Ex-Post Project Evaluation 2012: Package I-4 (Uganda, Sierra Leone, Benin, Kenya)

October 2013

JAPAN INTERNATIONAL COOPERATION AGENCY

Octavia Japan, CO., LTD.
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Preface

Ex-post evaluation of ODA projects has been in place since 1975 and since then the coverage of evaluation has expanded. Japan's ODA charter revised in 2003 shows Japan's commitment to ODA evaluation, clearly stating under the section "Enhancement of Evaluation" that in order to measure, analyze and objectively evaluate the outcome of ODA, third-party evaluations conducted by experts will be enhanced.

This volume shows the results of the ex-post evaluation of ODA Loan projects that were mainly completed in fiscal year 2010, and Technical Cooperation projects and Grant Aid projects, most of which project cost exceeds 1 billion JPY, that were mainly completed in fiscal year 2009. The ex-post evaluation was entrusted to external evaluators to ensure objective analysis of the projects' effects and to draw lessons and recommendations to be utilized in similar projects.

The lessons and recommendations drawn from these evaluations will be shared with JICA's stakeholders in order to improve the quality of ODA projects.

Lastly, deep appreciation is given to those who have cooperated and supported the creation of this volume of evaluations.

October, 2013

Toshitsugu Uesawa
Vice President
Japan International Cooperation Agency (JICA)

Disclaimer

This volume of evaluations, the English translation of the original Japanese version, shows the result of objective ex-post evaluations made by external evaluators. The views and recommendations herein do not necessarily reflect the official views and opinions of JICA. JICA is not responsible for the accuracy of English translation, and the Japanese version shall prevail in the event of any inconsistency with the English version.

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JICA's comments may be added at the end of each report when the views held by the operations departments do not match those of the external evaluator.

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The Republic of Uganda

Ex-Post Evaluation of Japanese Grant Aid Project
The Project for Improvement of Medium Wave Radio Broadcasting Network

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

0. Summary

With an aim to increase the number of people who have access to medium wave (MW) radio service in Uganda, this project procured and installed a set of broadcasting equipment. At the time of the ex-post evaluation, the project remains consistent with Uganda's development policy concerning information and telecommunication networks and also with Uganda's development needs for establishing and restoring the MW radio broadcasting network and facilities. Thus the relevance of this project is high. As a result of the rehabilitation of Mawagga MW Transmitting Station and Kyeriba MW Transmitting Station, the coverage of the MW radio service has improved from 25% to 77%. Also, the procurement and installation of the latest equipment at the head studios of the implementing agency has led to the improvement in the broadcasting quality of the MW radio, which now offers a broader spectrum of programs. Furthermore, local residents are generally satisfied with the project according to the beneficiary survey. Therefore, the project demonstrates highly positive effectiveness and impacts. On the other hand, the efficiency of the project is fair because the project completion took significantly longer than planned while the project cost was within the plan. Although no major problems are observed in the technical and financial aspects of the operation and maintenance, which is carried out by the implementing agency, there are some concerns about the institutional aspects. The number of technicians at Mawagga and Kyeriba MW Transmitting Stations is too small, and the procurement and delivery of diesel fuel necessary for the emergency power generating system take a considerable amount of time. Thus the sustainability of the project is fair. In light of the above, this project is evaluated to be satisfactory.

1. Project Description

(Project Location)


Mawagga MW Radio Transmitting Station

1.1 Background

In the Republic of Uganda (hereinafter referred to as "Uganda") approximately 4 million units of radio receivers were owned with the household saturation rate of 78.1% in 2002, whereas for TV 390,000 units[1] were owned with the household saturation rate of 7.6%, which was one tenth that of radios. In fact, radio broadcasting played an important role as an information medium in Uganda since it was more accessible to people than TV. The Uganda Broadcasting Corporation (UBC), the only public radio broadcasting service provider in the country, had sufficient units of broadcasting equipment. However, most of them were procured and installed back in the 1970-80s. The aging equipment often created problems in producing and broadcasting radio programs. In addition, even though UBC was the only organization with the MW radio broadcasting system, which was best suited for a nationwide network, its regional transmitting stations were underutilized because of the old facilities. The government of Uganda recognized the urgent need to restore the functions of Mawagga MW Transmitting Station (Mubende District, Central Region) and Kyeriba MW Transmitting Station (Kabale District, Western Region) as these two stations were not in use despite their potential for reaching greater population. It was also deemed necessary to procure and install studio equipment for radio program development.

1.2 Project Outline

The objective of this project is to increase the number of people who have access to MW radio broadcasting service by procuring and installing MW radio broadcasting equipment for

[1] The source of the data concerning the numbers of radio receivers and TV sets is the International Telecommunication Union (ITU).

Mawagga MW Transmitting Station in Mubende District, Kyeriba MW Transmitting Station in Kabale District, and Kampala Broadcast House, thereby contributing to improving the people's living standard and correcting the disparities in information access among the people.

Grant Limit / Actual Grant Amount		1,112 million yen / 1,058 million yen
Exchange of Notes Date (/Grant Agreement Date)		July 2007
Implementing Agency		Uganda Broadcasting Corporation (UBC)
Project Completion Date		April 2009
Main Contractors	Construction	Mitsubishi Corporation
	Consulting Service	NHK Integrated Technology Inc.
Basic Design		August 2006 – March 2007
Detailed Design		N/A
Related Projects (if any)		[Technical Cooperation Projects] ■ Training of Local Officials in Japan (a total of 9 officials between 1977 and 2006) [ODA Loan] ■ "The Project for Expansion of Uganda Television Network" (Approximately 618 million yen, 1966) [Grant Aid] ■ "The Project for Improvement of Television Transmitting Facilities" (720 million yen, 1984) ■ "The Project for Improvement of Kololo Transmitting Station" (197 million yen, 1991)

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Octavia Japan Co., Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: September 2012-August 2013

Duration of the Field Study: February 2-15, April 27-May 3, 2013

3. Results of the Evaluation (Overall Rating: B[2])

3.1 Relevance (Rating: ③[3])

3.1.1 Relevance to the Development Plan of Uganda

The government of Uganda developed the "Poverty Eradication Action Plan (PEAP)" in 1997, which identified the following priority areas: (1) economic management; (2) improvement in production, income and competitiveness; (3) public security, resolution of conflicts, and disaster management; (4) good governance; and (5) human development. After having been revised in 2000 and 2003, the third PEAP was launched in December 2004. According to this, an emphasis was placed on crosscutting issues, such as gender, environment, HIV/AIDS, employment, population problem, social security, income distribution, and correction of regional disparities. In particular, educational and awareness raising programs through the national public radio were viewed as an important cross-sectoral approach[4].

At the time of the ex-post evaluation, the government of Uganda is implementing the "Five-year National Development Plan (2010/11-2014/15)" launched in April 2010. The plan recognizes the importance of developing information telecommunication networks for social and economic development. It also lays out the government's direction towards expanding information and communication services to regions, such as radio and television, as they are rather concentrated in the capital, Kampala. In addition to the five-year development plan, UBC and the Ministry of Information, which supervises UBC, are preparing a program to develop broadcasting network entitled, "The Improvement of UBC Broadcasting Network and Information Diffusion." In this program radio broadcasting is viewed as a tool to establish a solid base for information and communications in all regions so as to contribute to the welfare of Ugandan citizens.

As described above, the expansion of information and communication networks as well as radiobroadcast continues to be an important issue for the government of Uganda. Therefore, it is confirmed that this project remains consistent with the development policy of Uganda.

3.1.2 Relevance to the Development Needs of Uganda

Before the project, most of the equipment used at seven MW Transmitting Stations[5] and

[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[3] ③: High, ② Fair, ① Low
[4] The PEAP states that following roles to be played by radio: (1) equitable access to education, (2) improvement of agricultural activities and health management; (3) awareness raising for citizens; and (4) learning about new techniques and technologies of various fields.
[5] Seven stations are Arua, Bobi, Butebo, Mawagga, Kibira, Bugolobi, and Kyeriba.

Kampala Broadcast House , which are the main facilities of UBC's radio broadcasting networks, was procured and installed back in the 1970-80s. Therefore, problems were often found in producing radio programs and broadcasting due to the old equipment and shortage of spare parts. UBC had seven transmitting stations in the country, with which they had the potential of reaching 90% of the national population with MW[6]. At the time of project commencement, however, Butebo was the only operational transmitting station. Consequently, the MW radio service coverage was as low as 25% of the population. To address this situation, the government of Uganda requested Japan to extend a grant aid assistance for the procurement and installation of studio equipment at the Kampala Broadcast House and also for the restoration of Mawagga MW Transmitting Station[7] (Mubende District, Central Region) and Kyeriba MW Transmitting Station[8] (Kabale District, Western Region), the two most crucial transmitting stations in terms of coverage.

At the time of the ex-post evaluation, there continues to be a demand for developing MW radio broadcasting networks. After the commencement of the project, UBC and the Ministry of Information developed "The Five-Year Strategic Plan of UBC (2008-13)", which aims to restore the other MW transmitting stations which were not covered by this project. By expanding the MW radio coverage to the entire nation in the near future, UBC aims to reduce information disparity between Kampala and the regions and provide people with more relevant information.

As described above, there continues to be a demand for developing and rehabilitating MW radio networks and facilities in Uganda. Therefore, it is judged that the project is consistent with the development needs of Uganda.

3.1.3 Relevance to Japan's ODA Policy

Following the Japan-Uganda Economic Cooperation Policy Conference in July 1997 and the Project Confirmation Study in 1999, the government of Japan advocated 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

[6] MW radio has wider geographical coverage than FM radio.
[7] Mawagga MW Transmitting Station was constructed in 1972. Initially, the station had two 50kW MW transmitters of British make which were operated using the active/standby operating system. Both of these transmitters broke after 5 years and were replaced with one Japanese 50kW transmitter in 1988. When this one broke in 1999, the broadcasting was stopped.
[8] Kyeriba Transmitting Station and Mawagga Transmitting Station began their operation with British equipment manufactured in 1972. By 1998 the equipment became extremely old, and spare parts became unavailable. Finally they stopped operating.

development (road, electric power, etc.). The continuity of these priorities was reaffirmed at the Japan-Uganda Economic Cooperation Policy Conference in October 2006, confirming the overall direction towards poverty reduction through growth.

This project is designed to contribute to education, awareness creation, and reducing information disparities among regions, which relates to "(1) human resource development (education, vocational training, etc.)" above. Therefore, it is judged that this project is consistent with Japan's ODA policy. Additionally, Japan has been active in supporting communications and broadcasting sector in Uganda. Following the "The Project for Improvement of Television Transmission Facilities" in 1984 and the "The Project for Improvement of Kololo Transmitting Station" in 1991, this project is designed to improve information infrastructure by procuring and installing broadcasting equipment so as to contribute to the improvement in the living and educational standards of Ugandan citizens. Therefore, it can be said that this project is consistent with Japan's ODA policy to Uganda.

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 Effectiveness[9] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

1) Direct Effects of the Project (MW Radio Broadcasting Coverage: Area and Population)

It was expected before project implementation that this project would improve UBC's MW radio broadcasting coverage from 25% to 75%, with 7.25 million people in Central Region and 6.9 million people in Western Region (totally 14.15 million people) gaining access to the MW radio broadcasting service. Table 1 shows the coverage of UBC's MW broadcasting service (population) and the numbers of people served by Mawagga and Kyeriba MW Transmitting Stations before project implementation (actual) and after project completion (target and actual).

[9] Sub-rating for Effectiveness is to be put with consideration of Impact

Table 1: Data concerning Direct Effects of the Project
(Before Project Implementation, Target, and Actual after Project Completion)

Effect Indicators	Before Project Implementation	Target after Project Completion	Actual after Project Completion (At Ex-Post Evaluation in 2012)
(1) Coverage of UBC's MW Radio Broadcasting Service	25%[10]	77%[11]	77%[12]
(2) Number of People served by Mawagga and Kyeriba MW Transmitting Stations	0	14.15 million people	Approximately 17.29 million people

Source: JICA document and answer on questionnaire

Following the completion of this project, the coverage of MW radio broadcasting service has expanded, particularly in Central and Western Regions. As shown in Table 1, MW broadcasting service covers 77% of the nation or 17.29 million people at the time of the ex-post evaluation. Now, it appears as if the number of people served by the two stations exceeded the original target. However, it was largely attributed to the rapid population growth[13]. Considering that the equipment was procured and installed at Mawagga and Kyeriba Transmitting Stations as planned, which will be discussed later in 'Project Output' under 'Efficiency', and that no problem has been reported about the breakdown and failure of the equipment thus far[14], it is no surprise that the coverage has expanded as planned. Nevertheless, it can be said that the project is contributing to the stable provision of MW broadcasting service.

2) Radio and Television Saturation Rates of the Nation

Table 2 provides the data concerning radio and television saturation at the national level. The radio saturation rate is 66.0% at the time of the ex-post evaluation, which is higher than the television saturation rate of 12.4%. Now, comparing 66.0% to 78.1% (rate before project

[10] This 25% was calculated by dividing the number of people residing in the area covered by Butebo Transmission Station by the national population.
[11] This figure indicates the coverage of the three transmitting stations: Butebo (Eastern Region), Mawagga (Central Region), and Kyeriba (Western Region). Because Mawagga and Kyeriba Transmission Stations can serve 52% of the national population, 77% was derived by adding 52% to 25%. As was the case for the coverage of Butebo Station, 52% was calculated by dividing the number of people residing in the areas covered by the two stations, assuming that population grew at the same rate across the country by the national population.
[12] According to UBC, the operation of Butebo Transmitting Station, the only station which was operational before project commencement, is currently unstable due to the breakage of the diode system of the semiconductor inside the transmitter (as of mid February 2013). Although UBC is trying to coop with the problem by assigning experienced staff for the recovery work, they have not been able to procure and install the needed spare parts. According to one staff member, UBC is hoping to stabilize the function of this station by August 2013.
[13] The population growth rate is 3.1% as of 2013 (UNFPA data), which is the third highest in the world according to the "State of World Population 2011" published by UNFPA.
[14] It will be further discussed in '3.5.4 Current Status of Operation and Maintenance.'

commencement), it appears as if the radio saturation is lower at the time of the ex-post evaluation than it was before project commencement. However, the data provided by Audience Scapes, a private research institution, shows the radio saturation rate of 83.0%[15]. UBC commented about the validity of 66.0% radio saturation rate as follows: "In recent years mobile phone users have increased dramatically in the capital, Kampala. Because more and more people use mobile phones to listen to the radio, the radio saturation rate could be higher than 66.0% in reality given the increasing number of mobile phones." Based on the above, it can be concluded that radio, which is supported by this project, continues to have a comparative advantage as a means of information gathering in Uganda[16].

Table 2: Data on Radio and Television Saturation

Item	Before Project Commencement			At the Time of Ex-Post Evaluation
	1995	1998	2002	2012
Number of radio set (unit: thousand)	2,300	2,800	4,000	5,045
Number of television set (unit: thousand)	140	219	391	948
Population (unit: thousand)	19,235	21,174	24,068	34,509
Number of household (unit: thousand)	4,093	4,505	5,121	7,644
Radio saturation rate (unit: %)	56.2	62.2	78.1	66.0 (83.0) *Note
Television saturation rate (unit: %)	3.4	4.9	7.6	12.4

Source: Uganda Bureau of Statistics (UBOS), World Telecommunications Indicators Database 9th Edition 2005 and ITU for the data before project commencement, UBOS, World Telecommunications Indicators Database 16th Edition 2012, ITU and Audience Scapes's survey results for the data at the time of ex-post evaluation
Note: 66.0% is 2011 data provided by UBOS. 83.0% is 2008 data cited from Audience Scapes, a private research company.

3) Improvement of Studio Performance at Kampala Broadcast House

Before project implementation live broadcasts of Kampala Broadcast House were often interrupted by a power circuit problem resulting from voltage changes. To address this problem, this project procured and installed a set of equipment for studios at Kampala Broadcast House

[15] Audience Scapes conducted a survey on access to and utilization of radio broadcasting with a sample size of 5,797 in 2008. According to the survey results, 83% of the respondents listen to radio. When interviewed about the radio saturation rate, UBC commented: "The rate of 78.1% for 2002 seems to be an overestimate in the first place given the MW radio service coverage at that time. As far as UBC is aware, ITU, which provided this data, did not actually count the number of receivers. Instead, they simply estimated the saturation rate for Uganda based on the numbers from the neighboring countries."

[16] Although the television saturation rate is on the increase as compared to it was at the time of the ex-ante evaluation, it is still lower than the radio saturation rate. The main reasons are: (1) Television sets are not affordable to many people; and (2) Electrification rate is still low in rural areas (e.g., 5.3% as of 2012 according to UBOS statistics). While radio can be operated on batteries, electricity is necessary for television.

while restoring MW transmitting stations[17].

Table 3 shows the utilization of the studios (hour/day) for which the project procured and installed broadcasting equipment. Table 4 shows the hours of live broadcast as opposed to recorded programs before and after the project. At the time of the ex-post evaluation the studios are being utilized throughout the day. The share of recorded programs decreased as the hours of live broadcast increased[18]. Because live broadcasts used to be interrupted by a power circuit problem resulting from voltage changes before project commencement, the project has introduced an uninterruptible power system (UPS) to regulate voltage. In addition, the project installed air conditioning facilities to keep the room temperature constant in the studios, which helps control the quality of equipment. As a result, it is now possible to use the studios throughout the day, which has opened up an opportunity for UBC to produce live programs which requires higher degree of precision and accuracy. In terms of the current radio programs, news, educational programs (agriculture, health, hygiene and nutrition), talk-shows with guest politicians and cooking programs are broadcasted during the day, while music, interviews with celebrities and sports news are broadcasted in the night. Maintenance staff and radio MCs commented when interviewed that although radio programs used to be interrupted from time to time as the broadcasting equipment broke down frequently before the project, such problems do not occur after the completion of the project. Thus it can be concluded that the broadcasting quality has improved in terms of sound and stability as a result of the procurement and installation of the latest studio equipment by the project.

Table 3: Studio Use (hour/day) at Kampala Broadcast House

Studio Name	Studio Usage per day	
	Before Project Implementation	At the Time of Ex-Post Evaluation
Red[19]	9-12 hours	24 hours
West[20]	9-12 hours	24 hours
Butebo[21]	6-9 hours	24 hours

Source: JICA document (for figures before project implementation), and UBC's data (for figures at the time of the ex-post evaluation)

[17] Although it will be discussed more later in 'Project Outputs' under the 'Efficiency' section, equipment procured and installed for the production studio includes on-air studio equipment and digital audio workstation.
[18] Live broadcast has the following advantages: (1) It allows interaction with the listeners during talk shows and debate programs using phones; and (2) News can be communicated in case of emergencies, such as natural disasters and power outage.
[19] This studio is used to produce radio programs for the capital, Kampala, and around as well as for North Region.
[20] This studio is used to produce radio programs for the western part of Uganda. UBC changed the name of the studio from "Blue" to "West" following the project commencement.
[21] This studio is used to produce radio programs for the eastern part of Uganda.

Table 4: Broadcast Hours by Type (Live or Recorded Programs)

Studio Name	Before Project Implementation			At the Time of Ex-Post Evaluation		
	Hours of broadcast	Live	Recorded	Hours of broadcast	Live	Recorded [22]
Red	18 hours	14-15 hours	3-4 hours	24 hours	23 hrs. 15 min.	45 min.
West	18 hours	14-15 hours	3-4 hours	24 hours	22 hrs. 56 min.	1 hour 4 min.
Butebo	18 hours	15-16 hours	2-3 hours	24 hours	23 hrs.	1 hour

Source: JICA document (for figures before project implementation), and UBC's data (for figures at the time of the ex-post evaluation)

Figure 1: Locations of the Project Sites
(Circles show the areas covered by MW radio of the Project)

[22] The contents of the recorded programs which are broadcasted for "45 minutes to 1 hour 4 minutes per day" from each studio are mainly advertizing and CM production, which do not necessarily require live broadcast.

3.2.2 Qualitative Effects

1) Improved Reliability of Broadcast Transmitting Equipment at UBC Kampala Broadcast House, Mawagga and Kyeriba Transmitting Stations

Before the implementation of the project, UBC Kampala Broadcast House experienced frequent breakdowns and failures of the broadcast equipment. At the time of the ex-post evaluation, the incidence of equipment-related troubles reduced, and radio programs can be produced without the problems. When interviewed with the maintenance staff, technical officers, and radio MCs of UBC Kampala Broadcast House, they commented as follows: “Before the project we had to struggle with old and easy-to-break equipment. Now, we can produce radio programs with confidence.” Similarly, technicians at Mawagga and Kyeriba Transmitting Stations commented as follows: “The MW radio broadcasting facilities and equipment procured by this project are functioning good. In fact, the Japanese transmitting equipment is of high quality. We can use it for long hours as long as we maintain it properly. We believe that MW radio broadcasting is more reliable and stable now than before.” Based on the these comments, it can be assumed that this project has improved reliability of the broadcast transmitting equipment thereby stabilizing and improving the quality of MW radio broadcast.

Figure 2: UBC Kampala Broadcast House

Figure 3: Procured Audio Equipment

3.3 Impact

3.3.1 Intended Impacts

3.3.1.1 Improved Education and Raising Awareness of Citizens, Reduction in Information Disparities among Regions

A beneficiary survey was conducted as a part of this ex-post evaluation study for the purpose of measuring project impacts targeting local residents in the following three areas: Mityana

County, Mubende District (Central) around Mawagga Transmitting Station, Kabale County, Kabale District (Western) around Kyeriba Transmitting Station, and Central District of Kampala in the vicinity of Kampala Broadcast House. The survey used a questionnaire, and samples were drawn based on the random sampling method (sample size: 100 for three areas)[23]. Figure 4 shows whether any changes have occur in UBC's MW radio broadcasting during the last three years or not: the majority of the residents in all three areas detected some changes. Figure 5 shows what kinds of changes were detected by the residents: many of the respondents pointed to the fact that they became able to receive clearer radio transmission. It can be assumed that the quality of the MW radio broadcast has improved as a result of the procurement and installation of the broadcasting and transmitting equipment at Mawagga and Kyeriba Transmitting Stations. Figure 6 shows the level of satisfaction with UBC's MW radio broadcast: the result is generally positive among the residents. Those who responded either "very satisfied" or "satisfied" were asked why: they said that they were satisfied with the contents of the news, sports, and entertainment (music) programs. In addition, they pointed out that the sound became clearer over the last three years. Furthermore, as shown in Figure 7-10, many respondents think that MW radio programs contribute to the improvement in education standards, health and hygiene, agriculture and increased exposure to news and international affairs. Therefore, it can be assumed that this project plays a certain role in improving people's access to information, to reducing information disparities among regions, and to improving living conditions through the provision of diverse and well-rounded programs.

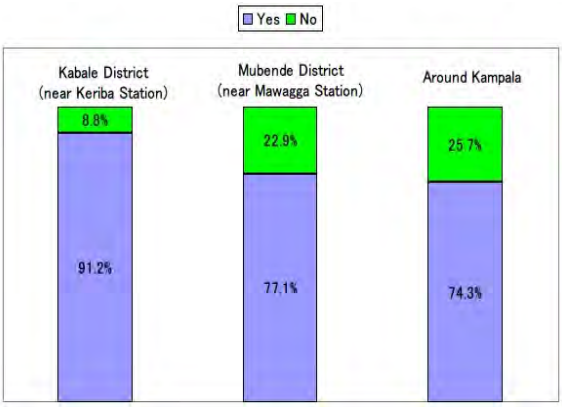

Figure 4: Do you detect any change(s) in UBC's MW radio broadcasting during the last three years?

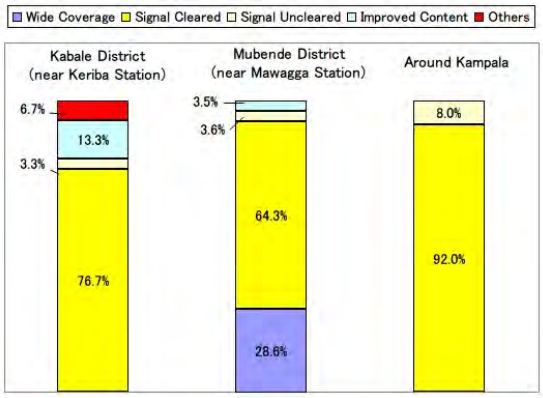

Figure 5: Reason(s) for answering "Yes" to the question in Figure 4

[23] It was not possible to capture the accurate population of each area targeted by the survey because the regional and district boundaries changed following the project commencement, and since then no census has been conducted. (Note: Although there was a plan of conducting a census in 2011, it has not been realized until now as at February 2013.)

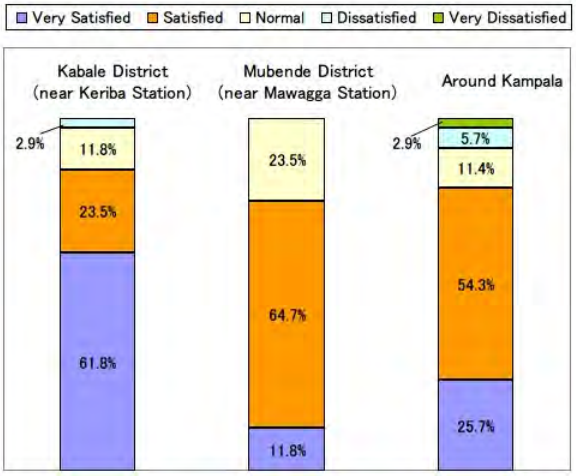

Figure 6: Are you satisfied with UBC's MW radio broadcasting service?

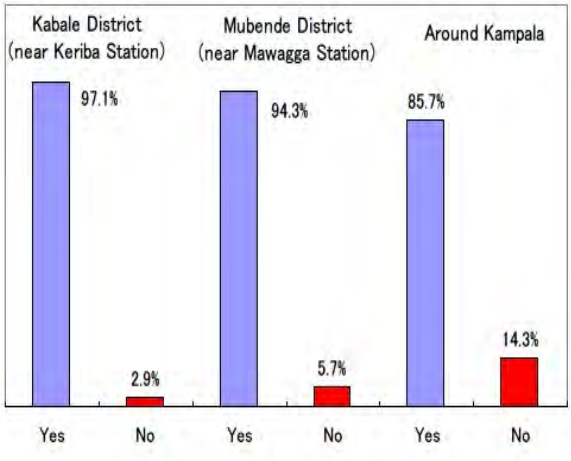

Figure 7: Do you think UBC's MW radio broadcast contributes to the improvement in educational standards?

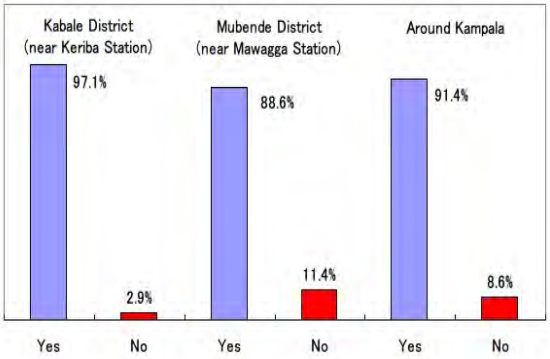

Figure 8: Do you think UBC's MW radio broadcast contributes to the improvement in health and hygiene?

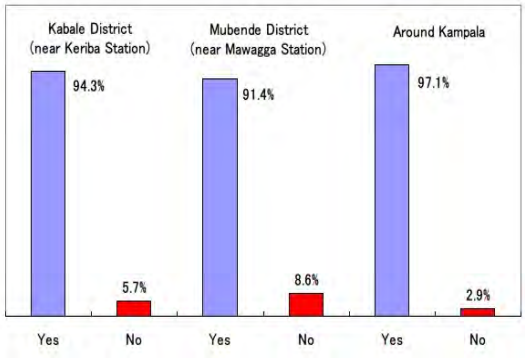

Figure 9: Do you think UBC's MW radio broadcast contributes to the improvement of agriculture?

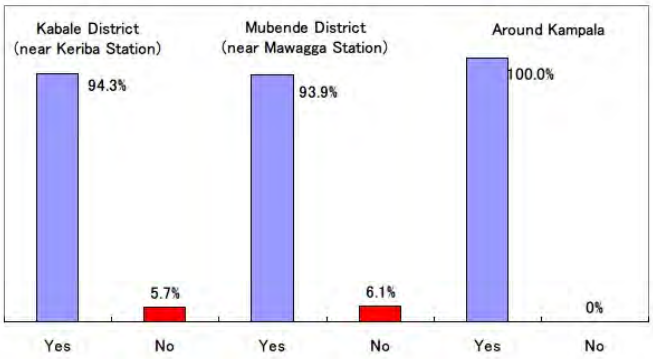

Figure 10: Do you think you listen to the news more often and are more aware of the international affairs owing to UBC's MW radio broadcast?

Some respondents commented, “I get a reception of UBC’s MW radio while I am on a business trip to the neighboring countries, such as DR Congo and Rwanda[24]. Having access to local information and news while I am out of the country is quite beneficial for my business.” It can be said that this comment supports the wide geographical coverage of MW radio and that UBC’s MW radio broadcast is utilized by citizens to gather useful information.

When interviewed about project impacts, the Ministry of Information, a supervising body to UBC, commented as follows: “We see various impacts of this project. Taking a national election as an example, with MW radio, we can easily inform people about the announcement date, candidates, time and date of voting, access to polling places, voting method and system. As compared to FM radio, which has a limited coverage, the MW radio broadcast has advantages of covering a wide geographical area. For the government, it is an effective communication tool for disseminating public information[25].” These comments confirm that MW radio broadcast has advantages and that the project has extensive impacts.

Furthermore, the Ministry of Health commented as follows when interviewed: “We use UBC’s broadcast to promote health-care programs. We think the MW radio broadcast plays an important role in improving people’s knowledge about medicine and health-related issues. The existence value of MW radio is high as it is a useful communication tool to advocate health and medical programs. Since we have relatively high incidence of sporadic diseases, such as epidemics and infectious diseases (e.g., Ebola hemorrhagic fever and Marburg hemorrhagic fever[26]) in Uganda, with the MW radio which boasts a wide coverage, we can inform people of essential details, such as the place of occurrence, description of the patients, and the status of the medical response team. In addition, we can also efficiently and precisely inform people of family planning, medical centers in each area, vaccinations, maternal and child health programs in an efficient and precise manner, through the MW radio.” Based on these comments it is thought that the extent of the project impacts and the significance of the project are not small.

3.3.2 Other Impacts

3.3.2.1 Impacts on the Natural Environment (Legal Procedures Concerning the Environmental and Social Considerations)

In Uganda the National Environmental Authority (NEMA), which supervises environmental

[24] When asked about the MW radio coverage in relation to this comment, UBC explained that the coverage of Mawagga and Kyeriba Transmission Stations is not limited to inside Uganda; it is possible to receive the transmission in some parts of the neighboring countries which share borders with Uganda.

[25] As a side note, 58 languages exist in Uganda. While UBC currently broadcasts in 26 languages, the effort is going to be made to increase the number of languages along with the widening of its area coverage.

[26] Both Ebola hemorrhagic fever and Marburg hemorrhagic fever are viral hemorrhagic diseases.

and social aspects of all projects, is mandated to review and approve/disapprove projects based on the National Environment Act. Concerning this project, it was required that UBC obtain an environmental-protection permission from the NEMA for the construction of transmitting station buildings and MW transmitting antennas. In fact, UBC followed the necessary steps and had the permission before project commencement. Whenever some environmental issue develops in the vicinity of the transmitting stations, NEMA is obligated to assess the situation and urge UBC to take appropriate measures as needed. According to the interviews with UBC, no environmental issues have arisen since the completion of the project.

3.3.2.2 Land Acquisition and Resettlement

No land acquisition or resettlement occurred for this project, which was confirmed through the interviews with UBC and site visits during the evaluation study.

Figure 11: Antenna System at Mawagga Transmitting Station

Figure 12: Transmitting Equipment inside Mawagga Transmitting Station

In view of the above, this project has largely achieved its objectives; therefore its effectiveness is high.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

Table 5 shows the planned and actual outputs of the project.

Table 5: Planned and Actual Outputs of the Project

Planned Outputs (At Appraisal)	Actual Outputs (At Ex-Post Evaluation)
【Contribution of the Japanese Side】 1) Procurement of the MW Radio Broadcasting System Equipment for Mawagga and Kyeriba Transmitting Stations • 50kW MW Transmitter: 1 set each, total 2 sets • 50kW dummy load: 1 set each, total 2 sets • Output switching unit (3-port U-link panel): 1 set each, total 2 sets • Program input and monitoring equipment: 1 lot each, total 2 lots • 50kW MW directional antenna system: 1 lot each, total 2 lots • Satellite receiving equipment: 1 lot each, total 2 lots • Lightning protector: 1 set each, total 2 sets • Automatic voltage regulator: 1 set each, total 2 sets • Isolation transformer: 1 set each, total 2 sets • Emergency generator: 1 lot each, total 2 lots • Air-conditioning and ventilation system: 1 lot each, total 2 lots • Measuring equipment: 1 lot each, total 2 lots 2) Procurement of the Equipment for Kampala Broadcast House • Equipment for 3 on-air studios: 1set each, total 3 sets • Equipment for 3 production studios: 1 set each, total 3 sets • Audio test set, spare parts, maintenance tools: 1 set 3) Installation Work, including the construction of transmitting station buildings, main and sub Antenna Tuning Unit (ATU) huts	【Contribution of the Japanese Side】 All the outputs were achieved as per the plan although there were some minor design changes.
【Contribution of the Ugandan Side】 1) Introduction of commercial power into the transmitting station buildings, which are to be constructed at Mawagga and Kyeriba MW Transmitting Stations 2) Dismantlement of the existing antenna towers at Mawagga and Kyeriba MW Transmitting Stations 3) Construction of boundary fences at	【Contribution of the Ugandan Side】 Regarding 5), although the plan was to rehabilitate the dormitories, it was changed to construction of new dormitories. All the other inputs were provided as per the plan.

Mawagga and Kyeriba MW Transmitting Station 4) Removing existing equipment and repair of the production studios at Kampala Broadcast House 5) Rehabilitation of the staff dormitories located within the premises of Mawagga and Kyeriba MW Transmitting Stations	

With regard to Table 5, the project outputs, both the ones contributed by Japan and by Uganda, were generally achieved as planned. The outputs contributed by the Japanese side had some minor design changes as follows: (1) the site for constructing a transmitting station building was changed from the proximity of the transmitting antenna to the forecourt near the staff dormitory at Kyeriba MW Transmitting Station; (2) following the change described in (1), the coaxial cable for the power feeder, connecting the main & sub ATU huts to the transmitting station buildings, was extended. With regard to one of the outputs contributed by the Ugandan side, "5) Rehabilitation of the staff dormitories located within the premises of Mawagga and Kyeriba MW Transmitting Stations," the plan of rehabilitating the existing dormitory was changed to new construction because the assessment conducted after the project commencement indicated that the existing buildings were too old and nondurable.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The planned project cost was 1,146 million yen (out of which 1,112 million yen was the E/N ceiling, and 34 million yen was to be born by the Ugandan side), whereas the actual project cost was approximately 1,079 million yen (out of which 1,058 million yen was contributed by Japan, and 21 million yen was contributed by Uganda). Thus, the project cost is mostly as planned (94% of the planned cost).

3.4.2.2 Project Period

The planned project period was 1 year and 6 months (18 months) from July 2007 to March 2009. In reality, the procurement and installation, for which Japan was responsible, took 1 year and 7 months (19 months) from July 2007 to April 2009, whereas the construction work by the Ugandan side ended in May 2011. Comparing with the original plan, the actual period significantly delayed more than planned (261% of the plan):

The reasons why the procurement and installation work by Japan completed one month later

than planned are that it took the government of Uganda longer to approve the suppliers and that there were more rainy days than usual, which affected the foundation work and the equipment installation work particularly at Mawagga Transmitting Station. On the other hand, the construction work by the Ugandan side was not completed until March 2011, which is much later than the completion of the procurement and installation work by the Japanese side. It was because the budget allocation and the management's decision making concerning the construction work were significantly delayed due to the lack of communication within UBC.

Although the project cost was within the plan, the project period significantly exceeded the plan; therefore efficiency of the project is fair.

Figure 13: Emergency Generator for Kyeriba MW Transmitting Station (The one on the left is a diesel fuel storage tank.)

Figure 14: Transmitting Equipment procured for Kyeriba MW Transmitting Stations

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

The implementing agency of this project is UBC. UBC is a public radio and TV broadcaster supervised by the Ministry of Information[27]. As of January 2013, UBC has about 400 employees[28].

Mawagga MW Transmitting Station and Kyeriba MW Transmitting Station each has one technical staff for the operation and maintenance (O&M). In addition to the technical staff, each

[27] UBC's managing director reports to the Ministry of Information quarterly.

[28] Out of 400, 100-120 people are working on a contractual basis. The total number of employee is higher now than it was at the time of the ex-ante evaluation (it was 270). This is because the MW radio broadcast has expanded its service area (or the coverage) and the work burden has increased. Another reason is because UBC has been placing emphasis on the TV broadcast and advertisement.

station has 8-9 employees who maintain, clean and guard the premises. An observation from the site visits is that while the only technical staff is on duty around the clock at both stations, it is necessary to increase the number of technical staff for a stable operation of the equipment and facilities. Without any backup staff, it is concerned that the MW transmission and the equipment maintenance would face problems if the technical staff fell sick or encountered an accident. On the other hand, Kampala Broadcast House has 6 employees who are responsible for the O&M of the equipment and facilities procured by the project. The staffing level seems sufficient considering the volume of equipment and required O&M.

In Uganda, supply of electricity is not stable: power outages occur rather frequently. Because of this, the project procured and installed emergency generators for both Mawagga and Kyeriba MW Transmitting Stations. The generators run on diesel. Whenever a power outage occurs, the electricity power supply is moved to the generator. However, the procurement and delivery of diesel fuel currently requires a considerable amount of time. Although both transmitting stations submit a request to UBC's headquarters to obtain fuel, the process normally gets delayed at UBC's headquarters. As a result, on rare occasions, the operation of the transmitting equipment stops at both stations[29].

3.5.2 Technical Aspects of Operation and Maintenance

During the project implementation, training was given to UBC staff members by the construction management consultants. A one-week training was given at Mawagga Transmitting Station, Kyeriba Transmitting Station, and Kampala Broadcast House for a total of 15 UBC staff members (mainly the ones responsible for the technical aspects of broadcast equipment). Since the completion of the project, UBC has been sending 2 staff members each year to a training course in Egypt to improve their skills of operating broadcasting equipment (for about two and a half months). In addition, whenever new studio equipment is introduced, UBC staff receives training from a supplier on how to use the equipment.

UBC's technicians at Mawagga and Kyeriba Transmitting Stations have sufficient professional experience to manage the broadcasting equipment procured by the project[30]: they demonstrated satisfactory levels of knowledge about the facilities and equipment during the interviews[31]. As for newly recruited employees, they receive on the job training (OJT) as needed. In view of the above, no major problems are observed in the technical aspects of the O&M of

[29] Data was not available as to how many times the operation was stopped.
[30] It is worth noting that particularly technicians have long years of experience. Some technicians have the history of taking part in training in Japan (given by NHK and others) in the 1970s.
[31] In particular, they were quite knowledgeable about the machines and spare parts of Japanese make.

this project.

3.5.3 Financial Aspects of Operation and Maintenance

Table 6 provides UBC's profit and loss statement (P/L) for the last three years. In 2010/11, UBC ended in the red with its total cost exceeding the total revenue. Thereafter, UBC had its management team replaced and launched a company reform under a new managing director[32]. As a result, UBC ended in the black the following year (2011/12) by increasing its operating revenue. Operation revenue is generated from TV/radio antenna rental fees (mainly rental fees paid by commercial broadcasters to use UBC's antenna towers), charge for rights to air on TV/radio, and advertisement fees.

Table 6: UBC's Profit and Lost Statement (last three years)

(Unit: Thousand Ugandan shillings)

	2009/10[33]	2010/11	2011/12
Operating revenue	8,833,130	7,630,788	10,877,266
Non-operating revenue	3,943,022	1,891,974	882,285
Total revenue	12,776,152	9,522,762	11,759,551
Administrative cost	(4,907,371)	(5,597,435)	(6,407,354)
Facilities cost	(1,015,122)	(1,348,267)	(1,168,571)
Operating cost	(3,478,539)	(3,947,246)	(3,430,811)
Total cost	(9,401,031)	(10,892,948)	(11,006,736)
Operation Profit or Loss	3,375,120	(1,370,186)	752,815
Financial cost	(34,710)	(206,844)	(44,050)
Profit before tax	3,340,411	(1,577,030)	708,765
Software amortization	(11,602)	(8,314)	(3,370)
Property and equipment depreciation	(3,101,165)	(2,081,431)	(595,042)
Tax	-	-	-
Current term net profit or loss	227,644	(3,666,775)	110,352

Source: UBC

Note: One thousand Ugandan shillings is roughly 30 Japanese yen (as of January 2013)

Because UBC is a national public broadcaster, it is subsidized by the government of Uganda

[32] As a site note, in 2010/11 business efforts by UBC remained low comparing with other years, and UBC's costs associated with administration, facilities, and operation were higher than the previous year. UBC then made an effort to improve its management and operation towards the following year.

[33] The fiscal year starts in the beginning of July and ends at the end of June in Uganda.

(3,667,175 thousand Ugandan shillings in 2009/10, 1,546,272 thousand shillings in 2010/11, and 740,000 thousand shillings in 2011/12). The subsidies constitute the major part of the "non-operating revenue" in Table 6. The amount of subsidies has been declining in recent years mainly because of the increase in operating revenue.

Table 7 below provides the statement of changes in equity, which shows UBC's accumulated profit or loss and changes in equity. Although there was a loss of 3,666,775 thousand shillings in 2010/11 as seen in Table 6, it was covered by the amount brought forward (retained earnings), which was 12,489,909 thousand shillings, resulting in the balance of positive 11,439,808 thousand shillings at the end of the term. In 2009/10 capital was increased by 23,042,304 thousand shillings using the government subsidy. Considering that UBC's capital and retained profits are large enough to cover the deficit balance, no major problems are observed in the financial aspects of the implementing partner.

Table 7: UBC's Statement of Changes in Equity (Last 3 Years)

(Unit: Thousand Ugandan shillings)

		Capital	Revaluation Reserve	Amount Brought Forward	Total
2009/10	Opening balance	6,159,857	25,408,709	(1,545,024)	30,023,542
	Current ordinary profit or loss	-	-	126,457	126,457
	Change in the amount carried forward	-	(4,461,291)	4,461,291	-
	Change in capital	23,042,304	-	-	23,042,304
	Prior period adjustments	-	-	-	-
	Closing balance	29,202,162	20,947,418	3,042,723	53,192,303
2010/11	Opening balance	29,202,162	20,947,418	3,042,723	53,192,303
	Current ordinary profit or loss	-	-	(3,666,775)	(3,666,775)
	Change in the amount carried forward	-	(12,489,909)	12,489,909	-
	Change in capital	210,000	-	(210,000)	-
	Prior period adjustments	-	-	(216,050)	(216,050)
	Closing balance	29,412,162	8,457,509	11,439,808	49,309,479
2011/12	Opening balance	29,412,162	8,457,509	11,439,808	49,309,479
	Current ordinary profit or loss	-	-	110,352	110,352
	Change in the amount carried forward	-	-	-	-
	Change in capital	-	-	-	-
	Prior period adjustments	-	-	-	-
	Closing balance	29,412,162	8,457,509	11,550,160	49,419,832

Source: UBC

Note: One thousand Ugandan shillings is roughly 30 Japanese yen (as of January 2013)

Regarding costs required to operate and maintain Kampala Broadcast House, Mawagga and Kyeriba Transmitting Stations, UBC commented as follows in an interview: “Because all O&M costs are administered by UBC headquarters, we do not keep records of O&M costs for each station/broadcast house separately. Mawagga and Kyeriba Transmitting Stations as well as Kampala Broadcast House together account for around 20-30% of UBC’s administrative cost, facilities cost, and operating cost shown in Table 6. These are used for paying salaries to the technicians and maintenance staff, for operating facilities, and for purchasing equipment. The headquarters has been disbursing funds to the transmitting stations without delay, and the amount has been increasing from year to year.” Staff working at the transmitting stations commented in an interview, “So far we have not experienced any maintenance problem attributed to the shortage of O&M budget.” In view of the above, it can be concluded that no major problems are observed in the budgetary aspects of the O&M of this project.

3.5.4 Current Status of Operation and Maintenance

Through this ex-post evaluation no problems have been observed in the status of O&M concerning equipment procured and installed for Mawagga and Kyeriba Transmitting Stations, including 50kW MW Transmitters and lightning protectors, as well as equipment procured and installed for the on-air and production studios at Kampala Broadcast House. In terms of the content of the O&M, they regularly clean and check the operational status of the equipment and the timing of parts replacement based on a check list found in the maintenance manual[34]. Through the interviews with the technicians and the site visits during the field study, it is confirmed that equipment is operated properly without any defects or failures. On the other hand, as mentioned in ‘3.5.1 Institutional Aspects of Operation and Maintenance,’ it is also a fact that the procurement and delivery of diesel fuel necessary for the emergency generators requires a considerable amount of time.

Through this project, the premises of Mawagga and Kyeriba Transmitting Stations were fenced to restrict the access of unauthorized persons[35]. Similarly, the base of the directional antenna system was fenced by the project as a part of the Japan’s contribution. As a result, safety has improved in and around the transmitting stations. According to the technicians working at the transmitting stations who were interviewed, no accident has occurred since the completion of the project. In addition, a comment was received concerning the fence that it has

[34] Both Mawagga and Kyeriba Transmitting Stations have maintenance manuals, which are utilized by O&M staff for day-to-day activities as needed.
[35] It was financed by the Ugandan side as described in “Project Outputs” section under “Efficiency” above.

improved security: staff can now carry out their activities without worrying about suspicious individuals entering into the premises.

Concerning the working hours, as discussed above, technicians at Mawagga and Kyeriba Transmitting Stations lives in the dormitories located inside the premises and work almost around the clock. As for the O&M staff at Kampala Broadcast House, they normally work from 8am to 5pm, Monday through Friday, although they do come into work on weekends and holidays in case of emergencies, such as natural disasters.

With regard to spare parts, they are kept at Mawagga and Kyeriba Transmitting Stations as well as at Kampala Broadcast House. The transmitting stations procure spare parts by requesting to UBC's headquarters and store them. Generally, it takes longer to procure spare parts internationally although it depends also on the types of parts[36]. While it was not confirmed through the field visits that sufficient spare parts are stocked to prevent a transmission interruption, it was confirmed that UBC keeps a record of spare parts and stores them in a proper manner. Although ledgers are used for the management of spare parts, shortage does occur on rare occasions[37].

At the time of ex-post evaluation no major problems are observed in the technical and financial aspects of the O&M carried out by UBC. However, there are some concerns in terms of the institutional aspects of the O&M, such as the insufficient number of technicians at Mawagga and Kyeriba Transmitting Stations and the lengthy process of fuel procurement and delivery. Therefore, sustainability of the project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

With an aim to increase the number of people who have access to medium wave (MW) radio service in Uganda, this project procured and installed a set of broadcasting equipment. At the time of the ex-post evaluation, the project remains consistent with Uganda's development policy concerning information and telecommunication networks and also with Uganda's development needs for establishing and restoring the MW radio broadcasting network and facilities. Thus the relevance of this project is high. As a result of the rehabilitation of Mawagga MW Transmitting Station and Kyeriba MW Transmitting Station, the coverage of the MW radio service has improved from 25% to 77%. Also, the procurement and installation of the latest equipment at

[36] According to UBC, it takes roughly two months for the paper work and additional two months (a total of 4 months) for the transportation and delivery.
[37] It is not at a serious level.

the head studios of the implementing agency has led to the improvement in the broadcasting quality of the MW radio, which now offers a broader spectrum of programs. Furthermore, local residents are generally satisfied with the project according to the beneficiary survey. Therefore, the project demonstrates highly positive effectiveness and impacts. On the other hand, the efficiency of the project is fair because the project completion took significantly longer than planned while the project cost was within the plan. Although no major problems are observed in the technical and financial aspects of the operation and maintenance, which is carried out by the implementing agency, there are some concerns about the institutional aspects. There are only a few technicians at Mawagga and Kyeriba MW Transmitting Stations, and the procurement and delivery of diesel fuel necessary for the emergency power generating system take a considerable amount of time. Thus the sustainability of the project is fair. In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Implementing Agency

■ It is recommended that the implementing agency shorten the time required for the procurement and delivery of diesel fuel so that emergency power generators would be operative whenever a power outage occurs at Mawagga and Kyeriba MW Transmitting Stations. As the lengthy procurement and delivery of fuel could affect the broadcasting of MW radio, it is recommended that the implementing agency improve its procedural and institutional aspects. In addition, as a way of being prepared for unforeseeable circumstances, it is necessary to accelerate the process of procuring spare parts with a view to preventing interruptions to the radio transmission because in some cases considerable amount of time is required to procure and transport spare parts.

■ The number of O&M technicians at Mawagga and Kyeriba MW Transmitting Stations is not sufficient. Currently, at each transmitting station, one technical person is working almost around the clock to carry out the needed maintenance and inspections: the stations are clearly understaffed. It is recommended that UBC urgently consider increasing the number of technical persons to strengthen the institutional aspects of the O&M at the transmitting stations.

4.3 Lessons Learned

■ The project period was significantly longer than planned for the outputs contributed by the

Ugandan side. It is because of the prolonged approval process and procedures within UBC concerning budget allocation and construction execution despite the repeated reminders by JICA. JICA needs to have a thorough discussion with the implementing agency about the implementation schedule and the budget execution and to establish a common understanding about the contribution of the Ugandan side before the commencement of the project. JICA would then need to follow up on the progress as needed and request the implementing agency to take appropriate measures during the project implementation.

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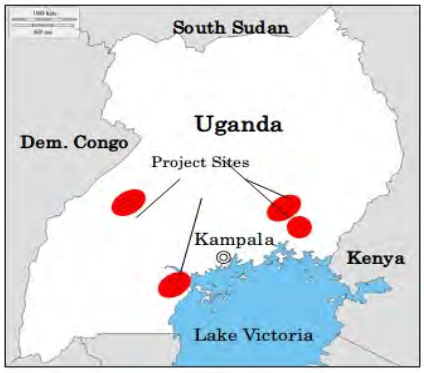
Ex-Post Evaluation of Japanese Grant Aid Project
The Project for Rural Electrification Phase II

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 Ferdsult 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

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 / Munteme 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: D[4])

3.1 Relevance (Rating: : ③[5])

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 infrastructures[6]. 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.

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[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 expensive[8] by the beneficiaries (rural residents). However, the government is currently planning to utilize OBA fund[9], 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 connections[10]. 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 districts[11] 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 Effectiveness[12] (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 Regio (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.

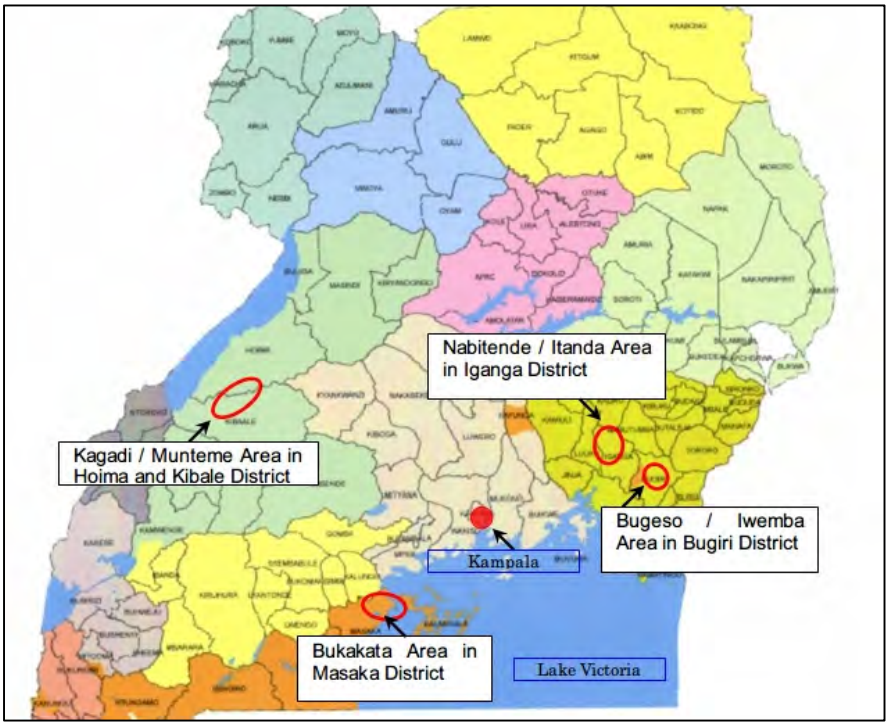

Figure 1: Locations of the Project Sites

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 706[13] (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 2010[14] (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 connected[15]. 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 Regio 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 Ferdsult 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.

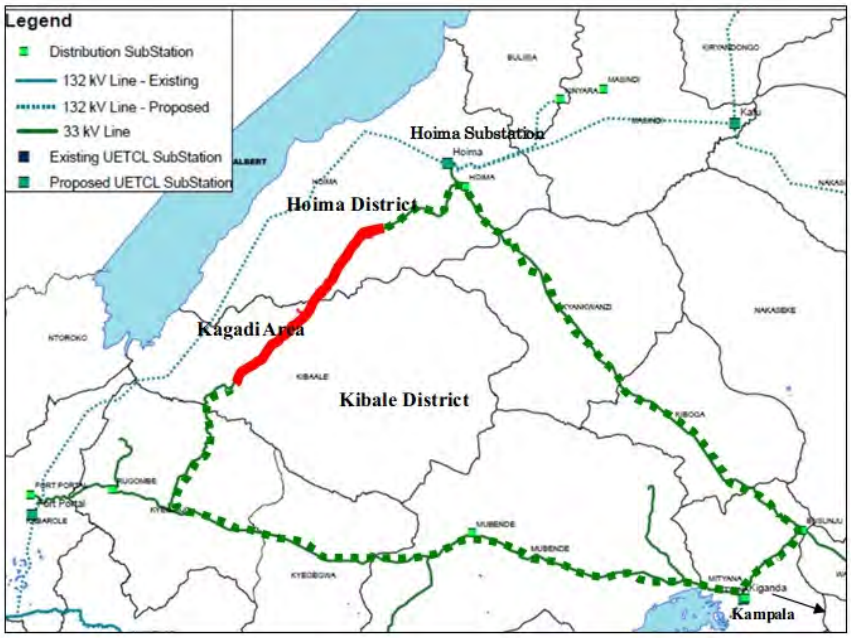

Figure 2: The 33kV System in Western Uganda (Existing and New Lines)
(Green dotted line: existing 33kV distribution line,
Red bold line: 33kV distribution line installed by this project)

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 line[18]. 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 areas[19], whereas there were no specific comments or answers confirming the other anticipated impacts through the beneficiary survey and interviews.

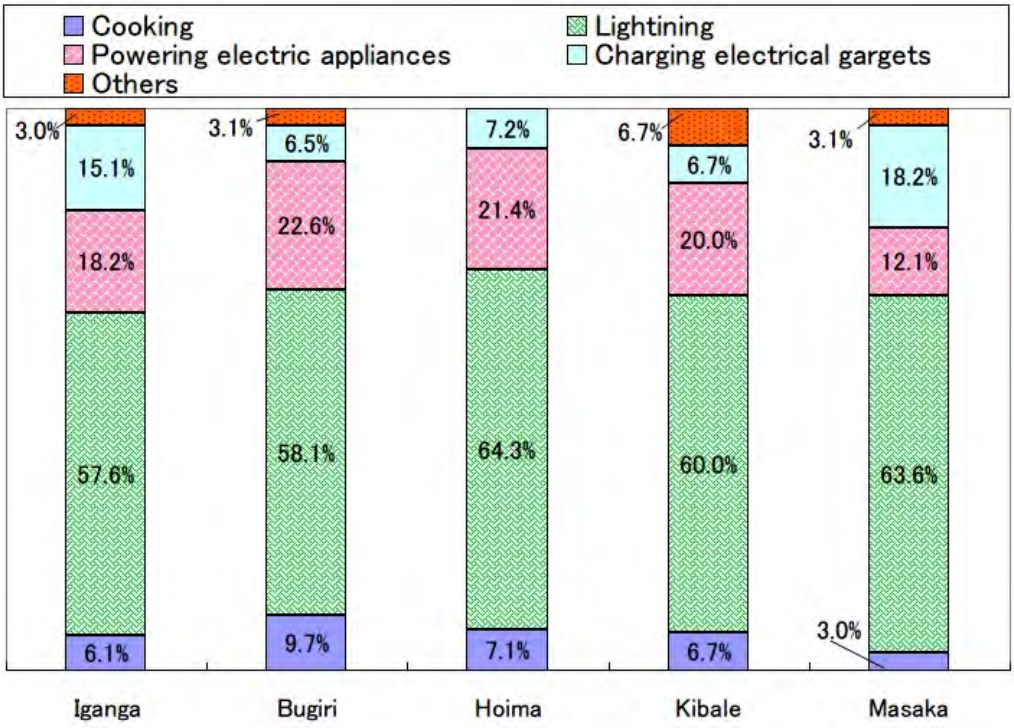

Figure 3: What do you use electricity for?

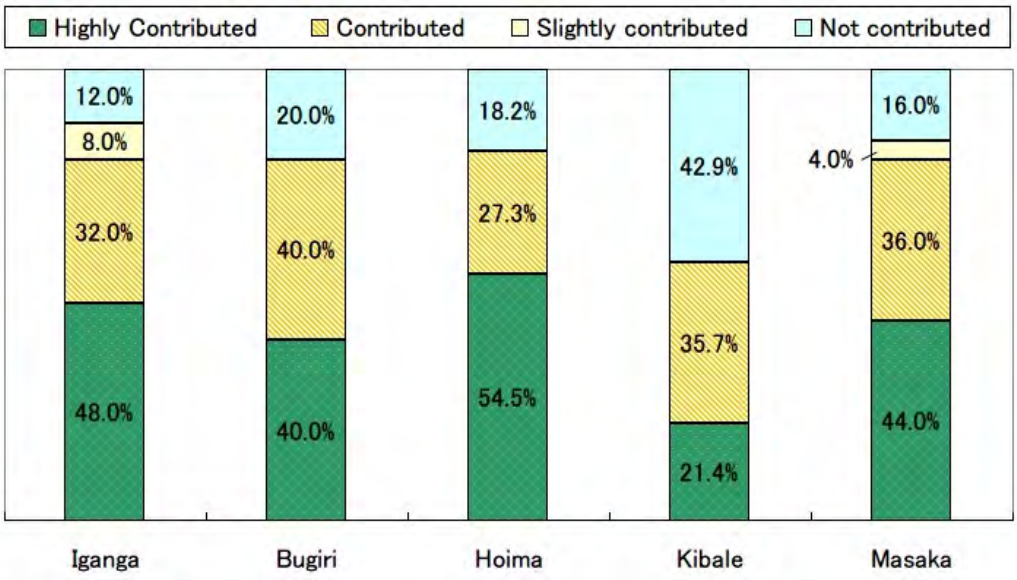

Figure 4: Did this project contribute to the reduction in time spent on household chores?

[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."

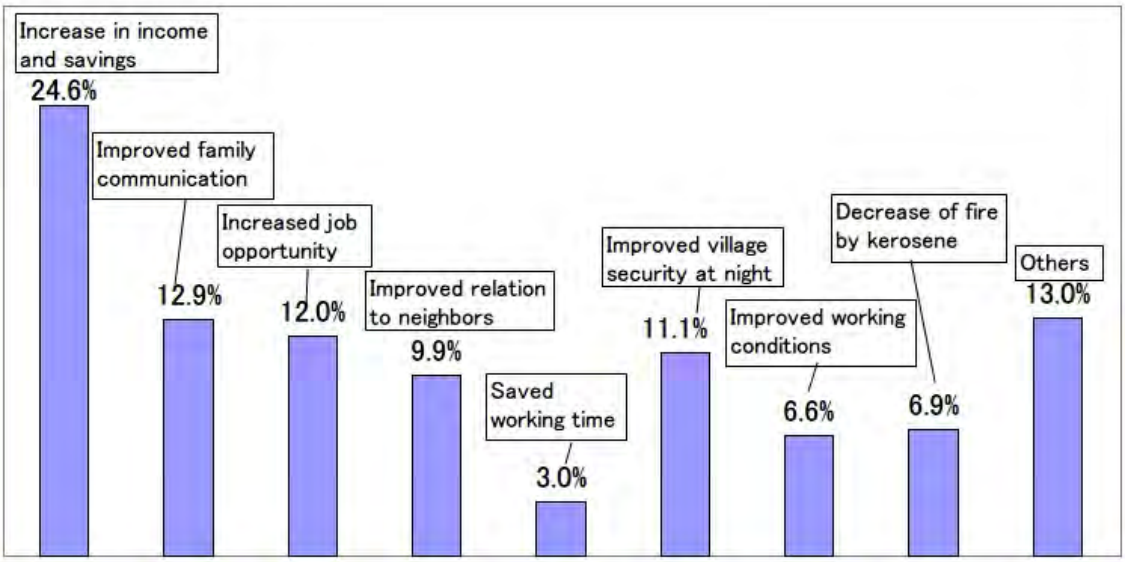

Figure 5: What changed has the project made in terms of living environment?

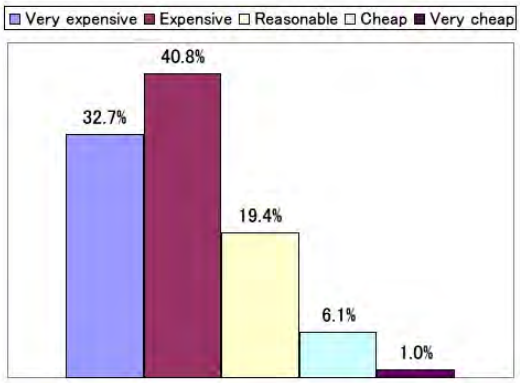

Figure 6: What do you think of the connection fees?

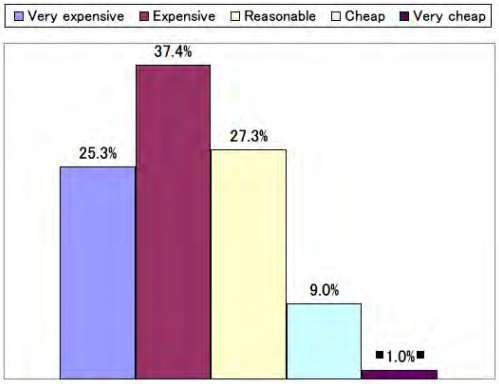

Figure 7: What do you think of the monthly electricity charge?

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 networks[22]. 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)
【Japanese Contribution】 (The 1st phase of construction: Kagadi / Munteme area in Hoima and Kibale Districts, Western Region) ■ Equipment & Materials Procurement and Installation Plan 1) 33 kV distribution line Existing 33kV distribution line from Kagadi connection point to Munteme connection point: total length of approx. 65km 2) 33 kV/415-240V distribution transformers (5 units of 50 kVA, 3 units of 100 kVA, and 7 units of 200 kVA) 3) One Set of Metering unit ■ Equipment & Materials Procurement Plan Spare parts & maintenance tools for 33 kV distribution line (The 1st phase of construction: Bukakata Area in Masaka District, Central Region) ■ Equipment & Materials Procurement and Installation Plan 1) 33 kV distribution line Connection point of existing 33kV distribution line to Bukakata village: total length of approx. 53 km 2) 33 kV/415-240V distribution transformer (5 units of 50 kVA, 2 units of 100 kVA, and 4 units of 200 kVA) 3) One Set of Metering unit	【Japanese Contribution】 Almost all the outputs were implemented as planned both for the first and second construction phases. 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.

■ Equipment & Materials Procurement Plan 1) Spare parts & maintenance tools for 33 kV distribution line 2) Load Break Switch: 1 unit (The 2nd phase of construction: Nabitende / Itanda Area in Iganga District, Eastern Region) ■ Equipment & Materials Procurement and Installation Plan 1) 33 kV distribution line Connection point of existing 33kV distribution line to Nawangaiza village: total length of approx. 29 km 2) 33 kV/415-240V distribution transformers (19 units of 100 kVA, 1 unit of 200 kVA) 3) Replacement of 33kV switchgears at Iganga Substation, and Installation of 6 units of 33 kV switchgears 4) One Set of Metering unit ■ Equipment & Materials Procurement Plan Spare parts and maintenance tools for 33 kV distribution line and switchgears (The 2nd phase of construction: Bugeso / Iwemba Area in Bugiri District, Eastern Region) ■ Equipment & Materials Procurement and Installation Plan 1) 33 kV distribution line Connection point of existing 33kV distribution line to Iwemba village: total length of approx. 21 km 2) 33 kV/415-240V distribution transformers (10 units of 100 kVA, 1 unit of 200kVA) ■ Equipment & Materials Procurement Plan Spare parts & maintenance tools for 33 kV distribution line 【Ugandan Contribution】 (The 1st phase of construction: Kagadi / Munteme area in Hoima and Kibale Districts, Western Region, Bukakata Area in Masaka District, Central Region) 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 distribution line facilities 4) Procurement and installation of automatic voltage regulator (AVR) 5) Procurement and installation of equipment and materials for low voltage distribution lines	【Ugandan Contribution】 All outputs were implemented as planned except for the procurement of AVR (“4)” of the 1st phase of construction)

6) Procurement and installation of consumer kWh meters (The 2nd phase of construction: Nabitende / Itanda Area in Iganga District, Eastern Region and Bugeso / Iwemba Area in Bugiri District, Eastern Region) 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	

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, AVR[23] 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 project[24]. 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 tasks[25].

Regarding the relationship between REA and the operators, in the case of Umeme Uganda Ltd., the company has a long-term service agreement with UEDCL[26]. (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 work[27]. 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, MEMD[28].

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 Ferdsult 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 Ferdsult 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.

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Republic of Sierra Leone

Ex-Post Evaluation of Japanese Grant Aid Project
The Project for Urgent Improvement of Electric Power Supply System in Freetown

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

0. Summary

With an aim to stabilize power supply in Freetown, which was destroyed by the civil war, this project procured and installed electric power generating units while constructing a building for the power station, a substation and distribution lines. Both at the times of before project commencement and the ex-post evaluation, this project is consistent with the policy stipulated in the Second Poverty Reduction Strategy Paper (PRSP-II), which recognizes the power sector as a priority, and with the development needs, such as increasing power generating facilities and power supply; therefore, relevance of this project is high. Although the total power demand still exceeds the supply capacity in Freetown and the outskirts after the project implementation, this project is contributing to the improvement of the power supply system through the procurement and installation of two power generating units at the Kingtom Power Station. On the other hand, the number of electrified households in Regent, one of the target areas in the suburb, is smaller than what was planned because a power feeder panel, which was supposed to be installed by a World Bank project, is not yet in place. Effectiveness and impacts of the project are evaluated to be fair in view of its contribution toward the entre power supply system and the stabilizing operation of the power generating units at the Kingston Power Station. The project period was as planned, and the project cost was within the plan. Thus efficiency is high. No major problems are observed in the institutional aspects of the operation and maintenance carried out by the Executing Agency. On the other hand, sustainability of the project is fair because the Agency has been operating in the red financially, which needs improvement.

In light of the above, this project is evaluated to be satisfactory.

1. Project Description

Project Location


Power Generating Unit Procured by the Project
(Kingtom Power Station)

1.1 Background

In the Republic of Sierra Leone (herein after referred to as "Sierra Leone"), the civil war from 1998 to 2002 devastated the country both economically and socially, which also affected the power sector severely. At that time the Kingtom Power Station was the only power plant supplying electric power in Freetown. However, the facilities were already old, and it experienced frequent failures because maintenance was not properly carried out during the civil war, limiting its power generating capacity. In addition, facilities and equipment of distribution networks and substations in the city also had problems. Thus the power supply capacity was not necessarily sufficient. As a result, residents were not able to receive sufficient power supply[1], downgrading the administrative and public service level. Although well-to-do families were able to generate their own electricity using diesel generators, families who could not afford in-house power generation were forced to live without electricity most of the time. While a majority of commercial industrial facilities also relied on in-house power generation, an increasing number of factories closed down because global oil prices rose and increased production costs, including the cost of purchasing fuel for in-house power generators; it had a major impact on the country's economy and employment. Due to such circumstances, there was an urgent need to reinforce power generating facilities and to rehabilitate power distribution networks.

[1] For example, 77.1% of the residents in Western Area did not receive sufficient electricity in 2008.

1.2 Project Outline

The objective of this project is to stabilize an electricity supply by procuring and installing power generating units (5MW x 2 units) and by constructing a powerhouse, a substation and 11 kV and 33 kV power distribution lines in Freetown, which was devastated by the civil war.

Grant Limit / Actual Grant Amount	【Grant Limit】2,240 million yen in total (Phase-1: 570 million yen, Phase-2: 1,652 million yen, Phase-2 detailed design: 18 million yen[2]) 【Actual Grant Amount】2,232 million yen in total (Phase-1: 568 million yen, Phase-2: 1,647 million yen, Phase-2 detailed design: 17 million yen)
Exchange of Notes Date (/Grant Agreement Date)	Phase-1: August 2007 Phase-2: May 2008 Phase-2 detailed design: January 2008
Executing Agency	National Power Authority (NPA)
Project Completion Date	March 2010 (Phase-1: March 2009, Phase-2: March 2010)
Main Contractor(s)	(Construction Management) ITOCHU Corporation & Dai Nippon Construction (JV) (Procurement of Machinery, Equipment and Materials) Phase-1: Added Value Corporation Phase-2: ITOCHU Corporation
Main Consultant(s)	Yachiyo Engineering Co., Ltd.
Basic Design	August 2006 – March 2007
Detailed Design	January 2008
Related Projects (if any)	【Technical Cooperation Project】

[2] According to JICA's document, this project was implemented in two phases: Freetown's distribution network was constructed in Phase-1 whereas the Kingtom Power Station was reinforced in Phase 2. A detailed design was a part of Phase-2.

[3] Technical training was held on operation and maintenance of diesel power generating facilities as well as power transmission, distribution and transformation facilities with the aim of improving the abilities of the Executing Agency's staff to operate and maintain power supply facilities. More specifically, the training included OJT, technology transfer through lectures and a third country training program.

[4] This project procured and installed one unit of 5 MW diesel power generator at the Kingtom Power Station.

[5] This project was implemented with the purpose of supplying electricity and water mainly in Freetown. Through this project the following was implemented: rehabilitation of the diesel power generator, auxiliaries and common facilities (fuel and cooling water) (targeting the entire unit); the procurement of fire safety equipment; the introduction of prepaid meters; the construction of customers' service centers; the refurbishment and upgrade of high voltage,

	"The Project for Capacity Development for Maintaining Power Supply Facilities[3]" (2011-14) 【Grant Aid】 "The Project for Improvement of Electricity Power Supply to Greater Freetown[4]" (1993) 【Other Projects by International Aid Agencies】 "Power and Water Project[5]," the World Bank (2004-09)

2. Outline of the Evaluation Study

2.1 External Evaluator

Kenichi Inazawa, Octavia Japan Co., Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: September 2012 – August 2013

Duration of the Field Study: February 23 – March 12, 2013, July 13 – 20, 2013

3. Results of the Evaluation (Overall Rating: B[6])

3.1 Relevance (Rating:③[7])

3.1.1 Relevance to the Development Plan of Sierra Leone

Before the project commencement, the government of Sierra Leone developed the "National Economy, Reform and Development Plan (2003-06)" aiming to reconstruct the economy after the civil war. In this plan, the "Reconstruction of Industrial Sector and Infrastructure" was listed as one of the priorities in order to reconstruct the country and stabilize its industry and economy. The government was aware that improvement of electric power infrastructures was essential for attracting private investments, reconstructing its economy and promoting employment.

At the time of the ex-post evaluation, four priority sectors are listed in the PRSP-II developed by the government of Sierra Leone in 2009: electricity, agriculture, roads and human development (education and health). Concerning electricity, it says that the country will "develop new power sources and promote private sector investment." In addition, the government enacted "The National Electricity Act" in September 2011, which states that

medium voltage and low voltage distribution facilities; the construction of 33 kV sub-transmission lines; and the rehabilitation of the 11 kV and low voltage networks.

[6] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[7] ③: High, ② Fair, ① Low

"improving electricity supply capacity is the most pressing issue for the national economy." Therefore, it can be said that the power sector continues to be viewed important at the time of the ex-post evaluation.

In view of the above, this project, which is designed to support the power sector in Sierra Leone, is consistent with the policy, such as the national and sectoral plans both at the time of before project commencement and at the time of the ex-post evaluation.

3.1.2 Relevance to the Development Needs of Sierra Leone

Before project commencement (February 2007), while peak demand was 45 MW in Freetown and the outskirts, a total (rated) power generation plant capacity of the Kingtom Power Station, the only power generating source at that time, was 39.2 MW (seven power generating units in total). However, because only one power generating unit (rated output of 6 MW) was operational at that time, its power supplying capability was low. In view of such situation, the government of Sierra Leone prepared a plan to develop 100 MW of new power sources over a ten-year period starting from 2005. As a part of this plan, the government requested for Japan's Grand Aid to construct new diesel power generators with a total output of 10 MW (2 units) and to rehabilitate power distribution networks with the aim of reducing distribution losses.

At the time of the ex-post evaluation, power demand of Freetown and the outskirts is increasing because of the high economic growth[8] after the end of the civil war. In terms of the entire power supply system, on the other hand, the Kingtom Power Station rehabilitated by this project and the Blackhall Road Power Station[9] developed with the financial assistance of the Arab Bank for Economic Development in Africa (BADEA) are designed to complement the Bumbuna Hydroelectric Power Station[10]. (The Kingtom Power Station and the Blackhall Road Power Station would increase their electricity generation in the dry season when the output of the Bumbuna Hydroelectric Power Station becomes low with a view to supplying electricity to Freetown and the outskirts. On the other hand, the Kingtom Power Station and Blackhall Road Power Station would go standby (planned halt) in the rainy season.) According to the National Power Authority (NPA), the Executing Agency of the Project, the total power demand is approximately 50MW at the time of the ex-post evaluation, whereas the total power generation (rated) output is approximately 32MW (10MW rated output by the Kingtom Power Station,

[8] GDP has been growing at an average 7% in recent years.
[9] It was developed with the assistance of BADEA and began operating in April 2011 (rated output of approximately 16MW: two power generating units).
[10] In addition to the assistance from ESKOM (a South African electricity public utility) and BADEA, it was also assisted by the World Bank and others. It began operating in November 2009.

6MW by the Bumbuna Hydroelectric Power Station, and 16MW by the Blackhall Road Power Station). Because power demand continues to exceed supply as it was the case before project commencement, it can be judged that there is a continued need to stabilize power supply and develop power sources. Concerning the Bumbuna Hydroelectric Power Station, it was expected to generate 50MW (two power generation units) in the rainy season (May-November) and 18MW (two power generation units) in the dry season (December-April). However, a trouble occurred as soon as it was commissioned; one power generating unit failed in November 2012. The remaining unit is barely operating, and the output is as low as 6MW as of March 2013[11]. In view of the situations, there is an urgent need to rehabilitate the Bumbuna Hydroelectric Power Station and to improve the entire power supply system with a view to stabilizing Freetown's power supply. Thus it can be said that there continues to be a high demand for this project.

In addition, although distribution networks in Freetown and the outskirts have been improved through this project, there still remain old distribution networks. Also, there is a distribution loss problem due to pilferage[12], which needs to be addressed urgently.

In view of the above, power shortage continues to be a problem in Freetown and the outskirts at the time of the ex-post evaluation, and there continues to be a need to respond to the increasing power demand. Therefore, it is judged that this project is consistent with the development needs both at the times of before project implementation and the ex-post evaluation.

3.1.3 Relevance to Japan's ODA Policy

According to the assistance policy of Japan to Sierra Leone (ODA policy outlined by the Ministry of Foreign Affairs in 2006), Japan was providing assistance by recognizing the following as priorities: (1) consolidation of peace and nation building after the civil war, which is a prerequisite for the government's efforts toward poverty reduction; and (2) social development and revitalization of productive activities through participation of local residents while promoting administrative capacity restoration[13].

This project follows the Project for Improvement of Electricity Power Supply to Greater Freetown which was implemented with Japan's Grant Aid in 1993. Through the development of electric supply facilities, this project is designed to contribute to the consolidation of peace and

[11] According to NPA, they will outsource the technical inspection to a foreign company to identify the cause by the end of 2013, based on which they hope to fix the problem and resume operation.
[12] The electric power distribution loss is high at 40-50% as of 2010, as per quantitative data provided in the Effectiveness section.
[13] The assistance to power sector is also specified in the Country Assistance Policies issued in December 2012.

economic reconstruction which is relevant to (1) above. Thus it can be said that this project is consistent with the development policy of Japan.

In view of the above, this project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policy; therefore its relevance is high.

3.2 Effectiveness[14] (Rating:②)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

Table 1 shows the targets set before project implementation and actual data after project completion in reference to the operation and effect indicators concerning power generating facilities and distribution network. Because power supply was concentrated in the central Freetown and that electricity was not available in some parts of the suburbs before project implementation, this project also intended to electrify 3,200 households in an area near the Regent Substation, a suburb of Freetown, by procuring power distribution equipment and materials.

Table 1: Data Concerning Direct Effects of the Project (Actual before project implementation, target after project completion, and actual after project completion)

	Actual (2007)	Target After Completion (2010)	Actual After Completion (2012)
【Improvement of Kingtom Power Station】			
a) Power generating capacity (rated output)	6.0MW	16.0MW (out of which 10MW by this project)	10.0MW
b) Reduction in the number of power blackouts attributed to the improvement in the power generating system (times/day)	1	0.5	0.5 (1 time per day after November 2012)
【Rehabilitation of 33/11 kV Distribution System in Freetown】			
c) Reduction of power distribution loss in Freetown and the outskirts	40% or lower	Approximately 30%	40% or little less
d) Electrification of non-electrified communities in Regent Area	None	3,200 households	187 households

Source: JICA document and NPA's response

[14] Sub-rating for Effectiveness is to be put with consideration of Impact.

a) Improving Power Generating Capacity (Rated Output) of the Kingtom Power Station and the Project Effects in Terms of the Power Station's Role in Entire Power Supply System

As stated earlier, only one power generating unit (rated output of 6.0 MW) was operational at the Kingtom Power Station before project commencement. The plan was that the power generating capacity would be increased to 16.0 MW after the completion of this project by procuring and installing two new power generating units (with the output of 10 MW in total: 5 MW each x 2 units). According to NPA, however, the existing power generating unit (6.0 MW), broke down and was decommissioned in 2008 because it was already becoming old before project commencement[15]. As a result, the two units (10 MW in total as mentioned earlier) that have been procured and installed by this project are the only ones operational at the time of the ex-post evaluation (see Table 1). Therefore, despite the fact that the power generating units were procured and installed by this project as planned, generating and supplying power as per the expectation without problems, the Kingtom Power Station has not been able to achieve a total output of 16.0 MW.

On the other hand, as stated earlier, the Kingtom Power Station is one of the power generating facilities complementarily supplying electricity to Freetown. The changes in generated energy of the Bumbuna Hydroelectric Power Station, the Kingtom Power Station and the Blackhall Road Power Station are shown in Figure 1 (2011) and Figure 2 (2012) below. These figures show that when the Bumbuna Hydroelectric Power Station operates in the rainy season (May-November), the Kingtom and Blackhall Road Power Stations reduce their outputs, whereas their outputs are relatively high in the dry season (December-April). With regard to Figure 1, no energy was generated from January to March 2011 in the Blackhall Road Power Station because it began operating in April 2011. With respect to Figure 2, the power generating unit of the Bumbuna Hydroelectric Power Station had a problem in November 2012 as mentioned above, which led to low rate of utilization and significant reduction in the generated energy from this month onward. It can be observed that this in turn increased the rate of utilization of the Kingtom Power Station. In other words, it is judged that the Kingtom Power Station is properly functioning as one of the complementary power generating facilities, supporting NPA's total power generation.

[15] Although it was procured in 1995, it broke down before its estimated service life most probably because maintenance was not sufficient during the civil war in the late 1990s.

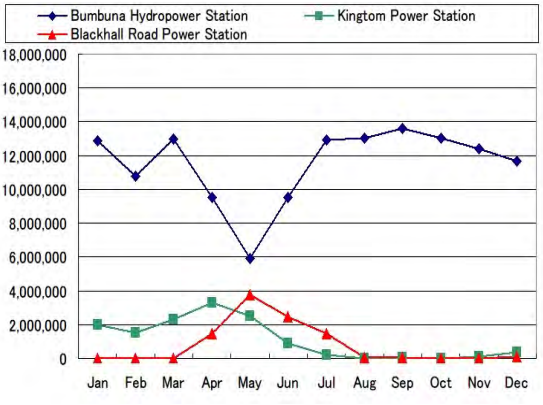

Figure 1: Generated Power (kWh) at Three Power Stations (2011)

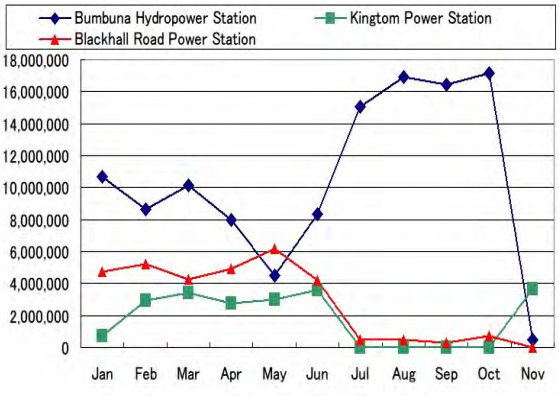

Figure 2: Generated Power (kWh) at Three Power Stations (2012)

With reference to the contribution of this project to the improvement in NPA's power generating operation, data is shown in Table 2 on the operation indicators concerning the overall operation of NPA's power generating facilities since the project commencement.

Table 2: Overview of NPA's Operation

Indicator	2007	2008	2009	2010	2011	2012
1. Electric Power Production (MWh)	30,681	138,538	132,855	175,045	182,863	189,894
2. Auxiliary Power Production (MWh)	2,250	321	508	833	N/A	N/A
3. Auxiliary Power Ratio (%)	7.3	0.23	0.38	0.48	N/A	N/A
4. Net Electric Power Production (MWh)	28,431	138,217	132,348	174,212	160,963	167,994
5. Sales Power Production (MWh)	17,341	76,395	67,540	82,339	N/A	N/A
6. Transmission and Distribution Losses (MWh)	11,090	61,822	64,808	91,873	N/A	N/A
7. Transmission and Distribution Loss Ratio (%)	39.0	44.7	49.0	52.7	N/A	Slightly less than 40
8. Electricity Tariff Collection Rate (%)	N/A	N/A	55 or lower	Around 55	N/A	N/A

Source: NPA

The most significant data concerning electric power production will be analyzed below with a view to reviewing the operation status.

The following can be said about the electric power production: (1) Before project

commencement in 2007, only one power generating unit was operational at the Kingtom Power Station, and the power supply to Freetown and the outskirts was at a critical level; (2) In the hope of improving this situation, NPA purchased electricity from a domestic Independent Power Producer (IPP) to supply electricity in the said areas, as a result of which 138,538 MWh of energy was secured[16] in 2008; (3) NPA continued to rely on IPP in 2009[17] in securing 132,855 MWh of energy, which is almost the same level as 2008; (4) In 2010, the two power generating units supported by this project began operating at the Kingtom Power Station (March 2010), and the electric power production increased from the previous year. The increase was also thanks to the Bumbuna Hydroelectric Power Station, which was commissioned at the end of 2009. On the other hand, NPA stopped purchasing electricity from IPP; (5) In 2011 the trend continued. The Blackhall Road Power Station began its operation (April 2011), and NPA secured 182,863 MWh of electric power; and (6) In 2012 the situation continued to be similar to the previous year, and the electric power production was stable until October 2012 although it has been decreasing since November 2012[18].

In view of the above, it is observed that this project is making a certain contribution to increasing the total electric power production of NPA. On the other hand, it is apparent that NPA needs to continue striving to stabilize the electric power supply system in Freetown.

b) Reduction in the Number of Power Blackouts Attributed to the Improvement in the Power Generating System

As shown in Table 1, the number of power blackouts was expected to decrease to 0.5 times per day in Freetown and the outskirts after the completion of the project. As planned, the target was achieved one and a half years after the completion. However, as discussed earlier, the power generating unit of the Bumbuna Hydroelectric Power Station failed, and it has become difficult to meet the power demand of Freetown and the outskirts given the generation capacity of the Kingtom and Blackhall Road Power Stations. Influenced by such external factor, the number of blackouts on the average has increased to once a day since then. At the moment, whether or not the number of blackouts goes down again is subject to the restoration of the power generating unit at the Bumbuna Hydroelectric Power Station. As stated earlier, the technical inspection is planned to be carried out by the end of 2013, which will identify what

[16] NPA purchased electricity from the IPP by signing a one-year contract. The purchasing cost was borne by the World Bank.
[17] NPA purchased electricity by extending the (one-year) contract from the previous year by one year.
[18] As mentioned earlier, it is because one power generating unit is broken at the Bumbuna Hydroelectric Power Station while the other unit is operating at a low output level.

has caused the failure of the power generating unit.

c) Reduction of Power Distribution Loss in Freetown and the Outskirts

With regard to the rate of power distribution loss ratio in Table 1, while the target was around 30% after project completion, the current ratio is slightly less than 40%, which is higher than planned. One reason is that electricity distribution is not efficient because many old distribution lines still exist in the city center. High rates of pilferage also explain why the distribution loss is high. As shown in Table 2, NPA's transmission and distribution loss ratios are 55% or below in 2009, around 55% in 2010, and slightly less than 40% in 2012. Since 2010 NPA has been implementing a program against electricity pilferage, called "MACPI," with the support of the central government, the police and the national army. Although the transmission and distribution loss ratio started to decline owning to the patrolling and tightened security in the areas with reported cases of pilferage, the ratio remains high. Thus NPA needs to strengthen its efforts to control electricity pilferage in order to stabilize power supply.

d) Electrification of Non-Electrified Communities in Regent Area

With respect to the electrification of non-electrified communities in Regent Area, although 3,200 households were expected to be electrified after the completion of the project, the actual number of electrified households is 187 households in the target area as of March 2013 as shown in Table 1. Before project commencement, it was envisaged that a 33 kV distribution line between the Freetown Substation and the Wilberforce Substation would be constructed by the World Bank's "Power and Water Project," whereas a 33 KV distribution line between the Wilberforce Substation and the Regent Substation would be constructed by this project, which would enable the distribution of the transmitted electricity from the Bumbuna Hydroelectric Power Station to Regent Area (see Figure 6). However, a 33 kV power feeder panel[19], which was supposed to be procured and installed at the Wilberforce Substation by the World Bank, is not yet in place while the 33 kV distribution line is completed. The absence of electricity supply through the high-voltage 33 kV distribution line in Regent Area is responsible for the limited number of electrified households[20]. Meanwhile, the World Bank approved a new project,

[19] The World Bank initially planned to procure and install a power feeder panel as a part of the Power and Water Project. Although there was an agreement between the World Bank and NPA, it was not executed. JICA communicated in writing several times up until the time of the ex-post evaluation, requesting for the procurement and installation.

[20] It is said that the procurement and installation could not be performed within the contract period set by the project because mainly the contractor appointed by the World Bank and NPA had some communication problem, which prolonged the procedure and coordination between the two parties. Currently the number of electrified households is

"Energy Access Project[21]" for Sierra Leone in June 2013. It is planned that through this new project, a 33 kV power feeder panel which was not fulfilled by the Power and Water Project will be procured and installed. The number of electrified households in Regent Area is expected to increase when the power feeder panel becomes operational[22].

Figure 3: Regent Area
(developing as a residential area)

Figure 4: Distribution Line Between Wilberforce and Regent (Left: 11 kV Distribution Line, Right: 33 kV Distribution Line)

not increasing because the electricity is supplied from the Kingtom Power Station only through the low-voltage 11 kV distribution line.

[21] The budget is approximately 1.6 billion yen. It aims to reduce the electric power distribution losses in Freetown and the Western region while improving NPA's finance. In addition, the International Development Association (IDA) of the World Bank group is planning to implement budget support with the aim of promoting the reform of the power sector. (The budget is approximately 3.5 billion yen.) By these two projects, high distribution loss ratio is expected to reduce, and NPA's finance is expected to improve.

[22] Many residents in Regent Area are requesting to join the electricity service at the time of the ex-post evaluation according to NPA. While residents are required to pay connection charges (roughly USD 100-130) in order to join the electricity service, their capacity to pay is not of concern because many households are relatively rich in this area according to NPA.

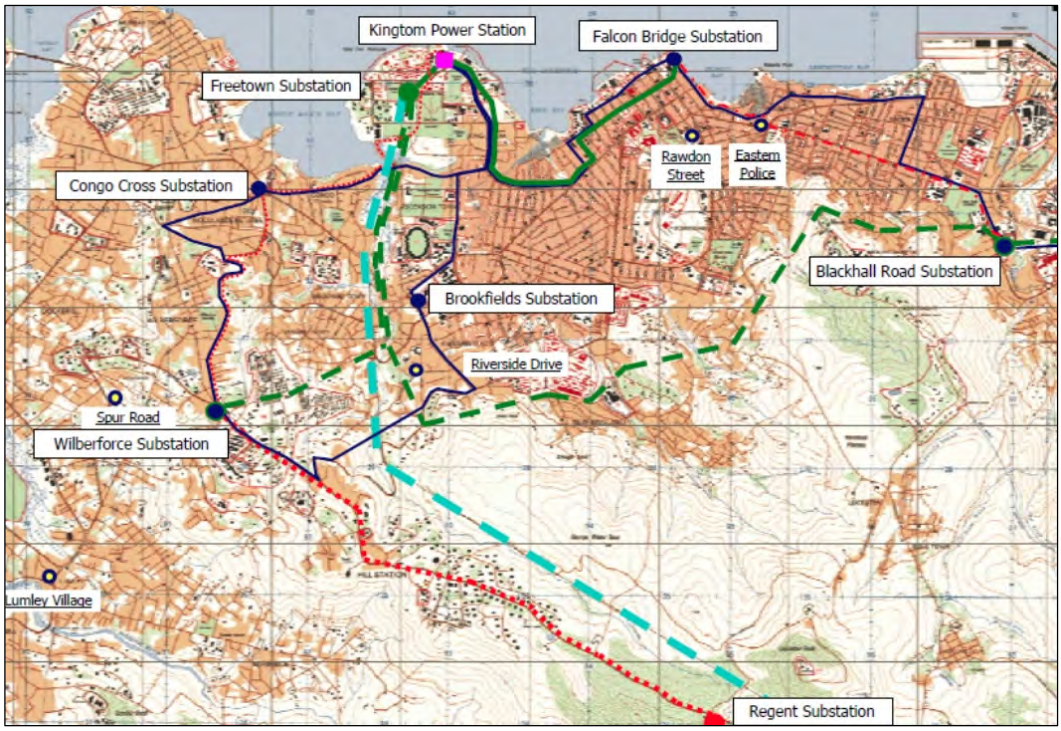

Figure 5: Power Stations, Substations and Distribution Networks in Freetown and the Outskirts (Locations of Project Sites[23])

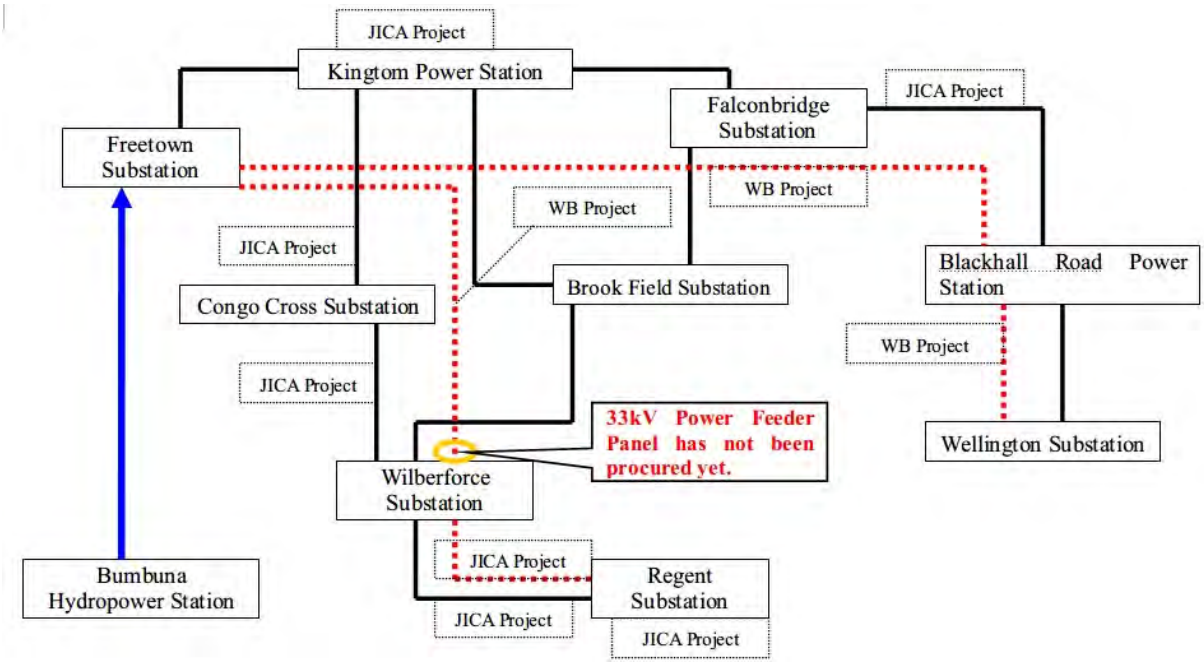

Figure 6: Power Stations, Substations and Distribution Networks in Freetown and the Outskirts (Schematic[24]) (Black lines represent 11 kV distribution lines, red dotted lines represent 33 kV distribution lines, and a blue heavy line represents a 161 kV transmission line)

[23] Source: JICA's Basic Design Study Report
[24] It was created based on the document prepared by the main consultant of this project.

3.2.2 Qualitative Effects (Stabilization of the Power Generating Facility Operation and the Improvement in the Power Supply Capacity)

Before project commencement it was envisaged that staff members' abilities to maintain power generating facilities would improve at the Kingtom Power Station through this project, which would improve the facility operation and thereby lead to less failures. The two power generating units procured and installed by this project are functioning properly at the time of the ex-post evaluation (as of March 2013). In addition, it has been confirmed that power station staff are making use of the instructions given by the generator manufacturer. Even after the completion of the project they occasionally contact the manufacturer by email for advice on the proper operation of the units. In view of the above observations during the field visits, it is believed that, with continuous and proper maintenance, less troubles and failures are foreseen at the power station, promoting further stabilization of the operation and improvement in the power supply capacity. According to the interviews with some staff members at the power station, they also commented, "If we take practical training on maintenance[25] continuously and carry out our day-to-day activities carefully, it is possible to prevent troubles and failures of the power generating units procured and installed by this project while improving the durability of the facilities."

3.3 Impact

3.3.1 Intended Impacts

3.3.1.1 Contribution to Living Environment and Economic Vitalization through Stable Supply of Electricity

As a part of this ex-post evaluation study, an interview-based beneficiary survey was carried out targeting residents in Freetown and Regent Area[26]. Given the nature of random sampling, it was presupposed that the survey's interviewees would include households receiving electricity from the Bumbuna Hydroelectric Power Station and Blackhall Road Power Station as well as those who largely rely on in-house power generators. Additionally, the survey questions were designed to assess the impacts of electricity connection on living environment. Therefore, it should be noted that the results of this survey do not necessarily represent the direct impacts of

[25] Currently the technical and maintenance capacities of staff members of the power station are being developed further through JICA's technical corporate project, "The Project for Capacity Development for Maintaining Power Supply Facilities."

[26] Sample size was 100-110. 70-80% of the total samples were randomly selected from Freetown whereas 20-30% from Regent Area although it also depends on the questions.

this project (e.g., whether or not electrification is sufficient).

First of all, the main purposes of using electricity are shown in Figure 7. Many respondents listed indoor lighting, electric appliances and charging mobile phones. When the respondents were asked which electric appliances they actually use at home, many people listed TV, mobile phones and refrigerators as seen in Figure 8. Figure 9 shows impacts of electrification. Answers are various: it has improved studying environment; it has facilitated conversation among family members; it has improved relations with neighbors; and it has improved nighttime security. The above results indicate the impact of electrification on living environment for people and communities. Figure 10 shows monthly electricity charges; around 60% of respondents pay 51,000 Sierra Leonean Leone per month (roughly 1,200 Japanese yen). Additionally, as seen in Figure 11, while most people said that electricity charges are “neither cheap nor expensive,” relatively many people also answered “expensive” or “very expensive.” As a follow up question, they were asked if they plan on continuing using electricity service for the next 6 to 12 months. All respondents said “they would continue using electricity.” In view of the above, it can be observed that people feel the benefits and reliability of electricity service as well as the impacts of electrification. Thus a possibility cannot be denied that electricity service subscription will be promoted if sufficient power is secured.

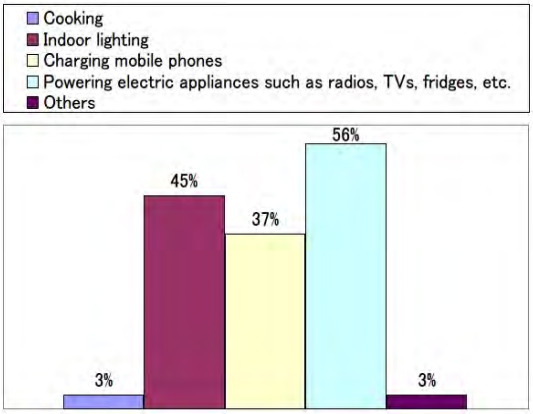

Figure 7: What is the main use of electricity?
(Multiple answers allowed)

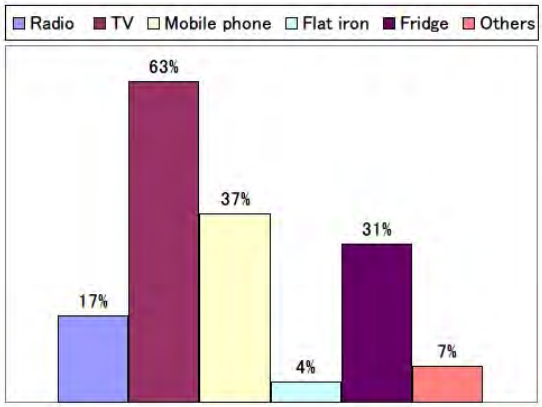

Figure 8: What electric appliance do you mainly use at home?
(Multiple answers allowed)

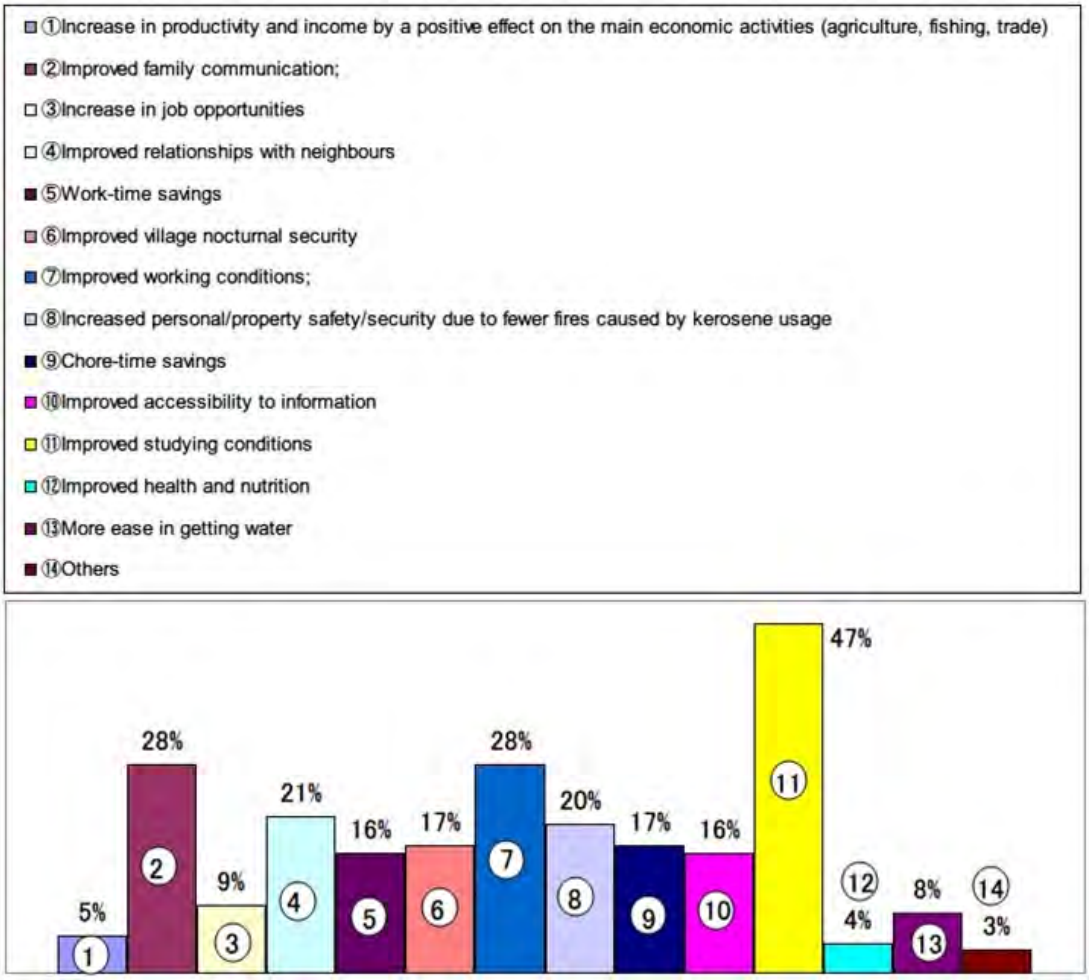

Figure 9: What is the impact of electrification?
(Multiple answers allowed)

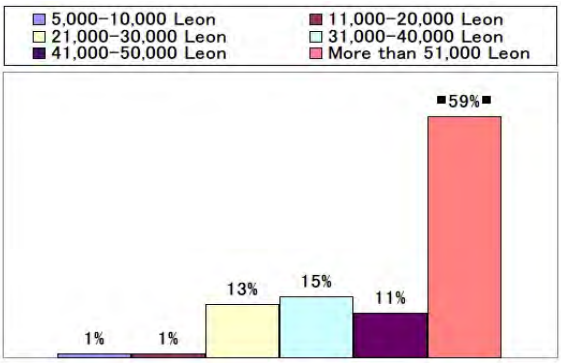

Figure 10: How much do you pay for the monthly electricity bill?

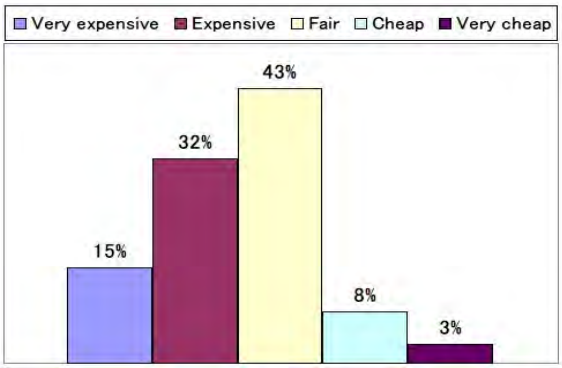

Figure 11: What do you think about the monthly electricity charge?

3.3.1.2 Contribution to Economic Reconstruction

Agriculture and mining are the main industries in Sierra Leon[27]. Before the project commencement, agricultural and mining production areas were devastated, and the economy was in a state of collapse due to the civil war. During the project implementation, however, the gross domestic product (real GDP) grew by an average of 5.2%[28] per year. The economic growth is also influenced by factors other than this project, and it is difficult to prove the cause-effect relationship between this project and the economic impacts. However, this project plays not too small a role in supporting the economy and economic development as it supplies electricity in Freetown and the outskirts that are the hub of the national economy. To supplement above information, real estate and hotel business managers (who are commercial-scale utility customers) were interviewed during the field study. They commented on this project and its economic impacts as the following: "Electricity in Freetown is still in a serious situation. On the other hand, we believe that an increase in power supply is inextricably linked to business growth and that supporting the development of power generating facilities is quite meaningful. Without such support, we would have to use emergency generators more frequently, which would require more fuel and would force us to bear even higher costs. On top of that, insufficient supply of electricity could lead to social turmoil, which would worsen security situations."

3.3.2 Other Impacts

3.3.2.1 Impacts on the Natural Environment

In Sierra Leone the National Environmental Action Plan was established in 1993 and the Environmental Protection Act was enacted in 2000 in accordance with the action plan. Under this act, a project executing body, such as NPA, is obligated to conduct an environmental impact assessment (EIA) when implementing a project to construct power plants or power transmission lines. Concerning this project, NPA carried out the EIA before the end of April 2007, which was approved in February 2008 according to NPA.

With regard to the environmental impacts of the Kingtom Power Station, the two power generating units were procured and installed by reference to the standards of Japan[29] because

[27] Main export products are cacao and coffee beans in the case of agriculture and diamonds, gold and bauxite in the case of mining. These are the main sources of foreign currency.
[28] Source: World Development Indicators, World Bank, 2012
[29] NOx emission should be 950 ppm or lower; SOx emission should be 250 ppm or lower; oil emission should be 50 ppm or lower; soot dust emission should be 100mg/Nm3 or lower; noise should be 110 dB or lower (when the power generator is operating), vibration should be 65 dB or lower at the boundary of the premises (when the power generator is operating).

environmental standards for power generating facilities had not been established in Sierra Leone. In addition, as waste oil disposal facilities were procured and installed by this project, no environmental pollution has been caused by oil spill. It has been confirmed through the interviews with staff of the Kingtom Power Station that currently there is no environmental issues (e.g., air pollution, noise, odor, etc.) inside the premise of the power station.

It is the Technical Service Department[30] of NPA that manages environmental and safety issues. Although they do not have periodic environmental monitoring, a system is in place to address issues in a timely manner whenever the need arises.

3.3.2.2 Land Acquisition and Resettlement

No resettlement was required for this project. On the other hand, land needed to be acquired for the construction of the Regent Substation (approximately 670 m^2 was acquired). The Ministry of Lands, Housing, Country Planning and the Environment of Sierra Leone negotiated with a landowner (1 person). Instead of monetary compensation, alternative land was provided for the acquired land based upon the mutual agreement between the ministry and the landowner. Although the ministry did not disclose detailed information about the landowner or the alternative land[31], they said that the provided land was of the same or higher value in the same area (inside Regent). As for the land acquisition process, it went smoothly because both parties agreed upon the terms before the commencement of this project. Thus it can be said that there was no problem with the land acquisition.

Figure 12: The Exterior of the Kingtom Power Station

Figure 13: Power Distribution Unit Control Room (Inside the Kingtom Power Station)

[30] This department is responsible for managing safety of staff handling power generation and distribution facilities and environmental issues.

[31] Detail information could not be obtained presumably because of the personal information protection as only one person was subject to the relocation.

【Conclusion on Effectiveness and Impacts】

Through this project 10 MW power generating capacity was procured and installed at the Kingtom Power Station as per the initial plan. The Kingtom Power Station, which is one of the power supply facilities complimenting the Bumbuna Hydroelectric Power Station and the Blackhall Road Power Station, is fulfilling its function thereby contributing to a stable power supply in Freetown and the outskirts. On the other hand, with regard to the electrification in Regent Area, which was one of the planned outputs of this project, the number of electrified households is low because a 33 kV power feeder panel, which was supposed to be procured and installed at the Wilberforce Substation by the World Bank, is not yet in place.

In view of the above, this project has somewhat achieved its objectives, therefore its effectiveness is fair.

3.4 Efficiency (Rating: ③)

3.4.1 Project Outputs

Table 3 shows planned and actual outputs of this project.

Table 3: Planned and Actual Outputs of This Project

Planned Outputs (At Appraisal)	Actual Outputs (At Ex-Post Evaluation)
【Planned Inputs from the Japanese Side】 1) Extension of Power Station ①Procurement & installation of diesel engine generators (output capacity: 5 MW x 2 units) ②Construction of a powerhouse ③Procurement of spare parts and tools 2) Improvement of Power Distribution Network ①Construction of 33 kV Regent Substation ② Extension of 33 kV distribution lines (between the Wilberforce Substation and the Regent Substation) a) 33kV: approx. 3.2km of underground cable and approx. 1.3km of overhead line b) 33 kV power feeder panel in the Wilberforce Substation: one additional unit[32]	【Actual Inputs from the Japanese Side】 Implemented as planned

[32] While the feeder panel, which was supposed to be procured and installed by the World Bank (the 33 kV), was meant for receiving 33 kV electricity transmitted from the Freetown Substation shown in Figure 6, this feeder panel procured and installed by this project is meant for transmitting 33 kV power to the Regent Substation after receiving

③Construction of 11 kV power distribution lines a) Between Kingtom Power Station and Congo Cross Substation: totally 3.8km (approx. 3.3 km of overhead line & approx. 0.5 km of underground cable) and one set of 11 kV power feeder panel b) Between Congo Cross Substation and Wilberforce Substation: approx. 2.5 km ④Procurement of the following equipment and materials (installation was to be done by the Sierra Leonean side) a) Between Falcon Bridge Substation and Blackhall Road Substation: approx. 3.4 km (0.8 km of overhead line and 2.6 km of underground cable) b) Between Regent Substation and the following distribution substations: 1) Guma Water Reservoir: approx. 1.3km (500 kVA and 200 kVA transformers (one each) and 2 units of RMU[33]) 2) Radio transmitting station: appox. 1.6km (315 kVA and 200 kVA transformers (one each) and 2 units of RMU) 3) Wilberforce line: approx. 100m ⑤ Procurement of spare parts and tools	
【Planned Inputs from the Sierra Leonean Side】 【Extension of Kingtom Power Station】 (1) Construction of a powerhouse (one story, partially two stories) with total floor approx. 1,087 m^2 (including building utilities) (2) Construction of foundations for Diesel Engine Generator (DEG) & auxiliary equipment 【Power Distribution System】 (1) Installation of equipment and materials between Falcon Bridge Substation and Blackhall Road Substation: approx. 3.4 km (0.8 km of 11kV overhead line and 2.6 km of underground cable) (2) Installation of equipment and materials between Regent Substation and the following distribution substations: 1) Guma Water Reservoir: approx. 1.3km of 11 kV overhead line	【Actual Inputs from the Sierra Leonean Side】 Almost implemented as planned. With regard to "(4) under 【Power Distribution System】," maintenance tools were not procured in this project because they were donated by another project supported by BADEA and Saudi Fund For Development (SFD) to avoid duplication.

it with the panel supported by the World Bank. Thus it is different from the feeder panel discussed earlier in connection with the World Bank project.

[33] Operating switches for the substations

2) Radio transmitting station: appox. 1.6km of 11 kV overhead line 3) Wilberforce line: approx. 100m of 11 kV overhead line (3) Power distribution equipment & materials for the substations 1) 500 kVA and 200 kVA transformers (1 each) and 2 units of RMU 2) 315 kVA and 200 kVA transformers (1 each) and 2 units of RMU (4) Procurement of spare parts and tools for power distribution facilities (5) Procurement of operation & maintenance manuals for power distribution facilities and implementation of On-the Job Training (OJT)	

The outputs, which were to be contributed by the Japanese side and the Sierra Leonean side, have been achieved almost as planned. However, as discussed earlier, a 33 kV power feeder panel, which was supposed to be procured and installed at the Wilberforce Substation by the World Bank, is not in place at the time of the ex-post evaluation. As a result, no electricity is being supplied through the 33 kV distribution line between the Wilberforce Substation and the Regent Substation. When interviewed, the World Bank commented that they would install a 33 kV power feeder in their new project entitled, "Energy Access Project."

3.4.2 Project Inputs

3.4.2.1 Project Cost

The planned project cost was 2,259 million yen (out of which 2,240 million yen was the grant limit and approximately 19 million yen was to be borne by the Sierra Leonean side). In reality, the actual project cost approximately 2,249 million yen (out of which 2,232 million yen was borne by the Japanese side and approximately 17 million yen was borne by the Sierra Leonean side), which is almost as planned (99% of the plan).

3.4.2.2 Project Period

The project was planned to take 2 years and 8 months (32 months) from August 2007 to March 2010. In reality, the procurement and installation work by the Japanese side was carried out from August 2007 to March 2010 as planned, and the construction and other works by the Sierra Leonean side were conducted from February 2008 to March 2009[34] (100% of the plan).

[34] According to the interview with NPA concerning the delivery and installation of the power generators and equipment, it was confirmed that there was no procedural delay, including transportation.

The project cost was within the plan, and the project period was as planned; therefore, efficiency of the project is high.

3.5 Sustainability (Rating: ②)

3.5.1 Institutional Aspects of Operation and Maintenance

The Executing Agency of this project is NPA. Meanwhile the Ministry of Energy and Power (MEP)[35] supervises the Agency. NPA has seven departments (Management Planning, Technical Services, Personnel Management, Commercial, Financial, Information Technology and Legal) with a total of 770 employees at the time of the ex-post evaluation (as of March 2013). The Kingtom Power Station supported by this project is managed by the Technical Service Department which has 98 staff members. Similarly, the Transmission and Distribution Division (under the Technical Service Department) is responsible for the operation and maintenance of the procured and installed power distribution facilities and equipment. The division has 212 staff members who are stationed in primary substations in Freetown and the outskirts, including the Regent Substation. Before the commencement of the project (as of 31 August 2006), NPA had totally 593 employees, out of which 72 staff were at the Kingtom Power Station and 78 staff at the Transmission and Distribution Division. According to NPA's executives, "the staffing level is sufficient for the operation and maintenance of the facilities and equipment procured and installed by this project. We will continue our endeavor to secure adequate human resources and train employees so that we can expand the electric power supply services to areas other than Freetown in the near future." Considering that the number of staff engaged in the operation and maintenance has increased as compared to before the project commencement as well as the comment of NPA's management, it is thought that no major problems are observed in the institutional aspects of the operation and maintenance of this project.

3.5.2 Technical Aspects of Operation and Maintenance

After the completion of the project, 8 staff members of NPA participated in a 4-week training course in Ghana to learn about power distribution networks and to improve maintenance skills[36].

[35] MEP which supervises NPA is a governmental organization, which promotes energy related policies in Sierra Leone. NPA implements MEP's policies on the ground.

[36] At the time of the ex-post evaluation, JICA's Technical Corporation Project, "The Project for Capacity Development for Maintaining Power Supply Facilities (2011-14)," is on-going, through which training sessions and practical training are being offered to NPA staff. For example, lectures were given to 39 staff members on "Theories

The interviews with staffs of the power station and the Transmission and Distribution Division, which intended to check their technical levels, have confirmed that they understand the importance of operation and maintenance and are familiar with the facilities and equipment procured by this project. Additionally it was confirmed that experienced staff have relevant qualifications, such as electric engineering, and that OJT is being provided to newly recruited staff.

On the other hand, NPA's management commented in an interview, "The facilities and equipment, such as the Kingtom Power Station, were not sufficiently maintained before the project commencement. When the power generating units were introduced, the manufacturer gave instructions and advice, which has been useful for operating the power generating facilities. However, proper maintenance is only possible with many small efforts, and we think continuous training is important." It has been reaffirmed that NPA intends to place an importance on continuous training for its staff and that there is a demand for such training.

In view of the above, NPA continues to train its staff, and staff members have relevant qualifications while OJT is provided as needed. Thus it would appear that there are no major concerns in the technical aspects of NPA's operation and maintenance at the time of the ex-post evaluation. Nevertheless, based on the above comment of NPA's management, it is important to continue the training of staff in order to improve their operation and maintenance capabilities.

3.5.3 Financial Aspects of Operation and Maintenance

Table 4 is NPA's profit-and-loss statement (P/L) for the past three years, which describes NPA's financial situation[37]. Recurring expenses exceed recurring incomes, and recurring loss for the period is increasing year by year. Operating expense accounts for a large portion of recurring expenses, and the main expense is diesel fuel used to generate power at the power station. Diesel price has been increasing every year[38], which is one of the major factors affecting NPA's finance. While NPA is ending in the red every year, the government of Sierra Leone is covering a large amount of NPA's loss. (The loss is made up yearly. As of the end of FY2011, 297,168 million leone has been provided by the government cumulatively to compensate for the

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and Exposition for Operation and Maintenance of Diesel Generators" and "Comprehensive Understanding about Power Supply System," while practical training was given to a total of 114 staff members through the inspections of the power generating facilities procured by this project, overhaul and periodic performance testing. Similarly, workshops on technical and managerial aspects have been organized for a total of 44 staff members. As seen above, various supports are being provided to improve the technical capacities of NPA staff members.

[37] At the time of the ex-post evaluation, NPA is in a middle of a financial audit (expected to be completed by October 2013). Thus there is a possibility that 2010-11 data will be slightly revised in the future. The 2012 data is not publicly available at the time of the ex-post evaluation.

[38] Setting 2008 as a base year, it has increased by 90% at the time of the ex-post evaluation.

accumulated deficit of 338,090 million leone.) The government of Sierra Leone has shown its direction to focus its effort on improving the power supply in Freetown. It also expressed its intension to continue supporting NPA financially for the time being. However, NPA still needs to strive to improve its finance so that it will not be dependent on the public fund. More specifically, NPA needs to reduce power distribution losses by stepping up its measures against electricity pilferage and by rehabilitating old distribution networks so as to increase operating income. NPA also needs to make efforts to minimize operating expenses other than diesel fuels to the extent possible. NPA's management commented on the issue in an interview, "Although recurring income is on the increase, recurring expense has also been increasing every year. Even though we have financial support from the government, we will continue to endeavor to improve our finances."

Table 4: NPA's Income and Expenditure

(Unit: 1,000 leone)

	2009	2010	2011
Recurring Income (A) = (B) + (C)	139,536,976	124,769,302	138,760,237
Operating Income (B)	90,714,761	122,009,222	135,485,965
Non-Operating Income (C)	48,822,215	2,760,080	3,274,272
Recurring Expense (D) = (E) + (F)	158,672,103	151,107,924	177,728,407
Operating Expense (E)	142,879,427	125,104,896	145,288,359
Non-Operating Expense (F)	15,792,676	26,003,028	32,440,048
Recurring Loss for the Period (G) = (D) - (A)	(19,135,127)	(26,338,622)	(38,968,170)
Income Tax etc. (H)	0	0	0
Net Loss for the Period (I)	(19,135,127)	(26,338,622)	(38,968,170)

Source: NPA
Note: 1,000 Leon is roughly 23 Japanese yen (as of March 2013)

The operation and maintenance cost of this project is reflected in the operating expense shown in Table 4. It was difficult to capture how much of the operating expense was spent for the Kingtom Power Station and the Regent Substation due to the unavailability of accurate data. However, according to NPA's management, funds have been allocated for the necessary expenses despite the fact that diesel and other costs increased year after year. On the other hand, staff members on the ground at the Kingtom Power Station and the Transmission and Distribution Division commented that fund allocation is not necessarily timely because

procurement and delivery of spare parts are delayed from time to time. Therefore, it seems that there is room for improvement in terms of timely allocation of operation and maintenance funds and procedures.

3.5.4 Current Status of Operation and Maintenance

Through this evaluation study, no major problems were observed in the operation and maintenance status of the power generating facilities and the distribution and transformation facilities procured and installed at the Kingtom Power Station. With regard to the power generating facilities at the Kingtom Power Station, the staff members at the Station check the status of air intake and exhaust valves, starter valves and fuel valves every 4,000 hours as a periodic preventive maintenance in addition to the routine inspection (e.g., checking exteriors and fuel oil levels). Furthermore, another set of periodic preventive maintenance is performed every 8,000 hours, such as dismantling of cylinder head, inspection of fuel injection valves, and replacement of nozzles[39]. With respect to the distribution and transformation facilities, in addition to the patrolling inspection, which examines the status of equipment and appearance of each part, they inspect the control systems and panels. All of these operation and maintenance tasks follow the operation and maintenance manuals[40]. According to the site visits and interviews with operation and maintenance technicians at the Kingtom Power Station and the Transmission and Distribution Division, it has been confirmed that the facilities and equipment are operating properly without any particular problems.

With regard to working hours of the above mentioned staff members, they work in three shifts around the clock to carry out the operation and maintenance tasks. A system is in place to respond to emergencies in a timely manner.

Spare parts are properly stored at the Kingtom Power Station, the Transmission and Distribution Division and the Regent Substation. NPA commented that although procurement takes long in some cases, NPA is making efforts to secure necessary spare parts in recognition of the importance of facilities and equipment developed by this project.

For reference, data on outage hours of the two power generating units procured and installed at the Kingtom Power Station after the completion of project is provided in Table 5 below.

[39] It was carried out during the first half of 2013.
[40] JICA's Technical Corporation Project mentioned earlier is involved in these operation and maintenance tasks.

Table 5: Outage Hours of the Two Power Generating Units
Procured and Installed at the Kingtom Power Station

(Unit: hours)

Unit Name	Type of Outage	2010	2011	2012
1) Niigata 7	Preventive maintenance and machine trouble	0.0	1,056.0	107.0
	Stand-by (planned outage)	1,448.5	5,926.5	4,763.4
2) Niigata 8	Preventive maintenance and machine trouble	0.0	1,344.0	51.0
	Stand-by (planned outage)	1,430.0	5,295.0	5,029.0

Source: NPA

Normally, preventive maintenance is carried out at 4,000 hours after the commission of power generating units. In this case, the two power generating units installed at the Kingtom Power Station ("Niigata 7" & "Niigata 8") were commissioned in March 2010. In 2011 "4,000 hour maintenance" was carried out, including the inspections of air intake and exhaust valves, starter valves and fuel valves, for the two power generating units[41]. Apart from such preventive maintenance, both units had outage due to troubles in 2011 and 2012[42]. This is why Niigata 7 recorded 1,056 hours and Niigata 8 recorded 1,344 hours of outage due to preventive maintenance and machine troubles in 2011, and similarly Niigata 7 recorded 107 hours and Niigata 8 recorded 51 hours of outage in 2012. At the time of the ex-post evaluation (as of March 2013), both units are operating properly without problems.

On the other hand, a "stand-by (planned outage)" refers to times during which the Kingtom Power Station stops operating (planned outage) in the rainy season (normally June-December) when the Bumbuna Hydroelectric Power Station is operation on a full scale. According to NPA, the stand-by hours were short in 2011 because the two power generating units at the Kingtom Power Station began operating in April 2010. It was also mentioned that the stand-by hours of 2011 and 2012 were as planned for both Niigata 7 and Niigata 8.

In view of the above, it can be confirmed that the Kingtom Power Station is operating properly at the time of the ex-post evaluation. Additionally it can be judged that the power station is fulfilling its role in complementing the Bumbuna Hydroelectric Power Station.

[41] It required around 600-700 hours.
[42] Fuel injection pumps broke for the both power generating units. This is mainly because some kind of objects went inside the injection pumps (jamming). Investigation of the causes and restoration work were carried out for a few rounds.

【Conclusion on Sustainability】

At the time of the ex-post evaluation, no major problems are observed in the institutional and technical aspects of the operation and maintenance carried out by NPA. On the other hand, the financial aspects have room for improvement; NPA needs to improve its finances by reducing power distribution losses and increasing profitability. Therefore sustainability of the project effect is fair.

Figure 14: Power Distribution Control Room (Inside the Regent Substation)

Figure 15: Procured Power Distribution Transformer (Inside the Regent Substation)

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

With an aim to stabilize power supply in Freetown, which was destroyed by the civil war, this project procured and installed electric power generating units while constructing a building for the power station, a substation and distribution lines. Both at the times of before project commencement and the ex-post evaluation, this project is consistent with the policy stipulated in the Second Poverty Reduction Strategy Paper (PRSP-II), which recognizes the power sector as a priority, and with the development needs, such as increasing power generating facilities and power supply; therefore, relevance of this project is high. Although the total power demand still exceeds the supply capacity in Freetown and the outskirts after the project implementation, this project is contributing to the improvement of the power supply system through the procurement and installation of two power generating units at the Kingtom Power Station. On the other hand, the number of electrified households in Regent, one of the target areas in the suburb, is smaller than what was planned because a power feeder panel, which was supposed to be installed by a World Bank project, is not yet in place. Effectiveness and impacts of the project are evaluated to

be fair in view of its contribution toward the entre power supply system and the stabilizing operation of the power generating units at the Kingston Power Station. While the project period was as planned, the project cost was within the plan. Thus efficiency is high. No major problems are observed in the institutional aspects of the operation and maintenance carried out by the Executing Agency. On the other hand, sustainability of the project is fair because the Agency has been operating in the red financially, which needs improvement.

In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

・It takes a long time to procure spare parts in some cases at NPA. For the stable operation of the power generators, it is deemed important to accelerate the allocation of operation and maintenance budgets and see to it that spare parts are procured and placed smoothly.

・It is preferable that the central government of Sierra Leone make a progress on the restoration of the Bumbuna Hydroelectric Power Station, which is the largest power supply source for Freetown and the outskirts, so that it can operate properly and fulfill its complementary role to thermal power stations.

・At the time of the ex-post evaluation, the World Bank is planning to procure and install a 33 kV power feeder panel at the Wilberforce Substation as a part of its new project. It is preferable that NPA coordinate and discuss with the World Bank immediately and concretely.

・Although the central government of Sierra Leone has been covering NPA's deficits, it is preferable that NPA should develop a management improvement plan which focuses on improving and strengthening its finances and should make efforts to resolve the deficit issue in accordance with the said plan.

4.3 Lessons Learned

・With regard to the procurement and installation of a 33 kV power feeder panel at the Wilberforce Substation, lost benefits persist until it is duly installed. During and after the project implementation, JICA attempted to coordinate with NPA and the World Bank to check the progress with a view to facilitating the realization of the planned procurement and installation. However, as it turned out that the procurement and installation of the power feeder panel is not completed yet at the time of the ex-post evaluation. Therefore, it would have been beneficial for NPA and even for JICA to have sufficiently coordinated with the World Bank to ensure that the

said procurement and installation work would be implanted in accordance with the plan from the design stage. For similar projects in the future, it is considered necessary to thoroughly discuss the issue of communication among different parties involved in the project, procurement for different components, and progress of installation from the planning stage.

The Republic of Benin

Ex-Post Evaluation of Japanese Grant Aid Project

The Project of Reinforcement of Lagune Mother and Child Hospital of Cotonou

(Le Projet de renforcement des installations et équipements de l'Hôpital de la Mère et l'Enfant-Lagune de Cotonou en République du Bénin)

External evaluator: Hiromi TAKENAKA

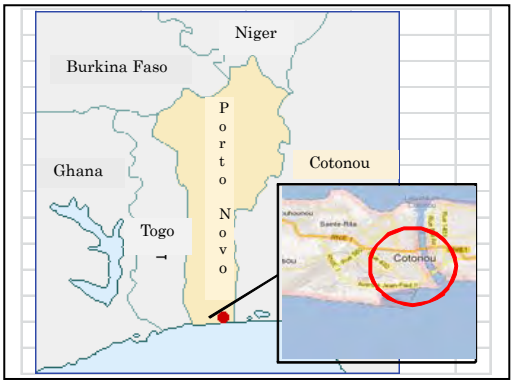
Nonprofit Organization HANDS

0. Summary

The objective of this Project is to enable the Lagune Mother and Child Hospital of Cotonou (hereinafter referred to as HOMEL) to function as the top referral hospital for maternal and child healthcare by constructing new hospital wards, a delivery ward and providing equipment. This objective was consistent with the development policies and needs of the Government of Benin at the time of the planning and the ex-post evaluation for the Project, and it was in line with Japanese ODA policies toward Benin at that time. Therefore, the project relevance is high. Due to factors such as the strikes by health personnel and changes in the domestic health sector environment, a number of operation indicator targets were not met. However, the quality of medical services improved, benefitting the users of the hospital; the outpatient waiting time for doctor consultations was shortened, and the facility structure was optimized for hospital users. These improvements were possible due to the positive synergy created from this Project being combined with other technical cooperation projects. Since some results were achieved, the effectiveness and impact of this Project could be regarded as fair. While outputs in accordance with the initial plan were achieved, there were three items on the Benin side that were not yet completed and were still being addressed at the time of the ex-post evaluation. Thus the efficiency is low. On the other hand, there were no significant issues regarding operation and maintenance, thus the sustainability of the Project is high.

In light of the above, this Project is evaluated to be partially satisfactory.

1. Project Description



Project Location Map

New hospital ward and procured medical equipment

1.1 Background

Since starting as a maternal and childcare hospital in 1958, HOMEL gained people's trust as the biggest and oldest "delivery hospital" in Benin. Until 2005, HOMEL served as the departmental hospital (secondary medical facility) for Atlantique and Littoral Departments, but after that, it was positioned as the top referral medical facility in Benin as well as an educational hospital for doctors, midwives, nurses, clinical laboratory technicians and others working in the fields of obstetrics and gynecology and pediatrics.

However, due to the poor condition of its facilities and equipment, it was difficult for HOMEL to adequately fulfill its function as the top referral medical facility, and so remained a secondary level facility. Most of HOMEL's existing buildings were constructed for an electric power company over 50 years ago, and the ventilation and lighting were inadequate for a health facility. With a bed occupancy rate of over 80%, mothers and sick children could not be accommodated in the prescribed wards when there were many deliveries or when there were outbreaks of malaria or other infectious diseases. During these periods, the aisles and corridors were used to accommodate patients as the beds were fully occupied. In addition, there were no consultation rooms for pediatric outpatients, and temporary partitioning of wards was common. This made it difficult to provide safe services in terms of infection control. The equipment was obsolete and inadequate for the number of patients, which made it difficult to provide patients with safe treatment.

The Government of Benin initiated improvements to make HOMEL a sound medical facility but had difficulties due to lack of funding. As a result, taking into account the situation, the Government of Benin filed a request with the Government of Japan for a grant aid program which intended to improve HOMEL facilities and equipment.

1.2 Project Outline

The objective of this project is to enable HOMEL to function as a top referral hospital in the maternal and child healthcare field by construction of new pediatric outpatient department, neonatal ward and delivery ward and upgrading of the medical equipment (such as delivery tables, ultrasonic diagnostic equipment, and high pressure steam sterilizers).

Table 1: Project Outline

Grant Limit/Actual Grant Amount	1,295 million yen / 1,280 million yen
Exchange of Notes (E/N) Date	May 2007
Implementing Agency	Benin Ministry of Health, HOMEL
Project Completion Date	November 2009 (not yet completed for Benin side)
Main Contractor	Contractor: Toda Corporation Equipment procurement: Ogawa Seiki Co., Ltd.
Main Consultant	Nihon Sekkei, Inc., Fujita Planning Co., Ltd. (JV)
Basic Design	November 2005 – July 2006
Detailed Design	January 2007 – March 2007
Related Projects	[Technical cooperation] ■ Dispatch of individual experts: Program Advisor for Maternal and Child Health Program (2008-2010), Medical Equipment Maintenance (2009-2010), Advisor for Maternal and Child Health Program (2010-2012, 2013-2015) ■ JOCV (dispatch of team of volunteers) ■ Total Quality Management Program for Better Hospital Services (from 2009) [Other international organizations, aid agencies, etc.] ■ UNFPA: Technical training in obstetric care for HOMEL obstetricians ■ UNICEF: Basic emergency obstetrical care, ante- and post-natal examinations, nursing training, supervision ■ Swiss Agency for Development and Cooperation: Support for formulation of national health development plans ■ WHO: Overseas training in maternal and child health ■ Belgian technical cooperation: Continuous training in reinforcement of HOMEL's referral function

2. Outline of the Evaluation Study

2.1 External Evaluator

Hiromi Takenaka, Nonprofit Organization HANDS

2.2 Duration of Evaluation Study

Duration of the Study: September 2012 – August 2013

Duration of the Field Study: December 8 – 21, 2012, April 28 – May 4, 2013

3. Result of the Evaluation (Overall Rating: C[1])

3.1 Relevance (Rating: ③[2])

3.1.1 Relevance to the Development Plan of Benin

At the time of the Basic Design Study, the state of maternal and child health in Benin

[1] A: Very high, B: High, C: Some issues remain, D: Low
[2] ③: High, ②: Medium, ①: Low

was such that the maternal mortality rate was 850 per 100,000 live births (2003) and the under-five mortality rate was 156 per 1,000 live births (2003). This was extremely severe compared with the respective averages of 440 and 60 (2003) for developing countries[3]. To improve the family health situation of the poor and the very poor, the government promoted the "Policies and Strategies for Development of the Health Sector (2002 – 2006)", Benin's national development plan for the health sector, aiming to (1) improve reproductive health and the living conditions of mothers and children in order to promote maternal and child health, (2) enhance the quality of medical treatment and health services and provide appropriate facilities which could be accessed by the mothers and children, (3) improve the quality of health services at regional level, and (4) improve healthcare services for the poor and very poor.

At the time of the ex-post evaluation, the maternal mortality rate was 350 per 100,000 live births (2010) and the under-five mortality rate was 121 per 1,000 live births (2010)[4]. Although the indicators have improved compared to the situation at the time of the Basic Design Study, the situation remains abysmal compared to the averages for other developing countries: 240 for maternal mortality and 66.1 for under-five mortality (2010)[5]. Benin's "National Health Development Plan (2009-2018)" advocates; (1) reducing the maternal mortality rate and under-five mortality rate, (2) addressing infectious diseases, and (3) improving medical service including medical facilities and medical equipment.

Based on the above, maternal and child health and improving the environment to enable the provision of high quality medical services are still regarded as important, thus are relevant to the policy at the time of the Basic Design Study and the ex-post evaluation.

3.1.2 Relevance to the Development Needs of Benin

The Ministry of Health (hereinafter referred to as MOH) is responsible for the health administration, and the administrative system is divided in three levels in the shape of the pyramid: national level, department level, and peripheral level. At the national level, MOH is in charge of planning, coordinating and presiding over healthcare activities. In addition, MOH supervises five health facilities under its direct control; the National University Hospital, the National Tuberculosis Center, the National Center of Neurology and Psychiatry, the National Geriatrics Center, and HOMEL. HOMEL, which used to be the departmental hospital specializing in the care of mothers and children in Atlantique and Littoral Departments, was designated as the top referral facility for maternal and child healthcare in 2006. However, due to the poor condition of its facilities and equipment, it remained a secondary level medical facility. As a result, it could neither fulfill its role as the top referral health facility nor contribute fully

[3] UNICEF (2004) "The State of the World's Children"
[4] World Health Organization (2012) "World Health Statistics 2012"
[5] United Nations Population Fund (2012) "State of World Population 2012"

toward the improvement of maternal and child health or the lives of mothers and children as promoted by MOH.

Through the Project, HOMEL was able to fulfill its function not only as the referral facility in Atlantique and Littoral Departments, but also as the top referral medical facility in the country. As there are no other medical facilities specializing in mothers and children in Atlantique or Littoral Departments, HOMEL functions as the top referral facility as well as the departmental hospital specialized in mothers and children.

In light of the above, it has been confirmed that HOMEL is fulfilling its function as the top referral medical facility for maternal and child health, and it is relevant with respect to the development needs both at the time of the Basic Design Study and at the time of the ex-post evaluation.

3.1.3 Relevance to Japan's ODA Policy

Benin was proactive in pursuing democratization and economic reform based on the Poverty Reduction Strategy Papers. This was considered to be important for the TICAD[6] process, an initiative led by Japan, to support reform processes with national ownership. It was also important from the perspective of "poverty reduction", a top priority issue in Japan's ODA Charter, to support Benin as one of the poorest countries in the world. Support toward Benin was focused on basic human needs, namely human resources development, health and medical care, agriculture and rural development, which directly contribute to the improvement of the living conditions of the people. In the health sector, improvement of health facilities and medical equipment, and enhancing maintenance management capacity were considered to be priorities, and this Project was in line with these priorities.

This Project was highly relevant to the country's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Effectiveness[7] (Rating: ②)

3.2.1 Quantitative Effects (Operation and effectiveness indicators)

3.2.1.1 Operation Indicators

It was expected that HOMEL would function as the top referral medical facility for maternal and childcare through the construction of wards, including a delivery ward and a radiology department, and through the provision of basic minimum equipment needed for these

[6] TICAD (Tokyo International Conference on African Development) was held in 1993 for the first time to promote high level policy dialogue between the heads of African states and development partners. It forms the main international framework for promoting initiatives based on two fundamental principles, African ownership and partnership with international society, towards the promotion of African development.

[7] This rating also takes into consideration the score for impact.

facilities to be operational, and through the replacement of medical equipment which were worn out. The following were taken as operation indicators, all of which were expected to increase; the number of pediatric outpatients, the number of referrals from lower level health facilities, the number of deliveries, and the number of operations. Table 2 below shows the results for each operation indicator.

Table 2: Operation Indicators

Operation indicator	[Reference value] (Year 2004)	[Target value]	[Actual value] (2011)	[Actual value] (2012)	Rate of increase
Number of pediatric outpatients	4,751	Increase from reference value	4,838	6,833	143.8%
Number of referral patients from lower level medical facilities	2,648	Increase from reference value	2,088	2,116	79.9%
Number of deliveries	6,547	Increase from reference value	4,369	4,620	70.57%
Number of operations	3,842	Increase from reference value	2,709	2,632	68.51%

Source: Basic Design Report (reference values), questionnaire responses (actual values)

Although the number of pediatric outpatients increased by 143.8%, other operation indicators did not meet the target, but rather decreased. The following are factors which may have contributed to these results.

From 2009 until the end of 2011, health personnel throughout Benin went on strike almost on a daily basis to improve their working conditions, and HOMEL was no exception. The facilities and equipment provided in this Project were handed over to Benin in November 2009, but HOMEL was not operating fully due to the strikes.

The reason for the decrease in the number of referral patients from peripheral -level health facilities could be explained by the fact that the number of health facilities in Atlantique and Littoral Departments, the departments covered by HOMEL, increased from 77 to 95 by 2011, while the number of health facilities across the country increased from 481 to 702 countrywide. As the number of health facilities increased, cases which could be handled at lower level facilities increased, resulting in the decrease in referrals to HOMEL.

The decline in the number of deliveries could be explained by the free caesarean section policy[8] introduced in selected hospitals. This policy decision was taken in 2008 and was implemented from 2009. Before the free caesarean section policy, many caesarean sections were done at HOMEL as it was the top referral hospital for maternal and child health. However, after 2009, mothers often opted for other hospitals designated for free caesarean sections instead of

[8] Free up to 100,000CFA. 100,000CFA is paid to the medical facility as a subsidy.

HOMEL. The percentage of caesarean sections for delivery increased to around 190% in Atlantique and Littoral Departments, and to around 165% countrywide from 2009. In HOMEL, the proportion of caesarean sections among deliveries has remained at around 40%[9], suggesting that expectant mothers are using hospitals other than HOMEL for caesarean sections.

3.2.1.2 Other Reference Indicators

Although it was not an operation indicator for the Project, "waiting time for consultation for outpatients" was included in the beneficiary survey[10] for the ex-post evaluation. The result showed that 58% of respondents (80 patients) replied that the "waiting time is shorter than before 2009". Those who waited more than 1.5 hours before 2009 was 71%, which declined to 62% in 2012 (refer to Table 3).

Table 3: Waiting Time

	Before 2009	2012
1 hour or less	29%	38%
1.5 hours or more	71%	62%

Source: Beneficiary survey

3.2.2 Qualitative Effects

3.2.2.1 Functions as the Top Referral Facility for Maternal and Child Health

It was expected that the Project would contribute towards making HOMEL the top referral facility for maternal and child health. The Project introduced user-friendly facility designs for mothers and children, as follows; (1) a slope, instead of steps, was installed on the side facing the courtyard and each floor was made accessible by slope, (2) ventilation and lighting of the wards were improved, which made it easier for people in the waiting area, with better air circulation during the hot season, (3) lighting and ventilation for patients rooms were improved. Sufficient number of medical equipment of the same type as those already being used by the health personnel was provided. From these points, it is clear that the quality of services at HOMEL improved, which was also confirmed by the interviews with health personnel of the hospital.

3.2.2.2 Synergistic Effect between the Project and Other Projects

HOMEL introduced 5S gradually through the "Total Quality Management Program for Better Hospital Services (5S-KAIZEN-TQM)"[11] which started at the same time as the handover

[9] The proportion of caesarean section among all deliveries in HOMEL between 2004 and 2012 was 40% (ranging from 32% to 44%). From 2006, the figure was between 40% and 44% (average 42%).

[10] In the beneficiary survey, individual interviews were conducted with 80 HOMEL users (patients) and 20 staff members (medical staff, etc.) based on questionnaires designed for users and staff respectively.

[11] The "Total Quality Management Program for Better Hospital Services" is one of the programs within the framework of the "Asia-Africa Knowledge Co-Creation Program", which was established with the objective to utilize "Japanese style quality control techniques" to improve management of the health facilities and services. The first

of the Project. As a result of the synergy between these projects, awareness of the staff increased on maintenance and management. The staff came to realize that maintenance of the facility and equipment should be done by all staff, not only by the maintenance unit staff, and this has been put into practice[12]. In addition, JICA developed a program for maternal and child health, and an effective combination of various schemes contributed to the improvement of health services provided by HOMEL. These schemes included; dispatch of technical experts (long-term advisors for Maternal and Child Health Program and a short-term advisor for Medical Equipment Maintenance), training courses in Japan, training courses in third countries and dispatch of overseas cooperation volunteers (JOCV) in the field of maternal and child healthcare.

3.2.2.3 Beneficiary Survey

The results of the beneficiary survey revealed that both patients (users) and health personnel positively evaluated HOMEL after the Project (refer to Table 4). The patients' level of satisfaction with the hospital was very high. Whereas approximately 50% of respondents replied that they were "satisfied" with the services before 2009, almost 90% of them replied that they were "satisfied" with the services in 2012. Patients were satisfied on the following points; "quality of medical services", "trust in the hospital", "knowledge and skill of the health personnel", "attention and care of the medical staff", and "equipment". While only 50% of the health personnel replied that the quality of hospital services before 2009 was "good/very good," 85% responded that it was "good/very good" in 2012. The main reasons given were: "receive more patients" and "health personnel could perform their task efficiently with new facilities and equipment". In addition, health personnel also reported that they believed that their services had improved as they received fewer complaints from patients.

Table 4: Patient Satisfaction and Assessment by Health Personnel

Item	Before 2009	2012
% of patients who are satisfied with the hospital	51%	87%
Quality of the hospital assessed by health personnel (100 points)	50 points	85 points

Source: Beneficiary survey

step is to transform the workplace environment with 5S (abbreviation for five words in Japanese that start with S which are: *Seiri* (Organized), *Seiton* (Neat), *Seiso* (Clean), *Seiketsu* (Sanitary) and *Shitsuke* (Disciplined)). In addition, with this technique, a number of small action teams are formed, and periodic meetings are held between teams in order to increase the opportunities for dialogue between personnel, increase transparency, and achieve "visible change" through application of the 5S concept to boost the awareness of each individual.

[12] Currently, 5S has been achieved, and HOMEL is focusing on KAIZEN. It is serving as a model hospital in Benin in the field of 5S, in addition to providing maternal and child healthcare. HOMEL acquired ISO9001 certification in three fields in 2009 (ante- and post-natal examinations, deliveries and neonatal ward), and in two more fields in 2011 (clinical examination and operating room).

3.3 Impact

3.3.1 Intended Impacts

3.3.1.1. Contribution to the Reduction in Maternal and Infant Mortality Rates in Benin

By comparing the data from the Basic Design Study with the latest data, it can be seen that the maternal and child health situation has improved in Benin, with the maternal mortality rate decreased by approximately 60%, and the under-five mortality rate decreased by approximately 23% (refer to Table 5). However, as direct causation could not be obtained in this study, it was not possible to determine to what extent HOMEL had contributed to these improvements in maternal and child health indicators.

Table 5: Maternal Mortality Rate and Under-five Mortality Rate

Item	2003	2010
Maternal Mortality Rate (Per 100,000 Births)	850	350
Under-five Mortality Rate (Per 1,000 Births)	156	121

Source: République du Benin Ministère de la Santé “Annuaire des Statistiques Sanitaires 2011”

3.3.1.2. Increase in Consultation Care Income due to Increase in Number of Pediatric Outpatients, Annual Deliveries and Number of Operations

It was expected that the number of patients using HOMEL’s services would increase as a result of the upgrading of facilities and medical equipment by this Project, resulting in an increase in medical care income, and in turn contributing to improved fiscal health for HOMEL. However, as previously stated, the nationwide strikes in Benin from 2009 to 2011 by health personnel had a large impact on this. During these strikes, HOMEL provided a minimum level of services, resulting in a decrease in the number of patients using HOMEL. The 2012 data, which is not affected by the strike, indicate that HOMEL made a transition from deficit to surplus and income from consultations and medical care increased. The number of deliveries and number of operations were still lower than the reference value of 2004, but were not decreasing, although the data varied from year to year. The number of pediatric outpatients is on the rise. In summary, a positive trend in its financial status can be seen (see section 3.5.3).

3.3.1.3. Capacity Building of Health Personnel in Benin

HOMEL accepts trainees because it is an educational hospital. The training is conducted in small groups and consists of observation, practical training and discussions with supervisors who closely monitor the trainees. Training opportunities at HOMEL are not limited to just learning practical skills with good facilities and equipment, but trainees also have the chance to learn about “good hospital management” since HOMEL is the top referral facility and a model hospital in 5S. In HOMEL trainees learn that good appropriate service considered satisfactory by the patients is achieved not just through the quality of medical techniques but also through efficient hospital management (source: interviews with HOMEL trainees). In this

way, HOMEL is contributing toward improving the quality of health personnel through capacity building. However, since there was only a slight increase in the number of trainees, from 68 in 2006 to 71 trainees in 2011, HOMEL's contribution in terms of numbers is modest.

3.3.1.4. Improvement in People's Health

In the beneficiary survey, 90% of patients stated that the health of mothers and children in the region have "improved/improved greatly" compared to 2009. The main reasons given were; "satisfied with the service provided by the hospital (21%)", "prevalence of malaria decreased (19%)", "babies quickly recover after being treated when sick (14%)", "rate of mortality has decreased (14%)" and "quality of hospital facilities and equipment improved (14%)". In addition, 78% of the respondents stated that "I and my family act more proactively to improve the health of mothers and children compared to 2009 or earlier"[13].

Regarding the health personnel, 90% of those who responded in the survey stated that they felt the state of healthcare in the region has "improved". In addition, 95% stated that "the hospital encourages preventive care" and 90% stated that "the hospital is now able to provide effective care" noting the changes in the hospital's approach. Furthermore, 78% answered that "residents are now able to proactively act on issues related to improving health".

The results of the surveys of both patients and health personnel confirmed that the facilities and medical equipment provided under this Project contributed to the improvement of healthcare in the region to a certain extent.

3.3.2 Other Impacts

3.3.2.1. Impact on the Natural Environment

The impact on the natural environment of the Project was minimal. There were no reports of improper wastewater disposal, waste contamination or any other issue that could be considered problematic. Wastewater facilities installed for sewage and gray water disposal from the delivery ward and general ward were satisfactory with respect to the wastewater quality level set by the Directorate of Hygiene and Basic Sanitation of the Ministry of Health. Neither breakdowns nor incidents were reported at the time of the ex-post evaluation.

Waste was being sorted and disposed according to the color-coded waste containers.[14]. Each waste container was marked on the floor with tape of the same color, and these waste containers were collected from a fixed location. As was the case at the time of the Basic Design Study, waste was being collected on a routine basis and each type of waste was sorted according to established rules. The volume of waste was at a level which could be well managed by

[13] This positive behavioral transformation could be the effect of the Maternal Education Classes conducted by HOMEL.

[14] Black: general waste, yellow: medical waste without any blood, red: medical waste with blood, and used needles are collected in a dedicated box.

HOMEL.

In addition, it was confirmed that the X-ray equipment procured by the Project was operating without any significant problems.

In light of the above, it could be concluded that there was no notable negative impact on the natural environment.

3.3.2.2. Land Acquisition and Resettlement

Due to the fact that this Project was implemented on the existing hospital site, resettlement of residents and land acquisition were not required. Based on interviews of HOMEL staff during the ex-post evaluation, it was confirmed that there had been no complaint from residents to date.

This project has somewhat achieved its objectives, therefore its effectiveness is fair.

3.4 Efficiency (Rating: ①)

3.4.1 Project Outputs

Table 6: Outputs

At Time of Basic Design Study	At Time of Implementation
[Japan side Input Plan] • Construction of hospital wards, delivery ward, and radiology department. • Provision of 61 items of equipment. Procured equipment was either 1) upgrading the existing obsolete equipment or 2) minimum basic equipment for new wards built by the Project. Selection of equipment took into account the operation and maintenance capacity of HOMEL. • Technical support related to operation and maintenance of procured medical equipment.	[Japan side Achievements] • Although there were some minor changes, the Project was implemented as planned. However, there were some inputs which shifted from the Japanese side to the Benin side due to currency exchange rate fluctuations.
[Benin side Input Plan] • Grading and leveling of planned construction site, construction of water supply facilities, construction of wastewater facilities, provision of electrical facilities, provision of telephone facilities, transfer to hospital under this plan, other facilities (plants and outdoor signs, blinds, curtains, general furniture, etc.), hiring additional staff for operating and maintaining facilities and equipment, costs related to operation and maintenance of facilities and equipment.	[Benin side Input Achievements] • The Project was generally implemented as planned but the following three items were still ongoing at the time of the ex-post evaluation: Medical gas piping work, medical gas plant procurement and installation, open roof ceiling atrium.

Source: JICA internal document

As shown in Table 6, the work on the Japanese side was completed, but the following three items were not yet completed at the time of ex-post evaluation; medical gas piping work, medical gas plant (central piping unit and medical gas generating machine), and open roof ceiling atrium.

Regarding medical gas, funds could not be allocated in the budget prior to 2010, and

although funds were allocated in the budget for 2011 and 2012, work was put on hold due to a delay in contract-related procedures with the vendor. A contract was finally signed with a Dutch vendor in September 2012, and as of December 2012 it was reported that the vendor had submitted a bank draft (1% of contract sum). The medical gas installation work has not been done, but because the medical gas piping was delivered with nitrogen inside, it is possible that the pipe may have rusted since it has not been used for an extended period of time. Both the Ministry of Health and HOMEL were fully aware that this issue needs to be urgently addressed[15]. However, the work was not proceeding due to delays by the vendor. It was verified through interviews with Ministry of Health officials that the President of Benin issued instructions in August 2012 to complete all work related to the HOMEL development plan by April 2013, and that discussions were held with the Dutch Ambassador to Benin in February 2013 on how to speed up the work.

Regarding the medical gas plant, a budget allocation was secured in 2011 and a contract was signed with another Dutch vendor, but the vendor did not submit a bank draft equivalent to 1% of the contract sum, resulting in the contract being carried over to the next fiscal year. The contract was signed again with the same vendor in June 2012, and a bank draft (1% of contract sum) was submitted by the vendor, a payment of 30% of the contract amount was paid as the first payment, and a deposit was made in the bank for 60% of the payment amount as of the end of May 2013, and the procedure to issue a letter of credit was in process[16].

An open roof ceiling atrium was planned as an input from the Japanese side but was shifted to the Benin side due to exchange rate fluctuations, and was ongoing at the time of the ex-post evaluation. Since family members taking care of inpatients stay outdoors within the hospital compound, an open ceiling atrium was proposed (a structure without walls, but with a roof to provide some protection against wind and rain) as a means to improve the conditions of these family members who were exposed to the wind and rain. A contract with a local vendor was signed and the roof structure has been built, but the work to install the roof was pending due to problems with the vendor.

3.4.2 Project Inputs

3.4.2.1 Project Cost

As shown in Table 7, the Project actual expenditure was 1,280 million yen compared to the original plan of 1,295 million yen (98.8% of planned), indicating that the Japanese side Project cost was within the original plan. However, the following are areas of concern.

[15] Since the medical gas piping work has not been done, medical gas is being supplied to the neonatal ward by bringing in gas cylinders. This has the inherent risk of the gas cylinder falling over onto the cots or incubators holding the neonatal infants.

[16] 60% of the remaining amount will be paid when the medical gas plant is installed at HOMEL, with the final balance of 10% to be paid one year later.

Regarding the Japanese inputs, some of the work was shifted to the Benin side due to the fluctuation of the exchange rate. Regarding the Benin inputs, only the "installation costs" for the medical gas piping and medical gas plant for which work has not been completed were budgeted in the plan. Since these "installation costs" also include the cost of equipment items which are currently being procured, it is difficult to separate out only the installation costs.

While the costs for Japan came within the planned amount, the total project costs including the costs borne by Benin are expected to exceed the initial planned amount of 1,351 million yen and will be about 1,464 million yen (108.3% of planned amount) due to increases in procurement, installation and other costs for the medical gas and generator, resulting in a slightly higher cost than planned.

Table 7: Comparison of Planned Project Costs and Actual Project Costs

	Planned	Actual	Predicted (Including portion not completed)
Total Project Costs	¥1,351 million	¥1,344 million	¥1,464 million
• Japan side (E/N grant limit)	¥1,295 million	¥1,280 million	¥1,280 million
• Benin side	¥56 million	Approx. ¥64 million*	Approx. ¥184 million**

Source: Project Completion Report
* Excluding portions which are not completed.
** Including medical gas, medical gas plant facilities, etc. During planning, the costs for medical gas and medical gas plant facilities were budgeted under HOMEL upgrade work being independently done by the Ministry of Health. It is difficult to make a simple comparison of the amounts since the content of work covered on the Benin side differs from the initial plan.

3.4.2.2 Project Period

As shown in Table 8, the planned period was 23.5 months, but the work had not been completed at the time of the ex-post evaluation.

Table 8: Comparison of Planned Project Period and Actual Project Period

	Planned	Actual Period
Detailed Design	4.5 months	4 months (E/N detailed design to end of contract)
Bidding	3 months	5 months (E/N construction to contract with contractor)
Work	16 months	25 months (contract with contractor to handing over) Benin side not completed at the time of ex-post evaluation
Total	23.5 months	May 2007 (E/N construction) – Handover November 2009 (2 years 7 months: 31 months (132% of planned period)) Project not yet completed and is 73 months as of May 2013 (311% of planned period).

Source: Project Completion Report

One of the reasons that the Japanese side exceeded the planned schedule was the fact that while test boring was done at the site before starting work, groundwater far exceeding the projected amount was found when the actual work started. As a result, the work needed to carefully proceed with the caisson method[17], resulting in a delay of 3 months or more. Since HOMEL faces a bay, it is considered difficult for even Beninese engineers to assess the

[17] This is a construction method where a reinforced concrete tube- or box-shaped structure (caisson) is made and sunk in the ground when constructing a large structure in water or soft ground.

likelihood of groundwater at the site (source: Ministry of Health officials). In addition, the ground was harder than expected, making it difficult to proceed with the work, and this was compounded by the sluggish supply of cement in Benin during the project period, and a longer than normal rainy season.

As described above in the Project Outputs section, three items were not yet completed at the time of ex-post evaluation; medical gas piping work, medical gas plant, and open roof ceiling atrium. These issues contributed to the project period becoming significantly longer than planned, however, they don't correspond to the decrease of the outputs.

Therefore, the project cost slightly exceeded the planned figure, while the project period significantly exceeded the planned period, thus efficiency of the Project is low.

3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

The Ministry of Health headed by the Minister, consists of the Secretariat headed by the Minister's Secretariat and Vice Minister, and the Technical Directorate, as it was at the time of the Project planning. Before 2005, the Technical Directorate consisted of 9 directorates, which was reorganized into 12 directorates in 2005, and reorganized again into 8 directorates in 2010. HOMEL, being a top referral facility, is under the supervision of the Hospital/Medical Facility Directorate[18] within the Technical Directorate. In addition to HOMEL, the Ministry of Health supervises the National Center of Neurology and Psychiatry, the National University Hospital and the National Tuberculosis Center as they are top referral medical facilities. The Facility/Equipment/Operation and Maintenance Directorate (hereinafter called DIEM) is in charge of construction and maintenance of hospital facilities and equipment, but due to the lack of budget at DIEM, activities for operation and maintenance activities are limited to annual medical inspections and emergency equipment repairs, rather than supporting particular specific facilities.

HOMEL consisted of three departments under the Hospital Director when this project was planned: Medical Service/Medical Technology Department (Obstetrics and Gynecology Division and Pediatrics Division), Financial Management Department and Economic Administration Department. It had 206 beds and a staff of 441. The total number of staff had increased to 527 as of the ex-post evaluation, but this was due to an increase in outsourced staff mainly filling technical positions, and the number of actual staff is decreasing.

Medical policies are discussed, decided and implemented by the Medical Commission of Establishment (MCE) and the Nosocomial Infection Control Committee (NICC). MCE is held by HOMEL and headed by a professor of gynecology and it meets four times each year.

[18] The Directorate formulates standards for quality of medical services at the hospital, sets healthcare costs, and supports healthcare and operations management.

NICC is responsible for providing the guidelines of hospital hygiene policy and the guidelines on the respect for hygienic standards. The section of Management and Quality is responsible for the implementation of quality management process within HOMEL. It ensures the compliance of procedures and regulation based on ISO9001 version 2008 in all areas of activities of HOMEL. Administration Committee, which is authorized with the broadest powers to act in the all circumstances on behalf of HOMEL under the limits of social purpose, is held 3 to 4 times each year. Administration Committee is composed of the representative of the Ministry of Health as a chairperson, the representative of the Ministry of Higher Education as a vice-chairperson, the representative of the Ministry of Finance and the Ministry of Labour, the representative of traditional therapists elected by their peers, the president of CME, two representatives of staff, and the mayor of the commune where the head office of the hospital university is located or his representative.

During the ex-post evaluation, it was confirmed that there were no significant changes in the organizational structure and the new director since the beginning of 2012 has taken over the existing structure.

Regarding the current operation and maintenance of facilities and equipment, there are two electrical technicians, one technician for water supply and wastewater, and one carpenter and one clerk, and the team is headed by a manager who holds two posts, the operation and maintenance section manager and the medical equipment manager, for a total of six members. During the night, maintenance staff could be contacted through an emergency contact network. At the time of the Basic Design Study, it was noted that more maintenance staff were needed; one in charge of the air conditioning facilities, and the other for inventory management. There were no changes in the number of maintenance staff at the time of ex-post evaluation. However, the maintenance manager at the time of Basic Design Study was transferred and one of the Project consultants has been hired by HOMEL through its own fund, and is currently the manager.

Periodic inspection and repair of procured equipment are performed using the equipment ledger and periodic inspection plan formulated as soft components under this Project. Regarding operation and maintenance procedures, two flowcharts have been prepared; one for prevention, and the other for repair procedures in the event of a breakdown, and the users, the health personnel, are acquainted with these procedures. In addition to the daily checkups performed by health personnel, the operation and maintenance department performs periodic inspections, and the health personnel know the mobile phone numbers of the operation and maintenance department staff so that the department can quickly respond in the event of a breakdown.

Though there was no increase in the number of maintenance staff, it has been confirmed that guidelines, equipment ledger and other related documents enabled operation and

maintenance to be performed in a systematic manner.

3.5.2 Technical Aspects of Operation and Maintenance

It was confirmed that there were no issues regarding the skill of health personnel and everyone could use the equipment sufficiently. Most equipment procured in the Project was ones already used by the staff, so the staffs were familiar with the procured equipment.

Excluding some complex equipment, most of the equipment and facilities are being maintained by the staff, and those which cannot be handled by the staff are being outsourced for maintenance. The hospital's facilities and equipment, other than those procured by the Project, were old but being used without any problems.

The soft component of the Project was as follows; 1) promoting awareness on the importance of the operation and maintenance system, 2) enhancing the capacity to build and manage an operation and maintenance system, and 3) preparing and executing annual operation and maintenance plans. In regard to promoting awareness on the operation and maintenance system, it has been well understood by all section managers that the daily checkup and maintenance not only by the operation and maintenance staff, but also by the end user (health personnel) are important, and accordingly this is being put into practice. In addition, the Director of HOMEL participated in the "Asia-Africa Knowledge Co-Creation Program 'Total Quality Management Program for Better Hospital Services'" and learned 5S in Japan and Sri Lanka. This was a contributing factor for strengthening operation and maintenance and for the introduction of 5S. As a result, "5S Time" was scheduled every other Friday, and each section started implementing 5S. In addition, once a month, a meeting for the quality improvement team members, notably doctors, nurses, laboratory technicians, pharmacists, radiologists, clerical workers and midwives, is being held.

Ledgers for equipment and ledgers for maintenance were set up in order to structure the maintenance system and to build capacity. A maintenance manual was also supposed to have been prepared, but this was not possible because the information required for the manual, as well as computers, were destroyed during a fire in the work area during the Project. However, a maintenance flow was established and all staff members are familiar with the flow. For newly joined staff members, training on 5S is being provided and regular, staff-initiated meetings for 5S are taking place every two weeks.

As for the annual maintenance plan and its execution, a plan is being formulated and shared so that all staff in the hospital are well-informed about the activities of the maintenance unit. Before the Project, maintenance costs were handled by the management section and maintenance unit staff were not aware of the cost to maintain facilities and equipment. But now, the operation and maintenance staff are able to utilize the plan knowing the procurement costs.

3.5.3 Financial Aspects of Operation and Maintenance

The Ministry of Finance determines the budget for the Ministry of Health. While the 2011 budget for the Ministry of Health has increased by approximately 150% from 2004, it has decreased by approximately two percentage points as a ratio of the national budget as shown in Table 9.

Table 9 National Budget of Benin and Health Budget

Unit: Million CFA Francs

Fiscal Year	2004	2011
National Budget	547,700	1,099,375
Ministry of Health Budget	45,670	69,153
Budget Ratio	8.34%	6.29%

Source: République du Benin Ministère de la Santé 'Annuaire des Statistiques Sanitaires 2011'

Regarding the financial status of HOMEL, consultation/medical care fees have increased 115% between 2004 and 2012, and overall income has increased by 151% (Table 10). Subsidies from the Ministry of Health used to comprise approximately 30% of the overall income (approximately half of the consultation/medical care fees) until 2009, and this ratio has been increasing since 2010. The reason for this increase is that the Ministry is supporting the improvement of facilities and equipment at HOMEL and these additional costs are added on top of the regular support fund. This additional funding is reflected under "others" in the expenditure figures. In 2012, the financial status turned to surplus from a deficit as a result of the organization of client account and immobilization. Action taken by HOMEL to improve the financial status included; 1) collection of outstanding consultation/medical care fees, (the unpaid amount was reduced to 25 million CFA per year from 50 million CFA per year), and 2) expansion of services by adding two units, cardiology and counseling.

Interviews with the Hospital Director and the operation and maintenance manager revealed that the required funds for operation and maintenance were being allocated in an effort to ensure efficient services without any interruption. In addition, the service life of the equipment was noted in the maintenance plan, and discussions on procuring new equipment were taking place.

Table 10 Financial Status of HOMEL

Unit: Million CFA Francs

		2004		2005		2011		2012	
Income	Consultation Fee	821.62	68.6%	925.02	68.4%	865.82	56.8%	943.92	52.1%
	Ministry of Health	368.40	30.8%	424.95	31.4%	657.21	43.1%	867.57	47.8%
	Subsidies from Other Agencies	4.97	0.4%	0.00	0.0%	0.20	0.0%	0.00	0.0%
	Unpaid Amounts to Vendors	0.93	0.1%	0.61	0.0%	0.00	0.0%	0.00	0.0%
	Fixed Assets	1.94	0.2%	1.53	0.1%	0.00	0.0%	1.98	0.1%
	Total	**1,197.86**		**1,352.11**		**1,523.23**		**1,813.47**	
Expenditure	Personnel	426.37	28.5%	537.38	33.2%	812.75	51.2%	862.23	49.0%
	Drug Cost	206.31	13.8%	170.84	10.6%	92.72	5.8%	131.88	7.5%
	Office Management Cost	2.60	0.2%	3.64	0.2%	179.74	11.3%	1.03	0.1%
	Facility Operation and Maintenance Cost	0.87	0.1%	0.42	0.0%	2.68	0.2%	0.95	0.1%
	Equipment Operation and Maintenance Cost	5.42	0.4%	5.58	0.3%	2.75	0.2%	6.27	0.4%
	New Equipment Procurement Cost	159.38	10.6%	88.37	5.5%	12.23	0.8%	71.77	4.1%
	Consumables	366.96	24.5%	35.13	2.2%	21.11	1.3%	39.15	2.2%
	Public Service Cost	90.96	6.1%	109.25	6.8%	162.69	10.3%	126.75	7.2%
	Other Cost	237.69	15.9%	666.63	41.2%	300.18	18.9%	518.66	29.5%
	Total	**1,496.56**		**1,617.24**		**1,586.85**		**1,758.69**	
	Difference in Income and Expenditures	**-298.70**		**-265.13**		**-63.62**		**54.78**	

Source: Responses to questionnaire

3.5.4 Current Status of Operation and Maintenance

During the Basic Design Study, it was confirmed that although most facilities and equipment were obsolete, they were operational and that the hospital departments were functioning effectively. In addition, weekly and monthly medical statistics were analyzed and posted in the hospital to help improve the services. Regarding cleaning and waste collection, it was verified that these were done in line with standard procedures and that the hospital was clean.

At the time of the ex-post evaluation, it was confirmed that the operation and maintenance department was maintaining the facilities and medical equipment provided by this Project. Maintenance work was being implemented based on the guidelines and ledgers prepared by the soft components of the Project, and it was verified that the facilities and equipment were functioning without any issues. Detailed records of the service life and status of the medical equipment were found in the ledger, and procurement plans were formulated for spare parts depending on the level of wear and tear. Health personnel knew the mobile phone numbers of the operation and maintenance staff, so that they could be contacted in the event of a problem. Furthermore, the guidelines, ledger and other tools that were prepared as soft components of this Project were applied not only to the facilities and equipment provided by the Project but to all facilities and medical equipment of the hospital.

Regarding operation and maintenance of facilities and equipment, emphasis is placed on preventive measures. Daily checkups by end users, the health personnel, were in place, as well as periodic checks by the operation and maintenance unit members. The work flow for maintenance, available in graphic form, was well-known among all staff.

In addition, the program on “Total Quality Management Program for Better Hospital Services” which relates to the operation of facilities and medical equipment started in 2009. It was verified that this program has helped to incorporate the operation and maintenance of facilities and equipment into suitable and efficient hospital management.

No major problems have been observed in the operation and maintenance system, therefore, sustainability of the Project effect is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of this Project was to enable the Lagoon Mother and Child Hospital (hereinafter referred to as HOMEL) to function as the top referral hospital for maternal and child healthcare by constructing hospital wards, a delivery ward and providing equipment. This objective was consistent with the development policies and needs of the Government of Benin at the time of the planning and the ex-post evaluation for the Project, and it was in line with Japanese ODA policies toward Benin at that time. Therefore, the project relevance is high. Due to factors such as the strikes by health personnel and changes in the domestic health sector environment, a number of operation indicator targets were not met. However, the quality of medical services improved, benefitting the users of the hospital; the outpatient waiting time for doctor consultations was shortened, and the facility structure was optimized for hospital users. These improvements were possible due to the positive synergy created from this Project being combined with other technical cooperation projects. Since some results were achieved, the effectiveness and impact of this Project could be regarded as fair. While outputs in accordance with the initial plan were achieved, there were three items on the Benin side that were not yet complete and were still being addressed at the time of the ex-post evaluation. Thus the efficiency is low. On the other hand, there were no significant issues regarding operation and maintenance, thus the sustainability of the Project is high.

In light of the above, this Project is evaluated to be partially satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) Completion of the Project

Through the ex-post evaluation field study, it was verified that three inputs from the

Benin side had not been completed. Specifically regarding the medical gas, the gas piping has already been installed, and since it was delivered with nitrogen inside, it is possible that the pipe may have rusted since it has not been used for an extended period of time. If the pipe is rusted, the piping work will need to be done again, meaning that that expenditure will have been wasted. All three items are important to maximize the benefits of this Project, so it is recommended that these issues be dealt with as soon as possible.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

(1) Effective Combinations of Soft Components and Other Schemes

In a hospital improvement project like this one, “soft components” that support operation and maintenance of facilities and medical equipment are very important in terms of sustainability. One of the major factors in enabling the soft components to be adequately utilized in this project is the implementation of additional schemes, such as the “Total Quality Management Program for Better Hospital Services (5S-KAIZEN-TQM)” that started in parallel with the Project, as well as the dispatch of an expert in medical equipment maintenance (short-term). In addition, since 2006, JICA has dispatched Japanese experts such as Program Advisors for the Maternal and Child Health Program, and have sent HOMEL staff to Japan for training (22 staff) and to third countries (35 staff) as part of the “Benin Maternal and Child Health Program”. Through an effective combination of these programs and schemes, outputs have been maximized in this Project, and the same approach could be applied to other similar projects.

(2) Confirmation for Counterpart Procurement

Problems related to procurement by the counterpart government have become a bottleneck for this Project. When equipment needs to be procured by the counterpart government and the equipment is procured from overseas, as is the case in this Project, it is advisable to review the counterpart agency’s experience and guidelines (including the measures to be taken in case the procurement was not fulfilled in a timely manner.) and assess the feasibility of counterpart procurement.

(3) Mobilizing Support of the Entire Organization

It was confirmed through the ex-post evaluation field study that three Benin side inputs had not been completed. For this Project, submission of the required documents (bank draft) to the counterpart by the Dutch vendor became a bottleneck. In the current situation, it

was difficult for DIEM to break this deadlock on their own, so support of other Ministry of Health offices was required. It would be important to confirm whether there exits an appropriate system in place to facilitate smooth procurement, in addition to verifying the past procurement experiences.

(4) Considerations while Setting Operation Indicators

While setting operation indicators, it is often effective to use indicators associated with actions or phenomenon at facilities which could be described as “XYZ increases”. But for a health facility improvement project, it is not always desirable to have an indicator which “increases”. There are cases in which progress and improvement of services provided at a lower level health facility and educational activities in the community could result in the early detection and treatment at lower level facilities. Moreover, the patients might not have to be treated at the referral health facilities if there were an increase in the number of lower level health facilities. Therefore, while setting indicators, it is important to review the development policies of the whole sector and any factors that might influence the project. This will help to identify appropriate indicators to assess the quantity and quality of the service provided by the health facility.

Republic of Kenya

Ex-Post Evaluation of Japanese ODA Grant Aid Project

The Project for Improvement of District Hospitals in the Western Region of the Republic of Kenya

External Evaluator: Hiromi TAKENAKA

Nonprofit Organization HANDS

0. Summary

The objective of this Project is to enable Kisii District Hospital[1] in Kisii District, Nyanza Province, and Kericho District Hospital in Kericho District, Rift Valley Province to function as top referral hospitals of the areas by improving the outpatient department building for Kisii District Hospital, constructing the emergency diagnosis and treatment unit (casualty) for Kericho District Hospital, and providing equipment to both hospitals. This objective is consistent with the development policies and needs of the Government of Kenya at the time of the planning and ex-post evaluation of the Project, and it was in line with the Japanese ODA policies toward Kenya at that time. Therefore, the project relevance is high. The operation indicators were basically met and the hospitals expanded their services in both quantity and quality wise. The health personnel and patient satisfaction was high according to the beneficiary survey and other expected effects were observed. Thus effectiveness and the impact of the Project are high. While output was achieved according to the plan, the Project period was significantly prolonged. However, taking into account that the Project period was affected by the instability caused by the presidential election and a piracy by a group of Somali pirates which can be considered as an accident by “force majeure”, the Project period should be considered as slight delay. Thus efficiency of the Project is fair. No major problems have been observed in the operation and maintenance system, thus the sustainability of the Project effect is high.

In light of the above, this project is evaluated to be highly satisfactory.

1. Project Description

Project Location

Kisii Level 5 Hospital (Left) and Kericho District Hospita (Right)

[1] At the time of Basic Design Study, Kisii District Hospital, currently Kisii Level 5 Hospital was a “district hospital” which was classified as the quasi-provincial hospital.

1.1 Background

The state of health indicators among people in the Republic of Kenya ranked one of the worst in the world, as were neighbouring countries in East Africa at the time of Basic Design Study. Particularly the western part of the country sharing borders with Uganda and Tanzania, namely five Districts in Nyanza and Rift Valley Provinces, was suffering from widespread infectious diseases such as malaria, tuberculosis, measles, and HIV/AIDS. The western part of Kenya lacked social infrastructure in spite of their significant number of population. Many of the health facilities at various levels were built and equipped as far back as in the 1940s to 1970s and had not been upgraded since. Often they had to cope with infrastructure problems and medical equipment broken down. To tackle these problems, the Government of Kenya had been implementing programs by putting more emphasis on establishing referral systems at district level to improve the community health service, and by upgrading the health sector infrastructure.

In responding to these efforts by the Government of Kenya, the Japanese government had been providing various assistance to strengthen high level medical facilities at the central level, and to improve facilities and healthcare services at the district level. For the western part of the country in particular, two projects were implemented; the improvement of health centres at primary health care level in 2001, and strengthening of the management and the operation at health centres and the improvement of maternity care services since 2005. As a result, health service provided at the primary health care level was showing some improvements at the time of the Basic Design Study. On the other hand, however, the secondary health care level, which is at the district hospital level, was slow in progress. Though the referral system from the primary to the secondary level started to function, district level hospitals were not capable of providing appropriate care to referred patients in a timely manner due to the deterioration of the facilities and medical equipment.

Faced with the budgetary constraints in the health sector, the Government of Kenya realized difficulties to solve these problems, and therefore, filed in 2004 a request with the Government of Japan for a grant aid intended to strengthen the functions of Kisii District Hospital (classified as a quasi-province hospital then) in Nyanza Province and Kericho District Hospital in Rift Valley Province. Both hospitals were core hospitals at district level medical and healthcare services in the western part of Kenya, and were expected to improve the healthcare service of the region through improvement of facilities and provision of equipment.

1.2 Project Outline

The objective of this Project is to enable Kisii District Hospital in Kisii District, Nyanza Province, and Kericho District Hospital in Kericho District, Rift Valley Province to function as top referral health facilities in the area by improving outpatient department building for Kisii District Hospital, constructing emergency diagnosis and treatment unit (casualty) for Kericho District Hospital, and providing equipment, thereby contributing to the improvement of health/medical care service in the area. Further, the Project had second phase, though it was not planned initially. (Detailed

information is provided under the section of 3.4 Efficiency).

Table 1: Project Outline

Grant Limit / Actual Grant Amount	1,360million yen / 1,348 million yen
Exchange of Notes Date (/Grant Agreement Date)	May, 2005 March, 2010 (March 2010) for second phase
Implementing Agency	- Ministry of Health (Ministry of Medical Service, at the time of ex-post evaluation) - Kisii District Hospital (currently Kisii Level 5 Hospital), Nyanza Province - Kericho District Hospital, Rift Valley Province
Project Completion Date	March, 2010 for First Phase May, 2010 for Second Phase
Main Contractors	Mitsui Sumitomo Construction Co., Ltd. (construction)/ Mitsubishi Corporation (medical equipment) (JV)
Main Consultant	Nihon Sekkei Co., Ltd. / Earl Consultants Inc. (JV)
Basic Design	'Basic Design Study Report on the Project For Improvement of District Hospitals in the Western Part of Kenya in the Republic of Kenya', December 2005
Detailed Design	February, 2007 to January, 2008
Related Projects	**[Japanese Technical Cooperation]** Japan International Cooperation Agency (JICA) ・ Development Study: Study on Enhancement of District Health System (1998) ・ Technical Cooperation Project: Project for Improvement of Health Service with a Focus on Safe Motherhood in Kisii and Kericho Districts (2005-2008), Strengthening Management for Health in Nyanza Province (2009-2013) **[Japanese Grant Aid]** JICA 'Project for Improvement of Health Centres in the Western Part of Kenya' (2000-2001) **[Other Donors[2]]** ・ GIZ: Construction of Ophthalmology ward and provision of equipment to Kisii District Project ・ Spain: Provision of medical equipment to Kisii District Hospital and Kericho District Hospital ・ World Bank: Construction of three wards at Kissi District Hospital ・ President's Emergency Plan for AIDS Relief (PEPFER): HIV/AIDS related support to Kericho District Hospital (rehabilitation of facility and provision of equipment)

2. Outline of the Evaluation Study

2.1 External Evaluator

Hiromi TAKENAKA, Nonprofit Organization HANDS

2.2 Duration of Evaluation Study

Duration of the Study: August, 2012 – August, 2013

Duration of the Field Study: November 23, 2012-December 3, 2012

May 5, 2013 – May 11, 2013

[2] These projects are support to Kisii District Hospital and Kericho District Hospital, which does not overlap with the Project.

2.3 Constraints during the Evaluation Study

Based on the amendment of the constitution in 2010, administrative system of Kenya would be re-clustered to 47 independent counties from 8 provinces. In addition, Ministry of Health was restructured to Ministry of Medical Service and Ministry of Public Health and Hygiene after the 2007 Presidential election. After March 2013 Presidential election, county system would be introduced and annual plan has already been developed based on county, not province or district bases, and Ministry of Medical Service and Ministry of Public Health and Hygiene would be remerged into one ministry. The ex-post evaluation took place at the time of transition period of both country and health system wise, and had difficulty in comparing related policies to certain extent.

3. Results of the Evaluation (Overall Rating: A[3])

3.1 Relevance (Rating: ③[4])

3.1.1 Relevance to the Development Plan of Kenya

The state of the health sector of the Republic of Kenya ranked one of the lowest in the world, as were neighbouring countries in East Africa at the time of Basic Design Study. Maternal mortality rate was 1,000 per 100 thousand live births (2003), and infant mortality rate was 78 per 1,000 live births (2002)[5]. To improve such situation, the Government of Kenya formulated "National Health Sector Strategic Plan (1999-2004)" in 1999 which set forth such priorities as decentralization, effective and fair allocation of health personnel, adjusting regional disparities, preventative and primary health care, establishment of referral system from health centre (primary health level) to district hospitals (secondary health level), in addition to the improvement of health facilities. As the health budget was limited, however, the improvement of health facilities was slow in progress.

Development plan for Kisii district (2002 - 2008) emphasized the importance of health sector, especially the improvement of facilities and medical equipment at health centers and district hospitals, training for health personnel, and measures against HIV/AIDS. Kericho district had listed malaria control, and measures against infectious diseases and HIV/AIDS in its district plan 2002 – 2008.

At the time of ex-post evaluation, the health sector has been given an emphasis as was at the Project Basic Design Study. In the first Medium-term Plan of Vision 2030, health issues are recognized as a pillar in the social development and the health/medical system reform is envisioned so as to enable a shift from the curative to the preventative health care. The Ministry of Health was divided to the Ministry of Public Health and Hygiene and the Ministry of Medical Service, and the secondary level health facilities are supervised by the Ministry of Medical Service[6]. In the Strategic Plan of Ministry of Medical Service (2008-2012), the importance of improving health facilities for effective medical services and strengthening the referral system for improving the access to health

[3] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[4] ③: High, ② Fair, ① Low

[5] Japan International Cooperation Agency (JICA) documents (World Health Report, World Bank 2003, JICA Safe Motherhood 2004)

[6] Currently, health facilities are divided into six levels. Previously, all the health facilities were under the supervision of the Ministry of Health, Ministry of Medical Service supervises the central top referral (level 6), province (level 5), district (level 4), and Ministry of Public Health and Hygiene supervises health facilities within the district (level 1 – 3).

facilities are noted.

As the transition to the county system was anticipated, county plans 2012/2013 had been developed instead of provincial annual plans. The 2012/2013 annual plans for Kisii County as well as Kericho County are in line with the Vision 2030, namely placing much more emphasis on human-centered health sector development than ever before, and thereby stressing the provision of quality health service from the community level to higher health facility levels. It aims at providing quality medical services in the county as a whole, while keeping the emphasis on health promotion activities regarding such issues as HIV/AIDS and antenatal care at the community level.

In light of the above, it is reconfirmed that the health and medical sector remains as an important area for the Government of Kenya. Especially the improvement of health facilities and medical equipment, as stated by the Vision 2030, is regarded important in order to achieve high quality medical services together with preventive health care services. Thus, the Project continues to be relevant to the policies at the time of the Basic Design Study as well as at the time of the ex-post evaluation.

3.1.2 Relevance to the Development Needs of Kenya

The western part of Kenya (the population around 11,370,000), sharing borders with Uganda and Tanzania, has high prevalence of such infectious diseases as malaria, tuberculosis, measles, and HIV/AIDS. The area is poor in such social infrastructure as electricity, water, and health services in spite of its significant population. District health facilities, which are the secondary level of the health care system, were suffering from such problems as obsolescence and failures of medical facilities and equipment.

Nyanza Province, where Kisii District Hospital (currently Kisii Level 5 Hospital, i.e., provincial hospital) is located, has vast area with high population density. While the Provincial Hospital at the province capital Kisumu covers the northern part of Nyanza Province, the Kisii District Hospital covers the southern part[7] of the province which consists with 8 districts and 6million people. As Kisumu locates at the northern part of the province, it is difficult to access the Provincial Hospital from the southern part of the province. Therefore, Kisii District Hospital covered not only the southern part of the province, but also people from neighboring provinces and thus had been recognized as a quasi-provincial hospital. At the time of the Basic Design Study, Kisii District Hospital was to cover almost the same number of patients as the Provincial Hospital. However, it was not capable of meeting the demand because of its deteriorating infrastructure and obsolete medical equipment.

Kericho District Hospital did not have an emergency diagnosis and treatment unit. However, patients were frequently sent from neighboring district hospitals as its operation rooms were relatively well equipped compared to other district hospitals which also did not have emergency diagnosis or treatment units. Furthermore, as Kericho District Hospital is located in a heavy traffic accident area, it

[7] Southern part of Nyanza Province is larger than northern part of Nyanza Province with more or less the same amount of population.

needed to respond to patients injured in accidents. However, because Kericho District Hospital was not equipped with an emergency diagnosis and treatment unit, emergency patients were received at the general outpatient department. As a result, the hospital was not able to provide necessary services in a timely manner for both general outpatients and emergency patients. Under such situation, the establishment of an independent emergency diagnosis and treatment unit was in urgent needs.

As the result of this Project, Kisii District Hospital became capable of providing adequate medical services as a provincial level hospital, especially in the units of outpatient and obstetrics/gynaecology. As for Kericho District Hospital, speedy and appropriate services are now provided to both general outpatients and emergency patients through the new emergency diagnosis and treatment building, which resulted in an increase in the number of outpatients (casualty, general consultation, maternal child and health, and special clinic). In addition, through the improvement of medical equipment in the general outpatient unit, it was verified that Kericho District Hospital was now able to provide medical services with better quality.

In light of the above observations, it has been confirmed that both hospitals are now fulfilling their functions as the top referral medical facilities in each area, and thus the Project is relevant to the development needs of Kenya at the time of the Basic Design Study, as well as at the time of the ex-post evaluation.

3.1.3 Relevance to the Japan's ODA Policy.

The Government of Japan underlined 'economic and social development benefiting poor strata' as a development issue in the Country Assistance Policy for Kenya. Medical and healthcare service was set as a high priority area in the Japan's Country Assistance Policy as well as the JICA's Country Assistance Strategy for Kenya. Guided by these policies and strategies, Japan had implemented various programs to strengthen the highly advanced medical treatment at the national level as well as to improve the district level medical and healthcare services[8]. Given these background, the Project under the evaluation is in line with the development issues stated in Japan's ODA policies and strategies which aim at the provision of high quality medical services at district level through upgrading medical facilities and equipment.

In conclusion, this Project is confirmed to be highly relevant with the country's development plans, development needs, as well as Japan's ODA policy, therefore its overall relevance is high.

3.2 Effectiveness[9] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

1) Kisii District Hospital

Through the Project, the number of operation and ultrasonography examinations was

[8] Maternal child health, school health, and medical facilities such as health centre.

[9] Sub-rating for Effectiveness is to be put with consideration of Impact

expected to increase as the operation room would increase from one to three rooms, and the ultrasonography was to be provided. As presented in Table 2, the number of operation tripled compared to the year 2005. Regarding the number of ultrasonography examination, it has been understood that the data acquisition method changed from at the time of Basic Design Study and at the time of ex-post evaluation, according to the health personnel. Thus, it was not possible to compare the data to evaluate impacts of the project accurately.

Table 2: Operation Indicator (Kisii District Hospital)

Indicator	【Standard Value】 Year 2005	【Target Value】	【Actual Value】 Year 2011
Total number of operation per year (including emergency, caesarian section)	2,166	Increase from standard value	6,068
Total Number of Ultrasonography examination per year*	2,453	Increase from standard value	1,357

Source: Answer to questionnaire
Note: Data collection method was different from standard value and actual value, thus it is not possible to compare. The data would be utilized as reference.

At the ex-post evaluation, outpatient's waiting time to receive consultation was surveyed though it was not an operation indicator. Ninety two percent of 40 respondents answered that the waiting time had decreased compared to the year 2009[10] (before the Project completed). In addition, the number of referral was surveyed and the result was that 95% of incoming referral patients were handled by Kisii District Hospital and remaining 5% were referred to Kenyatta Hospital (level 6 in Nairobi). The ones referred to the level 6 are those who had cancer or heart diseases, which could not be treated by Kisii District Hospital as it is level 5 (refer to Table 3)[11].

Table 3: Number of Referral[12]

	Year 2010	Year 2011
Total Number of Referral	1,910	2,113
- Incoming	1,802	1,989
- Outgoing	108	124

Source: Answer to the questionnaire

2) Kericho District Hospital

Since a new independent emergency diagnosis and treatment unit was to be built, an increase in the number of outpatients, including emergency patients, was anticipated. As presented in Table 4, the number of outpatients has increased 1.8 times compared to the year 2005. Before the Project, emergency patients were handled at the General Outpatients Department and there were cases where

[10] 'Waited more than 40 minutes for consultation' decreased from 91% to 57%. On the contrary, the ones who received consultation within 30 minutes increased from 9% to 43%. These results demonstrate that the Project has contributed to increased satisfaction of the patients.
[11] Based on the interview with the Health Facility staffs.
[12] As there were no data for Year 2005, data from Year 2010 has been utilized for the sake of comparison. Data for Year 2012 is up till end of October. It is assumed that the total number for Year 2012 would be around 1,560 taking into account that the average number per month is 130.

emergency patients lost their lives as they could not receive speedy and timely service. Currently, patients are sorted at the entrance of the hospital and these emergency patients could receive the necessary service immediately and would be monitored 24 hours for any further action.

Table 4: Operation Indicator (Kericho District Hospital)

Indicator	【Standard Value】 Year 2005	【Target Value】	【Actual Value】 Year 2011
Total number of outpatients (Including casualty) per year	86,374	Increase from standard value	162,058

Source: Answer to questionnaire

The difference in waiting time was examined, in addition to the original operation indicators, and 98% of respondents answered that "waiting time decreased compared to year 2009"[13]. Furthermore, the total number of referrals, including both incoming and outgoing, was found to have increased around 2.6 times when comparing the years 2005 and 2011. While the number of incoming referral cases increased four times, the number of outgoing referrals was more or less the same. This shows that Kericho District Hospital expanded its capacity to handle more patients, and only the cases that could not be managed, such as those who needed the CT scan, were referred up to the level 6 hospitals[14].

Table 5: Number of Referral

	Year 2005	Year 2011
Total Referral Number	86	225
Incoming	44	182
Outgoing	42	43

Source: Answer to questionnaire

3.2.2 Qualitative Effects

1) Kisii District Hospital

Through the Project, the outpatient and examination functions were integrated into one building which resulted in the reduction of burdens for health personnel as well as patients as they now don't have to wonder around the area which used to be scattered[15]. The waiting area is now placed in the middle of the building as "patio" while examination rooms are lined either next to the waiting place or at the second floor of the same building. In addition, Kisii District Hospital introduced the CCTV on its own, so that they could monitor which examination rooms are with long queue and thus could guide patients to examination rooms with fewer people waiting. This created efficiency to both medical personnel and patients which contributed to the improvement in medical

[13] The difference in waiting time was as follows; 87% of respondents answered that they used to wait more than 40 minute, which now decreased to 25%, and the ones who could receive consultation within 30 minutes increased from 13% to 75%. This resulted in increase of satisfaction of the patients.

[14] Based on interview with hospital personnel.

[15] Additional wards and departments for Kisii District Hospital have been built according to the expansion of services to provide. Thus these wards and departments were not constructed based on the concrete landscape plan and were built where there were spaces. As a result, health personnel and patients had to move around scattered wards and department to receive necessary services.

services. In the survey conducted by the hospital in 2012, 78.5% of respondents answered that they were satisfied with the waiting time.

Moreover, Kisii District Hospital expanded its services offered as the infrastructure and medical equipment were reinforced. The Hospital was originally a level 4-district hospital. With improvements brought by the Project, it became the level 5-provincial hospital, and is currently providing services to southern Nyanza Province as well as districts of the neighboring province. As the type of services have got expanded, outgoing referral patients from Kisii District Hospital are basically cancer and/or cardiac patients to whom only the level 6-hospital (i.e., the Kenyatta Hospital at the central level) can provide necessary treatment.

Furthermore, the plan of the outpatient department raised interest among the health sector not only within the province but also countrywide as its design paid attention to the line of flow of staff and patients. The Ministry of Medical Service now advises those who are interested in building hospitals to visit Kisii District Hospital in order to learn how it is operated. Inspired by the Project, Kisii District Hospital led by the Director is eagerly working on further improvements of other wards and hygiene management so that it can be regarded as a model hospital with quality services at higher level than a provincial hospital.

Table 6 presents the result of the beneficiary survey. Both medical personnel and the patients evaluated positively about the Kisii District Hospital after the Project. While only about half of patients were satisfied with the hospital before 2009, around 90% of them answered that they were satisfied with the hospital in 2012. More than 90% of medical personnel answered that "the quality of the hospital improved"[16].

Table 6: Patient Satisfaction and Recognition of Health personnel

Item	Before Year 2009	December 2012
% of patients who are satisfied with the hospital	51%	87%
Quality of hospital recognized by the health personnel (100 point)	54 point	94 point

Source: Beneficiary Survey

2) Kericho District Hospital

Before the Project, emergency patients had to wait with general outpatients for treatment. Through this Project, the independent emergency diagnosis and treatment unit was constructed and patients were sorted at the hospital entrance so that they could receive necessary service on a timely manner. In addition, emergency patients are now monitored for twenty-four hours continuously which resulted in the improvement of the quality of emergency medical services.

Through the separation of emergency care, the general outpatient unit is now able to improve its capacity in accepting more patients than before (i.e., 4 times more than compared with the year

[16] Overall, patients are highly satisfied with the hospital. Respondents answered that they have observed the improvement on the following; quality of the service, trust, knowledge and technical skill of hospital personnel, attitude, and medical equipment. The medical personnel who responded, feels that the reason for the improvement in the quality of the hospital is due to that 'the hospital could provide more quality and timely service with new equipment'. Based on the result, they also feel that 'the complaint from the patients decreased'.

2005). Also, upgraded medical equipment in the general outpatient unit enabled the expansion of services offered and the improvement of their quality.[17] The beneficiary survey and interviews revealed that both patients and medical officials' satisfaction had increased as a result.

Table 7 presents the result of the beneficiary survey and it represents that both patients and medical personnel regard the hospital highly after the completion of the Project. Before 2009, only about 50% of patients responded positively about the hospital. In 2012, nearly 90% of them said that they were satisfied with it. More than 90% of medical personnel who responded scored higher points on 100 point scale than in 2009 about the quality of services provided by the hospital, implying that they see that "the quality of the hospital improved"[18].

Table 7: Patient Satisfaction and Recognition of Health Personnel

Item	Before Year 2009	December 2012
% of patients who are satisfied with the hospital	47%	88%
Quality of hospital recognized by the health personnel (100 point)	60 point	92 point

Source: Beneficiary Survey

3.3 Impact

3.3.1 Intended Impacts

1) The Role and Function as an Educational Hospital

Both the Kisii and Kericho District Hospitals play the role as educational hospitals and constantly accept trainees and students. However, there is no significant increase in the number of trainees and students. It was understood from interviews with the Hospital Director and other health personnel that there was a shortage of health staff as the number of health professional did not match with that of patients. Thus it is difficult for them to accept more trainees and students as the number of health personnel who can be instructors is limited.

2) Synergy Effects with Related Technical Cooperation Projects

Related to this Project, there were two technical cooperation projects in the area: "Project for Improvement of Health Service with a Focus on Safe Motherhood in Kisii and Kericho Districts"[19] (from March 2005 to February 2008) and "Strengthening Management for Health in Nyanza Province"[20] (from July 2009 to June 2013). Activities for the former technical cooperation project in

[17] Outpatients (internist, surgery, psychiatry, obstetrics and gynecology, pediatrics, dentistry, ENT, ophthalmology, tuberculosis), radiology, clinical pathology, physical therapy, obstetrics, neonatal, maternal and child health/ family health.

[18] Patients' satisfaction toward the hospital is very high. Quality of service, trust, knowledge and technical level of health personnel, health personnel attitude, medical equipment, were recognized as 'improved compared before 2009'. The major reason for the medical personnel who answered as the 'quality of the hospital improved' was that 'the hospital could provide more timely and effective service by the use of new equipment'. In addition, they feel that the improvement in the quality of hospital creased such situation as 'complaint from the patient decreased'.

[19] The project aimed to improve the health status, especially maternal health in the targeted area of Kisii District, Nyanza Province and Kericho District, Rift Valley Province. In order to achieve the goal, the project focused on improvement of maternal care provided at health centres and communities, through strengthening hospital management at health centres, improved maternal care service at health centres and communities, and awareness raising at the communities.

[20] The expected outcomes include training on leadership and management and designing model for health promotion activities.

Kisii and Kericho Districts included assistance to strengthen the referral system from community to district level. Even if a patient is referred from a community to a health centre, and then from a health centre to either Kisii or Kericho District Hospital, if the hospital was not capable of providing necessary services on a timely manner, the effort might end in vain. Thus, through this Project, it was hoped that the District Hospitals became more capable of providing appropriate services to outpatients, including expectant mothers, through improvements in hospital facilities and medical equipment. However, the said technical cooperation project in Kisii and Kericho Districts finished before the completion of the Project under the evaluation and the direct synergy effects between two projects could not be identified.

Another project “Strengthening Management for Health in Nyanza Province” which aims to strengthen the capacity of province and district health management teams is an on-going project. This project covers Nyanza province where Kisii District Hospital locates, however, it was difficult to identify direct contributions since Kisii was not included in pilot districts of the technical cooperation project.

Though it was difficult to observe direct synergy and collaboration between technical cooperation projects and the Project, it is expected that results of each project will bring about synergy effect so as to contribute to the improvement of health service in the target area.

3) The Improvement in Financial Independence

Kisii District Hospital increased its total annual revenue by 1.7 times and Kericho District Hospital by 2.4 times compared to year 2005/2006, the project design stage. The proportion of the revenue from consultation/diagnosis and treatment fees used to be about 50%, and the rest from government subsidy for both hospitals in 2005/2006. By 2012, the consultation fee proportion increased significantly and government subsidy decreased (see to 3.5.3 Financial Aspects of Operation and Maintenance). In both hospitals, the number of patients increased, which led to the increase in consultation/diagnosis and treatment fees, and thus financial independence improved substantially.

4) The Improvement in People’s Health

Before the Project, there were cases where emergency patients lost their lives as they had to wait among other outpatients for necessary treatment, according to interviews with medical personnel. Currently, patients are sorted at the hospital entrance, and emergency patients can receive immediate service with 24 hours monitoring. As a result of this quick response, the health personnel who are involved in the emergency service note that lifesaving rate is improving, which contributes to improvement of health conditions of people in the community.

3.3.2 Other Impacts

1) Impacts on the natural environment

The Project covered the waste water drainage, waste management (including medical waste),

infectious disease prevention and nosocomial infections, and no negative impact on natural environment was found. Sewerage treatment facilities are fully equipped for the waste water, and for the exhaust system, generator runs only at the time of a blackout and a trial run. Thus, there have not been any issues in particular. Regarding general and medical waste, an incinerator in line with the standard of the Environmental Standard of Kenya (draft at the time of Basic Design Study) was introduced to Kisii District Hospital so that they can manage both types of wastes. For Kericho District Hospital, the City of Kericho collects and disposes general waste. For the medical waste, the City also collect it but separately from other waste and burns it at a newly installed incinerator for medical waste. Both hospitals were in line with the related regulations and guidelines of the country[21].

2) Land Acquisition and Resettlement

Due to the fact that the Project was implemented on the existing site of both hospitals, resettlement of residents and land acquisition were not required. According to the Project documents and interviews with hospitals staff, there have been no complaints from residents to date, including during the time of the Project implementation. Thus, it is confirmed that no negative impact was created by the Project with regard to the resettlement or land acquisition.

3) Unintended Positive/Negative Impacts

It was observed that the moral and the motivation of the health personnel improved as the reinforcement of facilities and medical equipment contributed to upgrading of the quality of services. Before the Project, health personnel found it rather difficult to maintain their motivation as they were not able to provide appropriate and necessary services on a timely manner, and sometime ended in the loss of patients' lives. Through the Project, the motivation increased as they could provide necessary services on time. In addition, the improved level of satisfaction among patients resulted in higher reputation of the hospital in the area, and hence raised the health personnel's motivation. The ranking of the country's health facilities, which was introduced by the government in 2008, facilitates competition among them. Moreover, awarding of "best health personnel of the year" has also been introduced and now practiced all over the country. All these new measures outside the Project also have contributed to enhancing motivation of health personnel and creating synergetic effects.

On the other hand, there were only a few increases in health personnel though the number of the patients increased due to the improvement of the services accompanied with timely respondent. It has to be noted that from the beneficiary survey, 70% of health personnel from Kisii District

[21] The Project is complied with the following regulations for waste water management; 1) Legal Notice No.121: Waste Management Regulation (2006), 2) Legal Notice No.101: Environmental Impact Assessment and Audit Regulation (2003), 3) Legal Notice No.120: Water Quality Regulations (2006). In addition, it is also complied with "Guideline for Managing Health Care Waste" for medical waste management. Dustbin are coloured in either black, yellow, red, and black stands for general waste (rubbish, paper, etc), yellow for medical waste without blood and red for medical waste with blood. In addition, small containers are provided separately for placenta, and used needles are collected in a dedicated box. Both hospitals utilize the incinerator for medical waste which is in the hospital. The Project is also complied with the national guideline 'National Infection Prevention and Control Guidelines for Health Care Services in Kenya' for infectious disease prevention, which was set in 2010.

Hospital and 30% from Kericho District Hospital responded that they had been serving patients beyond their capacities.

Though data collection method was different for one of the operation indicators and it was not possible to compare standard and target values accurately[22], the result of the operation indicators proves that the Project has achieved its objectives, as most of indicators demonstrated increases. The breakdown of the referral number also shows that the service of the two hospitals improved. In addition, though the two hospitals used to be district hospitals (level 4), they are now providing either level 5 or equal to level 5 services, equivalent to province level hospitals. The facilities and medical equipment of the Project were utilized and operated effectively, and the improvement of the services resulted in the increase in patients' satisfactions, as well as to health personnel as they could provide quality and timely services.

Based on the above, this project has largely achieved its objectives, therefore, its effectiveness is high.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

As Table 8 shows, the Project was implemented as planned though there were slight changes in the output. Regarding the air conditioner/cassette, the shipment which contained them was captured by a group of Somali pirates, and as a result, the installation and necessary construction of the equipment were covered by the second phase of the Project (see to 3.4.2).

Table 8: Outputs

【Planned】 Basic Design Study	【Actual】 Implementation
【Japanese Side】 ■Kisii Level 5 Hospital · Facilities: Outpatient Department Building, Ancillary facility, elevated water tank · Medical equipment: 63 types of equipment for general outpatient, casualty, special clinic、X-ray division, Operation Division, High dependency unit (HDU) division, delivery division、existing facilities ■Kericho District Hospital · Facilities: Casualty, ancillary facility, elevated water tank · Medical equipment: 53 types of equipment for casualty and some existing facilities ■Common Output for Two Hospitals (Soft Component Program) · Technical support on maintenance system and medical waste management system. · Technical support on infectious prevention.	【Japanese Side】 · Minor changes were made but have basically been implemented as planned. · As the shipment which contained air conditioner/cassette was captured by a group of Somali pirates, these were covered by the second phase of the project.
【Kenyan Side】 · Relocation of the existing gate and access road (Only for Kisii Level 5 Hospital) · Demolition of the existing facilities and building site preparation	【Kenyan Side】 · It has been confirmed that it has been implemented as planned.

[22] Among the operation indicators, the data acquisition method of the ultrasonography examination at the time of Basic Design Study and at the time of ex-post evaluation was different. Thus it was not possible to compare the data to understand what has been achieved accurately.

in the site of the cooperation project. · Cost of transfer of the demolished facilities and replacement of existing infrastructure. · Improvement of the power system. · Purchase of general furniture (including medical consultation desk set) and supplies. · Bearing of the expenses of relocation to the newly built buildings.	

Source: JICA documents

3.4.2 Project Inputs

3.4.2.1 Project Cost

As Table 9 shows, a second phase of the Project was not planned initially. However, the additional E/N (Exchange of Notes) for the second phase for 27 million Japanese Yen was agreed, which made aggregate limit of the first and second E/N up to 1,360 million Japanese Yen. The actual expenditure was 1,348 million yen (99% against planned).

The reason for the addition of a second phase was that the shipment which contained air-conditioners and cassettes was captured by a group of Somali pirates. As it was difficult to assume when the shipment would be released, this equipment had to be re-procured[23] through another phase. In the ex-post evaluation, this unexpected accident is taken into consideration and the planned total project cost is considered to be the sum of the total project costs of the first and second phases. The difference in the amount for Kenyan side is due to the increase in the cost for the improvement of the power system for Kisii District Hospital, and the increase in cost for the transfer of demolished facilities and the abolition of scrapped material for Kericho District Hospital[24].

Table 9: Project Cost – Plan and Actual

Unit: million Japanese Yen

	Initial Plan	Additional E/N	Actual
Total Project Cost	1,371		Approximately 1,392
・Japanese (E/N limit)	1,333	27	1,348
・Kenya	38[25]		Approximately 44[26]

Source: JICA documents

3.4.2.2 Project Period

As shown in Table 10, while project period was planned as 20 month, the actual project period was 37 month. The delay in the project period was due to the political uncertainty after the 2007 Presidential election and by the incident of piracy off the coast of Somalia[27].

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[23] In 27 December 2007, Presidential election was held and result brought civil unrest with riots. Japanese residents in Kenya, including the Project members, had to evacuate. Though the Ministry of Foreign Affairs of Japan lifted a ban on travel to in April 2008 Nairobi, the Project area was regarded as a 'Hot Spot' and the project members could not enter the area till September 2008. As 10 month had past already in October 2008, discussion took place in order to resolve force majeure clause, and constructors needed further time to examine the security situation. The construction work could only start from February 2009.

[24] Includes additional construction cost for HIV/AIDS Clinic as it needed to be continued.

[25] Exchange rate: 1 Kenyan Shilling = 1.526 Japanese Yen

[26] Exchange rate: 1 Kenyan Shilling = 1.393 Japanese Yen (average rate between the year of start of the Project and the year of hand-over.

[27] As the shipment which contained air conditioner/cassette was captured by a group of Somali pirates, these equipment had

Table 10: Project Period—Planned and Actual

	Plan	Actual
Detail Design	4 month	4 month (from E/N detailed design study to E/N construction)
Tender	3 month	4 month (from E/N construction to contract with contractor)
Construction	13 month	29 month (from contract with contractor to handing over date)
Total	20 month	37 month (185% against planned period)

Source: JICA documents

At the time of Basic Design Study, 4 months for detail design, 3 months for tender, 13 months for construction, 20 months in total was planned. However, the construction could not start until February 2009, which caused 13 months delay. After the 2007 presidential election, Japanese construction company could not enter the area till September 2008 due to the political instability of the area, and had to reassess the security situation of the area as well as to consult with the Kenyan side the interpretation of contract termination by force majeure. In addition, the Project period was affected by the incident of piracy in which the ship containing air conditioners and cassettes for the Project was captured. A second phase of the Project was added so as to re-procure these stolen items, and this caused 2 months of delay. In total, the Project period was delayed by 15 months.

The actual project period was 37 months in total, and it was significantly longer than planned (20 months). However, taking into account 15 months of delay caused by the above-mentioned factors, the evaluator re-calculated the project period by deducting 15 months and concluded the revised actual project period as 22 months in total; which is to say 110% compared to the planned project period. In sum, the project period with the revised actual project period was “slightly longer than planned”.

Although the project cost was within the plan, the project period exceeded it, therefore efficiency of the project is fair.

3.5 Sustainability (Rating: ③)

3.5.1 Institutional Aspects of Operation and Maintenance

At the time of the project design stage, both hospitals were defined as secondary level hospital in the Kenya’s health system, and were the top referral hospital within each district. The Kisii Hospital consisted of 6 general outpatients, 5 wards, 3 examination departments, and administration. The Kericho Hospital consisted of 6 general outpatients, 6 wards, 3 examination departments, and administration. The operation and management structure of district hospitals is represented by a hospital director, who is assisted by heads of medical departments (medical treatment and nursing), examination departments and the administration.

There is no major change in the structure of operation and management since the time of Basic Design Study. Though both hospitals have not employed additional staff for the maintenance

to be re-procured through the second phase of the project.

unit, regular maintenance is carried out systematically according to guidelines and ledgers which were reinforced by the Project's technical assistance.

At the time of Basic Design Study, the regional maintenance unit in both provinces functioned[28]. However, at the time of the ex-post evaluation, personnel of maintenance and administration bureau of both hospitals mentioned that it did not function anymore as GIZ ended its assistance. Spare-parts that are held by the regional maintenance unit are limited in number (quantity) and varieties, and moreover, they do not match with the medical equipment of the two hospitals. Nevertheless, both hospitals are able to procure necessary spare-parts by themselves.

Regarding the cleaning and waste collection, Kisii District Hospital hires cleaning personnel and the hospital provides training for them. On the other hand, Kericho District Hospital outsources the cleaning and waste collection to a private company. Health personnel of the hospital separate general waste and medical waste into three categories: black, yellow and red. Cleaning personnel collects and handles the waste accordingly to the regulations.

3.5.2 Technical Aspects of Operation and Maintenance

There is no particular problem to be noted regarding the human resources of health personnel[29]. All health personnel holds relevant national qualifications, and all technicians also holds medical qualifications or have acquired necessary technology in order to be able to operate medical equipment procured by the Project. Both hospitals have the role as educational hospitals and provide training and technical supports to human development of health personnel and health facilities at lower levels in the region. Thus, it was felt that both hospitals have attained adequate level of human resources.

The Hospital Maintenance Units (HMU) of both hospitals maintain facilities and medical equipment. They provide maintenance and management service from regular check-ups to repair work for malfunctioning medical equipment, and the level of technical capacity of both HMUs is considered as adequate for daily maintenance. The maintenance for the equipment which requires advanced maintenance and repair is outsourced and carried out when necessary. Though HMU staffs have opportunities to participate in the professional trainings provided by the government and relevant ministries, they request more brush-up and step-up type of trainings since these are still quite limited[30].

In addition, the director and staff of Kericho District Hospital recognize that it is more costly to repair broken equipment, and emphasize the importance of preventive measures, such as proper usage and regular maintenance in order to avoid a complete breakdown.

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[28] When an issue was raised and it was beyond the capacity of the management unit of District hospital, it was transferred and handled by the management unit of Provincial hospital. Spare-parts were stocked in 4 storages and necessary spare-parts were purchased on a request-basis through a centralized procurement system. Since it was not an on-line system, technicians at District hospital would receive a fax once requested spare-parts arrived at the storage so that they could be picked up.

[29] Based on the interview with the Directors and health personnel of both hospitals.

[30] Kisii District Hospital staff received 2 training courses and Kericho District Hospital staff received 1 training course, both related to facility and medical equipment maintenance. These training courses were announced by the Ministry of Medical Services for the respective health facilities.

3.5.3 Financial Aspects of Operation and Maintenance

The health sector of Kenya depends heavily on tax revenue. At the same time, the user fee system has already been implemented. There are two main sources of national budget in the health sector, one is “health development budget” (construction of facilities, equipment procurement, etc.) and the other is “health regular budget” (labour and administrative costs). The proportion of the budget for the health sector in the government budget decreased from 8% at the time of Basic Design Study to around 6% in years 2010 and 2011.

Table 11: Percentage of Budget for Health Sector against National Budget

	Year 2004	Year 2010	Year 2011
Proportion of Health Sector Budget against National Budget	7.9 %	5.9 %	5.9 %

Source: WHO Database

The budget of both hospitals consists of subsidy from the Ministry of Health and consultation/diagnosis and treatment fees. Tables 12 and 13 show that Kisii District Hospital increased its total income by 288% and Kericho District Hospital, by 275%, when compared with years 2004/2005 and 2011/2012. The subsidy from the Ministry of Health to Kisii District Hospital decreased by approximately 46%, and the subsidy to Kericho District Hospital increased by 140%. Furthermore, the percentage of subsidy against total income of Kisii District Hospital decreased from 36% to 7%, and that of Kericho District Hospital, from 30% to 15%. On the other hand, the consultation/diagnosis and treatment fees of Kisii District Hospital increased by 4.2 times, and that of Kericho District Hospital, 3.3 times. Similarly, the percentage of consultation/diagnosis and treatment fees against total income of Kisii District Hospital increased from 64% to 93%, and of Kericho District Hospital increased from 69% to 85%.

Table 12: Income and Expenditure of Kisii Hospital

Unit: 100 million Kenyan Shilling

	Year 2004/2005	Year 2011/2012
Subsidy from the Ministry of Health	16.68	9.09
Medical Treatment/ Consultation Fee	29.47	124.04
Total Income	46.17	133.13
Total Expenditure	46.17	133.13

Source: Answer to Questionnaire

Table 13: Income and Expenditure of Kericho Hospital

Unit: 100 million Kenyan Shilling

	Year 2004/2005	Year 2011/2012
Subsidy from the Ministry of Health	6.90	9.69
Consultation Fee	16.00	53.54
Total Income	22.91	63.23
Total Expenditure	22.91	63.23

Source: Answer to Questionnaire

The total income is equal to the total expenditure in both hospitals. The directors and relevant staff of both hospitals confirmed that they keep balanced payment. As Table 14 shows, the maintenance costs increased after the Project completion. Of the total expenditure, maintenance cost accounts for approximately 29% for Kisii District Hospital, and 4% for Kericho District Hospital. According to the hospital personnel, the reason for this increase is mainly due to the increase in the cost of procurement of spare parts for medical equipment, the increase in unit cost for utilities (3 times more for electricity unit cost, for example) and consumption of utilities. Regarding Kisii District Hospital, the reason that the maintenance cost accounts for nearly one third of the total expenditure, is that the hospital installed LAN system and CCTV system which enables them to monitor waiting time of patients.

Both hospitals (directors and HMU staffs) pointed out that the maintenance is a pressing issue as the cost for maintenance increased as well as the percentage of the maintenance cost against the total expenditure also increased. Many of the spare parts for the medical equipment procured by the Project are not locally available and they need to procure from a third country. Thus spare parts procurement has become expensive and time consuming. Taking this background into account, both hospitals prioritize procurement by cost and timing and take preventive measures as much as possible, so as to minimize the negative impacts on hospital services.

Table 14: Maintenance Cost of Kisii District Hospital and Kericho District Hospital

Unit: 100 thousand Kenyan Shilling

	Year 2010/2011		Year 2011/2012	
	Maintenance Cost	% out of Total Expenditure	Maintenance Cost	% out of Total Expenditure
Kisii District Hospital	14.44	11%	39.04	29%
Kericho District Hospital	1.87	3%	2.85	4%

Source: Answer to Questionnaire

3.5.4 Current Status of Operation and Maintenance

Hospital Management Unit (HMU) is in charge of the maintenance of facilities and medical equipment implemented by the Project. HMU practices maintenance work in accordance with such tools created by the Project's soft component as: the guidelines, maintenance system flow, yearly maintenance plan, ledger for facilities and equipment, and maintenance record. Detailed information such as life-span and conditions of medical equipment at the time of daily maintenance is recorded in the ledger for equipment. Spare-parts are purchased based on the procurement plan and the level of wear and tear, and the timing of maintenance and parts replacement is planned based on these records. Health personnel knew the Mobile phone numbers of the HMU staffs, so that they could be contacted quickly in the event of a problem. These guidelines and ledgers are applied not only to the facilities and equipment supported by the Project, but also to the whole facilities and equipment of the hospital.

Based on the above, no major problem has been observed in the operation and maintenance system, therefore, sustainability of the Project effect is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of this Project is to enable Kisii District Hospital[31] in Kisii District, Nyanza Province, and Kericho District Hospital in Kericho District, Rift Valley Province to function as top referral of the area by improving outpatient department building for Kisii District Hospital, constructing emergency diagnosis and treatment unit (casualty) for Kericho District Hospital, and providing equipment for both hospitals. The objective is consistent with the development policies and needs of the Government of Kenya at the time of the planning and the ex-post evaluation of the Project, and it was in line with the Japanese ODA policies toward Kenya at that time. Therefore, the project relevance is high. The operation indicators were basically met and the hospitals expanded their services in both quantity and quality wise. The health personnel and patient satisfaction was high according to the beneficiary survey and other expected effects were observed. Thus effectiveness and impact of the Project are high. While output was achieved according to the plan, the Project period prolonged significantly. However, taking into account that the Project period was affected by the instability caused by the presidential election and a piracy by a group of Somali pirates which can be considered as an accident by "force majeure", the Project period should be considered as slight delay. Thus efficiency of the Project is fair. No major problems have been observed in the operation and maintenance system, thus the sustainability of the Project effect is high.

In light of the above, this project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) Cleaning and Waste Collection

The two Hospitals have adopted different ways of cleaning and waste management; Kisii District Hospital hires cleaning staff directly, while Kericho District Hospital outsources cleaning and waste management to a private company. Both systems have advantages and disadvantages. As Kisii District Hospital does, direct recruiting relatively reduces labor costs. At the same time, cleaning and waste collection staff has to be trained, given guidance, monitored, and managed by the hospital whenever there is a turnover. In addition, the hospital has to purchase consumables and equipment for the cleaning, such as clothes and gloves. On the other hand, outsourcing these works to a private cleaning company eases the burden of quality control. The training, re-training, and replacement of consumables are direct responsibilities of the company. It may be worthwhile to reconsider which option is better suited to the hospital, taking into account the advantages and disadvantages of direct recruitment and outsourcing.

[31] At the time of Basic Design Study, Kisii District Hospital, currently Kisii Level 5 Hospital, was a "district hospital" which was classified as the quasi-province hospital.

(2) The Impact of Improvement of the Hospital and Medical Equipment on staff.

Through the Project, moral and motivation of the staff has been enhanced and the quality of services (timely response, in particular) was improved. The number of patients has also largely increased alongside. On the other hand, the number of health personnel and relevant staff has not increased, and the health personnel and relevant staff actually feel that they are overstretched. It is highly recommended to take urgent actions by verifying the ratio of health personnel and patients, and working hours of the employees, for example, that are under the control of the Ministry of Health.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

(1) Data Collection and Calculation Method

Data calculation method for the number of ultrasonography examination at the time of project design was different from the one at the time of ex-post evaluation. As the number of ultrasonography examination was applied as an operation indicator, it became difficult to compare and to judge the project effect. Upon deciding operation indicators, it is important to verify the ways of data acquisition and calculation method even if the data is submitted by relevant stakeholders.

(2) Considerations on “Appropriate Referral System”

One of the outcomes expected from the Project was that “an appropriate referral system is set through reinforcement of the hospital and intensive concentration of outpatient at district hospital is mitigated”. It is rather difficult to quantitatively specify the cause and effect link of “mitigation of intensive concentration of outpatients” and “increase/decrease of the number of referral”. Taking into account such a difficulty, the evaluator tried to examine several data to analyse the changes in the quality of services provided by the hospital and the working situation of the referral system. From the view point of qualitative analysis, the evaluator interviewed relevant hospital staffs and acquired such qualitative data as “the hospital was enabled to handle more cases by themselves, and the number of patients who are referred to higher level hospital decreased”. In the meanwhile, the quantitative data analysis such as the incoming and outgoing referral numbers made clearer that the total referral numbers increased while the number of outgoing patients did not increase. Thus, upon evaluating the hospital project, it might be worthwhile to take into account the proportion of incoming and outgoing patients, in addition to the total referral number.

(3) Consideration on Improvement of Facility and Medical Equipment, and Staff Allocation

Through the improvement of the facility and medical equipment, both hospitals were able to increase the types of services to be offered, and to upgrade the quality of services. At the same time, the moral and the motivation of the health personnel and satisfaction of the patients were enhanced. As

a result, both hospitals now receive more patients than expected while the number of health personnel remains more or less the same. Hence, the ratio of patient per one health personnel increased. Behind this background, staff recruitment of public hospitals is handled by the Ministry of Health (Medical Service) and the hospital cannot employ staff on its own decision. Since the recruiting more staff will affect the budget of the Ministry of Health, it is not easy for the Kenyan government whose budget is under severe pressure to increase the staff number. Thus, upon planning a similar hospital project, the possibility of the increase of burden of health personnel as a result of the increase of patients should be taken into consideration. It is desirable to discuss such human resource issues from the project planning stage with concerned stakeholders (i.e. Ministry of Health, hospitals), who are in charge of the recruitment of health personnel, in addition to the issues of facility and equipment improvement.