

Rural electrification and education in Sierra Leone

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In brief

- Most schools in rural Sierra Leone do not have access to electricity. This lack of access limits the ability of schools to teach night shifts, limits the ability of students to study at night, and limits the ability for instruction with devices such as computers.
- The United Nations Office for Project Services (UNOPS) is supporting the Government of Sierra Leone to increase access to electricity through the Rural Renewable Energy Project (RREP).
- This policy brief investigates findings from surveys of government or government-assisted schools in rural Sierra Leone, across 14 districts of Sierra Leone.
- The findings show that the project has successfully provided access to electricity to some of the eligible RREP schools. However, it will require time and investment before there is greater access to electricity in the schools, and the schools have the appliances needed to productively use the electricity.
- This brief points to policies which can improve the implementation of the programme in Sierra Leone and elsewhere, contributing to higher rates of school electricity access, and increasing the benefits of electricity access in schools.

Policy motivation for research

According to a UNESCO survey of 46 different African countries, approximately four out of every five primary and secondary schools surveyed lack access to electricity.¹ Electricity access enables the introduction of productive learning appliances into schools, such as computers and televisions. The electrification of schools may also increase schools' abilities to recruit and retain qualified teachers. Electrification may also enable schools to introduce a night shift or provide a space for students to study using light at night (which they may not have access to at home). These improvements may help to increase test scores and graduation rates over time. Outside of the school setting, providing electricity at home will likely increase students' ability to study after dark.

Most schools and households in rural Sierra Leone, however, do not have access to electricity. In this context, the United Nations Office for Project Services (UNOPS) is supporting the government's goal of ensuring universal access to electricity by implementing a Rural Renewable Energy Project (RREP) project worth over UKP40 million. This project – funded by the UK Foreign, Commonwealth & Development Office (FCDO) – is an ambitious electrification effort that aims to provide access to off-grid solar electricity in up to 97 communities in Sierra Leone.

The project's implementation is being conducted in multiple phases. This policy brief focuses on findings from the impact evaluation of the first and second phases of the project, which provided communities

¹ UNESCO Institute for Statistics, A view inside schools in Africa: Regional education survey (Paris: UNESCO, May 2014).

across 14 districts of Sierra Leone with access to off-grid solar electricity through the construction of 97 mini-grids.

Overview of the research

The findings are based on data collected during baseline (2019) and follow-up (2021) surveys to evaluate RREP’s impact on key development outcomes. To do this, a representative sample of schools in communities where mini-grids have been installed was compared with a representative sample of schools in statistically similar communities where no mini-grid was installed. All schools interviewed were either Government or Government-assisted. All RREP schools have been offered the opportunity to connect to the mini-grid. However, unlike health clinics, schools are expected to pay for the electricity connections themselves.

In total, the impact evaluation team interviewed 522 different schools to understand the current electrification status of schools in rural Sierra Leone.

Key findings

Electricity in comparison and RREP communities

We see that most schools surveyed, whether in comparison or RREP communities, do not have access to electricity. Among schools from RREP communities, 20 percent report having access to electricity. Among schools from comparison communities, only 9 percent report having access to electricity, from any source.

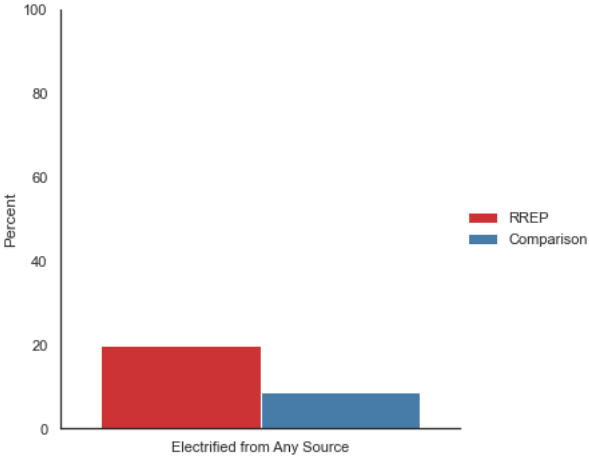


Figure 1. Percent of Schools Electrified from Any Source

20 percent of the RREP schools in the sample reported having electricity, at follow-up, as compared to 9 percent of the comparison schools.

Most schools with access to electricity report they had electricity in the day before the survey was conducted. 88 percent of RREP schools surveyed at follow-up had electricity the day before the survey was conducted, and 100 percent of the comparison schools had electricity the day before the survey was conducted.

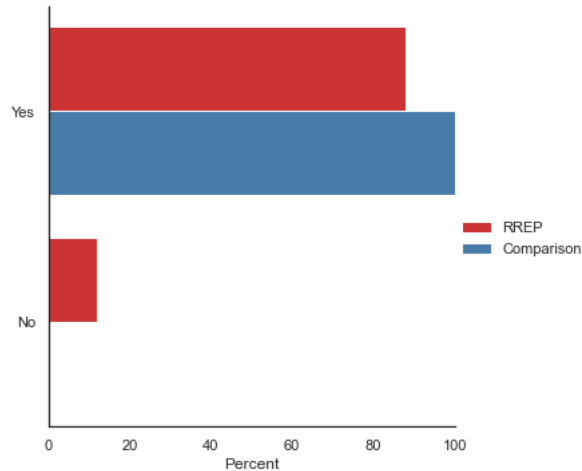


Figure 2. School Had Electricity Yesterday

Among the respondents who reported their school having access to electricity, at follow-up, most schools had electricity the day before the survey was conducted. In comparison schools (100 percent), this number was slightly higher than in RREP schools (88 percent).

School attendance and electrification

In RREP schools, on average 402 students attend the school. In comparison schools, on average 368 students attend the school. We found that schools in RREP communities had significantly higher attendance than schools in comparison communities. This may indicate increased academic achievement at RREP community schools in the future. However, these gains may not be realized without the necessary complementarities at the school level, such as better resources, teacher incentives, etc.

When respondents were asked about student attendance rates, most respondents said that student attendance was high. When asked why students miss days of school, the answers from respondents ranged from the distance to school, sickness, parents moving to another town, and the occurrence of traditional events in the community. There were also some respondents who said that parents do not believe in education and do not help students do their homework. During the farming season, some parents have their children work on the farm instead of attend school. The school fees that students still need to pay are also one of the major reasons why students do not stay in school.

Teacher attendance rates were seen as largely depend on a teacher’s status as either volunteer or certified. Volunteer teachers are more frequently absent due to trainings or due to having lower motivation. Respondents stated that finding qualified and motivated staff is a significant issue with the distance to school and the lack of availability of allowances and accommodation for teachers being deterrents.

Sources of electricity

Among the schools that did have access to electricity, the sources of electricity varied between schools located in RREP communities and schools located in comparison communities. For schools located in RREP communities, the most common source of electricity was the UNOPS solar mini-grid (71 percent). For schools located in comparison communities, the most common source of electricity was the stand-

alone solar panel (70 percent). 17 percent of schools in RREP communities use the stand-alone solar panel as their source of electricity.

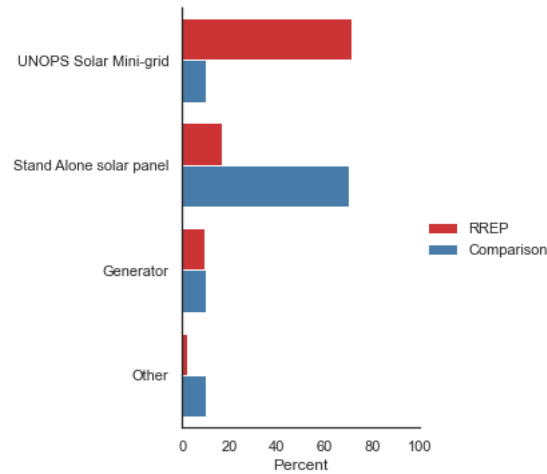


Figure 3. School Sources of Electricity

At follow-up, the most common source of electricity for RREP schools was the solar mini-grid (71 percent), followed by a stand-alone solar panel (17 percent). The most common electricity source for comparison schools was the stand-alone solar panel (70 percent).

For the schools where respondents reported using a generator for electricity, the average number of hours they used the generator was 2.25. A total of five schools in the sample reported using a generator for electricity.

Among schools who reported using stand-alone solar for electricity, the average number of hours the school reported using this electricity source was 4.5.

Electricity and educational outcomes

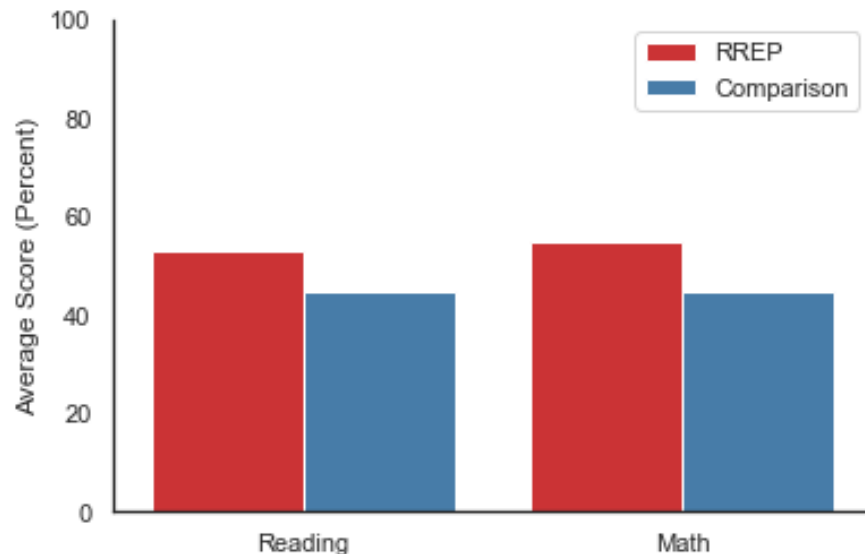


Figure 4. Literacy and Math Exam Scores

This graph presents children's scores on short literacy and math exams administered by survey enumerators at follow-up. We see that the scores for children in RREP communities (53 percent on reading and 55 percent on math) are slightly higher than in the comparison communities (45 percent in reading and 45 percent on math).

We see that children located in RREP communities have a higher average score on the short literacy and math tests administered by enumerators than children in comparison communities. However, we do not see any substantial difference between the average hours that a household reports their children study at home in a week. In RREP community households, 8.0 hours is the average amount children study at home in a week. In comparison community households, 7.7 hours is the average amount children study at home in a week.

Similarly, we see almost no difference in the percentage of households that report their children study at home, between the RREP and comparison groups. 95 percent of RREP households with children report that their child studies at home, and 94 percent of comparison households with children report that their child studies at home.

Among households who report having access to electricity (from either comparison or RREP communities), the mean hours children study at home per week is 8.5. Among households who report not having access to electricity the mean hours children study at home per week is 7.6.

Benefits of electrification

In schools that have access to electricity, many of the school principals commented that their students are now able to go to school in the evening to read, study, and do their homework. This is especially helpful for students whose families cannot afford any source of lighting. One school principal responded:

"We are lucky to have been connected since we had to pay for this ourselves. We see that students who are from families who are not connected to the mini-grid will come to the school during the evening hours to try to finish their homework and study for lessons."

– KII School Principal

When schools without night shifts are asked why they do not have a night shift, the most common answer was because they do not have electricity (35 RREP schools). Some schools also replied that no night shift is necessary because they do not have enough students, or they do not have enough teachers to staff the night shift. Only 5 percent of RREP schools and comparison schools report having night shifts.

The consensus among respondents is that electrification would result in the introduction of different appliances in schools, such as televisions, laptops, photocopy machines, and printers. Additionally, school staff hope that having electricity will enable the digitalization of school records, rather than the current system of manual entry where items are easily lost, misplaced, or harmed, due to weather and storing conditions.

All principals and teachers interviewed see acquiring electricity as a needed component in ensuring higher student and staff attendance, attracting children from other communities to the school, and having the potential to begin offering night classes.

Issues with electricity connection

Most schools with electricity report they “never face problems” with the electricity. 20 percent of RREP respondents report that they face voltage issues and 20 percent report they face power outages.

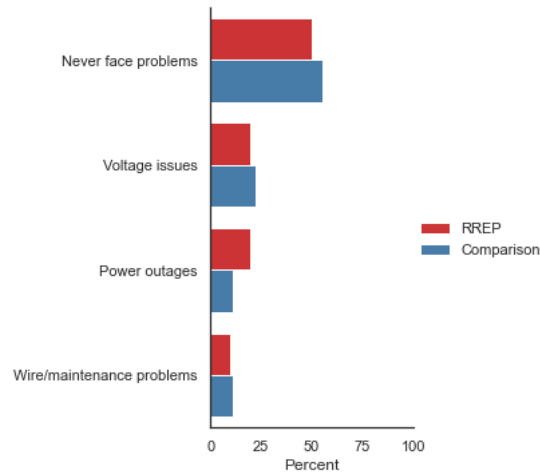


Figure 5. Issues Schools Experienced with Electricity

For both RREP and comparison schools, at baseline, most respondents (50 percent and 56 percent, respectively) state that they never face problems with electricity. For RREP schools, 20 percent of respondents each reported voltage issues and power outages as problems with electricity.

On average, schools reported having .9 days with power cuts per month. In RREP schools, the average was 0.8, while in comparison schools, the average was 2.0. On average, schools reported there would be 11.3 hours of power cuts in a day. Teachers were mainly unhappy with the state of the buildings, the lack of sufficient learning materials, the lack of water and sanitation, and the lack of trained and qualified teachers.

Future plans for electricity use

In the future, respondents mentioned they would like to learn how to work with computers and teach this skill to students. This would enable students to prepare for future jobs, as well as help the school to keep better records. The respondents also mentioned interest in purchasing photocopier machines and laminating machines, as well as printers which could be used to print out exams.

Electrification was perceived to make the school environment more comfortable, which would encourage higher attendance among both teachers and students. Focus group participants shared that having lighting at night would allow students to study in school at night and increase the security of the school. Additionally, respondents stated that teachers could grade papers using the lighting at night.

At home, electrification may enable students to increase the number of hours they study, since they would be able to study after dark. However, when comparing between the RREP and comparison communities, we do not yet see this difference in the data.

Policy recommendations

Below are three recommendations targeted at both policymakers and UNOPS for continuation of work on the RREP and future projects.

1. **Increase electricity affordability.** Since schools must pay for the electricity connection themselves, uptake of electricity will likely increase if the electricity is more affordable. Furthermore, schools may benefit from increased communication about the benefits of electricity and potential methods of affording the electricity connection.
2. **Increase access to productive electrified assets (e.g., electric fans, computers)** Many school respondents state that using appliances such as computers, televisions, and printers is a major benefit of electrification. Increasing access to these assets would likely help to increase the benefits schools experience because of electrification.
3. **Invest in longer-term impact evaluations.** The results of increased electricity access in schools will take time to manifest. It will take time to see impacts on student attendance, test scores, and teacher retention, among other outcomes. Through investing in longer-term impact evaluations, we will be able to better see and evaluate these effects over time.

Acknowledgements

We gratefully acknowledge funding from UNOPS, NWO (#VI.Vidi.191.154), the IGC and the Applied Research Programme on Energy for Economic Growth (EEG) led by Oxford Policy Management. The EEG programme is funded by the UK Government, through UK Aid. The views expressed in this policy brief do not necessarily reflect the UK government's official policies.

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