Republic of Mozambique

FY2024 Ex-Post Evaluation Report of Japanese Grant Aid Project

"The Project for Emergency Rehabilitation of Transmission Network"

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0. Summary

This project was conducted to improve and stabilize a power supply to the southern grid by rehabilitating an existing substation (Infulene Substation) in the suburbs of the capital city of Maputo, thereby contributing to the improvement of the lives of local residents and the promotion of economic activities in Mozambique. This project was consistent with Mozambique's development plans and development needs at both the planning and ex-post evaluation stages, thereby confirming its relevance. In addition, although no specific plans, implementation activities, or outcomes of collaboration were observed in relation to internal and external coherence, consistency with Japan's ODA policies was confirmed. Therefore, its relevance and coherence are high. The project's outputs were largely as planned, and both the project cost and the project period were within the plan. Therefore, efficiency of the project is very high. The operation and effect indicator, namely the capacity of transformers, achieved the target value, and the aggregate capacity utilization rate reached a high level of 90.5%. This is considered the result of reducing the burden on other substations and contributing to the stabilization of the power system. As a result, the avoidance of the risk of a total blackout—the main objective of the project—was achieved. The average outage duration and frequency also improved significantly, leading to enhanced reliability of the power supply. In terms of impact, improvements were observed not only in the quality of residents' daily lives—such as increased use of home appliances and nighttime lighting and enhanced public safety—but also in extended operating and business hours for factories, restaurants, and shops, as well as improved service quality in public institutions, thereby contributing to the revitalization of socio-economic activities in the region. Thus, this project has mostly achieved its objectives. Therefore, effectiveness and impacts of the project are high. While no issues have been observed in the policy/system, institutional/organizational, technical, financial, and environmental aspects and human resources, some issues have been observed in the utilization status of the installed mobile substation. Therefore, sustainability of the project effects is moderately low. In light of the above, this project is evaluated to be satisfactory.

1. Project Description

Project location
(source: prepared by the external evaluator)

Photo 1 Infulene Substation
(source: taken by the external evaluator)

1.1 Background

With the consolidation of peace and supported by abundant natural resources, including natural gas and coal, Mozambique's economy sustained an annual growth rate of around 6% from the late 1990s onward. Following reconstruction from the large-scale flood damage in 2000 and 2001, industrial development also began in earnest after 2005. As a result, electricity demand increased rapidly in tandem with economic expansion, and at the time of project planning, demand was growing at an annual rate of approximately 10%. On the other hand, the existing transmission and distribution systems contained many aging transmission lines and equipment that had been in use since the 1970s, and capacity enhancement to meet the growing electricity demand had not progressed sufficiently. Consequently, suppressed electricity demand had begun to surface in Maputo, the capital city, and its surrounding areas. In particular, at the Infulene Substation, which is the core facility of the southern grid, the existing T2 transformer[1] installed in 1971 was operated at a limited 50% of its rated capacity in order to secure supply reliability,[2] given the increasing risk of failure associated with long-term use. Accordingly, if the main T1 transformer were to fail, the capacity restriction on T2 would eliminate its backup function, placing the substation at risk of a complete shutdown. This situation also entailed the possibility of the failure cascading to other key substations in the metropolitan area, thereby necessitating urgent countermeasures.

In light of this situation, the Government of Mozambique requested assistance from the Government of Japan with the aim of ensuring a stable electricity supply in the Maputo

[1] "T2" in "T2 transformer" is the designation (unit name) used to identify this specific transformer among the multiple transformers installed at the Infulene Substation. At the Infulene Substation, three main transformers—T1, T2, and T3—were installed. The T1 transformer served as the primary unit and was operating under heavy load, with peak loads at times exceeding 100% of its rated capacity. The T2 transformer was originally intended to play an important role as a backup unit in the event of a failure of the T1 transformer.

[2] A transformer becomes increasingly prone to electrical short-circuit failures as a result of long-term use.

metropolitan area. As a result, this project was undertaken, which included not only the replacement and upgrading of the existing T2 transformer but also the procurement of a mobile substation intended for use at distribution substations in the vicinity of the Maputo metropolitan area.

1.2 Project Outline

The objective of this project is to improve and stabilize a power supply to the southern grid by rehabilitating an existing substation in the suburbs of the capital city of Maputo, thereby contributing to the improvement of the lives of local residents and the promotion of economic activities in Mozambique.

Grant Limit / Actual Grant Amount	1,390 million yen / 1,059 million yen
Exchange of Notes Date / Grant Agreement Date	August 2017 / August 2017
Executing Agency	Electricidade de Moçambique, EDM
Project Completion	May 2021
Target Area	Maputo metropolitan Area
Main Contractors	Mitsubishi Corporation / Hitachi Plant Construction, Ltd. (JV)
Main Consultant	Yachiyo Engineering Co., Ltd.
Preparatory Survey	November 2016 - June 2017
Related Projects	[Technical Cooperation] ・The Project for Integrated Master Plan on Mozambique Power System Development (2016 - 2018) [ODA Loan Project] ・Maputo Gas-Fired Combined Cycle Power Plant Development Project (L/A: 2014) [Other International Organizations and Donor Agencies] ・World Bank (WB) “Power Efficiency and Reliability Improvement Project” (2017) ・Government of Norway / KfW Development Bank (Germany) / European Investment Bank “Short Term Investment Program” (2017) ・African Development Bank (AfDB), Government of Germany, and Government of Sweden: “Mozambique Energy for ALL Program” (2021)

2. Outline of the Evaluation Study

2.1 External Evaluator

Hisae Takahashi / Juri Ishimoto,[3] Fortience Consulting Inc.

[3] Engaged as team member from Metrics Work Consultants Inc., responsible for satellite data analysis.

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: December 2024 - February 2026

Duration of the Field Study: April 13 - April 19, 2025 and August 3 - August 9, 2025

3. Results of the Evaluation (Overall Rating: B[4])

3.1 Relevance/Coherence (Rating: ③[5])

3.1.1. Relevance (Rating: ③)

3.1.1.1 Consistency with the Development Plan of Mozambique

At the time of the planning, the Government of Mozambique, in its *National Development Strategy (Estratégia Nacional de Desenvolvimento*, hereinafter referred to as "*ENDE*") (2015-2035), which indicated the development direction over a 20-year period, stated that it aimed to improve the living standards of the citizens through economic structural transformation, expansion and diversification of the productive base. To achieve this, it explicitly stated that industrialization and industrial development, with human capital development, infrastructure development, research, innovation and technological development, and organizational and institutional development as its main pillars, would be promoted, and identified power development as one of the priority areas of infrastructure development. In addition, in the medium-term plan formulated to realize the *ENDE*, the *Five-Year Government Plan (Plano Quinquenal do Governo*, hereinafter referred to as "*PQG*") (2015 - 2019), economic and social infrastructure development was presented as a priority area, and in the energy sector, improving access to electricity, liquid fuels, and natural gas for the development of social and economic activities, domestic consumption, and exports was set as a strategic objective. Moreover, in the *Power Master Plan* (2012 - 2017), the strengthening of the existing transmission and distribution networks was identified as a priority issue, and Emergency Rehabilitation of Transmission Network (this project) was positioned as a measure addressing this priority issue.

At the time of the ex-post evaluation, the *ENDE* (2025 - 2044)[6] set out six objectives, namely economic growth, reduction of social inequalities, improvement of citizens' living standards, infrastructure development, environmental sustainability, and efficiency of administrative services. Of the five policy pillars indicated to achieve these objectives, electricity plays an important role under "structural transformation of the economy" and "infrastructure and territorial development," and through the expansion of the transmission network and the modernization of substation facilities, the strategy seeks to establish a stable

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

[5] ④: Very High, ③: High, ②: Moderately Low, ①: Low

[6] Source: *Estratégia Nacional de Desenvolvimento* (2015–2035), https://www.mef.gov.mz/index.php/publicacoes/estrategias/2184-estrategia-nacional-de-desenvolvimento-2025-2024/file (accessed on September 4, 2025)

and sustainable power supply system. The *PQG* (2025 - 2029)[7] follows the five policy pillars presented in the *ENDE* and specifies concrete actions to be undertaken during the upcoming five-year period, indicating in the power sector measures such as the development of the power grid and the expansion of electricity supply. The *National Electrification Strategy* (2018)[8] states that the country aims to achieve electricity access for all citizens by 2030, and that an economic and efficient transmission network is required to ensure a reliable power supply.

As described above, both at the time of project planning and the ex-post evaluation, the development plans of the Government of Mozambique positioned the power sector as the core of infrastructure development, which was designated as a priority area. In the plans and strategies for the power sector, the strengthening and rehabilitation of the transmission and distribution networks were identified as priority issues toward achieving electricity access for all citizens, therefore consistency with this project can be confirmed.

3.1.1.2 Consistency with the Development Needs of Mozambique

At the time of the planning, the Mozambican economy had been maintaining a high annual growth rate of 7–8%, and accordingly, electricity demand was rapidly expanding at an annual average pace of approximately 10%. While the annual peak demand in the EDM system increased from 481 MW in 2009 to 761 MW in 2013, the existing transmission and distribution systems were aging, and the expansion of facilities to meet the rising demand had not kept pace. The T2 transformer at the Infulene Substation, covered under this project, was equipment installed in 1971, and EDM was forced to implement load restrictions due to a decline in supply reliability. Other transformers had also been in service for 26 to 33 years since their manufacture, and the switchgear was similarly aged. In fact, at the Matola Substation,[9] a core substation for the Maputo metropolitan area, a transformer failure occurred in 2015, resulting in a blackout across the entire metropolitan area. This total blackout served as the catalyst for the urgent implementation of this project. In this way, the development of substation facilities in the Maputo metropolitan area lagged behind the rapid increase in electricity demand, and shortages in capacity and the number of transformers had become apparent. Furthermore, investment in expansion did not progress due to EDM's financial constraints, and the introduction of mobile substations was required to prevent overloads and power supply disruptions. In particular, establishing such facilities was considered an urgent challenge at substations where demand was expected to exceed capacity and at those lacking flexibility due to a limited number of transformers.

[7] Source: *Plano Quinquenal do Governo* (2025-2029)
[8] Source: *National Electrification Strategy* (2018)
[9] The Matola Substation, along with the Infulene Substation, is a major core substation responsible for the power supply to the Maputo metropolitan area. The two substations are located such that they can mutually exchange power, maintaining a relationship where even if one ceases operation, the other continues to maintain the supply to the metropolitan area.

At the time of the ex-post evaluation, the peak demand in the EDM system had increased from 998 MW in 2020 to 1,137 MW in 2024. Meanwhile, peak power generation remained flat at 988 MW, indicating that supply capacity remained tight (see table below). In addition, for the transmission and distribution system as a whole, supply capacity has been enhanced—such as through the expansion of certain transmission lines in the Maputo metropolitan area from 50 MVA to 120 MVA—resulting in the avoidance of the systemwide blackouts that were observed at the time of the planning. However, some sections of the aging transmission lines still remain in service, and their replacement is required going forward. At the Infulene Substation, in addition to the replacement of the T2 transformer under this project, complementary improvements—such as the construction of a control and command building—have also been implemented. Nevertheless, transformers such as TR3, TR5, and TR6,[10] which have been in operation for more than 30 years, continue to be used, and the renewal of equipment in the 275-kV system, including transformers, circuit breakers, and switching equipment, has become an urgent necessity.

Table 1 Peak demand and peak power generation in the EDM system

(Unit: MW)

	2020	2021	2022	2023	2024
Peak demand	998	1,035	1,044	1,093	1,137
Peak power generation	973	988	988	988	988

Source: Documents provided by EDM

3.1.1.3 Appropriateness of the Project Plan and Approach

The project plan and approach were generally appropriate, and no particular issues were observed. Drawing on lessons learned from past similar projects, this project proposed the "implementation of measures to ensure that the operational status of existing substations is properly monitored and that a system is established for the adequate maintenance of equipment, including the procurement and storage of spare parts." During the construction supervision process, the maintenance framework of EDM and the conditions of storage for spare parts and consumables were reviewed, and it was confirmed that appropriate measures were being taken. In addition, in order to ensure that the supplied equipment would continue to be properly maintained after the commencement of operation, initial operation instruction and operational training by the contractor were provided. It can therefore be concluded that the lessons proposed were in fact put into practice.

[10] TR is the identifier used for transformers. It should be noted that the TR transformers belong to a different system from the T2 transformer, which is covered by this project.

3.1.2 Coherence (Rating: ②)

3.1.2.1 Consistency with Japan's ODA Policy

The *Country Assistance Policy for Mozambique* (2013) identified "Revitalization of the Regional Economy, including Corridor Development" as a priority area, and within the "Maputo Corridor Development and Improvement Program," it positioned the development of economic and social infrastructure—such as transport, traffic, and electricity—in and around Maputo as a core focus. The *JICA Country Analysis Paper for the Republic of Mozambique* (2015) also identified "regional economic revitalization" as one of the priority issues. This project contributes to the enhancement and stabilization of power supply to the southern grid through the rehabilitation of substations in the Maputo metropolitan area, thereby promoting economic activities in the region. This project is thus highly consistent with Japan's ODA policy.

3.1.2.2 Internal Coherence

At the time of the planning, no projects were anticipated that would require coordination or collaboration, and no JICA projects were identified during implementation that involved such coordination or collaboration.

3.1.2.3 External Coherence

Although no specific collaboration was stated at the time of the planning, support to the power sector in the southern grid was scheduled by WB, the Government of Norway, KfW, the European Investment Bank, AfDB, the Government of Germany, and others. These initiatives were relevant in that they contributed to enhancing the stability of power supply; however, as all of them were implemented after the completion of this project, no direct coordination or collaboration took place. Additionally, no partnership initiatives that had not been anticipated at the time of the planning were identified, nor were any related projects coordinated subsequently.[11] In relation to international frameworks, this project seeks to enhance and stabilize the power supply through the rehabilitation of substations, thereby contributing to improving the living conditions of local residents and promoting economic activities. Therefore, it contributes to SDG Goal 7: "Affordable and Clean Energy" and SDG Goal 9: "Industry, Innovation and Infrastructure."[12]

Based on the above, the project was highly consistent with Mozambique's development plans and development needs, and no particular issues were identified in the project plan or approach. With respect to coherence, the project is also highly consistent with Japan's ODA policy. Although

[11] Source: Questionnaire responses from the EDM and consultant.
[12] Source: SDGs materials, https://www.mofa.go.jp/policy/oda/sdgs/index.html (accessed on July 7, 2025)

no concrete partnerships or coordinated output were observed in terms of internal or external coherence, the project is nonetheless aligned with relevant international frameworks. Therefore, its relevance and coherence are high.

3.2 Efficiency (Rating: ④)

3.2.1 Project Outputs

The project rehabilitated the existing Infulene Substation and installed mobile substation facilities in the suburb of Maputo metropolitan area. As shown in Tables 2 and 3, the outputs—including those to be borne by the Government of Mozambique—were delivered as planned.

Table 2 Outputs of this project

Equipment name	Unit	Plan	Actual
1. Equipment for the Infulene Substation			As planned
1-1 275 kV circuit breaker (porcelain clad type)	Unit	1	
1-2 275 kV and 11 kV overhead line and terminals	Set	1	
1-3 275/66/11 kV three-phase autotransformer (250 MVA)	Unit	1	
1-4 Station transformer for T2 transformer (250 kVA)	Unit	1	
1-5 11 kV voltage transformer and through type current transformer for T2 transformer tertiary side	Set	1	
1-6 66 kV lightning arrestor	Unit	3	
1-7 66 kV voltage transformer	Unit	3	
1-8 66 kV current transformer	Unit	3	
1-9 66 kV circuit breaker	Unit	2	
1-10 66 kV disconnecting switch	Unit	4	
1-11 Overhead line and terminals for T2 transformer secondary side and bus coupler	Set	1	
1-12 Copper pipe	Set	1	
1-13 Equipment pedestal	Set	1	
1-14 Earthing system for T2 transformer secondary side	Set	1	
1-15 Control and protection panels for T2 Transformer	Set	1	
2. 66/33 kV mobile substation (20 MVA)	Set	1	
3. Maintenance tools			
3-1 Maintenance tools	Set	1	
3-2 Insulating oil analysis equipment (moisture, gas, etc.)	Set	1	
3-3 Transformer insultation oil purifier (including tank and accessories, etc.)	Set	1	
3-4 Withstand voltage tester	Set	1	
3-5 Protection relay tester	Set	1	
4. Consulting services	Plan	Actual	
	Detailed design, procurement management, etc.	As planned	

Source: Ex-ante evaluation sheet, preparatory survey report, documents provided by JICA, questionnaire responses

Table 3 Obligations by the Mozambican side

Plan	Actual
1. Provision of information and data required for the project	As planned
2. Communication and applications to relevant authorities	
3. Prompt customs clearance and implementation of duty exemption at Maputo Port for necessary equipment and materials	
4. Duty exemption and facilitation for necessary equipment, materials, and dispatched personnel	
5. Tax exemption and related measures for business tax and other applicable taxes for Japanese entities and Japanese personnel	
6. Bearing all necessary costs not covered by the grant aid	
7. Proper use and maintenance of facilities and equipment procured under the grant aid	
8. Free provision of temporary land for construction offices, storage areas for equipment and materials, etc.	
9. Removal of the existing T2 transformer from the system	
10. Implementation of connection and preparatory works for the mobile substation	
11. Outage of the 275 kV single bus during the internal transport of the 275 kV circuit breaker	
12. Provision of necessary conditions for the Japanese side to implement construction works through removal of the 66 kV bus	

Source: Preparatory survey report, documents provided by JICA

Photo 2 Infulene Substation T2 transformer (Source: taken by the external evaluator)

Photo 3 Infulene Substation 66 kV disconnecting switch (Source: taken by the external evaluator)

3.2.2 Project Inputs

3.2.2.1 Project Cost

The planned cost for the Japanese side was 1,390 million yen, while the actual expenditure amounted to 1,059 million yen, remaining within the plan (76%). This was due to the fact that the bidding price was lower than the estimated price. Since the amount borne by the Mozambican side could not be ascertained, the analysis was conducted based on the project

cost on the Japanese side. However, as all obligations of the Mozambican side have been fulfilled as described above, it is considered that expenditures were generally made as planned.

3.2.2.2 Project Period

The project period was planned to be 30 months, from August 2017 (the month of E/N signing) to January 2020 (the month when the equipment was put into service). The actual project period was 46 months, from August 2017 to May 2021 (153% of the plan).

Table 4 Planned and actual schedule by component

	Plan	Actual
Detailed design period (including bidding period)	5 months	October 2017-February 2018 (5 months)
Equipment procurement period	18 months	March 2018- August 2019 (18 months)
Equipment installation period	10 months	March 2019-January 2020 (11 months)

Source: Preparatory survey report, documents provided by JICA

The reason why the project period exceeded the plan was that the dispatch of engineers for replacing the new protection relay of the T2 transformer[13] and the energization of the 66 kV equipment at the Infulene Substation were delayed due to the spread of COVID-19. The malfunction of the protection relay occurred in January 2020, slightly before the Government officially imposed the lockdown in March 2020.[14] However, the Japanese contractor judged that ensuring the safety of the engineers would be difficult and consequently decided not to dispatch them. Subsequently, the project period was extended until April 2021, when the borders were gradually reopened and the dispatch of engineers became possible. This was due to the judgment that it would be difficult to address the issue within Mozambique. Therefore, the extended period was regarded as an external factor attributable to COVID-19, and the 30 months excluding the extension period (the 16 months from February 2020 to May 2021) were considered as the actual project period. Accordingly, it was assessed to be 100% of the plan and thus regarded as implemented as planned. It should be noted that, apart from this factor, no events were identified that led to delays in the overall project.

The outputs of this project were generally as planned. In addition, the project cost was within the plan. The project period was extended because the dispatch of engineers to address defects in some equipment was delayed due to the impact of COVID-19. However, since this extension resulted from external factors caused by COVID-19, it can be regarded as within the plan. Therefore, efficiency of the project is very high.

[13] Protection Relay (a device that protects transformers from abnormalities such as overcurrent and short circuits)
[14] State of Emergency (Presidential Proclamation No. 11/2020)

3.3 Effectiveness and Impacts[15] (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

The operation and effect indicators established at the time of the planning were "(i) total capacity of T1 transformer to T3 transformer" and "(ii) aggregate capacity utilization rate of T1 transformer to T3 transformer" of the Infulene Substation. Indicator (i), total capacity of the transformers, can be regarded as an output indicator, while indicator (ii), aggregate capacity utilization rate, does not directly demonstrate the effects of the individual transformers concerned (as detailed later). Accordingly, in this evaluation, in addition to these indicators, the "System Average Interruption Duration Index (hereinafter referred to as "SAIDI")"[16] and the "System Average Interruption Frequency Index (hereinafter referred to as "SAIFI")"[17] were additionally collected in order to assess the reliability of the power supply. The baseline values, target values (excluding the additional indicators), and actual values after project completion are shown in the table below.

Table 5 Operation and effect indicators

	Unit	Baseline value	Target value	Actual value			
		2015	2023	2021	2022	2023	**2024**
			3 years after completion	Completion year	1 year after completion	2 years after completion	**3 years after completion**
(i) Total capacity of T1 transformer to T3 transformer	MVA Note 2	436	620	620	620	620	**620**
(ii) Aggregate capacity utilization rate of T1 transformer to T3 transformer Note 1 (peak load)	%	68.8	75.1	84.9	90.5	N.A.	**N.A.**
(Additional) SAIDI in the Maputo metropolitan area	minutes	65.2	-	25.7	39.3	32.3	**24.5**
(Additional) SAIFI in the Maputo metropolitan area	times	50.3	-	12.76	14.77	12.0	**9.0**

Source: Documents provided by JICA, questionnaire responses, documents provided by EDM

Note 1: This indicator represents the ratio of the load at maximum demand to the rated capacity. With the implementation of this project, the capacity of the existing T2 transformer is reinforced, thereby increasing the denominator, and the aggregate capacity utilization rate was expected to temporarily decline in 2020. Moreover, the target value for 2023 is the projected value under the assumption that appropriate maintenance of the transformers is carried out and that electricity demand grows as anticipated. Therefore, as the rate varies depending on actual power flows, it is expected to approach the target value, which is based on the assumption of demand growth.

Note 2: An abbreviation for Mega Volt-Ampere

[15] When providing the sub-rating, Effectiveness and Impacts are to be considered together.

[16] Total customer outage duration / number of customers

[17] Total number of customer outages / number of customers

(i) Total capacity of T1 transformer to T3 transformer

The "total capacity of the T1 transformer to the T3 transformer" at the Infulene Substation increased from 436 MVA before the project to the target value of 620 MVA and has continued to be maintained after project completion. This enhancement of capacity demonstrates that improvements in power supply—the objective of this project—were achieved through strengthening supply-side infrastructure in response to the growing electricity demand in the Maputo metropolitan area.

(ii) Aggregate capacity utilization rate of T1 transformer to T3 transformer[18]

Compared with the baseline value of 68.8% in 2015 before the project, the rate rose significantly to 84.9% in 2021 and 90.5% in 2022 after project completion, substantially exceeding the target value of 75.1%.[19] However, according to interviews with EDM, electricity demand in the Maputo metropolitan area has continued to grow steadily, and the Infulene Substation has remained under a high-load condition. Therefore, it is assessed that the effects of the capacity enhancement continue to be sustained. In addition, this sharp increase in the utilization rate is presumed to be mainly attributable not only to the steady growth in electricity demand in the Maputo metropolitan area, but also to load-balancing measures in system operation whereby loads[20] were shifted to the Infulene side in order to alleviate the overload conditions at other major substations, such as the Matola Substation and the Maputo Thermal Power Plant (Central Térmica de Maputo, hereinafter referred to as "CTM"). Indeed, when the capacity utilization rates of other major substations during the same period are examined, following the reinforcement of the Infulene Substation, the CTM Substation, which had been in an overloaded condition, slightly eased its load from 91.0% to 89.0%, while the Matola Substation also decreased from 60.4% to 59.0%. This clearly suggests that, as the capacity at Infulene was reinforced and its reliability improved, system operators intentionally shifted loads to the Infulene side in order to reduce the burden on other overloaded substations. Through this load shifting, Infulene has played a role in ensuring the stability of the overall system and has contributed, in particular, to alleviating the overloaded condition at CTM.

While the loads of other substations were alleviated, the Infulene Substation itself reached a high loading condition exceeding 90%, resulting in an extremely limited reserve capacity. Nevertheless, this project was implemented as an urgent measure following the total outage

[18] Aggregate capacity utilization rate is an indicator that shows the ratio of the load at the time of maximum demand to the rated capacity. This indicator is essential for both operational planning and capacity expansion planning of facilities, from the perspective of avoiding overloads and ensuring the stability of power supply. Furthermore, as noted in Note 1 of Table 5, this indicator was not intended to serve as a target to be achieved with strict precision. Rather, it was set as an indicator for which movement toward the target value was expected, assuming continued demand growth.

[19] The actual data for 2023, the target year, and beyond were not available at the time of this ex-post evaluation due to issues with the data source.

[20] In the electricity and power sector, this term refers to the amount of electrical demand placed on power facilities such as power plants and substations, or the amount of electrical energy consumed.

caused by a transformer failure at the Matola Substation in 2015, with the objective of avoiding the risk of system collapse. Even under this high-loading condition, the fact that the SAIDI / SAIFI indicators have significantly improved, as shown below, indicates that the reinforcement effectively compensated for the vulnerabilities of other major substations and ensured the stability of the overall system, thereby achieving the project's core objective of avoiding the recurrence of a total outage.

(iii) Additional indicators: SAIDI / SAIFI

The reliability indicators of power supply, which were examined as additional indicators, have improved as a result of the Project. With respect to SAIDI, the actual value significantly decreased from 65.2 minutes in 2015, prior to project implementation, to 24.5 minutes in 2024, following project completion. This indicates that the average outage duration experienced by customers has been reduced by more than 60%, demonstrating a substantial improvement in the reliability of power supply. As for SAIFI, the actual value also significantly decreased from 50.3 times prior to project implementation to 9.0 times in 2024. This substantial decrease in outage frequency shows that customers are experiencing far fewer interruptions, thereby substantiating the stable operation of the substation facilities. As with SAIDI, it clearly indicates that the project has significantly improved the stability of power supply in the Maputo metropolitan area.

3.3.1.2 Qualitative Effects (Other Effects)

(1) Improvement in power supply reliability

As confirmed through interviews with residents and electricity consumers, the reliability of power supply has improved as a result of this project.[21] Prior to project implementation, the most common response was that outages occurred "several times per week," and some respondents reported that outages occurred "daily." After project implementation, the frequency of outages significantly decreased, with more respondents indicating that outages occurred "once per week," "several times per month," or "almost never." Notably, no respondents reported experiencing outages "daily" (see Table 6). Improvements were also observed with respect to the duration of outages. Prior to project implementation, long outages such as "one hour or longer" and "several hours or longer" occurred frequently. After project implementation, however, short-duration outages of "less than 30 minutes" increased, and no respondents reported long outages such as "several hours or longer," "half a day or longer," or "one day or

[21] To supplement the project's quantitative effects and to assess the improvements in power supply reliability—specifically the reduction in the frequency and duration of outages—interviews were conducted in the city of Maputo with 10 residents and 13 electricity consumers (including factories, hotels, public institutions, and retail shops) who were familiar with the conditions before and after project implementation. The breakdown of respondents is as follows. Residents: by gender (6 men and 4 women) and by age group (seven in their 40s and three in their 50s). Electricity consumers: one factory, one hotel, two logistics warehouses, one gas station, three restaurants, three retail shops, and two health centers.

longer" (see Table 7). Furthermore, according to EDM, the electricity supply utility, the number of complaints related to outages has also decreased, substantiating the improvement in supply stability. These results are consistent with the additional quantitative effect indicators and demonstrate that the installation of substation facilities contributed to the improvement of power supply reliability.

Table 6 Changes in outage frequency

(Unit: persons)

Item	Before implementation	After implementation
Almost never	1	3
Several times per month	2	4
Once per week	1	6
Several times per week	12	4
Daily outages	1	0

Table 7 Changes in outage duration

(Unit: persons)

Item	Before implementation	After implementation
Less than 30 minutes	1	9
One hour or longer	6	8
Several hours or longer	5	0
Half a day or longer	2	0
One day or longer	3	0

Source: Interview with residents and electricity consumers

(2) Changes in inspection and repair practices

As a result of this project, the flexibility in conducting inspections and repairs has increased. Before project implementation, the capacity of the transformers was insufficient, making it difficult to carry out maintenance work on weekdays when electricity demand was high. As a consequence, maintenance activities had to be concentrated on weekends, which led to excessive overtime work for staff members. At present, the replacement of the TR2 transformer has reduced the load on TR1, enabling maintenance work to be carried out on weekdays without difficulty and contributing to improved stability of power supply. In addition, shifting the work previously conducted on weekends to weekdays has also led to reductions in staff workload and costs.

On the other hand, the mobile substation, which was intended to be used as a backup transformer during maintenance, is currently not in operation (see "3.4.7 Status of Operation and Maintenance" for details). As a result, EDM has been taking emergency measures to avoid outages, such as temporarily transferring and installing a transformer from a substation in another province (Tete Province).

3.3.2 Impacts

3.3.2.1 Intended Impacts

(1) Improving the living conditions of local residents

According to interviews conducted with residents, 4 out of 10 respondents answered

“significantly improved,” while 6 answered “improved,” and all confirmed that the stability of electricity supply has enhanced their quality of life. Specific improvements include the stability of household lighting, increased convenience through the use of electrical appliances, reduced burden of housework, secured time for reading, studying, and working, improved safety and security through nighttime lighting, and stable water supply. As a result of these improvements, specific examples reported include the restoration of power outages within a short period, the ability to use multiple electrical appliances simultaneously, the use of air conditioning on hot days, safe food preservation through refrigerators, enhanced public lighting leading to improved community security, and even the enjoyment of entertainment such as movies and music on television, all contributing to an overall improvement in quality of life. Based on these residents’ feedback, it has been confirmed that the Project has broadly contributed to improving the lives of local residents. At present, all respondents have expressed overall satisfaction with the electricity supply provided by EDM.

Requests were raised regarding service aspects, including electricity tariffs, compensation for appliance damage caused by voltage instability, and responses to meter malfunctions, as well as concerns about EDM’s future measures to address the growing electricity demand associated with population increase in the region. Nevertheless, all respondents expressed overall satisfaction with the electricity supply provided by EDM.

(2) Promotion of economic activities

As a result of the project implementation, significant effects on economic activities in the region have been observed. According to interviews with consumers, 5 out of 13 respondents answered, “contributed significantly,” while 8 answered “contributed,” and all evaluated that stable electricity supply has had a positive impact on their service provision and business operations.

In the case of private businesses such as restaurants, shops, hotels, warehouses, and manufacturing enterprises, the reduction in the frequency and duration of power outages has enabled extended nighttime operations and improved operational efficiency. For example, restaurants have reported enhanced customer service capabilities and increased sales due to the stable operation of air conditioning and cooking equipment. Similarly, shops have benefited from the reliable functioning of refrigeration and freezing equipment, allowing for the preservation of beverage and food quality, which has led to improved customer satisfaction and expanded sales opportunities. In hotels, stable lighting and the reliable use of electrical devices in guest rooms have enhanced both safety and comfort for guests. In factories, the stabilization of electricity supply has enabled continuous operation of production lines, ensuring consistent product availability. In the warehousing sector,

refrigeration equipment has made it possible to maintain the quality of pharmaceuticals, and stable power supply has reduced customer complaints and contributed to improved service quality. In public institutions as well, stable temperature control for pharmaceuticals, reliable operation of electronic inventory management systems, and continuous use of diagnostic and testing equipment have become possible, and it has been confirmed that these developments have resulted in improved accuracy and quality of services.

Following the implementation of the project, the improvement of transmission and distribution facilities has enhanced the stability of electricity supply, resulting in a significant reduction in the frequency and duration of power outages. Consequently, interruptions in business operations and public services caused by power issues have decreased, and as noted above, this has contributed to the revitalization of economic activities in the region.

(3) Assessing impact using satellite data

Focusing on Maputo Province in Mozambique, changes in nighttime lights from 2013 to 2024 were analyzed to examine the impact of the project. As described in the column below, the analysis confirmed progress in the provision of stable electricity supply within the Maputo metropolitan area, which is the project's target area. In particular, a marked increase in nighttime light intensity was observed in the vicinity of the Marracuene substation,[22] suggesting that the project may have contributed to improving the stability of electricity supply in the region.

[Column] Satellite Data Analysis

<Changes in Nighttime Lights in the Target Area>

Figure 1 shows trends in the annual average nighttime radiance in the Maputo metropolitan area (Matola City, Marracuene District, and Maputo City). The analysis indicates that nighttime lights increased by approximately 200% in Matola City, and by about 120% in both Maputo City and Marracuene District. In particular, Matola City has exhibited a consistent increase in nighttime lights since 2013. These changes are considered to reflect, to a certain extent, the effects of the project's distribution network development.

[22] The Infulene Substation is a core substation covered by the project. Electricity stepped down at this substation is transmitted to consumers via distribution substations in various locations. The Marracuene Substation, located in the Maputo metropolitan area, is one such distribution substation; it receives electricity supplied from the Infulene Substation and performs further voltage reduction and distribution. In addition, Marracuene has recently been developing as an emerging area, with an increasing number of residential buildings and commercial facilities.

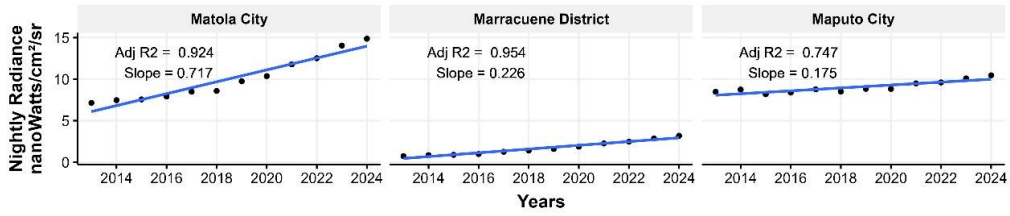

Figure 1 Changes in annual nighttime radiance in the Maputo metropolitan area[23]

<Relationship with Substations>

The Infulene Substation, which is covered by the project, is located in Maputo City and supplies electricity to consumers in various areas via distribution substations (Figure 2). Among these, the Marracuene Substation is one of the major distribution hubs. Based on the increasing trend in nighttime lights observed in the surrounding areas, spillover effects of the project implemented through this substation were confirmed.

As shown in Figure 3, nighttime lights across Maputo City as a whole show only a slight upward trend. In contrast, in the vicinity of the Infulene Substation, radiance levels in 2024 were slightly lower than those in 2013, and no marked improvement was observed. This may be attributable to constraints on transmission capacity caused by the lack of replacement of aging core equipment. Meanwhile, in northern Maputo City and around the Marracuene Substation, nighttime lights have steadily increased since 2017, indicating that the project's effects are more clearly reflected in newly electrified areas.

Figure 2 Location map of substations (blue dots) and target areas (green dots)

[23] $nW \cdot cm^{-2} \cdot sr^{-1}$ (nanowatts per square centimeter per steradian) is a unit of radiance that represents the intensity of light observed in satellite imagery and is used to evaluate the brightness of artificial nighttime lighting, such as streetlights and building illumination.

Note: The data used in Figure 1 were extracted at the "provincial level," whereas the data used in Figure 3 correspond to "single-point locations." This is because, in the case of substations, supply areas are not clearly defined, and therefore data were extracted on a point basis. To ensure consistency in the analytical approach, a single representative point within each city was also selected and treated in the same manner. As a result, some differences can be observed between Figures 1 and 3.

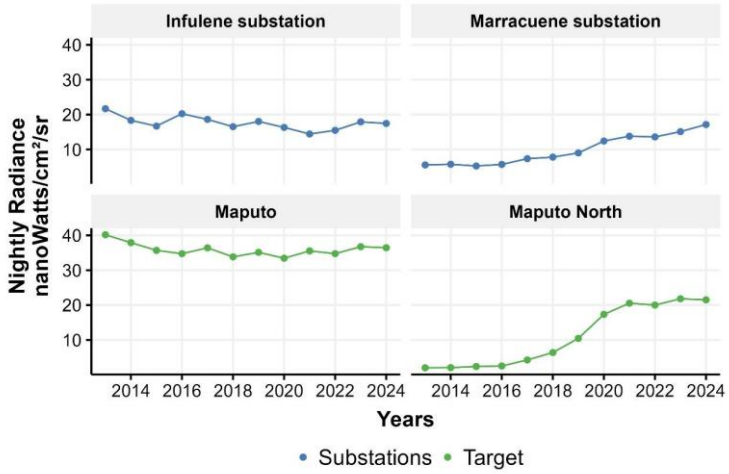

Figure 3 Year-on-year changes in nighttime lights in the target areas (2013–2024)

3.3.2.2 Other Positive and Negative Impacts

1) Impacts on the Environment

The Project was determined to have minimal adverse environmental impacts under the *JICA Guidelines for Environmental and Social Considerations* (formulated in 2010) and was classified as Category C. Additionally, as this project would be implemented within the premises of an existing substation, obtaining environmental permits prior to construction was deemed unnecessary. According to EDM and the Project Consultant, no unforeseen negative environmental impacts have occurred as a result of the project implementation. Furthermore, there were no complaints from local residents during the construction period.

2) Resettlement and Land Acquisition

The Project involved the installation of equipment and facilities within the premises of an existing substation, and according to interviews with EDM, no land acquisition or resettlement of residents was carried out.

3) Gender Equality, Marginalized People, Social Systems and Norms, People's Well-being and Human Rights, Unintended Positive / Negative Impacts

At the time of the planning, no specific measures were indicated from the perspectives of gender equality, marginalized people, social systems and norms, people's well-being and

human rights. Moreover, during project implementation and after its completion, no impacts—whether positive or negative—related to these aspects were identified.

Based on the above, the operation and effect indicators, namely the total capacity of transformers, have been achieved as targeted. Although the aggregate capacity utilization rate of transformers remains at a high level, it functions effectively for load balancing in system operation and fulfills the primary objective of avoiding the risk of complete outages. The additional indicators, SAIDI and SAIFI, have significantly improved, resulting in enhanced reliability of power supply. As an impact, this project has contributed to revitalizing social and economic activities in the region. This project has mostly achieved its objectives. Therefore, effectiveness and impacts of the project are high.

3.4 Sustainability (Rating: ②)

3.4.1 Policy and System

As indicated in "3.1.1.1 Consistency with the Development Plan of Mozambique," policies such as ENDE (2025–2044) and PQG (2025–2029) identify the improvement of electricity access as a priority issue, and the necessary policy and system have been secured.

3.4.2 Institutional/Organizational Aspect

The operation and maintenance of the facilities and equipment developed under this project are undertaken by the Transmission Department of EDM. At the time of the ex-post evaluation, the total number of EDM staff was 4,148, which does not reach the authorized staffing level of 5,961. At the Infulene Substation, 57 staff are assigned for operation and maintenance, consisting of 1 supervisor, 8 operators, and 48 maintenance staff (16 for primary equipment,[24] 9 for protection devices, and 23 for transmission lines).[25] Across EDM as a whole, while the network and customer base have been expanding, the number of staff at the time of the ex-post evaluation in 2025 remained below the authorized level, partly due to a series of retirements among technical staff.[26] In response to this situation, EDM is currently actively pursuing new recruitment. At the Infulene Substation, however, the required number of personnel for operation and maintenance has been secured, and no staffing-related issues have been identified.

Regarding the reporting system in the event of a problem, the on-duty operator reports to the substation supervisor, and if a failure occurs that results in supply interruption, it is also reported

[24] Primary equipment refers to devices that are directly involved in the flow of electricity, including transformers, circuit breakers, and disconnecting switches. Equipment that monitors and controls the operation of primary equipment—such as protection devices, measuring instruments, and control panels—falls under secondary equipment.
[25] Source: Questionnaire responses
[26] EDM was reorganized and established as a public utility in 1995. In 2025, marking the 30th anniversary of its establishment, a significant number of retirements is anticipated due to the concentration of employees reaching retirement age after long years of service.

to the National Transmission Control Center. Subsequently, the supervisor reports to the department head and the department director, and specialized technical staff are mobilized as necessary to address the issue. In this way, the reporting system for failures and problems is clearly established, and no structural issues have been identified at present.

As noted above, although the total number of personnel across EDM remains below the authorized level, new recruitment is underway. Furthermore, at the Infulene Substation, the required staffing has been secured, and the reporting system in the event of a problem is clearly established. Therefore, no particular issues have been identified at present.

3.4.3 Technical Aspect

EDM has consistently ensured stable operation and maintenance of the nationwide transmission network up to the present and possesses an adequate technical standard for system operation. At the Infulene Substation, when a necessity is identified, it is possible to participate in training conducted by EDM's Academy Directorate after reporting to the Head of the Transmission Department. In addition, engineers with extensive experience share their knowledge with less experienced engineers on a daily basis in the form of on-the-job training (OJT).

The necessary spare parts procured under this project have been stored in the warehouse, and as of the time of the ex-post evaluation, they are in stock. Major spare parts need to be procured from overseas, and normally, procurement plans are formulated on an annual basis with prioritization. Minor items can be procured by each department; however, for amounts exceeding 1.5 million Metical (MZN) (approximately 353 million yen as of October 2015), the Procurement Department is responsible. In addition, in the event of a failure, it is possible to contact the contractors. It has been confirmed that manuals are placed at EDM and at each facility, and they have been arranged so that engineers can refer to them as necessary. According to EDM, in this project, although initial operational guidance was provided, there was no support equivalent to training. On the other hand, at present, no obstacles attributable to technical factors have arisen in the maintenance activities of the installed facilities and equipment.

3.4.4 Financial Aspect

At the time of formulating the plan, EDM had a net loss and was facing financial challenges.[27] However, looking at the financial indicators for the past three years (2022–2024), profitability has shown an improving trend. Although a temporary decrease in profit was observed in 2023, the improvement in profit has been supported by factors such as an increase in operating revenue, optimization of personnel expenses, enhancement of operational efficiency through the utilization of external services, and expansion of financial income. In particular, the promotion

[27] Source: Preparatory survey report

of employees, salary adjustments, and progress in capital investment have enhanced supply capacity and service quality, thereby strengthening the revenue base. As a result of these factors, a significant surplus was achieved in 2024, and financial sustainability has been increasing.[28]

Table 8 Transition of major items in EDM's income statement

(Unit: million MZN)

	2022	2023	2024
Total revenue (i)	46,830	53,170	59,610
Power purchase and generation costs (ii)	30,834	35,300	36,940
Gross profit (iii = i − ii)	15,995	17,870	22,670
Total operating expenses (iv)	15,451	17,320	20,200
Operating profit (v = iii − iv)	544,	550	2,470
Financial income (vi)	8,865	6,970	9,610
Financial expenses (vii)	3,733	2,330	2,590
Profit before tax (viii = v + vi − vii)	5,676	5,190	9,490
Income tax (ix)	456	370	870
Net profit (x = viii − ix)	5,220	4,820	8,620

Source: EDM, *Relatório e Contas (Annual Report) 2022, 2023, and 2024 editions.*

In its business plan for 2015–2019, EDM set the strengthening of its financial base and the improvement of profitability as objectives, prioritizing the revision of electricity tariffs. In 2019, a target was established to set the electricity tariff at 15.4 MZN / kWh; however, the actual tariff remained at 14.75 MZN / kWh, falling short of the target. Nevertheless, although the tariff revision was not fully achieved, EDM's financial situation has shown an improving trend in recent years. According to EDM, with regard to the operation and maintenance facilities and equipment, although it cannot be considered optimal, a budget is formulated annually based on the needs of the following year, and the minimum necessary portions are approved and allocated according to priorities. Indeed, as indicated later in "3.4.7 Status of Operation and Maintenance," no cases have been confirmed in which facilities or equipment could not be repaired or were forced to cease operation due to budget shortages.

As stated above, at present, there are no cases in which maintenance activities have been hindered due to budget shortages, and no serious financial issues have been identified.

3.4.5 Environmental and Social Aspect

No significant risks to the sustainability of project effects from environmental and social aspects have been identified.

[28] Source: Interview with EDM, EDM, *Relatório e Contas (Annual Report) 2022, 2023, and 2024* editions

3.4.6 Preventative Measures to Risks

No specific risks were anticipated at the time of the planning, and no unintended risks have occurred during implementation or at the time of the ex-post evaluation.

3.4.7 Status of Operation and Maintenance

The equipment renewed within the Infulene Substation has been operating without any issues as of the time of the ex-post evaluation. Maintenance has been carried out in accordance with the annual maintenance plan stipulated by EDM, which includes routine inspections as well as a regular general inspection, conducted approximately once a year, focusing primarily on operational performance. In addition, a periodic detailed inspection, which thoroughly examines internal components and performance, has been conducted every few years. On the other hand, the mobile substation has not been in operation since 2021, one year after its installation, when lightning current from the 33 kV distribution line penetrated the transformer and caused an abnormality in the windings. It should be noted that during the one-year period of operation following installation, maintenance activities were carried out in accordance with the annual maintenance plan stipulated by EDM. However, after the occurrence of the abnormality, EDM understood that the contractor would be able to address the issue, whereas the contractor considered it outside the scope of responsibility, as the defect liability period had already expired. Due to this discrepancy in understanding, a certain period elapsed, and the transformer was eventually sent to South Africa for repair in 2024. Until the completion of the repair, EDM has transported a transformer from another province and has been using it at the Matola Substation. According to EDM, as of February 2026, the repair works for the transformer have been completed in South Africa, and it is currently being shipped to Mozambique. Although re-commissioning is scheduled for the end of March, further confirmation will be required regarding the preparation for grid connection and the implementation of trial operation before stable and continuous full-scale operation can be ensured.

As of the time of the ex-post evaluation, no operational issues have arisen because EDM has relocated and utilized a transformer from another province at the Matola Substation. However, the fact that the mobile substation installed under this project has remained non-operational for an extended period constitutes a concern in terms of maintaining a stable and reliable power supply.

In light of the above, some issues have been observed in the current status of operation and maintenance, and preventative measures to risks. Therefore, sustainability of the project effects is moderately low.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was conducted to improve and stabilize a power supply to the southern grid by rehabilitating an existing substation (Infulene Substation) in the suburbs of the capital city of Maputo, thereby contributing to the improvement of the lives of local residents and the promotion of economic activities in Mozambique. This project was consistent with Mozambique's development plans and development needs at both the planning and ex-post evaluation stages, thereby confirming its relevance. In addition, although no specific plans, implementation activities, or outcomes of collaboration were observed in relation to internal and external coherence, consistency with Japan's ODA policies was confirmed. Therefore, its relevance and coherence are high. The project's outputs were largely as planned, and both the project cost and the project period were within the plan. Therefore, efficiency of the project is very high. The operation and effect indicator, namely the capacity of transformers, achieved the target value, and the aggregate capacity utilization rate reached a high level of 90.5%. This is considered the result of reducing the burden on other substations and contributing to the stabilization of the power system. As a result, the avoidance of the risk of a total blackout—the main objective of the project—was achieved. The average outage duration and frequency also improved significantly, leading to enhanced reliability of the power supply. In terms of impact, improvements were observed not only in the quality of residents' daily lives—such as increased use of home appliances and nighttime lighting and enhanced public safety—but also in extended operating and business hours for factories, restaurants, and shops, as well as improved service quality in public institutions, thereby contributing to the revitalization of socio-economic activities in the region. Thus, this project has mostly achieved its objectives. Therefore, effectiveness and impacts of the project are high. While no issues have been observed in the policy/system, institutional/organizational, technical, financial, and environmental aspects and human resources, some issues have been observed in the utilization status of the installed mobile substation. Therefore, sustainability of the project effects is moderately low. In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

The mobile substation has been out of operation since 2021 and, as it cannot fulfill the originally intended flexible maintenance support function, a transformer from another substation in a different region has been relocated and is being used as a substitute. Although no complete blackout has occurred, the load on the Infulene Substation remains high. The repair works for the mobile substation have been completed in South Africa, and as of February 2026, the transformer is being transported to Mozambique and recommissioning is scheduled for the end

of March of the same year. In light of this situation, it is essential for EDM, as the executing agency, to ensure thorough preparation for grid connection and commissioning toward recommissioning, and to establish a stable and sustainable operational framework. It is also necessary to reconfirm the on-site availability of the operation and maintenance manuals and checklists provided at the time of provision, and to work toward restructuring the framework for regular inspections and maintenance.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

Importance of clarifying responsibilities and sharing understanding for post-defect liability failure

The mobile substation has remained non-operational since its failure in 2021 and, as of 2025, has not contributed to its original purpose of providing flexible maintenance support. EDM assumed that the contractor would handle the failure; however, the contractor indicated that, as the failure occurred after the expiration of the defect liability period, it was not obligated to respond. This resulted in a prolonged delay before the commencement of repairs. At the project formulation stage, it can be said that the allocation of responsibilities for handling failures after the expiration of the defect liability period should have been clearly defined in the contract, and that both the executing agency and the contractor should have fully understood and shared this content. For similar projects in the future, it is desirable to clarify in advance the responsibilities for failure response in order to ensure the sustainable utilization of equipment and materials and the maintenance of project outcomes.

Setting indicators for the appropriate measurement of project outcomes

The operation and effect indicators set at the time of project planning of this project were primarily output indicator, such as substation equipment capacity, and indicator like capacity utilization rate, which are influenced by the overall operating conditions of the system and are not necessarily suitable for directly demonstrating the effectiveness of individual equipment. Therefore, to better assess the impact of substation development under this project on the reliability of power supply, SAIDI and SAIFI were adopted as additional indicators. These are indicators that objectively demonstrate the quality of power supply and enable a more direct measurement of project effects. Incorporating these indicators at the project planning stage is considered to make the verification of effects at the ex-post evaluation more reliable and valid. For similar projects in the future, in addition to expanding equipment capacity, it would be meaningful to preselect indicators related to supply reliability, such as SAIDI and SAIFI, and to establish baseline and target values in order to enhance the transparency of project outcomes.

5. Non-Score Criteria

5.1 Performance

5.1.1 Objective Perspective

Japan's assistance has comprehensively contributed to the power sector in the southern region of Mozambique by supporting the entire process toward stable electricity supply—from post-generation distribution to delivery to end-users. The ODA loan project "Maputo Gas-Fired Combined Cycle Power Plant Development Project" (Loan Agreement signed in 2014) constructed a new thermal power plant with a capacity of 110 MW, significantly increasing the power supply capacity of the southern region (by approximately 20% at that time). In contrast, this project has played a role in strengthening the infrastructure necessary to reliably deliver the newly secured generation power to the demand center, the Maputo metropolitan area. Through these efforts, Japan's assistance has contributed to the stabilization of the southern region's power sector and to sustainable economic development, with two projects complementing each other by enhancing supply capacity and system stability.

5.2 Additionality

None

(End)