Micronesia

FY2023 Ex-Post Evaluation Report of Japanese Grant Aid Project

"The Project for Power Sector Improvement for the State of Kosrae"

External Evaluator: Hisae Takahashi, QUNIE CORPORATION

0. Summary

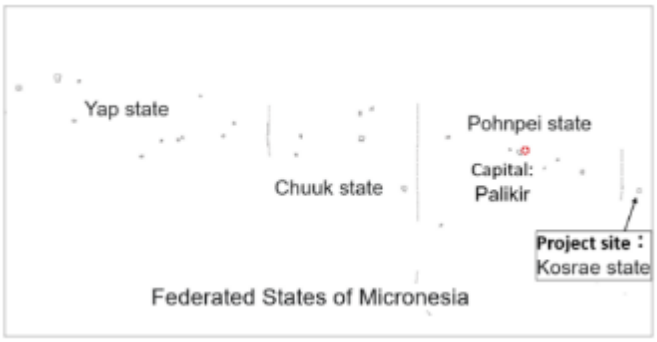
The objective of the Project was to secure stable and efficient power supply by installing diesel generators with associated facilities in the State of Kosrae (Kosrae State) of the Federated States of Micronesia (hereinafter referred to as "FSM"). Its purpose is in line with the development policies and needs of the FSM and Kosrae State at the time of planning and the ex-post evaluation, and the Project content and approach were appropriate. In terms of external coherence, coordination was undertaken with the support provided by the World Bank (WB) as indicated at the time of the planning. Although there were no specific references to internal coherence at the time of planning, it was also confirmed that the implementation of JICA's technical cooperation project contributed to the operation and maintenance of the facilities installed under the Project. The Project was in line with Japan's assistance policy, which emphasizes the economic growth and strengthening of social infrastructure, and with the international framework. Therefore, its relevance and coherence are high. Although the project cost was within the plan, the project period largely exceeded the plan due to the design changes of the generator house foundation. Therefore, efficiency of the project is moderately low. In terms of project effectiveness, after project implementation, the installed power generating capacity and the total generating capacity in Kosrae State increased, and both the frequency and duration of power outages decreased until 2022. That has allowed people in the state to run things efficiently without interruptions due to power outages, including public services such as hospitals and government offices, economic activities, and their lives, and the impact on the quality of the living environment has been confirmed. On the other hand, since 2023, power outages in the state have been on the rise due to several factors such as shutdown of a diesel power generator due to component failure at the Tofol Power Station, distribution lines damaged by storms, and inability to provide a stable power supply with the solar power systems[1] in the state because power generation of the system has been affected by weather conditions. The increase in the number of outages has also affected the resident's daily lives and some economic activities. Moreover, the planned improvement in power generation efficiency has not been confirmed. Accordingly, although the power generation equipment installed under the project is fully utilized and contributes to securing the power generation, the overall outcome of the Project has achieved its objectives only to a certain extent in Kosrae State. Therefore, effectiveness and impacts of the Project are moderately low. Although no issues have been observed in the policy/system, institutional/organizational, technical, and

[1] The facility which was installed in the state government building adjacent to the Tofol Power Station. It operates in conjunction with the diesel generation equipment of the Tofol Power Station.

environmental and social aspects, some issues have been observed in financial, preventative measures to risks, and the current status of operation and maintenance. Therefore, sustainability of the project effects is moderately low.

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

1. Project Description



Project Location
(Source: External evaluator)

Newly Constructed Power Station
(Source: External evaluator)

1.1 Background

The FSM is an island nation in the northern Pacific Ocean, consisting of four states, namely Yap, Chuuk, Pohnpei, and Kosrae. Each state mainly uses diesel power generation to supply electricity. However, declining generation efficiency due to aging equipment had led to an increase in fuel imports, and rising electricity prices had placed a heavy financial burden on government and the public. At the time of the planning, three diesel generators were operating at the Tofol Power Station in Kosrae State, however, two of them had already exceeded their intended service lives, and were experiencing frequent troubles and accidental outages due to the deterioration, thereby causing problems such as deterioration in the living environment and quality of public services. Moreover, as a result of years of exposure to the local harsh natural conditions, the associated power distribution equipment and underground cables deteriorated badly. Meanwhile, since there were plans to construct a new hospital, factory, and port facilities and the power demand was expected to grow, it was urgently necessary for Kosrae State to ensure an efficient and stable power supply to support people's lives.

Against this background, the FSM government requested Japan's grant aid for the development of primary diesel generating facilities and associated distribution facilities in Kosrae State.

1.2 Project Outline

The objective of the Project is to secure efficient and stable power supply by installing diesel generators with associated facilities in Kosrae State, thereby contributing to improving the quality

of life for the people, economic development and environmental and climate change measures of the FSM.

Grant Limit / Actual Grant Amount	1,193 million yen / 1,118 million yen
Exchange of Notes Date / Grant Agreement Date	April 2016, February 2021 (1st revision), March 2022 (2nd revision) / April 2016, September 2019 (1st revision), February 2021 (2nd revision), April 2022 (3rd revision)
Executing Agency	Kosrae Utilities Authority (KUA)
Project Completion	October 2019
Target Area	Kosrae State
Main Contractor(s)	(Equipment Procurement) NBK CORPORATION
Main Consultant(s)	Yachiyo Engineering Co., Ltd.
Preparatory Survey	January to October 2015
Related Projects	[Technical cooperation] "The Project for Introduction of Hybrid Power Generation System in the Pacific Island Countries" (2017-2022) [International organisations, etc.] WB "Energy Sector Development Project" (2014)

2. Outline of the Evaluation Study

2.1 External Evaluator

Hisae Takahashi, QUNIE CORPORATION

2.2 Duration of Evaluation Study

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

Duration of the Study: September 2023-September 2024

Duration of the Field Study: November 28-December 12, 2023 and April 8-16, 2024

2.3 Constraints During the Evaluation Study

This project installed diesel generators and the associated facilities in Kosrae State. At the time of the planning, it was assumed that the impact of this project would benefit the people of the FSM and the FSM as a whole. On the other hand, the power generation operations are conducted on a state-by-state basis in the FSM, and the impact of the Project is limited to power supply in Kosrae State. Therefore, as a supplementary indicator, the perspective of "improvement in the living environment of Kosrae State" was added to assess and analyze the Project's impact.

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

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

3.1.1. Relevance (Rating: ③)

3.1.1.1 Consistency with the Development Plan of the FSM

At the time of the project planning, the FSM had set the goal of providing and using safe, reliable and sustainable power services for the social and economic development of the country in its *FSM National Energy Policy (2010)*. Additionally, the *Kosrae State Energy Action Plan 2013* outlined the goals and outcomes of the state's power development projects, and indicated that high priority outcomes, which included improving power generation efficiency and achieving 100% of utilization of existing generators. The *Kosrae Strategic Development Plan 2014-2023* also aimed to improve the lives and livelihoods of residents through economical, safe, reliable, environmentally sound and sustainable energy with improving the power generation efficiency in Kosrae State.

At the time of the ex-post evaluation, the *FSM Energy Master Plan (2018)* has the goals of ensuring that almost all households have access to electricity with a good quality of service by 2027 and sets target values for the proportion of renewable energy, as well as for the reduction of diesel fuel and CO_2 emissions. The *Kosrae State Energy Master Plan (2018)* also aims to provide electricity to all households in Kosrae State through the development of new diesel generators, solar power generation and energy storage unit. The *Kosrae Strategic Development Plan 2020-2023*, updated in 2019, aims to maintain and improve the efficiency of power plants and expand the use of renewable energy to meet the state's energy demand.

The project aims to secure stable and efficient power supply by installing of power generation facilities. It aligned with the energy policies of the FSM and Kosrae State, which have consistently indicated the need for developing power generation facilities to improve residents' lives, both at the time of planning and at the time of the ex-post evaluation.

3.1.1.2 Consistency with the Development Needs of the FSM

At the time of the project planning, Kosrae State had three diesel generators (with a total generating capacity of 2,600 kW) in operation with the peak power demand of 1,140 kW. Of these three generators, two had already exceeded their service life, frequently causing malfunctions and accidental power outages due to aging, which led to a decline in the quality of life of residents and public services. The distribution facilities and underground cables had also deteriorated severely due to harsh environmental conditions, such as termite damages and salt corrosions. Meanwhile, private fish freezing facility and others were scheduled to begin operations, making the need of enhancement for adequate power

[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory
[3] ④: Very High, ③: High, ②: Moderately Low, ①: Low

facilities an urgent issue.

In Kosrae State, the peak power demand in 2023 remained at 1,139 kW due to a decrease in the population.[4] Although the two diesel generators (600kW, two units) installed by the Project have been fully utilized, a certain level of power outages has occurred even after the Project was implemented due to factors such as the shutdown of one of the existing diesel generators after the implementation of the Project, the lack of storage batteries in the solar power system which makes it heavily dependent on weather conditions, and damage of distribution facilities, etc. Furthermore, at the time of the ex-post evaluation, the diesel generator (600 kW) provided by the WB have ceased operation due to component failure, leading to an increase in the frequency of power outages in some areas. Therefore, the needs for development of generators and related facilities remain high.

As described above, at the time of planning and ex-post evaluation, the development needs for installing power generating facilities in Kosrae State was high, and the implementation of this project was consistent with these needs.

3.1.1.3 Appropriateness of the Project Plan and Approach

Based on lessons learned from similar projects in the past where spare parts could not be obtained due to limited availability and high costs, which hindered adequate maintenance, the Project required a minimum five-year supply of spare parts and components of facilities installed by the Project in the Supply Guarantee Certificate at the time of bidding. Additionally, after the importance of securing fund for regular maintenance was explained to the Executing Agency, Kosrae Utilities Authority (hereinafter referred to as "KUA"), it was also agreed upon in the minutes. There have been no problems in obtaining spare parts or related items for the facilities provided by the Project, and it can be said that the lessons learned were adequately addressed.

3.1.2 Coherence (Rating: ③)

3.1.2.1 Consistency with Japan's ODA Policy

At the time of project planning, the *Country Assistance Policy for the FSM (2012)* focused on "strengthening economic growth and social infrastructure" as a priority area and the *JICA Country Analysis Paper for the Oceania Region (2014)* on "strengthening infrastructure for economic activities/maintaining lifelines." Additionally, the Fukushima Iwaki Declaration, adopted at the 7th Pacific Islands Leaders Meeting (2015), expressed the commitment to implement cooperation that contributes to improving energy security

[4] The population of Kosrae State was approximately 6,600 according to the 2010 census. However, with an increasing number of residents emigrating to the United States, it is estimated that the population falls below 5,000 by the time of the ex-post evaluation. (Since 2010, official population figures have not been updated or published.) Source: Interview with KUA.

and reducing greenhouse gas emissions in pacific islands countries.

The Project was in line with Japan's assistance policy toward the FSM, as the installation of the generator and related facilities in Kosrae State was intended to ensure stable and efficient power supply and contribute to economic development and environmental and climate change countermeasures in the areas.

3.1.2.2 Internal Coherence

At the time of planning, there were no specific projects which were scheduled to collaborate or be coordinated with this project. However, the technical cooperation project, *(Regional) Project for Introduction of Hybrid Power Generation System in the Pacific Island Countries (2017-2022)* was implemented after the start of the Project with the aim of introducing a hybrid power generation system. This technical cooperation project provided the training on operation and maintenance of the power generation facilities and electrical switchgear installed by the Project, as well as training related to the introduction of hybrid power generation systems.[5] Moreover, activities related to ensuring the sustainability of the project's effects were carried out, such as the provision of equipment for checking and testing the power generation facilities. The Tofol Power Station in Kosrae State also requires coordinated operation between the power generators installed by this project and the solar power generation system. KUA staff in charge of operation and maintenance are applying their basic understanding of integrated operation and knowledge of generator engine maintenance to actual maintenance activities. It can be said that the support provided by the technical cooperation project was consistent with the implementation of this project.

3.1.2.3 External Coherence

At the time of project planning, the WB was planning to renew power generation facilities in Kosrae State through the *Energy Sector Development Project.* Therefore, based on the power demand forecast for the entire state, adjustments were made so that the WB provided a 600 kW diesel generator for emergency support, and JICA supported the installation of two 600 kW diesel generators (totalling 1,200 kW) for long-term operation. The diesel engine generators provided by the WB in 2019, together with the generators supported by the project, have contributed to stable power generation in the state by increasing the power supply capacity as planned.[6]

Additionally, from the perspective of contributing to the improvement of living

[5] Given the impact of the COVID-19 pandemic, the training was conducted remotely (online).
[6] The generator procured by the WB ceased operation in 2023 for component repairs. As of April 2024, the parts have been obtained from Malaysia, and operation is expected to resume after testing.

conditions, economic development, and environmental and climate change measures in Kosrae State through stable and efficient power supply, the Project is aligned with international development frameworks. Specifically, it is consistent with the two goals of the Sustainable Development Goals (SDGs): “Goal 7: Ensure access to affordable, reliable, sustainable, and modern energy for all” and “Goal 13: Take urgent action to combat climate change and its impacts.”

As described above, the Project aligned with the development policies and needs of the FSM and Kosrae State, and there were no issues with the Project plan and approach. Coordination with the WB’s support indicated at the time of planning, contribution of JICA’s technical cooperation project to maintenance activities, and consistency with Japan’s assistance policy, and international frameworks were confirmed.

Therefore, its relevance and coherence are high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

The Project was designed to procure and install diesel generators, construct a diesel generator house, rehabilitate the distribution network and underground cables, and provide consulting services and technical assistance for the operation and maintenance of diesel power plants (soft component) in Kosrae State of the FSM. The planned and actual outputs identified in the ex-post evaluation are as follows.

Table 1: Planned and Actual Outputs

	Plan	Actual
Procurement and installation of equipment		
1. Diesel engine generator Diesel engine (600 kW), AC generator, Common board	2 units	As planned
2. Diesel generator auxiliary unit (mechanical)		
Fuel supply equipment, Lubricating oil equipment, Cooling water equipment, Compressed air equipment, Ventilation equipment, Waste oil disposal equipment, Wire materials and pipe	1 set	As planned
3. Diesel generator auxiliary unit (electrical) 13.8 kV circuit breaker equipment, Control equipment, In-station power equipment	1 set	As planned
4. 13.8 kV distribution equipment 13.8 kV overhead distribution line (Lelu Island) 15 kV underground cable (Okat (airport) area)	 1 set 1 set	Largely as planned See “Description of the change ①, ② and ③ ”
5. Parts and spare parts Power generation maintenance tools, Replacement parts, Emergency spare parts	1 set	【Added】1 unit of measurement device for air pollution and noise See “Description of the change ⑤
Construction		
1. Diesel generator house	1 set	Largely as planned See “Description of the change ④
2. Diesel generator and auxiliary unit foundations	1 set	As planned
Consulting Services		
Detail design, Procurement and construction supervision, etc.		As planned
Soft Component（SC）		
Technical guidance on operation & maintenance of the diesel engine generators (including the proper operation method of interconnected PV system with generators), and others		As planned

Source: Preparatory survey report, documents provided by JICA

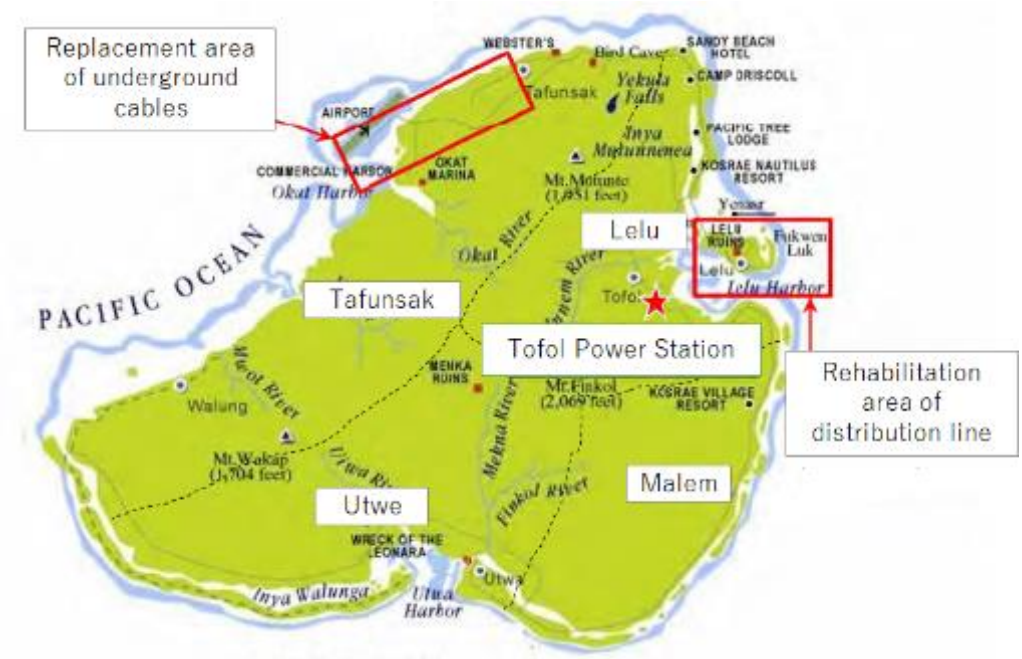


Figure 1 Map of Kosrae State and Location of the Project Site

(Source: Prepared by external evaluator based on preparatory survey report)

As shown in Table 1, the items covered by Japanese side were generally implemented as planned; however, the following main changes were observed.

【Description and reasons for changes[7]】

- Description of the change ①: Addition of salt resistance specification of power distribution facilities in Lelu Island

  Reason: At the time of planning, it was judged that the need for salt resistance specification was not high because there was rainfall throughout the year in the arear, which washed away the salt deposits on the equipment, so their functionality was not affected. However, later on (as of 2016), there were periods with less rainfall, raising a concern about a potential degradation in the functionality of the distribution lines. This led to the decision to switch to salt resistant specification.

- Description of the change ②: Change of part of the electrical system of the distribution lines on Lelu Island from three-phase line to a single-phase line.[8]

  Reason: KUA and the consultant re-confirmed the increase in power demand and determined that no significant growth in power demand was not expected in the target area in the near future. Therefore, the decision was made to apply a single-

[7] Interview with KUA, questionnaire answer from the consultant

[8] Single-phase is generally used for supplying electricity to smaller appliances and devices, such as household electronics. Three-phase is commonly used for supplying electricity to large equipment and industrial facilities.

phase distribution line, similar to the existing ones.

・Description of the change ③: Extension of underground cables in the Okat area to align with the commencement of operation at the fish transhipment facility.

Reason: The underground cable was planned to run from the connection poles to the airport. However, during the outline design survey, it was confirmed that the fish transhipment facility had begun operations. Therefore, the decision was made to extend the power cables to the facility.

・Description of the change ④: Change of diesel generator foundation

Reason: After the concrete was poured for the direct foundation of the diesel generator, uneven settlement[9] was detected in October 2017. In response, a review and confirmation were conducted, leading to the necessity for a design change from a direct foundation to a pile foundation.

・Description of the change ⑤: Addition of a measurement device for air pollution and noise

Reason: KUA did not have measurement device for assessing environmental impact; however, in preparation for the implementation of the Project, it was necessary to assess noise level and air pollution to obtain approval for the Environmental Impact Assessment (EIA) from the Kosrae Island Resource Management Authority. Therefore, new measurement device was procured.

The changes to the salt resistance specification of the distribution facilities and the electrical system of the distribution lines, the extension of underground cables, and the diesel foundation were made to align with the local conditions and avoid affecting the effectiveness of the Project. These changes are therefore considered reasonable. Additional procurement of a measurement device was also considered reasonable, as it was essential for assessing the noise levels and air pollution caused by the diesel generators, which could potentially impact the surrounding environment.

Additionally, the following items were planned to be implemented as the responsibilities of the FSM side.

(1) Partial removal of obstructions, trees, weeds, etc. from the construction site for the new power station
(2) Construction of facilities at the proposed site of the new power plant
(3) Connection of underground cable and overhead lines from the station 13.8 kV distribution board to the first pole
(4) Renewal of low-voltage distribution lines of Lelu Island distribution line
(5) Re-installation of water supply pipes for the new power plant

[9] This refers to the tilting and sinking of the foundation or the entire building.

(6) PR activities connecting the scheduled power interruption plan in line with project implementation.

(7) Other (including bank opening and payment commissions)

According to KUA and the consultant, all the responsibilities on the FSM side were carried out as planed, and there are no particular problems.

Photo 1: Generator installed at the Tofol Power Station
(Source: External evaluator)

Photo 2: Underground cable connection pole
(Source: External evaluator)

3.2.2 Project Inputs

3.2.2.1 Project Cost

The Project was planned to cost 1,202 million yen, of which 1,193 million yen was to be borne by the Japanese side and roughly 9 million yen by the FSM side. However, the actual project cost was 1,125 million yen (1,118 million yen on the Japanese side, and 6.5 million yen on the FSM side), which was within the plan (94% of the plan).

Although the costs for changing the distribution line specification, additional procurement of measuring device, and extension of underground cables exceeded the planned amount, the overall Project cost decreased by approximately 77 million yen due to changes such as switching the distribution system from a three-phase line to a single-phase line, removing the conversion base, and the appreciation of the yen.[10]

3.2.2.2 Project Period

The Project period[11] was planned to be 23 months. However, the actual Project period was 43 months, from April 2016 (the month in which the G/A was signed) to October 2019 (the month in which the construction was completed and facilities/equipment were handed

[10] Source: Documents provided by JICA, and questionnaire answer from the consultant

[11] The project period is defined as the period from the month in which the G/A is signed to the month in which the construction is completed and handed over.

over), which significantly exceeded the plan (187% of the plan).

Table 2 Planned and Actual Project Period by Process

	Plan	Actual
Detailed design period (including bidding period)	5 months	June - October 2016 (5 months)
Construction period	17.5 months	October 2016 - April 2019 (31 months)
SC implementation period	Completed by start of operations	May 2019 - October 2019 (6 months)

Sources: Preparatory survey report, documents provided by JICA, and documents provided by KUA

The delay was due to a change in the design of the diesel foundation. Initially, based on the results of the ground and geological survey[12] conducted during the preparatory survey, the foundation of the engine-generator foundation was planned to be applied for a direct foundation, similar to the foundation of the existing generator facility. However, after concrete was poured for the direct foundation of the diesel engine generator, uneven settlement was observed. Upon review of the ground conditions, it was found that a proper ground evaluation might not have been conducted, necessitating a design change from a direct foundation to a pile foundation. Subsequently, due to prolonged rainfall during the construction, the surface runoff and groundwater levels on the site increased. To address this, drainage channels were installed around the construction building to drain water. However, the groundwater level in the soil decreased more than anticipated due to the drainage. The instability of the soil layers, which was not technically anticipated based on the surveys conducted during the design stage and data from post-excavation, is estimated to be a factor contributing to the displacement (tilting) of the engine and generator foundations.[13] The extension resulting from these events was necessary for safety measures and can be considered an unavoidable decision.

The outputs of this Project were generally delivered as planned. Although the project cost was within the plan, the project period largely exceeded the plan due to unforeseen factors, which necessitated a redesign of the diesel generator foundation. Therefore, efficiency of the Project is moderately low.

[12] A brief land and geotechnical survey were conducted as directed by the instruction of works.
[13] Source: Documents provided by JICA, interviews with KUA and questionnaire answers from the consultant

3.3Effectiveness and Impacts[14] (Rating: ②)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

At the time of planning, capacity of the power generating equipment installed in the Project, the Tofol Power Station total generation capacity, the power supply interruptions (number of power outages) and the fuel consumption per unit of generated power were expected to improve as the operation and effect indicators of the Project. The actual values of these indicators observed at the time of the ex-post evaluation, are shown in Table 3. In line with the Project's objective of ensuring stable and efficient power supply in the target area, the operational and effect indicators for this project are set for the entire Tofol Power Station, including the two diesel generators provided by the project, with the exception of the "Power generating equipment capacity installed in the project".

Table 3 Original and Actual Values for the Operation and Effect Indicators of the Project

Indicator	Baseline value	Target value	Actual				
	2014	2021	2019	2020	2021	**2022**	2023
		3 years after completion	Completion year	1 year after completion	2 years after completion	**3 years after completion**	4 years after completion
1. Power generating equipment capacity installed in the Project (kW)	0	1,200	1,200	1,200	1,200	**1,200**	1,200
2. Tofol Power Station Total generating capacity (MWh) Note1	5,463	7,450	6,434	6,846	6,314	**6,371**	6,800
3. Power supply interruptions (times/year) Note2	48	24	53	38	37	**35**	85
4. Fuel consumption per unit of generated power (g/kWh) Note3	234	229	270	250	233	**235**	251

Source: Ex-ante evaluation, documents provided by KUA

Note1: The total generating capacity of the two diesel generators installed under the Project, the existing diesel generator (1,000 kW), and the diesel generator supported by the WB (600 kW). This does not include solar power generating system, etc.

Note2: Number of power outages per year (unscheduled and scheduled outages)

Note3: Fuel consumption regarding the total generating capacity of the Project plus the existing diesel generators, and the one scheduled for assistance by the WB.

The achievement of each indicator is evaluated based on the actual results of 2022, three

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

years after the completion of the Project, which was set at the time of planning. In the Project, the diesel generators (600kW: 2 units) were installed as planned, and the power generating equipment capacity achieved the target value. The actual value of the Tofol Power Station total generating capacity (6,371 MWh) slightly fell short of the target value mainly due to lower power demand in Kosrae State and a decline in the power generation capacity of the diesel generators as they aged. However, it still reached 86% of the target value (7,450 MWh). For the number of power supply interruptions (the number of outages), the target was set at approximately half of the baseline value. After the Project implementation, although the number of outages improved, the actual number of outages was 35, exceeding the target value of 24, and thus did not meet the target value. Possible causes were damage to distribution lines, corrosion of hardware due to salt damage, and the effects of fluctuations in solar power generation. Additionally, in 2023, the diesel generator, which was installed by the WB's support, malfunctioned and ceased operation due to a damage of the components. Consequently, power distribution to some areas was restricted more frequently, resulting in a significant rise in the number of outages. For further information, there are no blackouts throughout the state, and the stability of the system is maintained by daring to interrupt the power distribution to some areas in order to prevent blackouts throughout the state, and balancing supply and demand.[15]

The actual fuel consumption per unit of generated power at the Tofol Power Station was almost the same as the baseline values, and no improvement was observed. Moreover, according to the Operations Manager of KUA, if the fuel consumption of an engine does not exceed 14 kWh/gal, it is usually considered that the fuel is not being used efficiently and the performance of the engine is poor. Before the implementation of the Project, with Unit 6's fuel efficiency at 13 kWh/gal and Unit 8's at 10.2 kWh/gal, the existing generators at the Tofol Power Station were inefficient. On the other hand, the two diesel generators installed by JICA have been running smoothly at an average of 14 kWh/gal, indicating that generator performance and efficiency are deemed satisfactory.

3.3.1.2 Qualitative Effects (Other Effects)

At the time of project planning, it was assumed that the installation of diesel generators through the implementation of the Project would provide a stable and efficient power supply. The effects confirmed at the time of the ex-post evaluation are as follows.

It was confirmed through interviews with residents and large consumers in Kosrae State that, compared to before the Project implementation, the frequency and duration of power

[15] KUA, for example, restricts power distribution in areas with relatively low demand, such as the Utwe-Malem area, during the daytime and restores it after 3 p.m., when public services are closed.

outages had decreased, resulting in a more stable power supply until 2022.[16] However, as mentioned above, one diesel generator ceased operation in 2023 and the frequency of power outages is increasing. To prevent total blackouts in Kosrae State, the frequency of outages is being increased by restricting power distribution, particularly in the Malem/Utwe districts[17] where economic and public activities are relatively low. Consequently, the impact at the time of the ex-post evaluation varies by areas as follows:

<Tafunsak and Lelu districts>

After Project implementation, the power supply in both districts has been relatively stable. In interviews at municipality offices, fish freezing facility, hotels, and hospital, the majority of respondents reported that the frequency and duration of power outages improved after Project implementation. However, since power outages continue to occur, there is still room for improvement. For example, the fish freezing facility in the Tafunsak district has had to use a generator installed by the company itself to mitigate the impact of sudden outages on its operations.

<Utwe and Malem districts>

In Utwe and Malem districts, it was confirmed through interviews that the frequency and duration of power outages decreased, and that the power supply situation had improved after Project implementation until 2022. However, the frequency and duration of power outages increased significantly in and after 2023, and almost all respondents in both districts indicated in the interviews that the effect of providing a stable power supply was limited at the time of the ex-post evaluation.

As described in the Quantitative Effects, fuel consumption per unit of generated power has remained unchanged since the time of planning. Considering the deterioration in the efficiency of power generation due to the aging of the existing generators, it can be said that the installed power generation facilities by the project have made a contribution. However, it cannot be said that they have been as effective as originally expected with regard to efficient power generation.

3.3.2 Impacts

3.3.2.1 Intended Impact

The implementation of the project was expected to contribute to the economic development and the improvement of the living conditions of the people, as well as to

[16] During the first field survey, interviews were conducted with a total of 23 residents of Kosrae State: 16 residents (6 men and 10 women) and 7 large consumers (4 men and 3 women) from various entities including a supermarket, state government office, municipality offices (2), a hospital, a hotel, and a fish freezing facility, to assess the effects of the Project.

[17] Kosrae State is composed of four districts: Tafunsak, Lelu, Malem, and Utwe. Tafunsak is a commercial area where the airport, port, fish freezing factory, and hotels are located. Lelu is an area with government-related facilities, a hospital, and hotels. Malem and Utwe are primarily residential areas.

environmental and climate change measures by securing a stable and efficient power supply of the FSM.

In determining the impact of the Project, changes in living environment, quality of public services, economic activities and income, and satisfaction with the power supply due to a stable power supply were assessed through the interviews with residents. However, when analyzing the impact, it is necessary to consider the fact that the power generation in the FSM is operated on a state-to-state basis. The power supplied by the facilities installed by the Project is intended for use within Kosrae State. Additionally, among the four states of the FSM, Kosrae has a significantly smaller population and a smaller power grid scale compared to the other states. Therefore, as noted in "2.3 Constraints During the Evaluation Study", the impact on the overall FSM is very limited, and this was taken into account when making the evaluation judgment.

1) Contribution to Economic Development

As state-level statistical data has not been updated since 2018, it was not possible to analyze the contribution of this project to the economy of Kosrae State. Moreover, interviews with residents and large customers revealed that only 31% of respondents answered that the Project had contributed to local economic activities, confirming the limited contribution of stable power supply to economic activities at the time of the ex-post evaluation. According to respondents who noted a contribution to economic activities, the reduction in power outages allowed for uninterrupted economic activities and services, enabled the sale of frozen and refrigerated goods, and reduced the use and need for generators.

2) Contribution to improving the living conditions of residents

After the implementation of the Project, the following contributions to the living environment in the Tafunsak and Lelu districts were found: a stable power supply facilitated more efficient household chores, such as laundry, and the reduction in unplanned power outages decreased the strain on appliances, helping to prevent sudden breakdowns. Additionally, the need to discard frozen food due to power loss was eliminated. Also in Utwe and Malem districts, similar improvements were observed for a certain period following the project implementation as in the Tafunsak and Lelu districts. On the other hand, particularly since 2023, the increase in unplanned power outages has led to disruptions in laundry and other household chores, and breakdowns of household appliances, affecting daily life. Therefore, the positive impact of the project has been limited. In terms of satisfaction with the power supply, 56% of total respondents reported being dissatisfied. The contributing factors to the dissatisfaction include the increasing frequency of power outages and high electricity prices.

3) Contribution to improving the quality of public services

As the state government office and hospital are mainly located in the Lelu district, the power supply is relatively stable at the time of the ex-post evaluation and an overall improvement in the quality of public services was reported. For example, at the state hospital, during power outages, only the emergency wards use the power from the hospital's backup generators. Consequently, other medical departments have to suspend operation during outages. On the other hand, after the Project was implemented, the frequency and duration of power outages decreased, allowing the medical examination to operate without interruption. It was also reported that the decreased use of generators has reduced fuel costs, and also alleviated the financial burden. In addition, the mortuary, which was previously unavailable, is now in use. In municipality offices, the reduction in power outages has also allowed meeting rooms to be used for community awareness activities and meetings. Moreover, during power outages, phones became unusable, so there were frequent delays in responses to requests and complaints to public services, which are primarily received by phones. However, after the implementation of the Project, it has been confirmed that prompt responses have become possible.

4) Contribution to environmental and climate change measures

At the time of planning, the climate change mitigation effects (estimated GHG emission reductions) of the project were estimated to be approximately 460.6 tons of CO_2 equivalent per year. It was planned to attempt to calculate the emission reductions by determining the difference between baseline emissions and emissions after the Project; however, the information necessary for the calculation could not be obtained from KUA, hence no comparison could be made. However, according to KUA, the existing generators introduced about 25 years ago were outdated with excessive emissions of exhaust gases and CO_2. On the other hand, the Project has adopted smaller diesel engine generators that meet Japan's air pollution standards. Accordingly, the impact on air pollution from operating these new generators is less than the existing facilities. It was, therefore, explained that the Project has contributed to environmental preservation.

3.3.2.2 Other Positive and Negative Impacts

1) Impact on the Environment

The Project was classified as Category B based on the JICA Guidelines for the Confirmation of Environmental and Social Consideration (October, 2012) because it was not regarded as the large-scale project in the thermal power, power transmission and distribution lines sectors and its potential adverse impacts on environment were not significant.

For the implementation of the Project, an EIA was conducted and approved by the Kosrae Island Resource Management in February 2016, prior to the Project implementation. No special conditions were attached to the Project, and the plan included properly disposing waste, implementing noise control measured by restricting construction to daytime hours, and ensuring that emissions of air pollutant and noise comply with international standards. KUA was responsible for simultaneously monitoring air pollution, noise, etc. during construction.

According to KUA and the consultant, as the environmental mitigation measures, the proper disposal of waste, including concrete (after curing, crushed and used as exterior gravel bedding), and noise control measures were implemented as planned. During construction, monitoring was conducted by the contractor, and no specific problems were identified. In Kosrae State, regular monitoring of air quality and noise is not mandatory. Instead, during operations, the situation is monitored through visual inspections for dust dispersion and by conducting interviews with local residents. According to KUA and nearby residents, there were no negative environmental impacts from the implementation of the Project. Furthermore, it was reported that the power generation facilities installed in the Project produce significantly less noise compared to the facility used in the past, leading to reduction in noise problems in the neighbourhoods.

Based on the above, it can be considered that the measures to mitigate the impact of the Project on the natural environment were implemented as planned, and the necessary measures were taken. Moreover, no particular negative impacts on the natural environment have occurred after the Project completion, so it can be said that there are no particular concerns.

2) Resettlement and Land Acquisition

The Project did not require any land acquisition or resettlement. While upgrading and newly installing some of the distribution lines required permission from the landowner, the procedures were planned to be carried out in accordance with national laws and JICA Environmental and Social Considerations Guidelines. At the time of planning, it was confirmed that the key items were included in both the FSM national laws and the JICA Environmental and Social Considerations Guidelines, ensuring consistency between them. Prior to the implementation of the Project, it was required to enter into a land use agreement with the landowner in accordance with Kosrae State's customary law.[18] According to KUA, land use agreements were made as planned before the start of the Project, and it has been reported that no issues, such as complaints from landowners, arose.

[18] In the FSM, customary law is also recognized in the Constitution.

3) Gender Equality

In the implementation of the Project, the Japanese contractor planned to ensure that appropriate health and safety training was thoroughly provided to workers coming from outside the area during the construction period. It has been confirmed with KUA that the health and safety training for workers was conducted as planned prior to the start of construction and no problems were occurred during the Project implementation.

4) Marginalized People, Social Systems and Norms, People's Well-being and Human Rights

At the time of planning, no specific and direct initiatives from the perspectives of Marginalized People, Social Systems and Norms, People's Well-being and Human Rights were articulated, and no relevant impact occurred during and after the Project completion.[19]

It can be said that thanks to the Project, the frequency and duration of power outages in Kosrae State decreased by 2022, ensuring a stable power supply. However, while the power generation efficiency was maintained at the level required by the KUA, no significant improvements in power generation efficiency were observed. The stable power supply has allowed public services, such as hospitals and municipality offices, economic activities, and the lives of residents to be carried out efficiently without interruptions due to power outages. As a result, the impacts of the Project have been confirmed, such as the improvement of public services and the quality of life in Kosrae State. On the other hand, the frequency and duration of power outages are on the increase due to damages to distribution lines and fluctuations in solar generation systems caused by changeable weather, as well as the cease of operation of one generator installed by the WB in 2023.

Based on the above, while the power generation facilities installed by the Project have been fully utilized and contributed to securing the power supply, the overall impact of the Project in Kosrae State has achieved its objectives only to a certain extent. Therefore, effectiveness and impacts of the Project are moderately low.

3.4 Sustainability (Rating: ②)

3.4.1 Policy and System

As mentioned in "3.1.1. Relevance", the *FSM Energy Master Plan (2018), Kosrae State Energy Master Plan (2018)* and *Kosrae State Strategic Development Plan (2020-2023)* are positioned as effective policy documents at the time of the ex-post evaluation, and they are highly consistent with the Project. Regarding operation and maintenance, there has been no change in the institutional framework for power generation operations in Kosrae State, where KUA continues to handle daily operations and maintenance. Based on the above, it can be said

[19] Source: Questionnaire answers from KUA

that the sustainability in terms of the policy and system is considered high.

3.4.2 Institutional/Organizational Aspect

KUA is responsible for the operation and maintenance of the facilities installed by the Project, as it was also at the time of planning. As of December 2023, KUA had a total of 28 employees. Among them, five staff members are assigned to the operation and maintenance of the power generation facilities, and seven staff members are assigned to the maintenance of the distribution facilities.

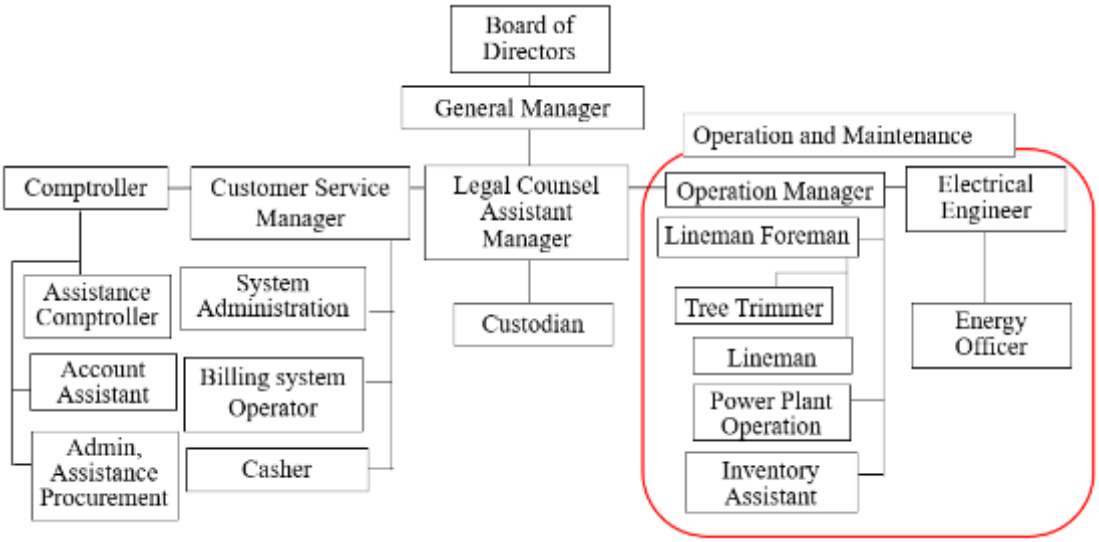


Figure 2 Organization Chart of KUA

Source: Documents provided by KUA

The operation and maintenance of the power generation and distribution facilities are mainly managed by the Operation Manager of the Division responsible for these tasks (hereinafter referred to as “the Operation Manager”), and there are no problems with the reporting system or related procedure. According to KUA, there is no surplus or shortage of personnel to carry out maintenance and management activities. However, as the staff members have largely relied on the directives and judgments of the Operation Manager for the operation and maintenance of facilities over many years, there are few staff members within KUA who can assume the role of Operation Manager. This is a concern for the future structure and indicates a need for improvement. In response to the above situation, KUA plans to organize internal training conducted by the operation and maintenance staff who received training through the Project for other operation and maintenance staff members. However, it is hard to have the Operation Manager, who plays a key role in training, set aside time for training, and as a result, the training has not yet been conducted.

Based on the above, it can be said that KUA is responsible for the operation and maintenance

of the power generation facilities installed in the Project and is currently performing its duties without any problems in terms of institutional/organizational aspect. However, it is necessary to train staff members to be successors of the current Operation Manager in the future.

3.4.3 Technical Aspect

At the time of planning, it was pointed out that KUA needed to deepen its understanding of preventive maintenance. To ensure proper operation and maintenance, it was necessary to enhance their maintenance capabilities, including conducting daily inspections and implementing the analysis and storage of maintenance records. To address this need, the Project provided technical training on the structure and systems of power generation facilities, operation and maintenance, and coordinated operations of diesel power generation facilities and solar power systems. The training was conducted through both classroom lectures and hands-on training. Of the six participants,[20] three are no longer with KUA due to retirement and others. However, the experience and knowledge gained from the training are planned to be shared within KUA, particularly, by the Operation Manager as a part of internal trainings for staff who did not participate in the original training. Additionally, according to the staff who participated in the training, daily inspections are being carried out under the leadership of the Operation Manager, based on the knowledge and experience gained from the training, as well as the established manuals and checklists for inspections. However, while the staff who participated the trainings conducted in the Project understands the need for maintenance and the required actions, they tend to wait for instructions from the Operations Manager before taking action in practice. Therefore, the daily workload of the Operations Manager is substantial, while no problems have arisen at this point. As mentioned above, it is evident that developing successor in the technical roles will be necessary in the future. In addition, the Project procured spare parts required for the major periodic inspection scheduled to be conducted two years after the Project completion, as well as for periodic inspections up to that point. More than four years have passed since the completion of the Project, they know the availability of spare parts, including distribution channels, and has not encountered any procurement problems. Therefore, no technical problems have occurred at the time of the ex-post evaluation.

3.4.4 Financial Aspect

KUA had been experiencing continuous deficit, but at the time of Project planning, the introduction of a prepaid system for electricity billing was leading to a gradual improvement in the status of income and expenditure. As of the ex-post evaluation, KUA has been able to keep profitable, as shown in the table below. Approximately 70-80% of KUA's operating expenses

[20] A total of six people participated in the training: one operation manager in charge of maintenance, one electrician, three in charge of Power Station operations, and one in charge of electric lines.

are related to power generation, and both income and expenses have been on the rise along with increasing fuel costs. The electricity charges consist of a base charge plus a fuel adjustment charge (FAC).[21] The unit price of the base charge has not changed since the time of planning, as shown in the table 5. However, the FAC has been increasing in response to rising fuel prices, and the financial burden on users remains high due to the rising cost of fuel.

Table 4 The Budget Information of KUA

(Unit: thousand US$)

Item	2021	2022	2023
1. Operating revenue	2,864	3,096	4,422
2. Operating expenses	2,451	2,774	4,079
(1) Generation costs	1,711	1,954	3,186
(2) Distribution costs	221	252	268
(3) Operating costs	130	140	165
(4) Technology & development plan cost	101	101	126
(5) General administration expenses	288	327	374
3. Depreciation costs	404	343	320
4. Interest expense	5	5	-
5. Development aid grants	45	56	-
6. Net income	49	30	23

Source: Documents provided by KUA

Table 5 Unit Price of Power (basic charge)

(Unit: US$/kWh)

Residential	Commercial	Government	Large consumers
0.478	0.488	0.542	0.533

Source: KUA website https://kosraepower.com/tariff-rates.html (confirmed April 2024)

Note: The unit price of electricity varies depending on the usage, with different rates (Rete 1 to Rate 5) set accordingly. The rates shown in the table correspond to Rate 3.

At the time of planning, the maintenance costs for the procured power generation facilities (including the purchase of replacement spare parts and consumables) were estimated at approximately US$154,000 per year. It was also indicated that funds needed to be set aside to replace the facility 15 years after the legal service life of the generators, requiring an annual allocation of US$ 683,000. However, as shown in the table below, the maintenance costs of the procured generators over the past three years have been significantly lower than the estimated amounts at the time of planning.

[21] The FAC is calculated as follows: FAC $/kWh = (Previous month's fuel price × $0.09) - $0.29.

Table 6: Maintenance Costs of Procured Diesel Generators

(Unit: US$)

Estimated amount as of the planning	2021	2022	2023
154,000	22,000	25,000	32,000

Source: Documents provided by KUA

KUA has found that the diesel generators installed through the Project have lower maintenance costs compared to existing equipment. Additionally, by using parts and consumables procured through the Project, KUA has not incurred significant cost. As a result, the actual maintenance costs for KUA are significantly lower than the estimated amounts. In addition, the major periodic inspection scheduled to be conducted two years after Project completion has not been carried out, leading to actual maintenance costs being substantially lower than the estimated amounts. According to KUA, there is currently no shortage in operation and maintenance costs. However, the current income only covers personnel costs and the minimum required operations and maintenance cost. It has been reported that no funds have been allocated for facilities replacement after 15 years. As described below, given that some maintenance activities (such as tree trimming activities) have not been properly performed, it cannot be said that sufficient maintenance budget is in place. Thus, it is necessary to examine the budget required for maintenance and develop a plan for reserve funds. Therefore, it can be said that issues have been observed in the financial aspect.

3.4.5 Environmental and Social Aspect

No negative environmental or social impacts were assumed at the time of planning, and at the time of ex-post evaluation, it has confirmed by KUA that there are no possible negative environmental and social impacts in the future.

3.4.6 Preventative Measures to Risks

The diesel generator that has been out of operation since 2023 due to a parts failure was initially scheduled to be back in operation by January 2024. Although there were delays because it took time for repairs, it has been completed and test operations are currently being conducted at the power station using parts that were delivered from Malaysia. The generator is expected to resume full operations in the near future (as of April 2024). In situations like the current one, where one of the generators at the power station ceases operation for any reason, there is a foreseeable risk of frequent and prolonged power outages in some areas. In January 2024, a generator that was operating as a backup generator also experienced some failures, resulting in a week-long large-scale outage in the state. As described below, the two generators installed by the Project have not undergone detailed inspections, even though the time when this should have been done has passed, and the fact that detailed inspections has not been performed even

once since installation with failing to find time to poses a risk to the stable power supply. Therefore, some issues have been observed in the preventative measures to risks.

3.4.7 Status of Operation and Maintenance

(1) Status of operation and maintenance of facility

All facilities installed by the Project, including the power generation facilities at the Tofol Power Station, the distribution lines and the underground cables, are being used and remain in good condition. On the other hand, according to KUA, the procured measuring device for air pollution and noise has not been used at the time of the ex-post evaluation. This is because noise level meters are already installed at the generator facilities. It was reported that subsidence was observed in the foundation of the power plant building between 2019 and October 2022. However, status surveys were conducted every three months for one year, and there was no influence from the groundwater level and no further subsidence of the building was detected. As a result, the foundation of the Power Station building is considered stable. During the ex-post evaluation, it was confirmed with KUA that no further subsidence of the Power Station building had occurred.

Regarding the operation and maintenance of the facilities, it was planned that in addition to daily inspections, the power generation facility would undergo detailed inspections every two years, and the electrical equipment would be inspected every three years. According to KUA, oil changes and radiator cleaning, etc. have been performed periodically, however, detailed inspections have not been carried out. Two years after the equipment installation, detailed inspections were not conducted, partly due to the limited personnel caused by the impact of COVID-19. Additionally, after one of the generators at the Tofol Power Station stopped operating, the generator installed by the Project have been running at full capacity, leaving no opportunity to conduct the detailed inspections. KUA plans to promptly conduct detailed inspections on the generators installed through the Project as soon as the currently non-operated generator resumes operation.

Although not within the scope of this Project, there is a concern: power outages have been frequently reported due to damage to distribution lines caused by falling trees and plants during rain and windstorms, as regular trimming of trees and plants around the distribution lines has not been conducted. In interviews with residents and large customers, the request for regular trimming of trees and plants around distribution lines was also highlighted to KUA. Therefore, some issues have been observed in the current status of operation and maintenance.

(2) Contribution of maintenance plan/software components

The training provided as part of the Project supported the training in preventive maintenance for diesel generator and mechanical equipment. It also assisted in formulating the operation

plans and preventive maintenance plan for generators considering the impact of the solar power generation systems integrated into the grid. Before participating in the training, KUA personnel were not fully aware of the necessary inspections and maintenance tasks to be performed, and followed the instructions of the Operation Manager to conduct the required tasks. In the classroom and hands-on training provided by the Project, maintenance plans and checklists for each task were prepared. Accordingly, staff involved in maintenance can now understand the necessary tasks and, by following the checklists and receiving instruction from the Operations Manager, effectively carry out the daily maintenance activities. Additionally, although KUA staff did not have sufficient experience in the maintenance diesel generators and their operation in conjunction with the solar power generation systems, the training provided by the Project contributed significantly to their understanding of the necessary inspection and maintenance tasks. Moreover, as the diesel generators and the solar power system at the Tofol Power Station are operating seamlessly together, it can be said that the training played a crucial role in ensuring the seamless coordination.

In light of the above, no issues have been observed in the policy/system, institutional/ organizational, technical, and environmental and social aspects. However, some issues have been observed in the financial aspects including the current status of operation and maintenance, and preventative measures to risks. They are not expected to be improved/resolved. Therefore, sustainability of the Project effects is moderately low.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The objective of the Project was to secure stable and efficient power supply by installing diesel generators with associated facilities in Kosrae State of the FSM. Its purpose is in line with the development policies and needs of the FSM and Kosrae State at the time of planning and the ex-post evaluation, and the Project content and approach were appropriate. In terms of external coherence, coordination was undertaken with the support provided by the WB as indicated at the time of the planning. Although there were no specific references to internal coherence at the time of planning, it was also confirmed that the implementation of JICA's technical cooperation project contributed to the operation and maintenance of the facilities installed under the Project. The Project was in line with Japan's assistance policy, which emphasizes the economic growth and strengthening of social infrastructure, and with the international framework. Therefore, its relevance and coherence are high. Although the project cost was within the plan, the project period largely exceeded the plan due to the design changes of the generator house foundation. Therefore, efficiency of the project is moderately low. In terms of project effectiveness, after project implementation, the installed power generating capacity and the total generating capacity in Kosrae State increased, and both the frequency and duration of power outages decreased until

2022. That has allowed people in the state to run things efficiently without interruptions due to power outages, including public services such as hospitals and government offices, economic activities, and their lives, and the impact on the quality of the living environment has been confirmed. On the other hand, since 2023, power outages in the state have been on the rise due to several factors such as shutdown of a diesel power generator due to component failure at the Tofol Power Station, distribution lines damaged by storms, and inability to provide a stable power supply with the solar power systems[22] in the state because power generation of the system has been affected by weather conditions. The increase in the number of outages has also affected the resident's daily lives and some economic activities. Moreover, the planned improvement in power generation efficiency has not been confirmed. Accordingly, although the power generation equipment installed under the project is fully utilized and contributes to securing the power generation, the overall outcome of the Project has achieved its objectives only to a certain extent in Kosrae State. Therefore, effectiveness and impacts of the Project are moderately low. Although no issues have been observed in the policy/system, institutional/organizational, technical, and environmental and social aspects, some issues have been observed in financial, preventative measures to risks, and the current status of operation and maintenance. Therefore, sustainability of the project effects is moderately low.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

- The frequency and duration of power outages in Kosrae State are increasing. One of the main reasons cited is damages of the distribution lines. In Kosrae state, there are many plants surrounding the distribution lines, and in many cases these trees are damaged by rain or wind, causing harm to the distribution lines. When responding to damage to distribution lines after they have been damaged, the restoration process takes a considerable amount of time because the work begins with identifying the location. KUA should urgently collaborate with the Department of Public Works in the State and FSM Telecom, who also uses the poles, to establish a plan for regularly clearing and trimming plants and trees around distribution lines in the state to prevent damage to distribution lines caused by natural disaster.
- Since one of the diesel engine generators at the Tofol Power Station stopped operating, the frequency of power outages has increased significantly, disrupting the daily lives of local residents. To reduce the risk of similar problems occurring with the generators currently in operation, KUA needs to review and update the preventive maintenance plan, including

[22] The facility which was installed in the state government building adjacent to the Tofol Power Station. It operates in conjunction with the diesel generation equipment of the Tofol Power Station.

precision inspections that have not been previously conducted, and make efforts to maintain a stable power supply. At the same time, when making adjustments such as stopping power distribution to certain areas to prevent a complete blackout, it is advisable to inform residents of the timing of power outages in advance as much as possible to mitigate the impact on them.

- Although KUA staff members have deepened their knowledge of generator maintenance through participation in the training programs conducted under the Project, the current situation at the Tofol Power Station remains that the Operations Manager is relied on for most of the operation and maintenance of the facilities. In order to continue stable operation and maintenance of the facilities in the future, it is important for KUA to assign personnel who can assist the Operation Manager and train successors.

4.2.2 Recommendations to JICA

None

4.3 Lessons Learned

Defining an impact that adequately captures the scope of the project's effects

The Project was expected to contribute to improve the quality of life for the people, economic development, and climate change measures of the FSM. On the other hand, the power generated by the diesel generator installed under the Project is used only in Kosrae State, and the power supply is also limited to Kosrae State. Given that Kosrae State has the smallest population in the FSM, and it is unlikely that the impact of the Project would spread nationwide, it was considered realistic for the target scope of the Project to be the state level rather than the national level. In this ex-post evaluation, the evaluation was conducted with the additional perspective of “improving the living environment in Kosrae State” to grasp impact. It is important to appropriately define the target scope of the Project’s impact during the planning phase to ensure it is not overly broad.

5. Non-Score Criteria

5.1 Performance

5.1.1 Objective Perspective

None.

5.2 Additionality

None.

(End)