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Executive summary

Since its privatisation in 2013, the Nigerian Electricity Supply Industry (NESI) has been constrained by persistent inefficiencies, corruption and liquidity challenges. Micro, small and medium enterprises (MSMEs) have faced high operational costs from the unreliable grid supply, they have been forced into rule-breaking behaviour like non-payment of bills, and they have resorted to costly and polluting self-generation of electricity. This has reduced the competitiveness and sustainability of MSMEs.

A previous study conducted by SOAS University of London's Anti-Corruption Evidence consortium (SOAS-ACE) concludes that a national grid-based solution is not feasible in the short to medium term to address energy scarcity in Nigeria (Roy et al., 2020; Roy et al., 2023). Instead, a decentralised and embedded grid model could provide SMEs with reliable electricity, powered by solar photovoltaics, battery storage and compressed natural gas. Our Power–Capability–Interest (PCI) framework (Khan and Roy, 2022) demonstrates that it is feasible to attract competent private investors to local SME grids, and that this would foster horizontal accountability between suppliers and users. MSMEs are currently reliant on diesel generators, but they exhibit willingness to pay for power at higher rates if the reliability of grid-supplied energy improves. A peer-to-peer monitoring mechanism within MSME clusters could ensure compliance with payment obligations, and encourage self-enforcement of rules and sustainable power provision.

There is funding available in Nigeria for distributed renewable energy projects (small-scale and located near end-users). However, donors are hesitant to fund such projects in MSME clusters given certain financial disincentives. This includes the low creditworthiness of businesses, their lack of adequate collateral and the informal nature of transactions in such clusters. This is the case even to fund a small intervention to fit out some MSME units with solar panels.

Evidence is needed to: 1) convince MSMEs of the feasibility of a decentralised and embedded grid model, and 2) to convince funders that it is possible to de-risk the embedded project by eradicating corrupt behaviour like non-payment of bills. To this end, we operationalised a lab-in-the-field experiment to test different mechanisms from individual contracts to group contracts with joint liability and incentives. This field-based behavioural experiment helps quantitatively validate our hypothesis of rule-following behaviour.

The objective is to explore how MSMEs respond to different group contracts with positive incentives, punishments, shared responsibility (joint liability) and peer-monitoring mechanisms in modelled scenarios. The findings show how these contract features influence electricity bill payments. Within a scenario of improved electricity provision, our theoretical prior is that group contracts based on horizontal enforcement will increase compliance with, and payment of, electricity bills. Our companion scoping study (Roy et al., 2025) suggests that monitoring will ensure timely payments, which will allow the solar provider to supply good-quality electricity at a price SMEs are willing (and able) to pay. The result is increased rule-following by SMEs as they no longer need to use non-compliant methods to access electricity, as well as higher productivity and revenue for these businesses.

The next phase of the research will test the embedded model and refine contracting mechanisms to ensure financial viability, environmental sustainability and reduced corruption incentives. The overarching aim of the initiative is to provide a scalable solution to Nigeria’s MSME energy crisis.

1. Introduction

Since privatisation of the Nigerian Electricity Supply Industry (NESI) in 2013, the country's energy sector has been plagued by persistent liquidity challenges, inefficiencies and corruption. This has adversely affected the growth of micro, small and medium enterprises (MSMEs) by increasing their operational costs and reducing profit margins. It has limited their overall sustainability and expansion.

SOAS-ACE research has demonstrated why a national grid-based solution is not possible in the short to medium term in Nigeria (Roy et al., 2020; Roy et al., 2023). The energy sector is not able to attract technically capable private-sector investors, and consequently MSMEs are losing competitiveness as they cannot access a reliable electricity supply. Businesses have to make their own precarious and polluting arrangements – like stealing electricity or using diesel generators – to make up for the shortfall in the grid supply.

A companion scoping study identifies MSMEs as a productive consumer base who suffer productivity losses due to lack of electricity (Roy et al., 2025). We posit that a reliable energy supply could be provided through an embedded and disaggregated grid, for which an evolving policy architecture already exists in Nigeria. The SOAS-ACE Power–Capability–Interest framework uses a society-wide approach to analyse the formal and informal drivers of rule-following and rule-breaking behaviour (Khan and Roy, 2022). Using this framework, we have showed that it is feasible to attract good investors to supply local MSME grids and that effective horizontal checks could be set up between local suppliers and users to curb corruption. Furthermore, the technology for this embedded and disaggregated solution is available through a mix of solar photovoltaic, battery storage and compressed natural gas, which helps make this investment 'green'.

Box 1. Summary of findings from phase one

1. A combination of interdependent issues has cascaded losses up the energy value chain in Nigeria. Factors include legacy corruption, problematic initial privatisation with politically connected but technically unsound firms, transmission inefficiency, technical bankruptcy of distribution companies and low billing collections
2. These losses have led to the failure of grid-based supply, which has forced over 80% of MSMEs to own or use a generator or to self-generate their electricity. This has hugely damaging economic consequences for MSMEs and for job creation, and it has environmental impacts as generators use diesel.
3. Many energy users (especially MSMEs) do not pay their bills currently as they feel underserved by public providers that are unable to supply electricity for more than four to five hours per day. The low collection rates impede much-needed earnings in the energy sector.
4. Alternative methods to improve power supplies have to be economically viable and they also have to address problems of corruption, particularly in terms of non-payment of bills and power theft.

Box 1. Summary of findings from phase one

5. End-users within mini grids are more likely to monitor their peers for illegal access and non-payment of bills, which can be worked into policy to reduce corruption and facilitate development in the energy sector.
6. MSMEs self-generate electricity at a considerably higher price than the cost of a grid-based supply, due to the cost of paying off engineers, buying diesel (legitimately or from the black market) and maintaining their generator. This demonstrates a willingness to pay for power at prices above what is available via the grid.
7. Large, politically connected firms dominate Nigeria's energy sector and they have little incentive to invest and upgrade services. The most plausible anti-corruption strategy is a peer-to-peer monitoring approach, where feasible and implementable solutions are identified that work within the constraints of this distribution of power.

Source: Roy et al. (2025)

The scoping study establishes proof of concept for the embedded and collective electricity supply solution focused on MSMEs (ibid.). This experiment in the field will be used to develop a pilot that brings together business clusters in Abuja with technology service providers to identify the contracting design that best enables policy delivery. The aim is to: 1) create a demonstration project using modelled scenarios (or 'games'), and 2) design policy for distributed energy that reduces the incentives for MSMEs to engage in corrupt behaviour, while also helping these businesses increase their competitiveness through lower costs and ensuring mini-grid providers see efficient returns.

We have used the Power–Capability–Interest framework to identify feasible entry points for policy that will have an impact. These policies are meant to complement and strengthen formal rules or 'vertical' enforcement by aligning the behaviour of a network of actors (in this case, rule-following by MSMEs) to the intended outcomes of formal developmental laws (here, a reliable, efficient and affordable electricity supply). This framework differs from a 'bottom-up' versus 'top-down' approach or collective-action approach. Collective action approaches tend to focus on mobilising a particular community or constituency. The Power–Capability–Interest framework focuses on horizontal checks that networked actors apply to each other and across constituencies which result in rule-following behaviour.

For these horizontal checks to be effective, stakeholders from across relevant networks will act in their own interest to monitor each other in a sustained and intense manner. Once these checks are regular and embedded, even 'free riders' have to follow rules as they get called out by their peers otherwise. However, successful checks depend on the power and capabilities of the actors (Khan and Roy, 2022). In contexts of asymmetric power and differential productive capabilities, it is unlikely to be in the interest of powerful players to be rule following. But, in a network of actors who are well-matched in their relative power and productive capabilities – that is, their ability to generate a livelihood and add value to society – there is higher interest in and likelihood of rule-following (Khan, 2018a; 2018b). Peer-to-peer checks and enforcement is also likely to be successful in such contexts.

Essentially, rule followers will call out rule breakers in their own interest, because they do not want others to gain by breaking rules.

For the scoping survey and experiment in the field we worked with MSMEs in Kugbo International Market in Abuja Municipal Area Council in the Federal Capital Territory, Abuja. These businesses share a relatively similar distribution of power and capabilities, and they already engage in informal checks within their professional associations for collective processes like security and waste collection. We have used insights from the scoping study to develop a strategy to enhance access to electricity for these MSMEs using a distributed energy system – a solar plant provides reliable, affordable electricity using a contracting system where MSMEs apply checks on one another to ensure bills are paid and the cluster receives electricity.

This strategy seems feasible given our Power–Capability–Interest analysis. The acute scarcity of electricity in the cluster means that MSMEs currently have no incentives to follow rules. They instead resort to non-payment of bills, bribing engineers and buying diesel on the black market to run generators. While this leads to very high operating costs for MSMEs, they cannot afford to be rule following because energy supplies are unreliable. The provision of an affordable and reliable supply using group contracts would therefore have a high chance of self-enforcement, as MSMEs would be incentivised to monitor bill payment to ensure their own energy supply.

As well as establishing horizontal checks between businesses in Kugbo market, the proposed strategy should also establish horizontal checks with more technically competent and capable distributed energy providers due to the combined relative power of the MSMEs. However, the first step is to convince financiers and technology providers that this policy would work *among* the MSMEs, and at a later stage a pilot may be developed to demonstrate that it could also work *between* the MSME cooperative and the technology provider.

While it is clear that the technical solution can be provided relatively easily, SMEs need to be convinced that the collective mechanism can be governed effectively. This means implementing a pilot for a section of the cluster, akin to an intervention with a treatment and control group. A preliminary workshop showed there is already strong support for the embedded and collective solution – SMEs understand that the approach could enhance their productivity, but also that it could significantly reduce the air and noise pollution from generators and therefore provide an environmentally friendly solution too. In the scoping study we conducted an energy demand and infrastructure audit and surveyed firms in collaboration with four SME associations in the Kugbo furniture cluster to understand socio-economic behaviours (Roy et al., 2025). We hope to use this data to inform SMEs of the true cost of their self-generation and shift their behaviour towards adopting the embedded model.

The need for 'mid-stage' evidence

There is funding available in Nigeria for distributed renewable energy projects (small-scale and located near end-users); however, donors are hesitant to fund such projects in MSME clusters given various financial disincentives. This includes the low credit worthiness of firms, their lack of adequate collateral and the informal nature of transactions in such clusters. This is the case even for smaller interventions to fit out some SME units with solar panels.

We therefore see that two sets of evidence are needed. First, evidence is needed to convince SMEs of the benefits of the embedded decentralised energy model. Second, evidence is needed to convince funders that it is possible to de-risk the embedded project by eradicating corrupt behaviour like non-payment of bills. Of course, funders will also need to see evidence that the pilot itself is a worthwhile investment. To this end, we operationalised a lab-in-the-field experiment to test different models from individual contracts to group contracts with joint liability and incentives. The aim is twofold: 1) to show how these contracts can work, and (2) to provide evidence to funders on the payment outcomes. This field-based behavioural experiment helps quantitatively validate our hypothesis of rule-following behaviour.

The objective of the lab-in-the-field experiment is to explore how SMEs respond to different types of group contracts with positive incentives, punishments, shared responsibility (joint liability) and peer-monitoring mechanisms. With this, we will understand how such contract features influence electricity bill payments.

Within a scenario of improved electricity provision, our theoretical prior is that group contracts based on horizontal enforcement will increase the likelihood of end-users paying their electricity bills. Our scoping study already suggests that horizontal monitoring will ensure timely payments, which in turn will allow the solar provider to supply good-quality electricity at a price MSMEs are willing (and able) to pay. The result is increased rule-following by SMEs as they no longer have to use non-compliant methods to access electricity, as well as higher productivity and revenue for these businesses.

Section 2 describes the design of the behavioural experiment, starting with a brief literature review to contextualise the design process. We then explain the experimental setting and randomisation process, before describing the modelled scenarios ('games') and payoff structures. Section 3 describes the operationalisation of the games and Section 4 presents descriptive statistics of the participants. Section 5 introduces the preliminary findings of the experiment before we conclude in Section 6 with avenues for further analysis.

2. Design of the experiment

2.1. Literature review on lab-in-the-field experiments

Lab experiments test behavioural theories in strict lab settings where the researcher can remove context to uniquely focus on the outcome of interest (Gneezy and Imas, 2017). However, the external validity of these experiments is questionable, since the context and environment where experiments are conducted can greatly impact the results obtained. Increasingly, researchers are conducting lab-in-the-field experiments where the same methodologies are applied but with the population of interest in the specific context of interest, thus allowing the results to be more relevant to specific cases.

The experimental design for this study was informed by a review of several strands of behavioural games, including those related to contract theory and enforcement, trust formation, cooperation and social capital, and microfinance. Among these, public good games most closely align with the objectives of this lab-in-the-field experiment. Specifically, the design draws primarily from Threshold Public Good Games (Ledyard, 1995; Marks and Croson, 1999; Fischbacher et al., 2001), which best capture the dynamics of collective electricity payments and contract compliance in this context.

Public good games are used to understand free-riding, cooperation, collective action mechanisms and incentives under varying conditions. The general premise is that players decide how much or whether to contribute to a common group account to pay for a good or service that will benefit all players. The funds are typically given by researchers to participants. These games have been used widely in microfinance, for example to understand repayment behaviour and collective-action dynamics.

The lab-in-the-field experiment has been designed to incorporate several games per treatment group. The games incorporate elements of Threshold Public Good Games where players contribute to a public good – in our case, electricity – which is provided only if contributions reach a certain threshold, for instance, a group contract payment. If the threshold is not met, the public good is not provided, and players receive nothing (some receive back their contributions). Some versions of the game introduce joint liability, revealed preferences and economic incentives to further test the effect of variations in contract design on payment behaviour.

While field experiments have been conducted in Nigeria to test policy in areas like agriculture and welfare this is the first time that a lab-in-the-field experiment has been conducted for electricity payments by SMEs in Nigeria.

2.2. The experimental setting

The study was conducted in Kugbo market, a commercial hub where approximately 500 MSMEs operate in timber-related industries, including timber processing, furniture production and wood machining. Businesses are organised into trade associations. The study was conducted with the support of the Timber, Wood Machinist, and Cutting and Edging trade associations.

The sample population was drawn from Kugbo market and comprised 140 SMEs,[8] with participants recruited through their respective trade associations. Participants were owners of SMEs or individuals delegated by SME owners to represent their business. Association leaders provided data on SME size (measured by the number of workers) and association membership, which were used as the randomisation variables.

Before the experiment started, participants were randomly assigned to either the control arm or one of the four treatment arms using cluster randomisation. Clustering was conducted based on trade association and SME size. The former variation allows us to examine the role of information, trust and social networks in payment behaviour. Whereas the latter variation, SME size, allows us to test whether symmetric or asymmetric groups affect peer pressure, horizontal checks and enforcement of bill payment. Once clusters were formed, participants were randomly allocated to either the control arm or one of the four treatment groups. Participants were then organised in groups of five people, with multiple groups within each experimental arm. This structure was particularly important for the treatment arms, as these groups formed the basis of the group contracts. In the control arm, groupings were maintained solely for logistical purposes and facilitation.

2.3. The treatment groups

Participants were randomly assigned to one of five treatment arms designed to test how different group formations influence repayment mechanisms in the context of electricity provision.

The first group served as the control group, representing the status quo of electricity provision in Kugbo market. Under this scenario, participants in the group had individual electricity contracts, where SMEs either purchased electricity from the public provider/distributor (Abuja Electricity Development Company or AEDC) or they purchased fuel for a generator. A random sub-sample was selected for the control group, without clustering by any additional characteristic.

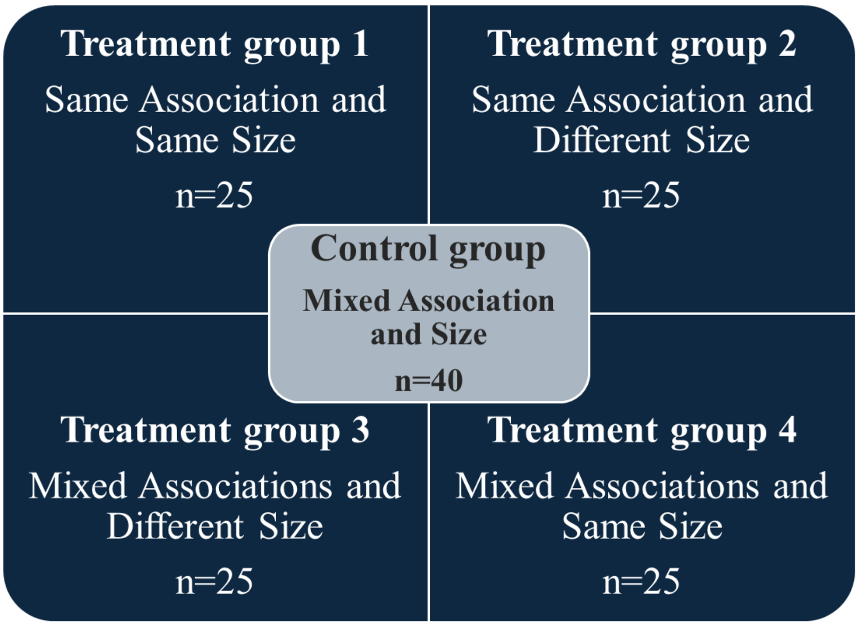
[8] Statistical power calculations were conducted to understand the effect size, power and significance level that could be achieved with the given sample.

In the remaining four treatment groups, participants collectively paid for solar energy from a new hypothetical solar plant built in Kugbo market. Participants were allocated to the treatment groups through cluster randomisation to ensure balanced representation across different SME types. The key variation across groups was SME size and trade association.

The first treatment group comprised SMEs from the same business association, ensuring that participants had pre-existing ties. Additionally, all SMEs in this group were of a similar size, as measured by the number of workers. This allows us to test whether similar firm characteristics facilitate greater cooperation and trust in collective electricity agreements. The second treatment group also comprised SMEs from the same business association, but they differed in business size to capture whether larger and potentially more influential SMEs change the dynamics of a group contract. The third and fourth treatment groups comprised SMEs from three different associations who potentially did not know each other and had not built pre-existing social ties which can impact trust. The third treatment group included mixed SMEs of different sizes, while the fourth treatment group included associations of a similar size. Figure 1 summarises the groups' composition.

The randomisation design was structured to evaluate how network ties, trust and firm size influence SMEs' willingness to cooperate in electricity payment schemes. By comparing individual contracts (control group) to various group contract models, the experiment provides insights into how businesses respond to collective liability, economic incentives and penalties, and varying degrees of trust in the provision of electricity.

Figure 1: Composition of control and treatment groups



2.4. The games and payoffs

2.4.1. The control arm

The control arm of the experiment was designed to model the status quo, where participants typically have individual electricity contracts with the public electricity provider (AEDC), produce electricity using generators they own, or rely on informal agreements with independent generator providers. In the control arm, participants played individually, reflecting the current contract structure in Kugbo market.

At the beginning of each round, participants were given 10,000 naira (₦) (approximately US$6.70 at the time of the experiment), which represented the monthly cost of grid-based electricity for SMEs. These funds were used to make decisions in each round. Each round introduced variations in probabilities, payoffs and conditions to capture electricity usage-related decision-making of SMEs under uncertain energy provision. Each round's payoff was independent of the other rounds. All decisions were private, and participants could not communicate with one another. The payoffs each participant received at the end of the game were also confidential.

The control arm played six rounds. In each round, participants had three options. They could pay the public electricity provider for grid electricity, which was subject to an uncertain service quality. Alternatively, they could purchase generator fuel (diesel) to guarantee electricity access, although at a higher cost due to its negative environmental and health impacts. This higher cost, which in the game materialised as a lower return, was modelled on findings from earlier qualitative research conducted by the scoping study team in Kugbo, which shows that SME owners consider diesel harmful in terms of the environment and health, but they have no other choice to access reliable electricity (Roy et al., 2025). Finally, participants could forgo electricity altogether and retain their initial allocation of ₦10,000, though this meant they were unable to operate their business for that round.

The six scenarios presented to participants are described below.

Round one

In the first round, participants who paid ₦10,000 to the public electricity provider had a 30% probability of receiving reliable and stable electricity for four hours, in which case they recovered the full ₦10,000 to represent the revenue from productivity gains of having reliable electricity. However, if the 70% probability of unreliable and fluctuating electricity materialised, they received only ₦5,000 back, to reflect the economic losses incurred due to the low-quality electricity supply. The quality of electricity was generated randomly via a programmed probability on a handheld tablet, ensuring that no one had control over the decision. Participants only found out the quality of the electricity after deciding whether to pay their ₦10,000 to the electricity provider.

The second option participants could choose was whether to pay ₦10,000 for generator fuel (diesel). This option guaranteed access to electricity but, given the negative externalities expressed by SME owners during the scoping study, participants only received ₦6,500 in return.

The third option was to forgo electricity altogether and retain the initial ₦10,000. However, choosing this option meant that participants could not operate their business during that round. The highest possible payoff in round three was achieved when participants kept the given funds and did not pay for electricity, as this guaranteed a return of ₦10,000. In contrast, the first option resulted in the same return only 30% of the time, while the second option yielded a maximum of ₦6,500, with a loss of ₦3,500 loss. Rational utility-maximising theory, a core tenet of Neoclassical economics (Mas-Colell et al., 1995) would predict that participants prefer the third option. However, this expectation did not hold in the local context. This is further explained in Section 5: Preliminary results.

Round two

In the second round, the probability of receiving reliable and stable grid electricity decreased to 20%, while the probability of receiving unreliable and fluctuating electricity increased to 80%. The payoff received from each outcome remained the same as in round one – ₦10,000 for stable electricity and ₦5,000 for fluctuating electricity. The generator and no-electricity options also remained the same as in round one. Similarly, the highest payoff would have been realised by choosing the third option of keeping the given funds and not paying for any electricity.

Round three

In the third round, the grid electricity quality probabilities were maintained (20%–80%) but a 50% chance of having to pay a bribe was introduced for those who decided to pay for a generator or who decided not to pay for electricity altogether. The bribe requirement was determined probabilistically via the tablet and had no bearing on the quality of electricity, which also ensured that no one had control over the decision. Participants only found out if they had to pay a bribe after making their decision. If a bribe was required, participants lost ₦5,000. In that case, those participants who had chosen to pay for a generator would pay ₦5,000 and then receive ₦3,500 back, to reflect the economic losses incurred due to low-quality electricity supply. If no bribe was required, the generator option remained the same as in rounds one and two, with a ₦10,000 cost and a ₦6,500 return. If participants decided not to pay for electricity but paid a bribe, they kept ₦5,000. The bribe was introduced to capture the cost of corruption that SMEs incur, such as from theft of power from the grid, non-payment of bills, paying off engineers or buying smuggled diesel (historically), all of which were assessed in the qualitative scoping study. In this scenario, the highest payoff would have been realised by choosing the third option of keeping the given funds and not paying for any kind of electricity.

Round four

In round four, the probabilities of accessing grid electricity reverted to those of round one, that is, a 30% chance of a reliable and stable grid supply and a 70% chance of unreliable and fluctuating electricity. However, this round introduced an economic return (profit) on high-quality electricity to emphasise productivity gains that can be achieved with reliable and stable electricity. If participants received reliable and stable electricity, they then received ₦15,000 instead of just the original ₦10,000. If the electricity supply was unreliable and fluctuating, the return was the same as in round one, just ₦5,000. Additionally, in this scenario, the generator option no longer accounted for the negative externalities. Participants who paid ₦10,000 for generator fuel received back ₦10,000 in return. There was no bribe in this round. Although the highest payoff remained the option of not paying for electricity, this scenario captured how participants behaved when grid electricity had a probability of economic return (profit), while the generator option no longer penalised for externalities. By removing the punitive aspect for the generator, this round examined preferences between grid or generator electricity. In this round, the same payoff is achieved with both the generator option and the third option of keeping the given funds and not paying for any kind of electricity, thus allowing us to test preference between these options when the returns are the same.

Round five

In round five, the probability of accessing a reliable grid supply reverts to that of rounds two and three, with a 20% probability of reliable and stable grid electricity, along with the economic return for high-quality electricity introduced in round four and an 80% probability of unreliable and fluctuating electricity. The generator option remained unchanged, with participants receiving the full ₦10,000 back for generator use. No bribe was offered in this round. This round assesses the extent of the preferences expressed in round four. By maintaining the potential for economic returns on stable grid electricity but reducing its probability, this scenario tested whether participants preferred a guaranteed electricity source through generator use or were still willing to take the risk with the grid, despite its lower reliability. In this round, the same payoff is achieved either with the generator option or the third option of keeping the given funds and not paying for any kind of electricity, thus allowing us to test preference between these options when the returns are the same.

Round six

Round six maintained the same options, probabilities and pay-offs as round five, but with the reintroduction of the 50% chance of having to pay a bribe. As in round three, participants who had to pay a bribe were left with only ₦5,000, limiting their ability to purchase generator fuel. However, unlike in earlier rounds where negative externalities were deducted, in this final round participants who spent ₦5,000 on generator fuel received the full ₦5,000 back (and similarly, if they did not pay a bribe and spent ₦10,000 on generator fuel, they received the full ₦10,000 back).

Participants only found out if they had to pay a bribe after making their decision. This final round brought together the different elements that were introduced progressively in previous rounds, in order to understand how participants reacted when faced with the possibility of a bribe (punitive), while at the same time having a positive incentive to pay for grid electricity. In this round, the same payoff was achieved with both the generator option and the third option of keeping the given funds and not paying for any kind of electricity. However, the difference with the grid electricity option was reduced. The round was designed to elicit preferences for grid-based electricity even when faced with a high probability of paying bribes (to not receive a bill) and a low probability of getting good quality (assured) electricity.

Table 1: Summary of control rounds

Round	Description	Required contribution	Decision options	Return of each option/payoff
1	• 30% probability of receiving reliable and stable electricity • 70% probability of unreliable and fluctuating electricity • Generator with lower return	Pay grid electricity: ₦10,000 Pay generator: ₦10,000 Not pay: ₦0	(i) Pay grid electricity (ii) Pay for fuel for a generator (iii) Do not pay	Pay grid electricity: (0.3 × 10,000) + (0.7 × 5,000) = ₦6,500 Pay generator: ₦6,500 Not pay: ₦10,000
2	• 20% probability of receiving reliable and stable electricity • 80% probability of unreliable and fluctuating electricity • Generator with lower return	Pay grid electricity: ₦10,000 Pay generator: ₦10,000 Not pay: ₦0		Pay grid electricity: (0.2 × 10,000) + (0.8 × 5,000) = ₦6,000 Pay generator: ₦6,500 Not pay: ₦10,000
3	• 20% probability of receiving reliable and stable electricity • 80% probability of unreliable and fluctuating electricity • Generator with lower return • 50% chance of receiving a bribe if not paying for grid electricity	Pay grid electricity: ₦10,000 Pay generator: ₦10,000 or ₦5,000 to bribe Not pay: ₦0 or ₦5,000 to bribe		Pay grid electricity: (0.2 × 10,000) + (0.8 × 5,000) = ₦6,000 Pay generator: (0.5 × 6,500) + (0.5 × 3,500) = ₦5,000 Not pay: (0.5 × 10,000) + (0.5 × 5,000) = ₦7,500

Table 2: Summary of control rounds continued

Round	Description	Required contribution	Decision options	Return of each option/payoff
4	• 30% probability of receiving reliable and stable electricity • Economic return in case of high-quality electricity • 70% probability of unreliable and fluctuating electricity • Generator with same return as contribution	Pay grid electricity: ₦10,000 Pay generator: ₦10,000 Not pay: ₦0	(i) Pay grid electricity (ii) Pay for fuel for a generator (iii) Do not pay	Pay grid electricity: (0.3 × 15,000) + (0.7 × 5,000) = ₦8,000 Pay generator: ₦10,000 Not pay: ₦10,000
5	• 20% probability of receiving reliable and stable electricity • Economic return in case of high-quality electricity • 80% probability of unreliable and fluctuating electricity • Generator with same return as contribution	Pay grid electricity: ₦10,000 Pay generator: ₦10,000 Not pay: ₦0		Pay grid electricity: (0.2 × 15,000) + (0.8 × 5,000) = ₦7,000 Pay generator: ₦10,000 Not pay: ₦10,000
6	• -20% probability of receiving reliable and stable electricity • Economic return in case of high-quality electricity • 80% probability of unreliable and fluctuating electricity • Generator with same return as contribution • 50% chance of receiving a bribe if not paying for grid electricity	Pay grid electricity: ₦10,000 Pay generator: ₦10,000 Not pay: ₦0		Pay grid electricity: (0.2 × 15,000) + (0.8 × 5,000) = ₦7,000 Pay generator: (0.5 × 10,000) + (0.5 × 5,000) = ₦7,500 Not pay: (0.5 × 10,000) + (0.5 × 5,000) = ₦7,500

2.4.2. The treatment arms

The treatment arms were designed to model electricity group contracts where SMEs collectively pay for solar energy from a new (hypothetical) solar plant built in Kugbo market. The hypothetical solar plant models an embedded and disaggregated grid that can provide reliable electricity at a price affordable to SMEs while minimising the negative environmental and health externalities of current diesel-based generator options. Based on our previous research, and using the Power–Capability–Interest framework, the assumption is that a disaggregated grid with peer ownership can also introduce effective horizontal checks, thus inducing rule-following behaviour and reducing corruption such as power theft from the grid and non-payment of bills.

The design is based on a modified Threshold Public Good Game (Berazneva et al., 2023). Public good games have been widely used to measure cooperative behaviour (Carlsson et al., 2015; Saldarriaga-Isaza et al., 2015). Threshold Public Good Games are a sub-set of public good games where the provision of a public good depends on collective contributions reaching or exceeding a predefined threshold. If this threshold is met, the public good is provided; otherwise, the good is not provided and contributors may lose their funds based on specific rules.

In our experiment, participants were randomly assigned to groups of five within their treatment arm, simulating the structure of the planned group-based energy contracts. At the beginning of each round, participants were given ₦10,000 with which they could decide whether to contribute to the collective solar energy fund or to abstain, with the provision of electricity contingent on reaching a pre-established threshold value. If the threshold was met, all participants who contributed received their full contribution back. However, if the total group contribution fell below the required threshold, the public good was not provided, and those who contributed lost their entire contribution.

In the first two rounds, participants were not allowed to communicate with one another. From the third round onwards, participants could reveal their individual preference and communicate with their peers, allowing participants to discuss their contributions. At the end of each round, the facilitator informed the group whether the threshold had been reached but they did not disclose individual contributions, ensuring that payment decisions remained private.

Unlike in the control arm, electricity from solar energy was guaranteed to be reliable and stable. The treatment arms consisted of eight rounds rather than six, with varying contribution amounts, economic incentives, penalties and joint-liability designs to elicit patterns of cooperation and peer pressure.

Round one

In the first round, participants were under a lump-sum contract, meaning that each participant had to contribute an equal fixed amount to secure electricity for the group. Each participant could either contribute their full ₦10,000 to the solar energy contract or choose not to contribute and retain the initial ₦10,000. For the group to receive electricity and for participants to receive their ₦10,000 back (to represent productivity gains), the collective contribution had to reach a threshold of ₦50,000 (i.e., all five members had to contribute). If the threshold was not reached, those who contributed lost their allocated funds and no one received electricity. Participants could not communicate or reveal their preferences, reflecting a scenario in which businesses must decide on collective energy investment without prior coordination. This setup introduced a strong free-rider problem, where individual incentives discouraged contributions, even though cooperation would result in the highest total payoff for the group.

Round two

In round 2, participants were under a pro-rata contract, meaning that required contributions were proportional to their electricity consumption levels. Two participants had a lower consumption level, requiring a ₦5,000 contribution, while the other three participants had higher consumption, requiring a ₦10,000 contribution. The specific participants who had a lower contribution changed in every lump-sum contract. The threshold for receiving electricity was ₦40,000. They all received ₦10,000. As in round one, participants could not communicate or reveal their preferences, meaning they had to decide on contributions without knowing the intentions of others. Similarly, if the total contribution reached the threshold, participants received electricity and recovered their contribution. If the threshold was not met, contributors lost their contributions, and non-contributors kept their money. In addition to the considerations from the previous round, this round tested free-riding when contributions to the group contract vary according to consumption. As with the previous scenario, the highest total payoff for the group was only achieved if everyone contributed but everyone had the individual incentive of not contributing to maximise their individual payoff. In this round the incentive to free ride was even greater because the contributions were not equal.

Round three

Round three was similar to round one, where participants were under a lump-sum contract requiring equal contributions to reach a ₦50,000 threshold. However, participants could now communicate and reveal their preferences before making their decisions. This modification tested whether revealed preferences increase cooperation, as coordination could help reduce uncertainty while at the same time strengthen trust and the commitment to contributing (peer pressure). Final decisions were still anonymous.

Round four

In round four participants were under a lump-sum contract with revealed preferences, but this round introduced a punishment for non-compliance. The threshold was ₦50,000 and all participants had to contribute ₦10,000. In this scenario, anyone who did not contribute to the group contract would be fined ₦5,000 by the group. The purpose of this was so see whether a punitive mechanism impacted the likelihood of people paying. The use of peer pressure as an enforcement mechanism in contracts can sometimes have adverse effects and distort incentives to participate. This was to be contrasted with round six where we introduced a shared responsibility to meet the threshold, which thus tests a less punitive aspect of group contracts.

Round five

Round five replicated the pro-rata contract structure and conditions from round two. However, participants could now communicate and reveal their preferences before making their decisions. This round tested how players coordinated contributions and whether peer pressure increased the likelihood of meeting the threshold.

Round six

Round six maintained the pro-rata contract structure in which participants could communicate before deciding to contribute, but it introduced joint liability so the group had a shared responsibility towards the contract. Under this new rule, if any participant failed to contribute, the remaining contributors had to cover the shortfall to ensure the group reached the threshold of ₦40,000. As in the previous pro-rata contract structures, two participants had a lower consumption level, requiring a ₦5,000 contribution, while the other three participants had higher consumption, requiring a ₦10,000 contribution. Contributors could only cover the shortfall if the combined value of their contribution was larger than the value of the shortfall (the sum of the non-contributors). If the threshold was reached, then contributing members received back their contribution minus any additional amount needed to cover for members who did not contribute. This condition tested whether the shared responsibility encouraged greater cooperation, as failing to contribute could impose financial burdens on others. As detailed in Section 5, the preliminary results section, most participants were willing to cover the shortfall of others who refused to pay, asserting that, in reality, they would "cover for brothers who could not pay". This indicates both a high level of trust within the cluster and the potential for a functioning (and yet) informal insurance mechanism. The willingness of others to pay for their peers points to an insurance-like risk transfer mechanism and could assure potential investors in a solar powered plant that the SMEs collectively have the capacity to absorb payment risk. The response to pay for others could also be prompted by a shared experience of significant margin pressures due to lack of electricity. This was a common response during our focus groups and field interviews for the scoping study.

Round seven

Round seven maintained the pro-rata and shared responsibility (joint liability) contract structure in which participants could communicate before making a decision, but it introduced an economic incentive for contributors. This additional rule meant that if the threshold was reached – that is, either all participants contributed or contributors had the funds to cover non-contributors – then all contributors received their contributions back plus a 50% bonus on their contribution. For example, a participant contributing ₦10,000 would receive ₦10,000 plus ₦5,000, while a participant contributing ₦5,000 would receive ₦5,000 plus ₦2,500 if the threshold was met. This tested whether participants reacted differently to punishments and positive incentives and examined whether economic incentives increased cooperation.

Round eight

Finally, round eight replicated round seven with a pro-rata, shared responsibility (joint liability) and economic incentive contract structure in which participants could communicate before deciding whether to contribute, but it introduced a penalty for non-contributors. This time, any participant who did not contribute incurred a ₦5,000 penalty, which was deducted from their given money. Contributors continued to receive their 50% bonus if the threshold was met. This round tested the combined effect of positive incentives (bonuses) and negative consequences (penalties) on cooperation.

Table 3: Summary of treatment rounds

Round	Description	Threshold	Required contribution	Decision options	Return of each option/payoff
1	Lump-sum group contract without revealed preferences	₦50,000	All contribute ₦10,000	(i) Contribute to the group contract (ii)Do not contribute to the group contract	If sum of contributions ≥ threshold = contributors receive contribution back If sum of contributions < threshold = contributors loose contribution, non-contributors keep their endowment
2	Pro-rata group contract without revealed preferences	₦40,000	Two participants contribute ₦5,000; three participants contribute ₦10,000		If sum of contributions ≥ threshold = contributors receive contribution back If sum of contributions < threshold = contributors loose contribution, non-contributors keep their endowment
3	Lump-sum group contract with revealed preferences	₦50,000	All contribute ₦10,000		If sum of contributions ≥ threshold = contributors receive contribution back If sum of contributions < threshold = contributors loose contribution, non-contributors keep their endowment
4	Lump-sum group contract with revealed preferences and punishment to non-compliers	₦50,000	All contribute ₦10,000		If sum of contributions ≥ threshold = contributors receive contribution back If sum of contributions < threshold = contributors loose contribution, non-contributors receive a penalty equivalent to half of their endowment

Table 4: Summary of treatment rounds

Round	Description	Threshold	Required contribution	Decision options	Return of each option/payoff
5	Pro-rata group contract with revealed preferences	₦40,000	Two participants contribute ₦5,000; three participants contribute ₦10,000	(i) Contribute to the group contract (ii)Do not contribute to the group contract	If sum of contributions ≥ threshold = contributors receive contribution back If sum of contributions < threshold = contributors loose contribution, non-contributors keep their endowment
6	Pro-rata group contract with joint liability	₦40,000	Two participants contribute ₦5,000; three participants contribute ₦10,000		If sum of contributions ≥ threshold = contributors receive contribution back – any funds required to cover the shortfall created by non-contributors If sum of contributions < threshold = contributors loose contribution, non-contributors keep their endowment
7	Pro-rata group contract with joint liability and economic incentive	₦40,000	Two participants contribute ₦5,000; three participants contribute ₦10,000		If sum of contributions ≥ threshold = contributors receive contribution back – any funds required to cover the shortfall created by non-contributors. Contributors receive a bonus equivalent to half of their contribution If sum of contributions < threshold = contributors loose contribution, non-contributors keep their endowment
8	Pro-rata group contract with joint liability, economic incentive, and penalties for non-compliers	₦40,000	Two participants contribute ₦5,000; three participants contribute ₦10,000		If sum of contributions ≥ threshold = contributors receive contribution back – any funds required to cover the shortfall created by non-contributors. Contributors receive a bonus equivalent to half of their contribution If sum of contributions < threshold = contributors loose contribution, non-contributors receive a penalty equivalent to half of their endowment

3. Operationalisation of the experiment

3.1. Pilot at SOAS University of London

The games were initially tested with 15 postgraduate students at SOAS University of London. The purpose of this small pilot was to assess the readability, clarity and logical flow of the scenarios, as well as the functionality of the digital data collection tools. Minor refinements were made to the wording of the game instructions to enhance comprehension, but the fundamental structure and content remained unchanged. Student responses followed the predictions of the assumption of utility maximisation (that is, one's choice will align with the maximum rational benefit) and they widely selected the options that would yield the highest payoffs. However, given these students were far removed from the energy-deprived context of Kugbo, their responses were very different from the SMEs in the market who opted for grid electricity over an option to not pay their bills.

3.2. Pilot in Kugbo and adjustments to the games

Before launching the full experiment, a second pilot was conducted in Kugbo market with 20 SME participants drawn from the study population. The purpose was to verify that facilitators applied their training correctly when reading and explaining the games and when collecting data on the tablets.

Analysis of these pilot results showed that a large majority of people paid for grid electricity, which therefore did not reflect the current status-quo that had been investigated in the previous scoping study. To understand this inconsistency, the team conducted a follow-up discussion with 10 SME owners, exploring why most participants in the pilot chose to pay the public provider despite previous findings of non-payment. The key insight was that our initial 50% probability of receiving stable, high-voltage electricity in the game was significantly better than what participants experienced in reality. Given this scenario, participants were willing to pay due to their near desperation for reliable power. This was not a contradiction but rather a reflection of the context: while many SMEs resort to electricity theft or alternative sources due to unreliable supply, some are willing to pay when presented with *some* reliable electricity access. In other words, they believe their corrupt behaviour to be 'reasonable' as it provides a means to protect their livelihood and it is not based on greed or discretion. SMEs in Kugbo and in our earlier work in Aba, Nnewi and Onitsha (Roy et al., 2020) understood the high transaction of costs of arranging for electricity through rule violation but were compelled to do so. As outlined in our introduction, a policy of distributed solar power-based electricity supply with group contracts that address the electricity provision concerns of SMEs shift behaviour to become rule-following.

Another key issue that emerged in the structure of the option in the control group was to respond by either paying the public provider for electricity or by not paying at all and to be unproductive. However, through discussions with participants, it became evident that not paying for electricity, in reality, did not and could not mean opting out of electricity use altogether – it meant finding alternative ways to power businesses, which is central to their economic viability. One participant encapsulated this reality when asked about the risks of paying for grid electricity, stating: “Life is a risk, you cannot stay at home”. We found that, in their pattern of thinking and dealing with scarcity, SME owners are simply not able to process or consider the option of opting out of paying for electricity, not using it and not producing any goods for that period. This is never going to be a choice for them and it has no connection with their reality. It is the reason why business owners choose to pay for grid access, however bad the supply is. This feedback was critical in refining the scenarios and response options to better capture the strategic decisions SMEs make under conditions of energy insecurity. Consequently, we then included the option to pay for a generator, where the initial scenario only had the option to pay for a grid supply or to opt out and remain unproductive.

3.3. How the experiment was conducted

The experiment was conducted in a community space within the Kugbo International Market in Abuja, ensuring that participants did not have to travel. Participation dates were communicated several days in advance through trade association leaders, who served as liaisons. Each session included 25 participants, which corresponded to the treatment groups, except for the control group, which comprised 40 participants. Sessions took place twice per day, once in the morning and once in the afternoon. Participants were seated in groups of five, each with a facilitator. In the treatment arms, these groups corresponded to the group contract structure, whereas in the control arm grouping was done solely for coordination. Six groups ran in parallel, with oversight from three supervisors who ensured consistency in implementation and adherence to the experimental protocol.

Participants were provided with answer sheets and pens to individually record their decisions. Answer sheets included a summary of each scenario (the team had prior knowledge that all participants could read and write). Each session lasted approximately two hours and began with a detailed explanation of the experiment’s purpose and procedures. Before proceeding, participants signed a consent form. This was followed by the game rounds, in which participants made electricity payment decisions under varying conditions. Facilitators read the scenario descriptions aloud and participants recorded their responses on their answer sheets. Facilitators then walked behind each group to digitally input responses into tablets.

The use of tablets also automated payoff calculations, allowing for real-time payments at the end of each session. Additionally, the tablet system embedded the randomisation mechanisms required for the experiment. Rather than relying on physical dice rolls, the tablet automatically determined the outcomes of probabilistic elements, such as electricity quality or the likelihood of being bribed.

After completing the game, participants responded to a short survey designed to collect socio-demographic and SME-related information, which is used as covariates and control variables in the analysis.

Compensation payments and game earnings were processed immediately after the socio-demographic and SME-related survey. Participants received fixed compensation of ₦30,000 (approximately US$20) for their time, in addition to any earnings accumulated during the game. Payments were processed digitally through a local platform. Participants were also provided with lunch and refreshments. No physical money was handled during the games. Instead, participants were informed that the money given in each round was stored in a virtual account on the facilitator's tablet.

4. Descriptive statistics

4.1. Demographic composition of the sample

Among the sample, 91% are male (95% treatment group and 87% control group), which was expected since businesses in the cluster are mostly led by men. Most participants completed senior secondary school (equivalent to 12 years of schooling). The mean age of participants is 43.25 years (42 years in the treatment group and 44.5 years in the control group).

Figure 2. Sample age distribution

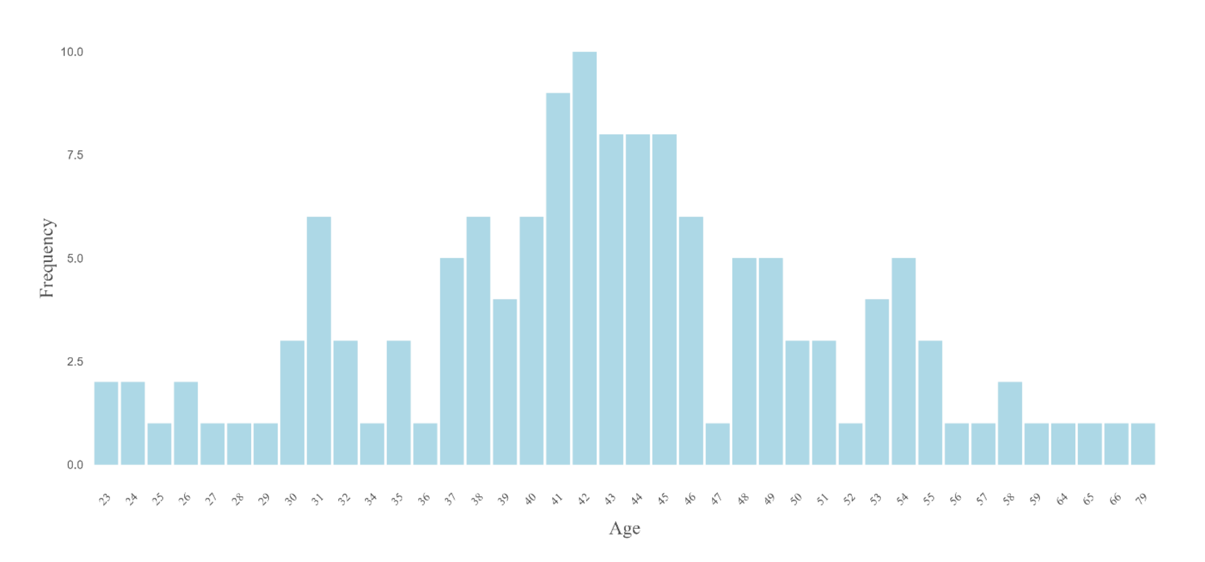
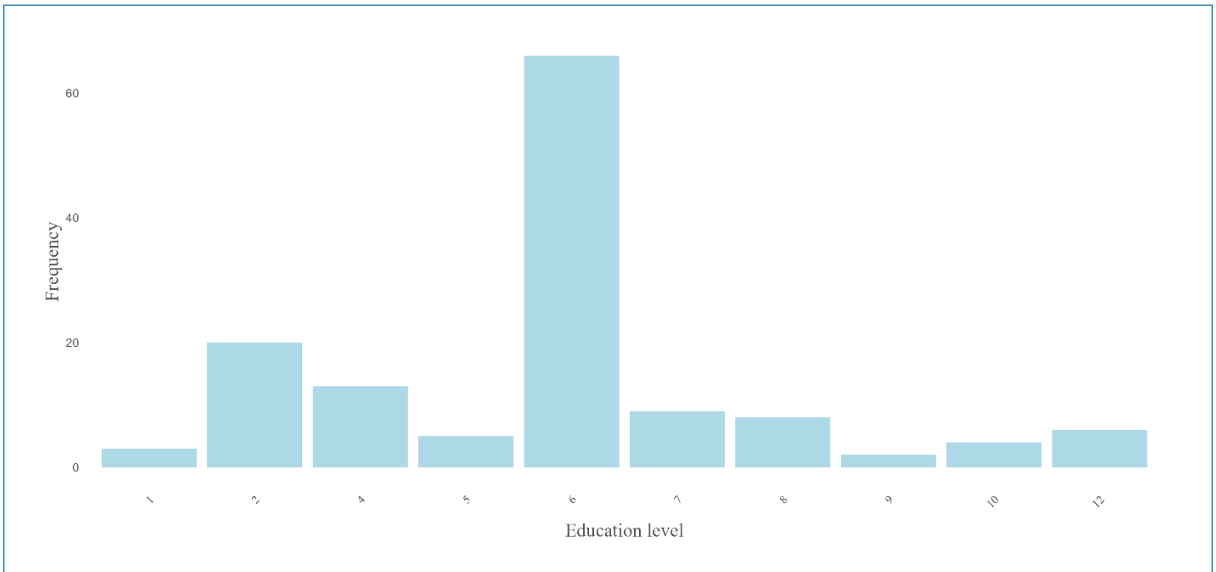


Figure 3. Sample education level



4.2. 4.2 Business descriptions

Most participants (49%, split 45% in the treatment group and 57% in the control group) belong to the Wood Machinists Association, followed by the Timber Association, and the Cutting and Edging Association. Six participants are not part of a trade association. For both groups, the mean business duration is more than six years and the mean number of employees is just under four. In terms of business type, 62% of businesses in the treatment groups and 40% of the control group work on wood products. The main cost component of the businesses is utilities/electricity and diesel, followed by materials and labour.

Figure 4: Number of employees

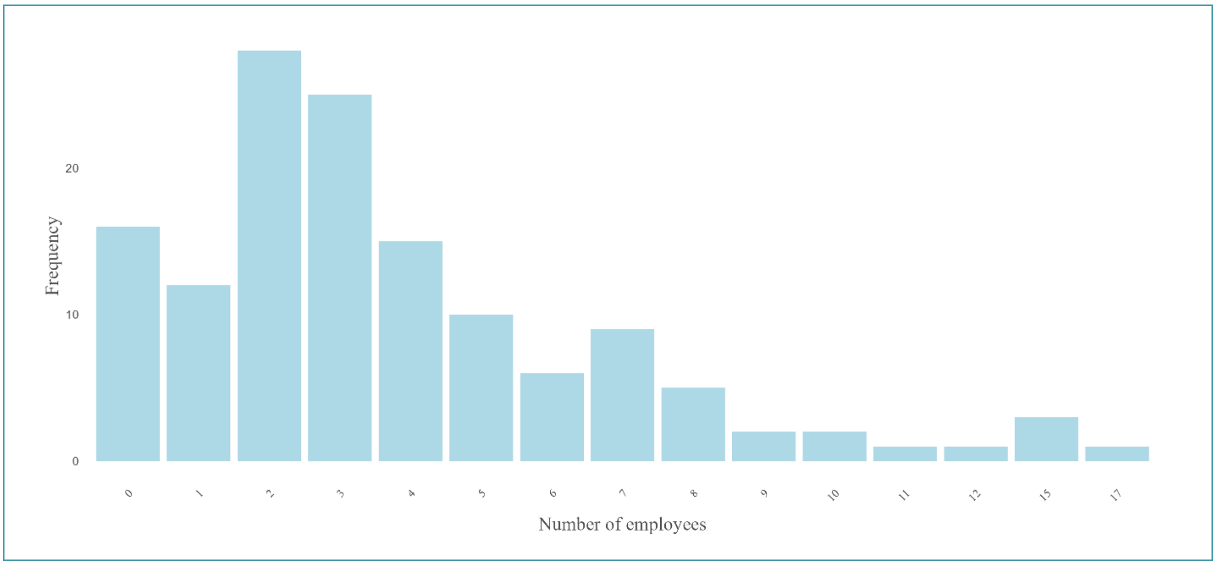
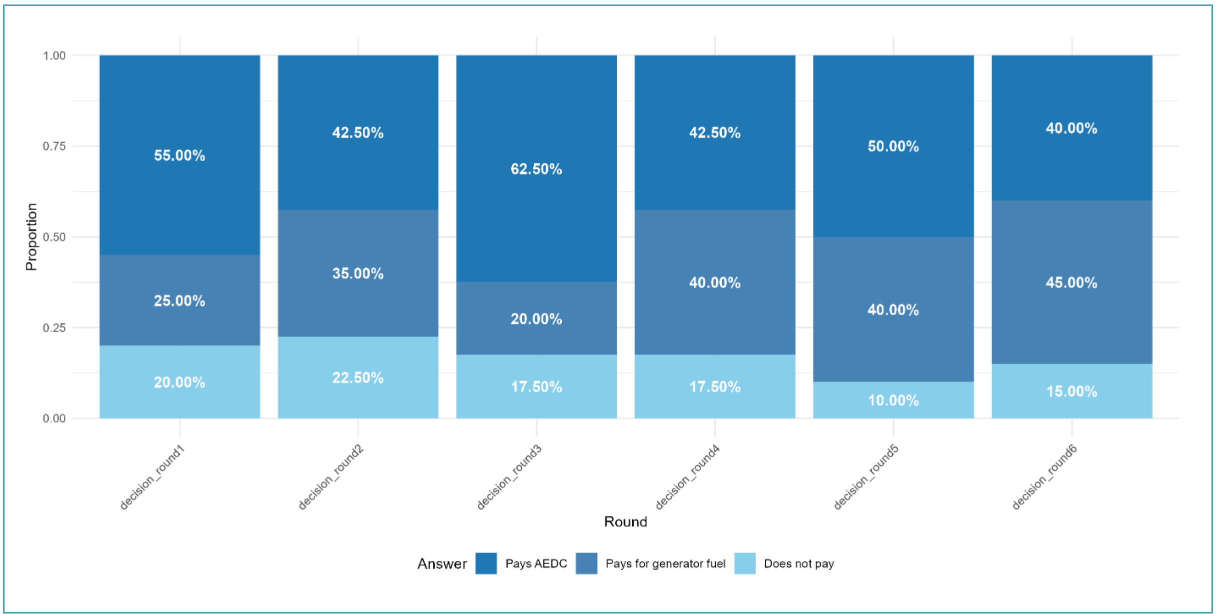


Figure 5. Proportion of answers by round (treatment 1 control)



4.3. Electricity usage

Most people declared having unreliable electricity (58%) or somewhat reliable electricity (34%). Similarly, most people (51%) declared only receiving one to three hours of electricity per day. AEDC provides electricity for all people surveyed. The most important result is that only nine people out of 140 in the treatment group declared not paying for electricity. Among these people, the main reason for not paying is because they do not have access to the grid (some participants explained that they sell food and beverages and do not need electricity/do not have a business to connect electricity to). The payment frequency is usually monthly, except for some people who have prepaid contracts. However our earlier qualitative research did identify that SMEs frequently disputed their bill amounts.

Most participants reported that they discuss electricity-related issues frequently or sometimes and would be very comfortable sharing electricity contracts with people from their association or from other associations. Almost all participants declared being more likely to pay their electricity bill if other firms in their group also committed to paying. Although people declared being able and comfortable paying electricity bills today (75%), an increase in electricity costs would have a major (50%) or minor (30%) impact for most participants.

In most groups the participants knew the other four people and 88% of participants stated that they trusted their session mates.

4.4. Formalisation

When surveyed on formal governance mechanisms, 96% of participants indicated that they have heard and use the National Identification Number (NIN) and the Bank Verification Number (BVN). Less than half of the group have heard of the Tax Identification Number (TIN) and less than half use it. Only nine people indicated that they have heard of the MSME Survival Fund and just three have used it.

5. Preliminary results

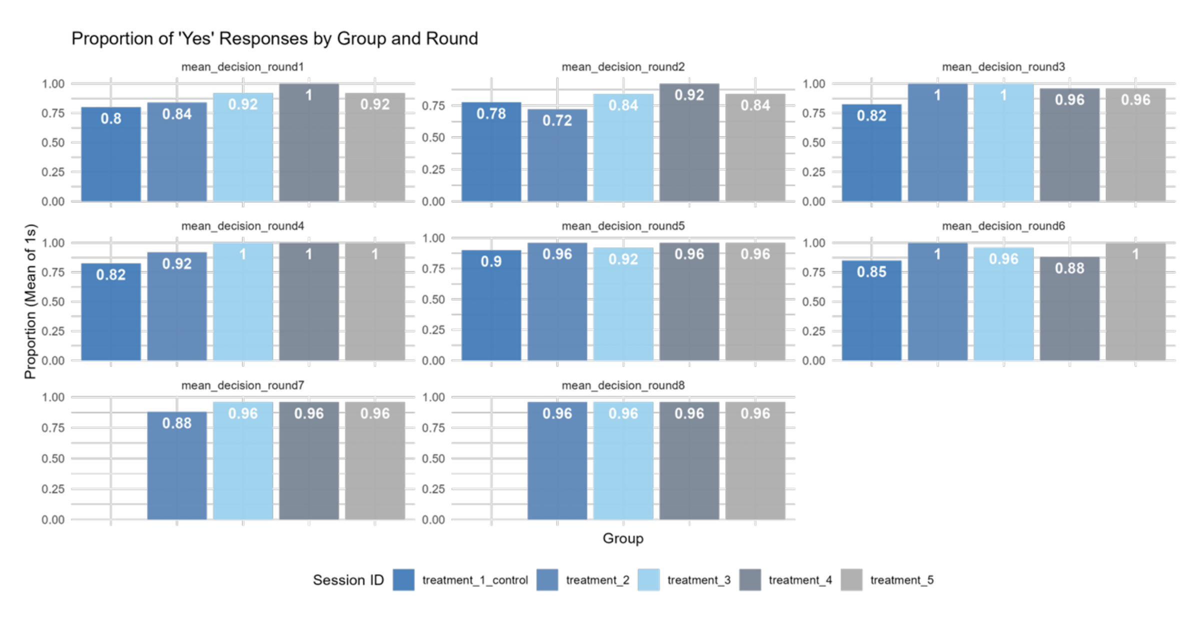
This section presents early, preliminary results. First, we analyse the observed response rates between different rounds and treatment groups. Then, we present t-test comparison of the mean outcomes (i.e., the probability of payment) for different contract types tested in our experiment. The t-tests compare control rounds (individual contracts with unreliable electricity access) with various treatment rounds (group contracts with different features such as revealed preferences, joint liability, economic incentives and penalties). This indicates the preliminary direction and significance of the difference in pairwise comparisons between control rounds and treatment rounds for each treatment. It is important to note that this preliminary analysis does not include controls. It may be the case that some of the significance is lost when we compute the more elaborate analytical models that will include controls. This does give us a 'direction of travel', however.

Figure 6 shows the response rates for the control group and treatment groups for all rounds. Each column represents the proportion of people who decided to pay for electricity. For the control group, responses one (pay electricity supplied by the utility company AEDC) and two (pay for a generator) were grouped to be able to compare them with the treatment group responses of one (yes) and two (no). The detailed breakdown of the responses for the control group are shown in Figure 7.

Round one and round two show slightly lower proportions of participants who paid for electricity (yes). For the treatment groups, in these two rounds people could not communicate between themselves before making their decision as to whether to pay. Rounds three through to eight exhibit a convergence toward paying for electricity, indicating that participants might become more aligned in their responses when they are able to communicate, discuss their decisions, and probably convince each other and exert some peer pressure. This is an encouraging result in terms of collective action mechanisms for group electricity contracts.

Treatment group round two (pro-rata group contract without revealed preferences) shows the lowest positive response rate. In this round, each member of the group contributed differently to the group contract and if one member did not contribute then no one received electricity. This means that those who did contribute did not recover their funds. Participants did not know whether other people were paying or not, which could have led to fewer people deciding to pay and instead maximising their own individual payoffs rather than the group payoffs. Treatment two (SMEs from the same association but of different size) shows a lower average positive response rate than the rest of the treatment groups. We will test the significance of this difference in a further analytical model.

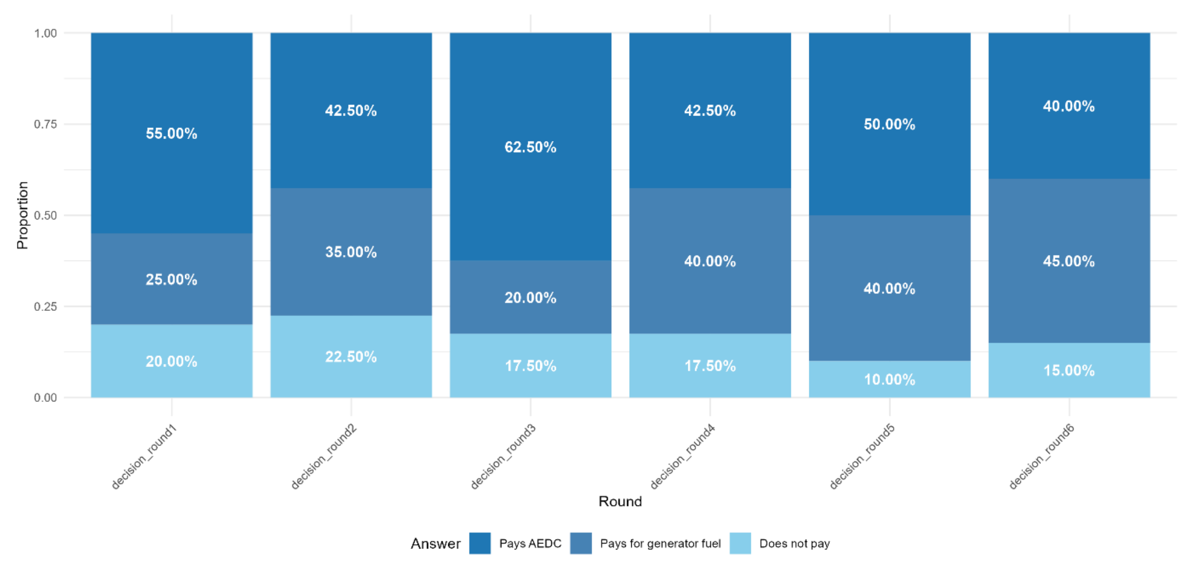
Figure 6. Proportion of 'yes' responses by group and round



With reference to the control group, on average, half (49%) of the participants decided to pay the utility company, 34% decided to pay for fuel for a generator, and 17% decided to keep the allocated funds and not pay for electricity. Rational utility-maximising theory would predict that participants prefer the third option of keeping their allocated funds and not paying for electricity. However, this assumption did not hold in the local context, because people need to pay for electricity or fuel for a generator to run their businesses and staying at home is not an option. This finding was investigated further through short interviews with participants who expressed that they preferred to take the risk of receiving at least some type of electricity, rather than keeping the funds and not working since their livelihoods are tied to the operation of their business. This is not a contradiction in the context of Kugbo market, where SMEs are near desperate to access a reliable energy supply.

Of the six control group rounds, round three shows the highest rate of payment to the utility company. This is the round where the probability of a bribe was introduced if participants did not pay the utility company. This indicates that, even though the previous findings show that individuals act corruptly by paying bribes or by not paying their bills, there is no preference for corrupt practices if there is the possibility of receiving some electricity without it. This is also in line with our analysis of 'reasonable corruption' above. Thus, in this round we observe that participants preferred to pay the utility provider even if there was just a 30% guarantee of high-quality electricity, rather than risking paying a bribe. Providing SMEs with a stable electricity supply would reduce incentives for corrupt practices. Contract structures that encourage peer-to-peer horizontal monitoring and enforcement would further reinforce this effect, as demonstrated across treatment rounds. The configuration of power and capabilities is such in this context that rule-following behaviour emerges.

Figure 7. Proportion of answers by round (treatment 1 control)



The results from the treatment groups reveal a high overall payment rate of 94%, indicating that group contracts for electricity provision could significantly increase electricity payments among SMEs. The ability to discuss decisions beforehand played a critical role in fostering cooperation, with peer-to-peer horizontal monitoring and enforcement. Participants in group contracts – whether structured as a fixed lump-sum contribution or a pro-rata rate based on consumption – demonstrated a significantly higher likelihood of paying for electricity compared to those in the control group, who had only a 20%–30% chance of receiving reliable electricity under their individual contracts.

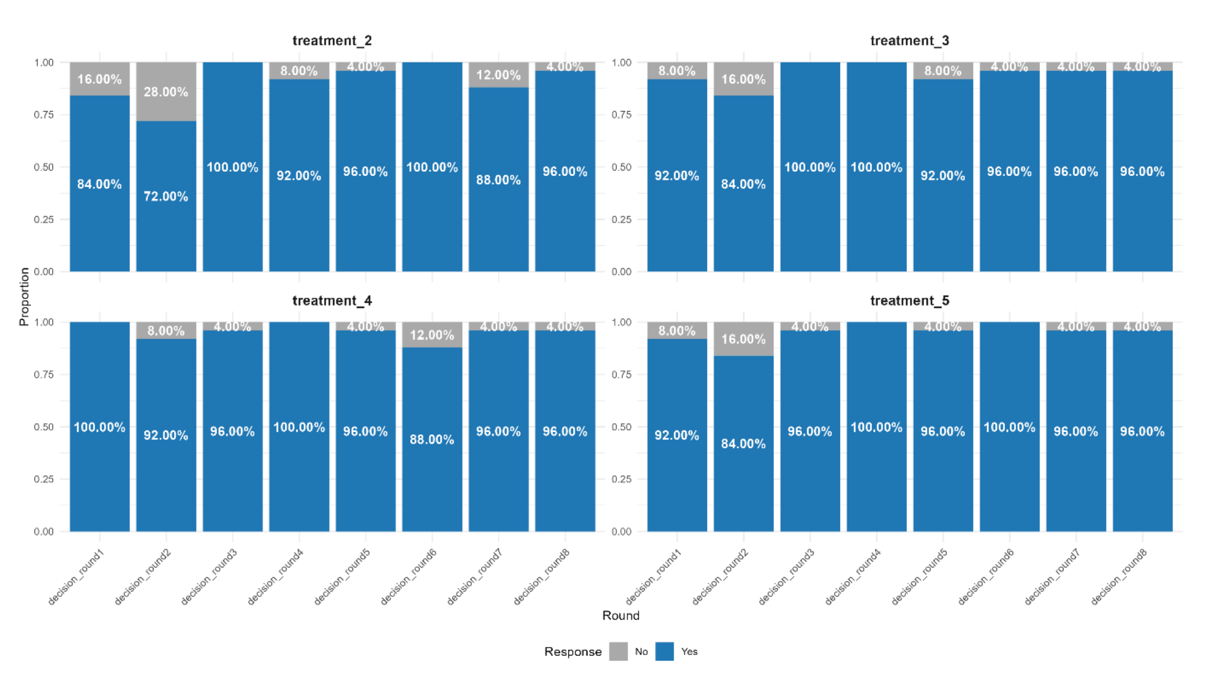
Among the treatment groups, SMEs belonging to the same business association with pre-existing ties exhibited a 91% average payment rate. Group contracts that included SMEs of different sizes within the same association exhibited a payment rate of 95%. Similar results were observed in treatment groups formed by SMEs from multiple associations. Regardless of whether the group was heterogeneous or homogeneous in terms of SME size, the payment rate remained consistently high at 95%. The significance of these differences will be tested in further analysis, but it seems that group formation did not play a significant role in the repayment rate and that trust and cooperation among SMEs from the same market was strong enough to not depend on association affiliation.

This pattern was maintained across different variations of group contracts, including those with revealed preferences, joint liability, economic incentives and penalties for non-payment. Each of these mechanisms contributed to higher payment rates compared to the status-quo scenario, where electricity was unreliable.

The introduction of shared responsibility (joint liability) generated interesting results. Many participants expressed a willingness to cover the shortfall for others who could not pay, stating that, in real life, they would “cover for brothers who could not pay”. This suggests that, beyond enforcement, joint liability operated as an informal insurance mechanism where those who could afford to contribute temporarily did so with the expectation that others would reciprocate in the future. This collective action dynamic reflects enforcement pressure and also the deeply embedded trust within the SME cluster, which is reinforced by a shared experience of energy deprivation and financial distress.

These findings align with broader trends observed in established Nigerian SME clusters, where high levels of trust and cooperation operate and can act as the backbone of group contracts.

Figure 8. Proportion of ‘yes’ responses by round and treatment



6. Conclusion

The findings from this study provide important insights into SME electricity payment behaviour. The descriptive analysis shows that, even under conditions of uncertain electricity quality, individuals are willing to pay for grid electricity, driven by the necessity to run their businesses. While self-generation using fuel-powered generators is prevalent, participants indicated that would they strongly prefer grid electricity if it can offer even a marginal improvement on current reliability.

A key finding is the significant increase in payment rates under group contracts, particularly when individuals can communicate with one another before making their decisions. The ability to coordinate within groups fosters higher levels of trust and peer monitoring than if individuals cannot communicate. Additionally, when participants are given shared responsibility for reaching a payment threshold, they demonstrated a willingness to cover shortfalls for group members who cannot contribute. This highlights the role of trust and social ties in payment behaviour, and also the presence of informal risk-sharing and insurance mechanisms.

Our analysis using the Power–Capability–Interest framework indicates that a decentralised, peer-to-peer check-based contracting approach to SME electricity access offers a feasible solution to energy scarcity in Kugbo market by fostering stronger oversight. SMEs show a clear willingness to pay for reliable power, which should attract high-quality investors who face fewer political risks and corruption pressures compared to if they were to invest in the central grid. Localised energy provision also promotes mutual accountability, which helps to curb power theft, ensure bill payments and align supply with business needs. In the next phase of this research we will undertake deeper statistical analysis, incorporating control variables and testing the significance of the observed effects. These insights will also inform the design of a pilot project, which will bring together SMEs with technology service providers to develop a model for distributed energy.

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Making Anti-Corruption Real

About the Anti-Corruption Evidence (ACE) Research Consortium:

ACE takes an innovative approach to anti-corruption policy and practice. Funded by UK aid, ACE is responding to the serious challenges facing people and economies affected by corruption by generating evidence that makes anti-corruption real, and using those findings to help policymakers, business and civil society adopt new, feasible, high-impact strategies to tackle corruption.

ACE is a partnership of highly experienced research and policy institutes based in Bangladesh, Nigeria, Tanzania, the United Kingdom and the USA. The lead institution is SOAS University of London. Other consortium partners are:

- Aspire to Innovate
- Bayero University
- BRAC Institute of Governance and Development (BIGD)
- BRAC James P. Grant School of Public Health (JPGSPH)
- Change Initiative Ltd
- Centre for Democracy and Development (CDD)
- Danish Institute for International Studies (DIIS)
- Economic and Social Research Foundation (ESRF)
- EMRC Ltd
- Health Policy Research Group (HPRG), University of Nigeria Nsukka (UNN)
- Ifakara Health Institute (IHI)
- London School of Hygiene and Tropical Medicine (LSHTM)
- Palladium
- REPOA
- Transparency International Bangladesh (TIB)
- University of Birmingham

ACE also has a well established network of leading research collaborators and policy/uptake experts.

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