

Case Study: Municipality Owned Off-Grid Electrification, Bonosha, Ethiopia

Background

Bonosha is a relatively small town in southern Ethiopia. Like Yaye town, people here survive on petty trade of agricultural products, although farmers too have a relatively strong presence. They supply the traders with farm produce, and in turn buy goods and services from the town traders. Details of the population in Bonosha town are summarised in the table below.

Table 1: Statistical details of Bonosha town

Number of Households in Bonosha town	614
Electrified Households in Bonosha town	200
Total population of the town	2,885
Number of males	1,432
Number of females	1,453
Monthly income for most households (74%)	300 Birr (\$35)
Electricity tariff	\$1.16

Bonosha was electrified in 1996 following the purchase of a 75kVA diesel generator from a neighbouring town which became connected to the national grid just before they installed it. The genset, which cost the town USD 8,140, worked for only six years due to lack of sufficient funds for maintenance repairs. It had been installed by a high school electricity teacher whose only skills were making minor home system installations and repairing electronic equipment. Hiring an electrical engineer had proved too expensive.

In February 2002, Bonosha town was re-electrified from another genset that was acquired for a health centre built in 2001. The 115kVA genset that cost USD 17,093 was too large to limit its use to the health centre, and so the town was also connected. The genset serves 300 customers excluding the health centre. At the same time, the Bonosha municipal council eventually got the first genset fixed at USD 1,047, and by February 2003 were planning to begin running it again.

Financing

The first electrification phase was coordinated by an electricity committee that was formed during the 1990s to work out ways of electrifying the town. They mobilised the community in raising funds to buy a genset, and required each household to contribute according to their income standings with contributions varying between USD 17 and USD 52. The municipal council established a special tax which was levied during market days from every trader. The tax revenue was used to finance the electrification project. The second electrification phase

was coordinated by the municipal council together with the Ethiopian Social Rehabilitation and Development Fund (ESRDF). The community contributed 20 per cent of the costs incurred in building the health centre, although it is not clear whether they contributed to purchasing the genset.

Public-Private Partnerships

Electrification of Bonosha town was mostly a community initiative, with the municipality council playing a leading role in mobilising funds. However, the presence and contribution of the ESRDF further boosted the town's electrification efforts, since the council was chronically short of funds. This partnership made all the difference in finally getting most of Bonosha town electrified.



Streetlighting and transmission lines in Bonosha

Access to Electricity

The successful electrification of Bonosha has enabled many of the town residents to access electricity. However problems still exist owing largely to the poor design and quality of the system. Wooden poles and an inappropriately sized copper conductor of 4mm² were used resulting in huge voltage losses along the distribution line. During the first electrification phase, power was initially made available for five hours a day, at USD 0.70 per month for every 60 watt bulb. Later the tariff was increased to USD 1.16 per bulb per month, thus excluding many residents from using electricity. At least 70% of the households without electricity said they cannot afford it. But many connected households

were also consuming more electricity than they were paying for since charges were only levied for just the bulbs and not the radios, cassette players and TV sets which consumers freely used.

Electricity thefts are rampant in Bonosha, prompting the municipal council to hire someone to nab the thieves. The fact that some people use radios and televisions means that clients that do not live near the electricity source can only obtain a very low voltage of supply. The system was installed for lighting purposes but no monitoring is taking place to ensure that this is the case. Complaints are rife regarding low voltage electricity, with some clients receiving just 96V (as opposed to 220V).



Potential micro-hydro site on Wara Falls near Bonosha

Livelihood benefits – Direct Consumers

Those households that are receiving an electricity supply are mostly happy about the huge savings they are making after abandoning the kerosene lanterns. At least 30% of connected households said that their monthly fuel expenses had gone down. Those with radios and TV sets now have easy access to information and entertainment (albeit illegally). Residents also reported an improvement in the health aspects of their livelihoods, with less eye and respiratory problems. Both men and women are also pleased with the fact that students are able to study during the night. This has also had the effect of improving the status of the local school.

Domestic Benefits: Irritation of the eyes and respiration difficulties from smoky kerosene wick lamps were common problems, but that is now in the past. 58% of men and 63% of women mentioned this as the main benefit.

Commercial and institutional users

All the commercial users said their expenses on lighting reduced markedly after switching from the pressurised kerosene lanterns to bulbs. They are also able to use

radio cassettes and televisions to attract customers from both Bonosha and surrounding areas. So far, the potential benefits of the scheme are not being fully realised for the institutional sector, since electricity is closed. The local health centre is the main institutional only supplied after 6.30pm, when most institutions are consumer, using electricity for refrigeration of vaccines. Despite the erratic power supply, Bonosha town is now a much improved image from eight years ago.

Commercial Benefits: It became evident to most commercial users that the introduction of electricity to their town attracts customers even from the nearby towns.

Livelihood benefits – Indirect Consumers

Thankfully, benefits have not been limited to those who are directly accessing electricity, since only 30% of households are connected. Investigations in Bonosha revealed that availability of power has brought benefits to all town dwellers and to the farmers who live in the surrounding areas. At least 90% of households not connected to the grid said they had noticed improvements in service provision by both the government and local institutions. Moreover, street lighting has helped improve security in the town, shops are open till late in the night, they have a pharmacy, and they can watch television while relaxing in the bars or restaurants.

Prospective Benefit: When asked what they would do with better electricity provision, over 50% of households and business establishments responded that they would invest in income generation activities such as provision of grain milling services and better entertainment facilities.

Conclusions

Bonosha town did well in persisting with the electrification process, and succeeding against all odds. However the following issues arise:

- Existing revenues cover running costs only, endangering the sustainability of the scheme and holding little prospect for improving affordability.
- Unless stopped, power stealing is likely to erode any opportunities for generating sufficient revenue from the system.
- Without tariff reductions, many households are likely to be excluded from the direct benefits of electricity in their household.
- To increase access for the whole community under current conditions, efforts should focus upon improving commercial uses of electricity (e.g. employment opportunities relating to income generation activities), especially since community members are keen in this area.

