

The Republic of Uganda

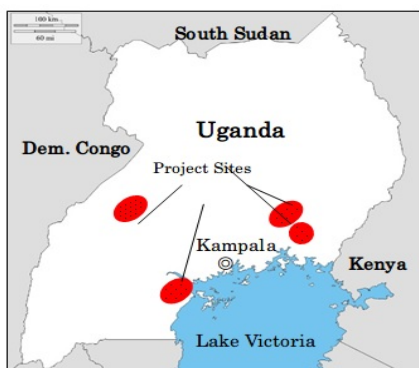
Ex-Post Evaluation of Japanese Grant Aid Project
The Project for Rural Electrification Phase II

External Evaluator: Kenichi Inazawa, Octavia Japan Co., Ltd.

0. Summary

This project procured, installed and upgraded equipment and materials for the 33kV distribution lines with the aim of increasing electrification rates and providing a stable electricity supply in Nabitende / Itanda area in Iganga District, Eastern Region; Kagadi / Munteme area in Hoima and Kibale Districts, Western Region; Bugeso / Iwemba area in Bugiri District, Eastern Region; and Bukakata area in Masaka District, Central Region. This project is consistent with the rural infrastructure development and the power sector policy as well as with the development needs to improve rural electrification rates; therefore relevance of this project is high. Efficiency of the project is evaluated to be fair because the project period was slightly longer than planned whereas the project cost was mostly as planned. No major problems are found in the operation and maintenance carried out by the private operators (Umeme Uganda Ltd. and Fersult Engineering Services Ltd.) in terms of the institutional, technical and financial aspects as well as the status of the project outputs. On the other hand, while there has been a steady expansion of power distribution networks in Uganda, only 706 households (3,500-4,200 people) have been electrified, which is a small proportion considering that there are totally 18,991 households (95,000-113,000 people) residing in the project areas mainly because many residents feel that the connection fees, which they have to pay upon joining the electricity service, are expensive; thus effectiveness and impacts of the project are low. In light of the above, this project is evaluated to be unsatisfactory. However, it is possible that the project demonstrates a certain level of effects in the near future because the number of households connecting to electricity is likely to increase with the introduction of connection subsidies using funds, such as OBA.

1. Project Description



Project Location



Procured 33kV Switchgear
(At Iganga Substation, Iganga District, Eastern Region)

1.1 Background

In Uganda most of the benefits of economic growth were concentrated in the capital city, Kampala; thus, the development and improvement of infrastructures in the rural areas were among the important development issues. In response to this situation, the Ugandan government developed the Poverty Eradication Action Plan (PEAP) in 1997, which recognized rural electrification as one of the strategies to promote economic activities and thereby to improve incomes of the rural poor. However, due to budget constraints, the electrification rate was as low as 4% in the rural areas as compared to 20% in the urban areas as of 2005. (The national average electrification rate was around 6%.) Under such circumstances, the government of Uganda recognized that promoting rural electrification is an urgent issue with a view to narrowing the standard-of-living disparity between the rural and urban areas, and they requested Japan to consider extending an assistance to implement this project.

1.2 Project Outline

The objective of this project is to increase electrification rate and to provide a stable supply of electricity in Nabitende / Itanda area in Iganga District, Eastern Region; Kagadi / Munteme area in Hoima and Kibale Districts, Western Region; Bugeso / Iwemba area in Bugiri District, Eastern Region; and Bukakata area in Masaka District, Central Region by procuring, installing and upgrading equipment and materials for the 33kV distribution lines.

Grant Limit / Actual Grant Amount	1,293 million yen / 1,284 million yen
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Exchange of Notes Date (/Grant Agreement Date)	August 2007 (phase 1/2) August 2008 (phase 2/2 ¹)
Implementing Agency	Rural Electrification Agency (REA)
Project Completion Date	February 2009 (phase 1/2) December 2009 (phase 2/2)
Main Contractor	Nishizawa Limited, Kinden Corporation
Main Consultant	Yachiyo Engineering Co., Ltd.
Basic Design	November 2006–February 2007
Detailed Design	N/A
Related Projects (if any)	[Grant Aid Assistance] •“The Project for Rural Electrification Phase I ² ” (1,144 million yen, 1998) [Other International Agencies and Donors] •NORAD’s Grant Aid Assistance ³ (7.76 million USD, 2006)

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Octavia Japan Co., Ltd.

2.2 Duration of Evaluation Study

Evaluation Study: September 2012-August 2013

Field Study: January 19-February 2, April 27-May 3, 2013

¹ The first construction phase covered Kagadi / Munte area in Hoima and Kibale Districts, Western Region and Bukakata area in Masaka District, Central Region whereas the second construction phase covered Nabitende / Itanda area in Iganga District, Eastern Region and Nabitende / Itanda area in Iganga District, Eastern Region. The materials and equipment were procured for each target area.

² This project constructed and renovated substations while procuring materials and equipment for the 33kV electric grids in Mukono district, Central Region, in Hoima district, Western Region and in Jinja and Kamuli districts in Eastern Region.

³ They installed electric grids (e.g., extension of 33kV distribution lines) in Western Region. While the target areas do not overlap with that of this project, both projects were expected to contribute to realizing reliable and high-quality power supply in Western Region.

3. Results of the Evaluation (Overall Rating: D⁴)

3.1 Relevance (Rating: : ③⁵)

3.1.1 Relevance to the Development Plan of Uganda

Before the project implementation, the government of Uganda developed PEAP in 1997, in which rural electrification, as a means to improve incomes of the rural poor, was identified as one of the priorities. Following the revisions in 2000 and 2003, the third PEAP was developed in December 2004, which placed an importance on “the development of infrastructures, such as roads, electricity and railways, as well as the technical and operational improvement in the power sector.”

At the time of the ex-post evaluation, the government of Uganda developed the Five-Year National Development Plan (2010/11-2014/15) in April 2010, which sets a goal of securing benefits for the poor through economic growth. The plan also stresses the needs to promote rural electrification while nurturing local industries and businesses and developing medical, educational and water supply facilities as a way to develop and reinforce rural infrastructures⁶. In addition, the government developed the Indicative Rural Electrification Master Plan (IREMP) with the assistance of the World Bank in 2009, which lays out the plan to improve rural electrification rates.

In view of the above, rural electrification was viewed important before the project implementation and continues to be a priority for the Ugandan government at the time of the ex-post evaluation; therefore, it is confirmed that this project is consistent in terms of Ugandan policies.

3.1.2 Relevance to the Development Needs of Uganda

Before the project implementation, the government of Uganda developed the National Electrification Planning Study (NEPS) in 1992 and aimed toward promoting rural electrification. However, the progress was limited due to budget constraints. As discussed above, the electrification rate was 4% in rural Uganda as compared to 20% in the urban areas as of 2005. In response to such situations, the government of Uganda developed the Uganda Rural Electrification Strategy and Plan (RESP) in 2001 with the goal of achieving a rural electrification rate of 10% by 2012.

⁴ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

⁵ ③: High, ② Fair, ① Low

⁶ More specifically, the plan talks about the promotion of rural development through the extension of 33kV distribution lines.

At the time of the ex-post evaluation (January 2013), the Ugandan government continues to operate under the RESP; however, the electrification rate is still low at 5.3%⁷. The main reason is that, despite the progress made on the infrastructures, such as power distribution grids, by utilizing the public funds and contributions from the international community, including this project, the number of households joining the power service has not increased at an expected rate because the connection fees are considered expensive⁸ by the beneficiaries (rural residents). However, the government is currently planning to utilize OBA fund⁹, which is a multi-donor trust fund supported by the World Bank and other donors. The fund is designed to subsidize connection fees, which many poor households consider expensive, for the purpose of increasing the number of households with electricity connections thereby improving the electrification rate. According to the Rural Electrification Agency (REA), the implementing partner of this project, the OBA subsidy is expected to take effect in the first half of 2013 thereby increasing the number of connections¹⁰. In addition, the government of Uganda continuously has a policy to develop the transmission and distribution networks, as the increase of industrial investment by the stable power supply, which will boost the country's economic development, is necessary. Based on the policy, Japan has a plan to implement the Project for Rural Electrification Phase III, which follows this project. Through this new project the 33kV distribution lines will be extended in six districts¹¹ in the future.

Considering that the efforts of rural electrification are continuing in Uganda, it can be judged that the project needs remain high at the time of the ex-post evaluation.

3.1.3 Relevance to Japan's ODA Policy

Following the Japan-Uganda Economic Cooperation Policy Conference in July 1997 as well as the Project Confirmation Study in 1999, the government of Japan identified the following priority areas for the Official Development Assistance (ODA) to Uganda: (1) human resource development (education, vocational training, etc.); (2) support for basic human needs (health and medical infrastructure, water supply, etc.); (3) agricultural development (promotion of rice production, value addition through post-harvesting, etc.); and (4) economic infrastructure

⁷ Source: The Uganda Bureau of Statistics (UBOS).

⁸ It will be elaborated in Table 2 in "Quantitative Effects" under "Effectiveness".

⁹ The OBA fund has two schemes: (a) grants and loans funded by the World Bank, EU, KfW and others; and (b) a multi-donor trust fund called the Global Partnership on Output Based Aid (GPOBA). The fund size is roughly 20 million USD as of April 2013. Apart from the OBA fund, the World Bank has approved 12 million USD (as of April 2013) to fund connection subsidies with a view to increasing the number of households with electricity connections.

¹⁰ The REA estimates that with OBA fund the number of electrified households will increase by 100,000 at the least in the first half of 2013.

¹¹ In addition to the extension of the distribution lines across Mayuge, Iganga, Bugiri, Namayingo and Busia districts in Eastern Region, electrification of Namayingo is planned under the phase-III project.

development (road, electric power, etc.). The relevance of these priorities and the overall direction of growth-based poverty reduction were reaffirmed at the Japan-Uganda Economic Cooperation Policy Conference held in October 2006. This project contributes to improving rural electrification rates and developing economic infrastructures; thus it relates to “(4) economic infrastructure development (road, electric power, etc.)” out of the above priority areas. Therefore, it can be judged that this project is consistent with the ODA policy of Japan.

This project has been highly relevant with Uganda’s development plan, development needs, as well as Japan’s ODA policy; therefore its relevance is high.

3.2 Effectiveness¹² (Rating: ①)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

1) Direct Effects of the Project (Electrified Population and Number of Households with Electricity Connections)

This project was expected to electrify areas with a total of 76,000 residents by procuring and installing materials and equipment for the 33kV distribution lines. The first construction phase was designed to cover Kagadi / Munteme area in Hoima and Kibale Districts, Western Region (13,000 people) and Bukakata area in Masaka District, Central Region (15,000 people), while the second construction phase was to cover Nabitende / Itanda area in Iganga District, Eastern Region (34,000 people) and Bugeso / Iwemba area in Bugiri District, Eastern Region (14,000 people). (See Figure 1 for the target areas.)

¹² Sub-rating for Effectiveness is to be put with consideration of Impact.

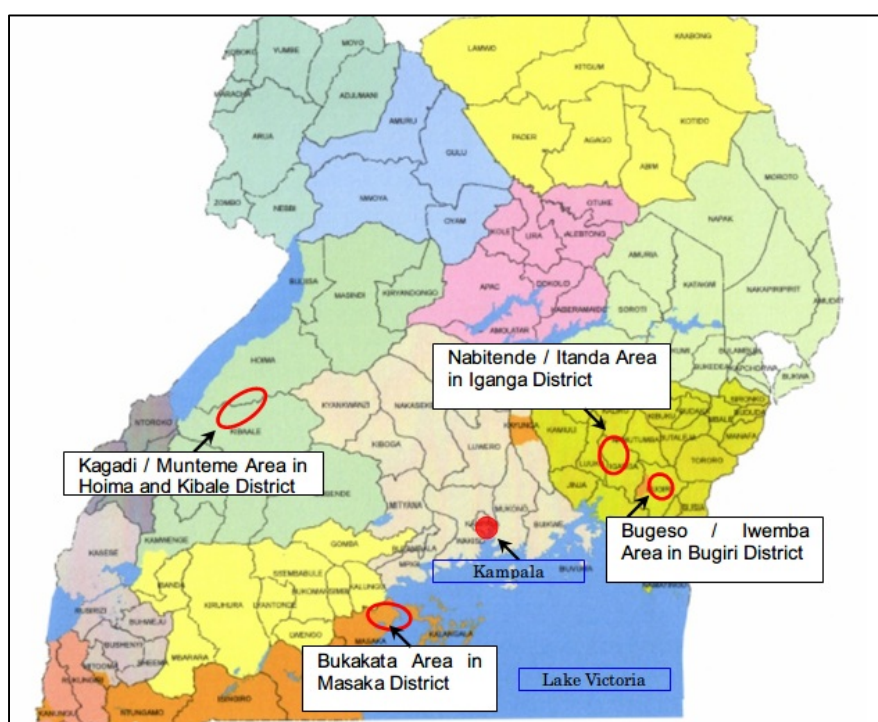


Figure 1: Locations of the Project Sites

Table 1 provides the trends of the following data: (1) total number of rural households; (2) total number of households residing in the project areas; (3) total number of rural households with electricity; and (4) number of electrified households in the project areas.

Table 1: Changes in the Total Number of Households and the Number of Electrified Households in Uganda and in the Project Areas

(Unit: No of Household)

	2007	2008	2009
(1) Total Number of Rural Households	5,608,057	5,793,123	5,984,296
(2) Total Number of Households in the Project Area	16,128	16,663	17,219
(3) Total Number of Rural Households with Electricity	100,838	116,043	132,901
(4) Number of Electrified Households in the Project Area	0	0	0
	2010	2011	2012
(1) Total Number of Rural Households	6,181,778	6,385,776	7,073,970
(2) Total Number of Households in the Project Area	17,797	18,399	18,991
(3) Total Number of Rural Households with Electricity	150,677	172,856	198,299
(4) Number of Electrified Households in the Project Area	432	543	706

Source: REA and the ex-post evaluation study

As seen in Table 1, the number of electrified households in the project areas in 2012 (706 households) is quite small as compared with the total number of households residing in the project areas (18,991 households). Dividing 18,991 (total number of households in the project areas) by 706¹³ (number of electrified households in the project areas), the ratio is calculated to be 3.7%, whereas the target was to electrify 76,000 people by 2010¹⁴ (after the completion of this project); thus one would have to say that the project has limited effects. The main reasons are as follows: (1) While there is a good progress on the development of power distribution grids utilizing the support from international aid agencies, including this project, and the public fund as discussed above, the number of electrified households has not increased at an expected rate because the connection fees are considered expensive by the project beneficiaries (rural households); (2) There has been a delay in operationalizing connection subsidy systems, such as OBA fund; (3) Connecting work is behind schedule, and there is a waiting list of households who want to have their houses connected¹⁵. As stated above, the government of Uganda is planning to utilize funds, such as OBA, in the near future to provide full subsidy for the electricity connection fees; therefore, the number of electrified households is expected to increase in many parts of Uganda, including the areas targeted by this project.

Table 2 shows the connection fees that residents would bear when joining the electrify services. It is an example of Umeme Uganda Ltd., the largest operator in the country. If residents want to have their houses connected to electricity, they have to pay (1) the premises inspection charge in addition to (2) the connection charge for those living within pole distance of existing grids or (3) the connection charge for those living within no-pole distance of existing grids (no pole within a 30-meter radius). Given that Uganda's GDP per capita is 487 USD (2011)¹⁶, this financial burden shown in Table 2 is nowhere near small.

¹³ Assuming the average household size of 5-6 people, it is equivalent to 3,500-4,200 people.

¹⁴ As stated earlier, this project aimed to electrify 76,000 people by targeting Kagadi / Munteme area in Hoima and Kibale Districts, Western Region and Bukakata area in Masaka District, Central Region in the first construction phase, and Nabitende / Itanda area in Iganga District, Eastern Region and Bugeso / Iwemba area in Bugiri District, Eastern Region in the second construction phase. However, this evaluation survey could not capture the actual number of people who gained access to electricity in each target area because the administrative boundaries changed after the project commencement, and since then no census has been conducted although one was planned in 2011 (every 10 years).

¹⁵ It was also confirmed during the field visit (January 2013) that the household connection was not making progress as expected. Taking one community in Iwemba area of Bugiri District as an example, only 3-4 households out of 20-25 households had their houses connected to electricity.

¹⁶ The World Bank data.

Table 2: Electricity Connection Fees (Example of Umeme Uganda Ltd.)

(Unit: Ugandan shillings)

	General Household	Commercial Facilities
(1) Premises inspection charge	41,300 (approx. 15.28 USD)	47,200 (approx. 17.46 USD)
(2) Connection charge for those living within pole distance of existing grids	198,000 (approx. 73.26 USD)	298,000 (approx. US110.26 USD)
(3) Connection charge for those living within one pole distance of existing grids	426,000 (approx. 157.62 USD)	526,000 (approx. 194.62 USD)

Source: Umeme Uganda Ltd.

Note: One Ugandan shilling is around 0.034 yen (as of January 2013)

On the other hand, regarding such connection fees, which the project beneficiaries feel burdensome, JICA's Basic Design Study Report of this project states: "According to the socioeconomic analysis of the Indicative Rural Electrification Master Plan (which was conducted before this project), roughly 98% of the rural families without electricity were willing to pay the electricity charges. In addition, during the residents' meetings conducted in each project area, local residents expressed their willingness to bear the connection fees and the wiring costs using their incomes from cash crops, savings and remittances from families."¹⁷ It is observed that the planning took account of the issue of connection fees before project commencement. Nevertheless, this evaluation survey could not verify how the targets had been set or considered achievable at the time of planning; thus it can be judged that the target of "electrifying 76,000 people" and its achievability were excessive.

3.2.2 Qualitative Effects (Improved Reliability of Power Supply)

One of the project outputs was to extend the 33kV distribution line from Kagadi area of Kibale District to the line near Hoima Substation as shown in Figure 2. This way the 33kV system would comprise a loop circuit, improving the reliability of power supply with redundant configuration of power source. REA and Ferdult Engineering Services Ltd., which operates

¹⁷ In addition, a Japanese consulting firm together with REA conducted a socioeconomic survey during the basic design study. The consulting firm commented in an interview, "REA staff members were with us throughout the process when we explained about the procedures and costs of electricity connection to the representatives of the targeted villages (all villages in which distribution transformers were planned to be installed). Based on the survey findings on the income levels of villagers and the discussion with REA, it was concluded that residents could afford the required connection charges." On the other hand, REA commented in an interview, "While it is not entirely clear as to how the decision was made at that time, we cannot deny that there was some misjudgment about the connection fees and numbers of new connections."

and maintains distribution lines in Western Uganda, commented in interviews, “The electricity supply was unstable before the project implementation: there were frequent power outages. Now, because the 33kV distribution system is connected to Hoima Substation comprising a loop circuit, the power supply is more reliable than it was before: it is possible to supply electricity from either side in case of an accident or a power outage.”

With regard to troubles related to the transformation and distribution facilities as well as equipment, Umeme Uganda’s branch office (Iganga office), which is responsible for the operation and maintenance (O&M) of distribution networks in Eastern Uganda, commented in an interview, “We are properly utilizing the equipment and materials procured by this project (e.g., distribution transformers). To date, we have not experienced any accidents in operation.” In addition, no problems were observed in the operation of the distribution panels for the substations (circuit breaker, transformer for metering instruments), the distribution transformers and the 33kV distribution line in Iwemba area during the site inspections which were carried out as a part of the field study.

In view of the above, it can be judged that this project is making contributions to improving the reliability of power supply in the rural areas.

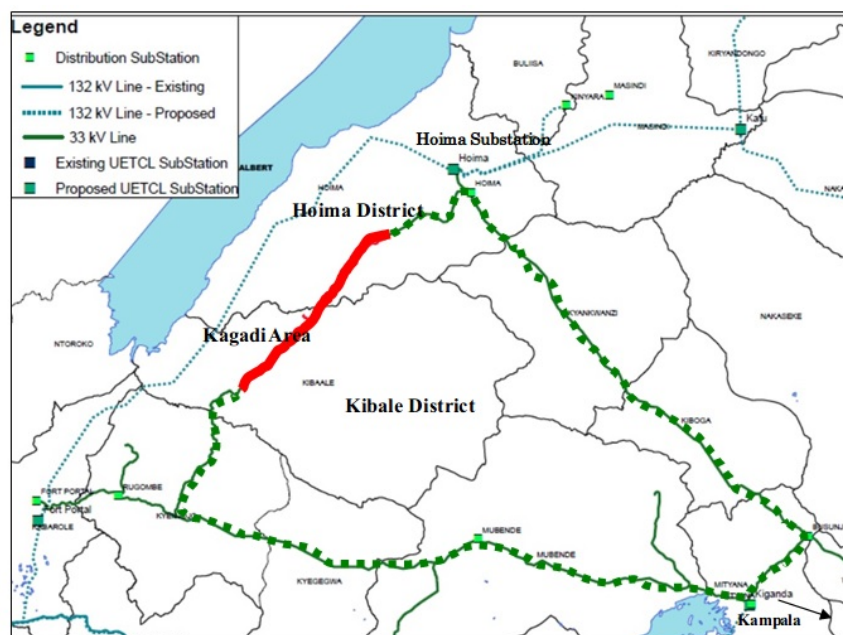


Figure 2: The 33kV System in Western Uganda (Existing and New Lines)
 (Green dotted line: existing 33kV distribution line,
 Red bold line: 33kV distribution line installed by this project)

3.3 Impact

3.3.1 Intended Impacts (Improved Living Standards and Social and Economic Vitalization)

According to JICA's Basic Design Study Report of this project, the following impacts were expected: "(1) The project would enable the introduction of electric medical equipment and refrigerators, thereby improving health and sanitation for the local residents; (2) The project would enable the introduction of lights and educational materials that require electrical power (e.g., PCs), thereby stimulating educational activities; (3) The project would enable farmers to use agricultural production equipment through more stable and affordable power at farming production bases, thereby contributing to the increase in agricultural production as well as to the modernization and advancement of agricultural practices."

As discussed previously, the project has demonstrated limited effects thus far with a small number of households benefiting from the improved power service. Nevertheless, a beneficiary survey was conducted by targeting residents who have had their houses connected to the electrical line¹⁸. The survey results are reviewed and analyzed below.

Figure 3 describes the purposes of using electricity: the most common answer is "lighting" in almost all areas. Other common answers include to use electric appliances and to charge mobile phones. In fact, refrigerators and TV are among the electric appliances that many households actually use; thus it is inferable that households frequently use electricity to operate electric appliances for daily living apart from lighting. Figure 4 shows the reduction in time spent on household chores: respondents in most areas answered the project "highly contributed" or "contributed," suggesting that electrification is relieving burdens of housework. As seen in Figure 5, concerning changes in the living environment, many respondents pointed to the fact that their incomes or savings increased as a result of the project. It is partly because many of the households connected to the electric line run grocery shops at their residence in all target areas. These beneficiaries commented in interviews, "We started selling chilled products, such as cold drinks, with the introduction of electric power." Based on these results, it is inferable that electrification is contributing to the improvement in incomes and living standards. In addition, there are comments that family members began to talk more, relationship with neighbors improved, and it has become safe in the night; thus it is inferable that this project is contributing to the improvement in the living and social environment. On the other hand, out of the impacts anticipated at the project planning stage, which are (1) improved health and sanitation; (2) better educational activities; and (3) increased agricultural production and modernization of agricultural practices, modernization of agricultural practices was the only impact mentioned in

¹⁸ It was an interview-based survey with a sample size of 100. Samples were randomly selected from the project target areas using the random sampling method. It was not possible to capture the accurate population of each target area because, as explained earlier, the administrative boundaries changed after the commencement of the project and since then no census has been conducted.

interviews with farmers residing in the target areas¹⁹, whereas there were no specific comments or answers confirming the other anticipated impacts through the beneficiary survey and interviews.

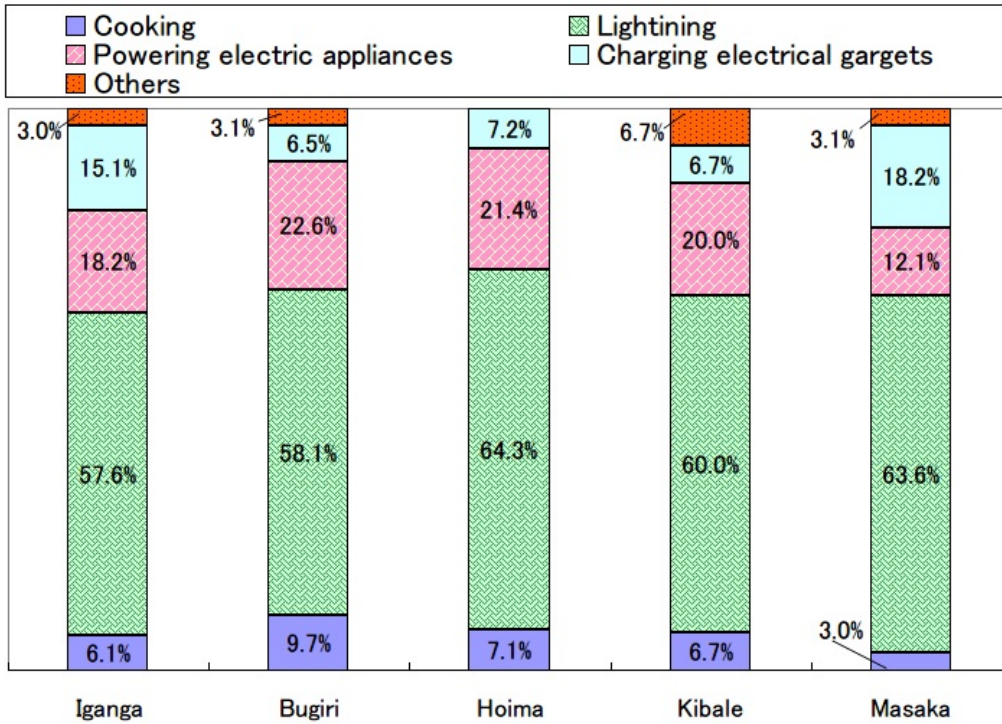


Figure 3: What do you use electricity for?

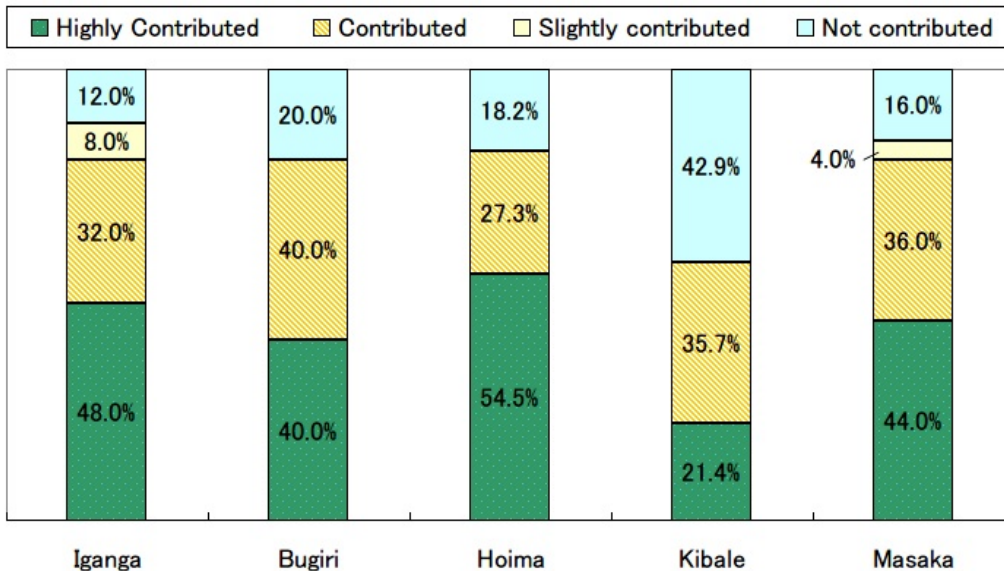


Figure 4: Did this project contribute to the reduction in time spent on household chores?

¹⁹ One of the comments was, “Our staple food is rice. Thanks to the electrification, farmers can use rice-polishing machines now. It has made the process of rice polishing through shipping less burdensome and less time-consuming.”



Figure 5: What changed has the project made in terms of living environment?

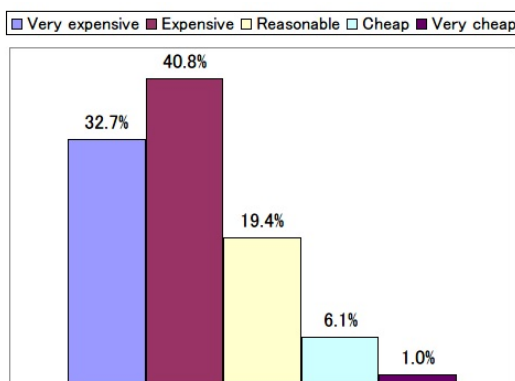


Figure 6: What do you think of the connection fees?

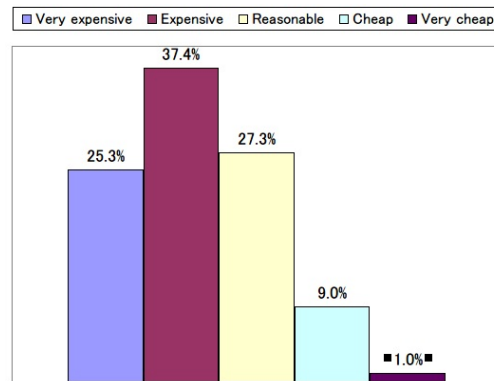


Figure 7: What do you think of the monthly electricity charge?

Figure 6 and Figure 7 are questions concerning the connection fees and monthly electricity charges: many respondents answered “very expensive” or “expensive.” It can be judged that the electricity service users feel that both the connection fees and the monthly charges are expensive even though they joined the service on the understanding that they could afford them.

3.3.2 Other Impacts

3.3.2.1 Impacts on the Natural Environment

In Uganda the National Environmental Authority (NEMA)²⁰ appraises, coordinates and supervises environmental impact assessments. Any organization planning to implement a project, such as REA, is mandated to submit a project summary document with an analysis of

²⁰ It was established as per the National Environment Statute of 1995.

expected environmental impacts and planned mitigation measures. In fact, the project summary document of this project was duly approved by NEMA before the project commencement. Because the distribution line targeted under this project partially passed through the national forest reserves administered by NFA, a permission from the National Forestry Authority (NFA) was required. Similarly, the project was duly approved by NFA before the project commencement. NEMA requested REA to regularly monitor oil leaks, minimize impacts on the ecosystem, and ensure proper collection, control and disposal of waste oil, while NFA requested REA to prevent dumping of waste when approving the project. According to the interviews with REA and the operators (Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd.)²¹ responsible for the O&M of the equipment and facilities installed by this project, it was confirmed that the following appropriate measures are being taken at the time of the ex-post evaluation:

■ Regular Monitoring of Oil leak

The operators (Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd.) conduct periodic inspections (once a year) of the distribution transformers procured by this project. Oil leaks or associated accidents have not occurred thus far.

■ Proper Collection, Control and Disposal of Waste Oil

As oil needs to be changed every 3-5 years for the majority of the distribution transformers, the time has not come yet at the time of the ex-post evaluation (January 2013). According to Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd., they will handle the oil change appropriately by outsourcing it to a specialized company.

■ Prevention of Dumping of Waste

Following the construction of the distribution line, Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd. cleaned the areas near the facilities, such as the 33kV distribution line. As at the time of the ex-post evaluation, no cases of waste dumping have been reported. According to the operators, they will continue to patrol and clean the area on a regular basis.

Additionally, it was confirmed through the interviews with REA, Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd. that no environmental problems, including noise, air pollution and dust created by the project vehicles, have occurred in and around the project sites.

3.3.2.2 Land Acquisition and Resettlement

No land acquisition or resettlement occurred in this project. On the other hand, compensation

²¹ It will be discussed later in “3.5.1 Institutional Aspects of Operation and Maintenance.”

was paid for the movable assets, such as tress and agricultural products, for those who own land right below the distribution line, which was borne by the Ugandan side. Compensation was paid to a total of 659 people in the amount of 131,751,190 shillings (about 8 million Japanese yen). According to REA, they first evaluated the movable assets, based on which they discussed with the eligible landowners, and payment was made after both parties agreed on the terms. Although it was not possible to obtain detailed information about the landowners through this evaluation survey due to some restrictions on the information, according to REA, no complaints have been received about the amount or REA's handling of the matter to date. Compensation was paid based on mutual agreement as stated above; thus, no major problems are observed in this regard.



Figure 8: Project Site
(Kagadi area, Kibale Districts, Western Region)



Figure 9: Developed 33kV Distribution Line
(Itanda area, Iganga District, Eastern Region)

(Conclusion on Effectiveness and Impacts)

The results of the beneficiary survey, which targeted those who have joined the electricity service, are generally positive, and it can be judged that the service users are detecting the project impacts. However, as previously shown in Table 1, the number of electrified households in the project areas is 706 households (roughly 3,500-4,200 people) as of 2012. Comparing this to a total of 18,991 households residing in the project target areas (at the time of the ex-post evaluation), the ratio is low at 3.7%; thus, the project demonstrates limited effects. This major reason why the number of electrified households is small is that many rural residents, who are the project beneficiaries, think the connections fees are expensive despite the progress made on the extension of the distribution networks²². However, the number of households is likely to increase with the utilization of OBA fund and others; therefore, it is possible that the project will

²² Other reasons, as discussed previously, include slow progress made on the execution of connection subsidies, such as OBA fund, and delays in connection works.

demonstrate a certain level of effects in the near future. Nonetheless, it could be said that the number of electrified people after the completion of the project (76,000 people) should have been set more carefully by thoroughly examining its achievability.

In view of the above, this project has achieved its objectives at a limited level; therefore, its effectiveness and impact is low.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

The planned and actual outputs of this project are shown in Table 3.

Table 3: Planned and Actual Outputs of This Project

Plan (Project Appraisal)	Actual (Ex-Post Evaluation)
<p>【Japanese Contribution】 (The 1st phase of construction: Kagadi / Munte area in Hoima and Kibale Districts, Western Region)</p> <p>■ Equipment & Materials Procurement and Installation Plan</p> <p>1) 33 kV distribution line Existing 33kV distribution line from Kagadi connection point to Munte connection point: total length of approx. 65km</p> <p>2) 33 kV/415-240V distribution transformers (5 units of 50 kVA, 3 units of 100 kVA, and 7 units of 200 kVA)</p> <p>3) One Set of Metering unit</p> <p>■ Equipment & Materials Procurement Plan Spare parts & maintenance tools for 33 kV distribution line</p> <p>(The 1st phase of construction: Bukakata Area in Masaka District, Central Region)</p> <p>■ Equipment & Materials Procurement and Installation Plan</p> <p>1) 33 kV distribution line Connection point of existing 33kV distribution line to Bukakata village: total length of approx. 53 km</p> <p>2) 33 kV/415-240V distribution transformer (5 units of 50 kVA, 2 units of 100 kVA, and 4 units of 200 kVA)</p> <p>3) One Set of Metering unit</p>	<p>【Japanese Contribution】 Almost all the outputs were implemented as planned both for the first and second construction phases.</p> <p>A change was made to the basic design: some spare parts were excluded from the procurement list of the 2nd phase of construction. It is because the estimated cost exceeded the budget limit for the procured items by 29 million yen at the detailed design stage. The excluded items are distribution transformers (2 units of 200 kVA, 2 units of 100 kVA), 2 units of load break switches, 6 units of fused cutout switches and 6 units of lightning arresters.</p>

<p>■ Equipment & Materials Procurement Plan</p> <p>1) Spare parts & maintenance tools for 33 kV distribution line</p> <p>2) Load Break Switch: 1 unit</p> <p>(The 2nd phase of construction: Nabitende / Itanda Area in Iganga District, Eastern Region)</p> <p>■ Equipment & Materials Procurement and Installation Plan</p> <p>1) 33 kV distribution line</p> <p>Connection point of existing 33kV distribution line to Nawangaiza village: total length of approx. 29 km</p> <p>2) 33 kV/415-240V distribution transformers (19 units of 100 kVA, 1 unit of 200 kVA)</p> <p>3) Replacement of 33kV switchgears at Iganga Substation, and Installation of 6 units of 33 kV switchgears</p> <p>4) One Set of Metering unit</p> <p>■ Equipment & Materials Procurement Plan</p> <p>Spare parts and maintenance tools for 33 kV distribution line and switchgears</p> <p>(The 2nd phase of construction: Bugeso / Iwemba Area in Bugiri District, Eastern Region)</p> <p>■ Equipment & Materials Procurement and Installation Plan</p> <p>1) 33 kV distribution line</p> <p>Connection point of existing 33kV distribution line to Iwemba village: total length of approx. 21 km</p> <p>2) 33 kV/415-240V distribution transformers (10 units of 100 kVA, 1 unit of 200kVA)</p> <p>■ Equipment & Materials Procurement Plan</p> <p>Spare parts & maintenance tools for 33 kV distribution line</p> <p><u>【Ugandan Contribution】</u></p> <p>(The 1st phase of construction: Kagadi / Munte area in Hoima and Kibale Districts, Western Region, Bukakata Area in Masaka District, Central Region)</p> <p>1) Land acquisition for distribution lines (33kV and low voltage) route</p> <p>2) Bush clearing on distribution lines (33kV and low voltage) route</p> <p>3) Land acquisition for stockyard for 33kV distribution line facilities</p> <p>4) Procurement and installation of automatic voltage regulator (AVR)</p> <p>5) Procurement and installation of equipment and materials for low voltage distribution lines</p>	<p><u>【Ugandan Contribution】</u></p> <p>All outputs were implemented as planned except for the procurement of AVR (“4”) of the 1st phase of construction)</p>
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<p>6) Procurement and installation of consumer kWh meters</p> <p>(The 2nd phase of construction: Nabitende / Itanda Area in Iganga District, Eastern Region and Bugeso / Iwemba Area in Bugiri District, Eastern Region)</p> <ol style="list-style-type: none"> 1) Land acquisition for distribution lines (33kV and low voltage) route 2) Bush clearing on distribution lines (33kV and low voltage) route 3) Land acquisition for stockyard for 33kV switchgears and distribution line facilities 4) Procurement and installation of 33kV distribution lines (Iganga to Karilo) 5) Removal of existing equipment and temporary cable installation at Iganga Substation 6) Procurement and installation of equipment and materials for low voltage distribution Lines 7) Procurement and installation of consumer kWh meters 	
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Almost all the outputs were implemented as planned both for the Japanese and Ugandan contributions. However, regarding the Japanese contribution, because the estimated cost slightly exceeded the budget limit for the procured items at the detailed design stage, some spare parts were excluded from the procurement plan: distribution transformers (2 units of 200 kVA, 2 units of 100 kVA); 2 units of load break switches; 6 units of fused cutout switches; and 6 units of lightning arresters. According to the interview with REA, this change has not created any problem to date (up to the time of the ex-post evaluation); however, REA is planning to procure these items using their own fund.

With regard to the procurement by the Ugandan side, AVR²³ was excluded from the procurement plan because, according to REA, “it was expected that Kinyara Power Station (14.5MW thermal power) in Masindi District and Buseruka Power Station (9.0 MW mini hydroelectric power) in Hoima District of Western Uganda would be completed after the commencement of this project²⁴. Because it was expected that these new power stations would stabilize the power supply, we deemed that AVA would not be needed.” It was confirmed through the field study that the absence of AVR has not created any problems or accidents.

²³ It automatically regulates voltage by taking a varying voltage level and turning it into a constant voltage level. It is used to maintain quality and stable power supply.

²⁴ In reality, Kinyara Power Station was completed in September 2009 while Buseruka Power Station was completed in January 2013.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The total project cost was initially planned to be 1,653 million yen (the grant limit was 1,293 million yen, and 360 million yen was to be contributed by the Ugandan side), whereas the actual project cost was approximately 1,562 million yen (1,284 million yen was contributed by Japan, and 278 million yen was contributed by the Ugandan side); thus, it was mostly as planned (95% of the planned cost). The amount contributed by the Ugandan side was less than what was planned because AVR was not procured as discussed above.

3.4.2.2 Project Period

The planned project period was 2 years and 7 months (31 months) from August 2007 to February 2010. In reality, it took 3 years and 3 months (39 months) from August 2007 to October 2010, which was slightly longer than planned (126% of the planned period). This is mainly because the procurement and installation work to be done by the Ugandan side was started and completed later than planned, causing a delay of about 8 months. The reasons include a delay in the budget allocation by the supervising ministry (the Ministry of Energy and Mineral Development), a delay in the supplier selection process for some items (materials and equipment for the low-voltage distribution), and a delay in supplier selection following the delay in the procurement and installation work.

Although the project cost was within the plan, the project period slightly exceeded the plan. Therefore, efficiency of the project is fair.

3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

REA remains the implementing partner of this project at the time of the ex-post evaluation. REA promotes and manages rural electrification under the supervision of the Ministry of Energy and Mineral Development (MEMD). There are a total of 47 staff members as at the time of the ex-post evaluation. While MEMD is responsible for electricity policies, the Electricity Regulatory Authority (ERA) holds the authorization right in Uganda, including the rights to set/revise electric rates. On the other hand, the Uganda Electricity Distribution Company Ltd. (UEDCL), which manages the power distribution networks across the country, and REA, which manages rural electrification, are the organizations actually operating on the ground.

Concerning the O&M of the materials, equipment and facilities procured and installed by this project, UEDCL conducts the tender processes and selects the private operators. Then the contracted operators periodically maintain, inspect and repair the distribution lines and transformers while responding to emergency situations (e.g., restoring electric wires disconnected by natural disasters). At the time of the ex-post evaluation, Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd. are the companies carrying out O&M works in the project areas. The former covers Nabitende / Itanda area in Iganga District, Eastern Region and Bugeso / Iwemba area in Bugiri District, Eastern Region (Umeme Iganga Office), whereas the latter covers Kagadi / Munteme area in Hoima and Kibale Districts, Western Region (Ferdsult Kibale and Kagadi Office) and Bukakata area in Masaka District, Central Region (Ferdsult Bukakata Office). There are 14 staff members at Umeme Iganga Office, 8 staff members at Ferdsult Kibale and Kagadi Office, and 4 staff members at Ferdsult Bukakata Office. The staffing levels appear sufficient considering the required tasks²⁵.

Regarding the relationship between REA and the operators, in the case of Umeme Uganda Ltd., the company has a long-term service agreement with UEDCL²⁶. (After signing a 20-year contract in April 2003 for the maintenance work, they began operating the distribution network in March 2005.) ERA and UEDCL supervise and monitor Umeme Uganda. Although REA does not give direct orders or instructions, it partially monitors the O&M work carried by Umeme Uganda (e.g., attending the inspection of equipment, such as distribution transformers procured by this project, patrolling sites, and giving advice as needed). REA also cooperates and shares information with Umeme Uganda about new projects and promotions of electricity service. In the case of Ferdsult Engineering Services Ltd., it is directly supervised and monitored by REA because the company has a service agreement with REA for the O&M work²⁷. The company submits quarterly reports to REA. Based on the reported information, REA visits Ferdsult's branch offices to monitor their activities and gives advice as needed.

Currently, because only a small number of households are using the electricity service, the workload is not substantial concerning the O&M of the facilities and equipment procured and installed by this project. However, both Umeme Uganda Ltd. and Ferdsult Engineering Services

²⁵ Based on the interviews with branch office O&M staff of both companies, they do not have understaffing problem concerning the O&M work.

²⁶ As a side note, the Uganda Electricity Board (UEB) was responsible for planning, operation and maintenance of the electric generation, transmission and distribution for many years in Uganda. In 2001, as part of the power sector reform, UEB's functions were separated into power generation, transmission & Substation, and distribution undertakings, and the Uganda Electricity Generation Company Ltd. (UEGCL), the Uganda Electricity Transmission Company Ltd. (UETCL) and the Uganda Electricity Distribution Company Ltd. (UEDCL) were incorporated. With respect to rural electrification, REA was established under the supervision of MEMD in 2003.

²⁷ Ferdsult Engineering Services Ltd. has signed a 10-year service contract with REA in 2007.

Ltd. commented, “We are aware that our O&M workload will increase if the number of electrified rural households increases with the introduction of OBA fund and others. We will see to it that sufficient staff and budget are allocated and strive more than today to provide quality services to our customers.” REA also commented, “Both companies have sufficient experiences in the field. They will have no problem, given their institutional set up and capacity, in handling the increased O&M workload as a result of an increase in number of households connected to the electric lines.” Based on the above comments, no major problems are foreseen in the institutional aspects of the O&M even if the number of electrified households increases in the project areas.

In view of the above, it is thought that no major problems are observed in the institutional aspects of the O&M of this project carried out by Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd.

3.5.2 Technical Aspects of Operation and Maintenance

Concerning the technical aspects of Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd., which are responsible for the O&M of the project, the main consultant of the project held a training on how to use distribution equipment during the project implementation, and a total of 23 staff members participated from the two companies. Those who took the training were interviewed, and they commented, “The training was useful. We are still utilizing what we learned in the training for our day-to-day work.” After the project completion, a number of training programs have been held at the headquarters and branch offices by guest lecturers and instructors covering technical aspects of O&M. In addition, newly recruited staff members receive on the job training (OJT) as needed.

It was confirmed that branch offices of both of the operators have sufficient numbers of experienced staff with relevant qualifications, including electric engineering. According to the executives of the companies, they value technical qualifications and relevant experiences when recruiting new staff. Additionally, the interviews with the branch office staff confirmed that they have good knowledge of the importance of O&M as well as specifications and functions of the materials and equipment procured by this project. Furthermore, it was confirmed through the field visits that the required O&M works, which will be described in “3.5.4 Current Status of Operation and Maintenance,” are carried out properly. In view of the above, it is thought that no major problems are found in the technical aspects of the O&M work carried out by Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd.

3.5.3 Financial Aspects of Operation and Maintenance

The O&M costs of Umeme Uganda’s Iganga Office, Ferdsult’s Kibale & Kagadi Office and Bukakata Office, which are responsible for O&M works in the project areas, are shown in Table 4. Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd. do not receive any subsidy or budget support from REA and its supervising ministry, MEMD²⁸.

Table 4: O&M Costs of Branch Offices of Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd.

(Unit: Ugandan shillings)

	2011	2012
[Umeme Uganda Ltd.]		
- Iganga Office	554,231,842	571,326,045
[Ferdsult Engineering Services Ltd.]		
- Kibale & Kagadi Office	111,387,275	87,149,289*
- Bukakata Office	64,357,170	38,472,775*

Source: Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd.

*Note: Data as of the end of September 2012 (Data for October 2012 onwards was not available)
Data before 2010 was not available, either.

Remark: One Ugandan shillings is about 0.034 Japanese yen (January 2013)

Concerning O&M costs of Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd., it is the headquarters in Kampala that manage and disburse the office budgets of the above branch offices. According to the interviews with the executives of the headquarters, financial officers and branch officers, the both companies commented, “the branch offices receive sufficient O&M funds necessary for the O&M work.” Based on such comments, it is thought that there are no major concerns in the financial aspects of the O&M carried out by the two companies.

3.5.4 Current Status of Operation and Maintenance

As O&M works, the branch office staffs of Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd. check the status of the power distribution panels and the distribution transformers, remove obstacles, such as trees, along the distribution lines, and visually confirm the 33kV distribution line. Through the interviews and field visits, no problems were observed in the O&M status of the 33kV distribution line, the 33kV switchgears inside Iganga Substation and the distribution transformers procured by this project.

Employees of the two operators normally work Monday through Saturday (half day on

²⁸ Both operators are private companies that are financially independent. As a side note, the authority of revising electric rates lies with ERA, which means the operators cannot set the price themselves. Both companies commented, however, that their operations are not strained by the current electric tariff system.

Saturdays). In case of emergencies (e.g., cut off distribution wires) they immediately head for the site to carry out a recovery work ²⁹.

With respect to spare parts, branch offices request the headquarters to procure the needed parts in the cases of both Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd. According to the branch office staff, they receive spare parts as per schedule most of the time although international procurement takes time in some cases. A maintenance manual is in place at each branch office. Staff members utilize the manual for their day-to-day O&M work.

No major problems have been observed in the institutional, technical and financial aspects of the operation and maintenance carried out by Umeme Uganda Ltd. and Ferdsult Engineering Services Ltd. Similarly there are no serious concerns about the status of the operation and maintenance of each project output. Therefore, it is concluded that sustainability of this project is high.



Figure 10: One Project Site
(Iwemba area in Bugiri District,
Eastern Region)



Figure 11: Branch of Ferdsult
Engineering Services Ltd. (Kagadi area,
Kibale District, Western Region)

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project procured, installed and upgraded equipment and materials for the 33kV distribution lines with the aim of increasing electrification rates and providing a stable electricity supply in Nabitende / Itanda area in Iganga District, Eastern Region; Kagadi / Munteme area in Hoima and Kibale Districts, Western Region; Bugeso / Iwemba area in Bugiri

²⁹ As a side note, after project completion, oil was stolen from distribution transformers in Bugiri and Iganga districts, Eastern Region (vandalism). The branch office in charge commented in an interview, “We are visiting the local communities to raise awareness about electricity distribution with a view to preventing similar cases of vandalism in the future. The local police is working on the case. They have strengthened security in the area with more frequent patrols.”

District, Eastern Region; and Bukakata area in Masaka District, Central Region. This project is consistent with the rural infrastructure development and the power sector policy as well as with the development needs to improve rural electrification rates; therefore relevance of this project is high. Efficiency of the project is evaluated to be fair because the project period was slightly longer than planned whereas the project cost was mostly as planned. No major problems are found in the operation and maintenance carried out by the private operators (Umeme Uganda Ltd. and Ferdult Engineering Services Ltd.) in terms of the institutional, technical and financial aspects as well as the status of the project outputs. On the other hand, while there has been a steady expansion of power distribution networks in Uganda, only 706 households (3,500-4,200 people) have been electrified, which is a small proportion considering that there are totally 18,991 households (95,000-113,000 people) residing in the project areas mainly because many residents feel that the connection fees, which they have to pay upon joining the electricity service, are expensive; thus effectiveness and impacts of the project are low. In light of the above, this project is evaluated to be unsatisfactory. However, it is possible that the project demonstrates a certain level of effects in the near future because the number of households connecting to electricity is likely to increase with the introduction of connection subsidies using funds, such as OBA.

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

- As at the time of the ex-post evaluation, the number of electrified households is not increasing because the connection fees are considered expensive by rural residents in the project areas. While the number of electrified households is expected to increase with the introduction of the connection subsidy, such as OBA fund, it is recommended that REA together with the operators set concrete targets and periodically monitor the progress on the number of connections. If for some reasons it becomes difficult to provide fully subsidies through OBA fund, the government of Uganda should consider allocating its own fund to promote electricity connections so that the number of electrified households will increase steadily. Furthermore, it would be beneficial for Umeme Uganda Ltd. and Ferdult Engineering Services Ltd. to reinforce their O&M capacities by allocating sufficient staff and budgets as needed so as to provide quality services to the increasing number of customers. It is suggested that REA monitor the O&M capacities of the operators as necessary.

4.2.2 Recommendations to JICA

- It is recommended that JICA monitor REA's work in promoting electricity connections to ensure that the number of electrified households will increase steadily in the near future.

4.3 Lessons Learned

- This ex-post evaluation study revealed that the number of people (households) electrified through the project is much lower than what was expected. The project target should have been set more carefully at the planning stage. In particular, it would have been necessary to collect information and verify the achievability more carefully instead of taking the number of connections simply from the preceding project ("The Project for Rural Electrification Phase I"). Furthermore, if the foreign assistance policy, such as OBA, had been taken into consideration at the project design stage, it would have been beneficial to consider the utilization of such policy with a view to increasing household connections at a good rate. Therefore, lessons can be drawn for similar future rural electrification projects, including the phase III, that research and design should be implemented by analyzing customers' ability to pay and by taking account of the background and issues pertaining to the entire rural electrification assistance policy. In addition, it would be important to identify foreseen risks at the time of project formulation and be prepared to take necessary countermeasures because even if the project progressed and completed by taking all these right steps, there would be a possibility that problems occur, such as electrification being stagnated because potential customers are unable to bear the connection costs.