compared with results in Figure B in the main paper and with Appendix Table B5, where "access" is defined only as grid access. There, we saw that people who gained grid access were less likely to contact a politician than their non-grid-gaining counterparts.

Finally, Table C3 shows whether individuals who gained access to any form of electricity changed their political behavior afterwards. These results are more similar to the results in Figure C in the main paper and in Appendix Table B9. In both cases, individuals are less likely to attend political rallies and more likely to use social media for political purposes after gaining access to electricity, regardless of how it is defined. That said, when electricity access is defined broadly, respondents are more likely to attend a protest or demonstration in the period after gaining electricity.

Rather than expand on these differences here, we call on researchers to do so elsewhere, drawing attention to differences in electricity source as the primary research question in a paper.

Table C1. Electricity Access Regression Results - Average Marginal Effects (2023 Data Only)

	(1) Participat'n Index	(2) Contact Civil Servant	(3) Contact Politician	(4) Mobilize Others for a Cause	(5) Attend Party / Candidate Rally	(6) Attend Protest / Demonst'n	(7) Attend Town Hall	(8) Speak at Town Hall	(9) Call Radio re: Politics	(10) Post Politics on Social Media	(11) Responded on Social Media	(12) Registered Voter	(13) Voted in 2022
Electricity Access	-0.181*	0.010	-0.003	-0.006	-0.068**	-0.000	-0.071***	-0.044**	-0.020*	0.026*	0.022	-0.003	-0.012
	(0.103)	(0.027)	(0.022)	(0.020)	(0.027)	(0.009)	(0.020)	(0.016)	(0.010)	(0.014)	(0.020)	(0.014)	(0.019)
Education	0.166***	0.005	0.006	0.014**	0.022**	0.002	0.011*	0.013**	0.002	0.038***	0.043***	0.017***	0.008
	(0.026)	(0.008)	(0.006)	(0.005)	(0.007)	(0.003)	(0.007)	(0.006)	(0.003)	(0.005)	(0.005)	(0.004)	(0.006)
# CSOs	0.268***	0.038***	0.030***	0.037***	0.034***	0.008**	0.038***	0.029***	0.004**	0.016***	0.013***	0.013***	0.018***
	(0.021)	(0.006)	(0.004)	(0.004)	(0.006)	(0.002)	(0.004)	(0.003)	(0.002)	(0.002)	(0.003)	(0.004)	(0.005)
Age	0.095***	0.031***	0.011**	0.008**	-0.004	-0.006**	0.023***	0.017***	-0.003*	-0.016***	-0.024***	0.061***	0.015***
	(0.016)	(0.005)	(0.004)	(0.003)	(0.004)	(0.002)	(0.004)	(0.003)	(0.002)	(0.003)	(0.004)	(0.005)	(0.004)
Gender	-1.085***	-0.157***	-0.096***	-0.092***	-0.153***	-0.029***	-0.170***	-0.143***	-0.035***	-0.102***	-0.084***	-0.019	-0.068***
	(0.100)	(0.021)	(0.021)	(0.020)	(0.022)	(0.009)	(0.022)	(0.015)	(0.010)	(0.014)	(0.014)	(0.014)	(0.018)
Income	-0.017	-0.009**	-0.002	-0.003	-0.011**	0.000	-0.008	-0.005	0.001	0.004	0.009**	0.000	-0.007*
	(0.022)	(0.005)	(0.005)	(0.003)	(0.005)	(0.002)	(0.005)	(0.004)	(0.002)	(0.003)	(0.004)	(0.004)	(0.004)
Kakamega	0.173	-0.055	-0.030	-0.010	0.048	-0.003	0.103**	0.080***	-0.002	-0.016	0.045	0.015	-0.010
	(0.210)	(0.043)	(0.037)	(0.035)	(0.054)	(0.013)	(0.038)	(0.023)	(0.011)	(0.019)	(0.027)	(0.022)	(0.025)
Uasin Gishu	0.382**	0.032	0.015	0.017	0.114**	0.011	0.076**	0.018	0.002	-0.013	0.037	0.040**	-0.035
	(0.188)	(0.043)	(0.040)	(0.032)	(0.052)	(0.015)	(0.035)	(0.018)	(0.012)	(0.018)	(0.023)	(0.020)	(0.025)
Interest in Current Events	0.077***	0.013***	0.006*	0.010***	0.020***	-0.001	0.006*	0.009**	0.004**	0.002	0.008**	0.001	-0.001
	(0.014)	(0.004)	(0.003)	(0.003)	(0.004)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
N	2258	2268	2268	2268	2268	2268	2268	2268	2268	2268	2268	2258	1915

Standard errors in parentheses
Observations from Year 1 only. Standard errors clustered at sublocation level.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Table C2. Gained Electricity Access Regression Results - Average Marginal Effects

	(1) Participat'n Index	(2) Contact Civil Servant	(3) Contact Politician	(4) Mobilize Others for a Cause	(5) Attend Party / Candidate Rally	(6) Attend Protest / Demonst'n	(7) Attend Town Hall	(8) Speak at Town Hall	(9) Call Radio re: Politics	(10) Post Politics on Social Media	(11) Responded on Social Media	(12) Registered Voter
Gained Elec Access	0.497	0.061	-0.065	-0.010	0.031	0.029	0.129**	0.108**	0.031	0.061	0.079	0.013
	(0.312)	(0.060)	(0.043)	(0.041)	(0.037)	(0.025)	(0.049)	(0.052)	(0.025)	(0.043)	(0.048)	(0.015)
Education	0.013	-0.004	0.007	-0.007	-0.001	0.006	-0.007	-0.001	-0.007*	0.009	0.015**	0.005
	(0.033)	(0.009)	(0.007)	(0.007)	(0.007)	(0.004)	(0.007)	(0.006)	(0.004)	(0.007)	(0.007)	(0.005)
# CSOs	0.362***	0.047***	0.038***	0.049***	0.043***	0.009***	0.054***	0.040***	0.012***	0.022***	0.032***	0.013***
	(0.027)	(0.005)	(0.005)	(0.006)	(0.004)	(0.002)	(0.005)	(0.004)	(0.002)	(0.004)	(0.005)	(0.004)
Age	0.036	0.017**	0.010*	0.009**	-0.009**	-0.003	0.007	0.013**	-0.003	-0.013***	-0.014**	0.022***
	(0.022)	(0.005)	(0.005)	(0.004)	(0.004)	(0.003)	(0.005)	(0.004)	(0.003)	(0.004)	(0.005)	(0.005)
Gender	-1.044***	-0.155***	-0.098***	-0.079**	-0.147***	-0.007	-0.133***	-0.148***	-0.040**	-0.105***	-0.087***	-0.042**
	(0.124)	(0.032)	(0.023)	(0.025)	(0.025)	(0.016)	(0.028)	(0.022)	(0.016)	(0.023)	(0.023)	(0.015)
Income	0.055*	-0.014*	0.009	0.005	0.007	-0.000	-0.011	-0.004	0.002	0.018***	0.028***	0.006
	(0.031)	(0.007)	(0.006)	(0.006)	(0.006)	(0.002)	(0.007)	(0.005)	(0.003)	(0.004)	(0.005)	(0.004)
Kakamega	-0.012	-0.085*	-0.044	-0.005	-0.007	0.022	0.086**	0.067**	-0.020	-0.026	-0.001	0.010
	(0.187)	(0.044)	(0.039)	(0.034)	(0.030)	(0.020)	(0.039)	(0.031)	(0.015)	(0.034)	(0.048)	(0.017)
Uasin Gishu	-0.135	-0.018	0.023	-0.014	-0.007	0.018	-0.002	0.035	-0.035**	-0.066**	-0.018	-0.031*
	(0.201)	(0.043)	(0.046)	(0.037)	(0.035)	(0.018)	(0.041)	(0.031)	(0.013)	(0.026)	(0.041)	(0.019)
Interest in Current Events	0.024	0.006	0.012**	0.005	-0.003	-0.005**	0.007	-0.000	0.004	-0.006	-0.003	0.004
	(0.025)	(0.005)	(0.006)	(0.004)	(0.005)	(0.002)	(0.005)	(0.004)	(0.003)	(0.004)	(0.004)	(0.003)
Electricity Both Years	0.301*	0.073*	-0.018	0.069*	0.005	0.001	0.044	0.002	-0.001	0.058**	0.045	0.024
	(0.175)	(0.042)	(0.037)	(0.036)	(0.029)	(0.015)	(0.034)	(0.028)	(0.016)	(0.027)	(0.035)	(0.015)
N	1304	1306	1306	1306	1306	1306	1306	1306	1306	1306	1306	1304

Standard errors in parentheses

Observations from Year 2 only. Standard errors clustered at sublocation level.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$

Table C3. Electricity Access Fixed Effects Regression Results

	(1) Participat'n Index	(2) Contact Civil Servant	(3) Contact Politician	(4) Mobilize Others for a Cause	(5) Attend Party / Candidate Rally	(6) Attend Protest / Demonst'n	(7) Attend Town Hall	(8) Speak at Town Hall	(9) Call Radio re: Politics	(10) Post Politics on Social Media	(11) Responded on Social Media	(12) Registered Voter
Electricity Access	0.191	0.042	-0.035	0.007	-0.069**	0.029**	0.055*	0.042*	0.027*	0.041*	0.054**	0.015
	(0.124)	(0.030)	(0.027)	(0.028)	(0.032)	(0.014)	(0.030)	(0.026)	(0.015)	(0.021)	(0.025)	(0.021)
Income	0.047	-0.000	0.008	0.015**	-0.018**	-0.003	-0.003	-0.001	0.002	0.013**	0.024***	0.007*
	(0.031)	(0.006)	(0.007)	(0.007)	(0.007)	(0.004)	(0.007)	(0.006)	(0.003)	(0.005)	(0.006)	(0.004)
# CSOs	0.277***	0.034***	0.022***	0.047***	0.030***	0.012***	0.041***	0.034***	0.005*	0.020***	0.022***	0.011**
	(0.027)	(0.006)	(0.005)	(0.005)	(0.006)	(0.003)	(0.006)	(0.005)	(0.003)	(0.004)	(0.005)	(0.004)
_cons	1.883***	0.334***	0.171***	0.019	0.320***	-0.016	0.162***	0.039	-0.002	0.007	0.021	0.818***
	(0.144)	(0.033)	(0.028)	(0.030)	(0.033)	(0.017)	(0.033)	(0.028)	(0.015)	(0.024)	(0.028)	(0.020)
N	2562	2567	2567	2567	2567	2567	2567	2567	2567	2567	2567	2562

Standard errors in parentheses
Standard errors clustered by ID.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$