

Environmental and Social Considerations in Detailed Planning Survey (Technical Cooperation for Developing Planning)

DATE: 10th May, 2017

1. Full title of the Project

Project for Study of Upgrading and Maintenance of the National Electrical Power Grid in the Republic of Palau (hereinafter referred to as “the Project”)

2. Type of the Project

Formulation of a master plan

3. Categorization and Its Reason

The Project formulates a Power System Development Plan in Palau.

The Project is categorized as a “Category B” project because of the following reason. The Project is not likely to have significant adverse impacts on the environment under the JICA Guidelines for Environmental and Social Considerations (2010) in terms of its sectors, characteristics and areas.

4. Agency or Institution Responsible for the Implementation of the Project

Palau Public Utilities Corporation (PPUC)

5. Outline of the Project

(1) Expected Goals which will be attained after completion of the Project

The Project aims to upgrade and enhance the Palau’s National Electrical Power grid with proper integration of sustainable renewable energy.

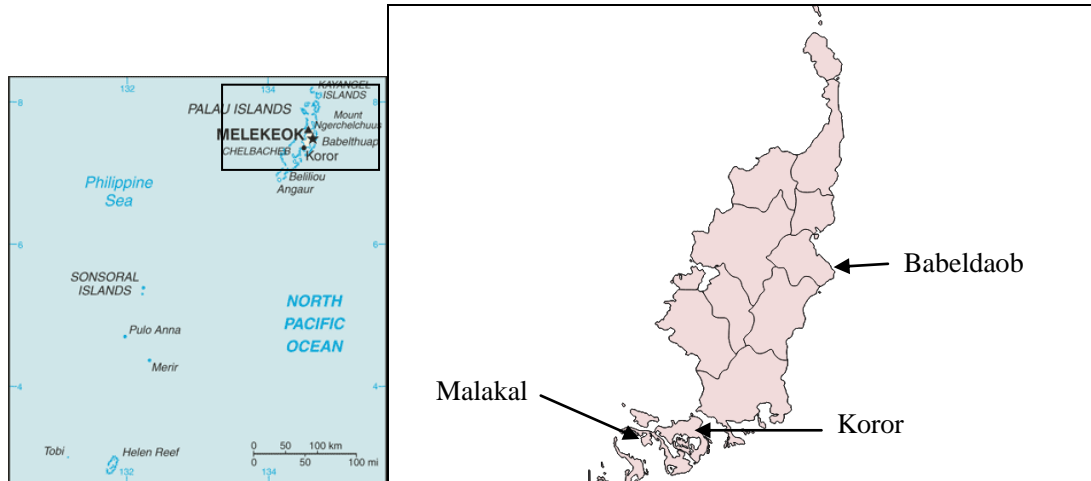
(2) Outputs

- 1) Master plan of the transmission and distribution system for the year 2030 is prepared and the roadmap of the introduction of sustainable renewable energy is revised.
- 2) Technical assistance for the reinforcement of operation and maintenance of transmission / distribution lines is conducted and the necessary technical transfer is completed.

6. Description of the Project Site

6.1 Target Area

Babeldaob, Koror and Malakal Islands in Palau (Figure 1).



The right map shows the enlarged view of the enclosed area of the left map.

Source: Central Intelligence Agency, USA (left), the Detailed Planning Survey Team (right)

Figure 1 Map of Palau

6.2 Description of the Environments

(1) Natural Environment

1) Physical Environment

Palau is an archipelago in the Pacific Ocean, about 800 km north from Papua New Guinea, and about 800 km east of the Philippines. The total land area consisting of more than 700 islands is 488 km² and the exclusive economic zone is 3,120,000 km². It is about 650 km away from the northernmost Kayangel atoll to the southernmost Helen reef, Hatohobei State. Islands of Palau are classified into four categories: atoll islands, high limestone islands, low platform islands, and volcanic islands. The terrain ranges from low-altitude coral reef islets surrounded by large barrier reefs to Babeldaob Island where high hills spread¹.

Palau belongs to the maritime tropical climate. It is hot and humid, and the annual average temperature is almost constant, around 28 °C. It is divided into rainy season (June - October) and dry season (November - May)².

2) Ecosystems and species

¹ The Republic of Palau: Revised National Biodiversity Strategy and Action Plan 2015-2025 DRAFT (Ministry of Natural Resources, Environment and Tourism)

² Palau Visitors Authority: <http://www.palau.or.jp/info/index.html>

Palau's rich biodiversity is supported by the diversified ecosystems distributed in 700 islands - forests, savannah / grasslands, freshwater, brackish water, marine lakes, coastal waters, coral reefs. There are over 7,000 terrestrial species and 10,000 species of marine species.

Although Palau is thought to have been covered with forests all over in the past, it is estimated that 82% of the land is covered with forest, including forest by agroforestry, in the forest cover analysis of 2007. Urbanization has resulted in loss of forests and other major changes to the environment in some areas, particularly around Koror, the Palau's population and the economic center.

Conservation International, international nature conservation NGO, identifies the country as part of "Polynesia-Micronesia"³, which is one of the "Biodiversity Hotspots" in the world. It means that it is necessary to urgently take appropriate actions to conserve its ecosystems and species.

Formulating a transmission and distribution plan, it is necessary to pay attention to electrocution and collision death of birds and bats⁴. There are no breeding grounds and large scale feeding areas of birds (especially seabirds) along the transmission / distribution lines and roads of Babeldaob, Koror and Malakal Islands⁵. Palau Flying Fox *Pteropus pelewensis* and Pacific Sheath-tailed Bat *Emballonura semicaudata*⁶ are distributed in Palau⁷. There are some electrocution death cases of Palau Flying Fox⁸. Palau Sheath Tailed Bat is small and insectivorous.

3) Conservation measures

Environmental Quality Protection Act serves as a basic law in Palau to protect and conserve environments including natural environment.

The Protected Area Network Act was enacted in 2003, and a protected area network (PAN) was established. PAN is a framework of protected areas to protect important biodiversity and effectively conserve natural resources in Palau⁹.

³ Conservation International:
http://www.conservation.org/global/japan/priority_areas/hotspots/asia-pacific/Pages/Polynesia-Micronesia.aspx

⁴ Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution (International Finance Corporation, 2007)

⁵ Observation by the Detailed Planning Survey Team (January 2017).

⁶ *Emballonura semicaudata palauensis* is distributed in Palau.

⁷ WWF: Island group of Palau in the western Pacific Ocean :

<http://www.worldwildlife.org/ecoregions/oc0110>

⁸ Palau Public Utilities Corporation (January 2017)

⁹ Protected Area Network – Small Investment, Priceless Return:

<https://www.env.go.jp/en/nature/npr/icccrc2013/pdf/year2013629/panel/elbuchel.pdf>

Table 1 shows the protected areas / historical sites registered in international conventions.

Table 1 Protected areas / historical sites registered in international conventions

Conventions	Protected areas / historical sites
Convention Concerning the Protection of the World Cultural and Natural Heritage: Mixed Cultural and Natural Heritage ¹⁰	Rock Islands Southern Lagoon
Convention Concerning the Protection of the World Cultural and Natural Heritage Properties submitted on the Tentative List ¹¹	<u>Mixed Cultural and Natural Heritage</u> Imeong Conservation Area <u>Cultural Heritage</u> - Ngebedech Terraces - Yapease Quarry Sites - Stone Coffin
Convention on Wetlands of International Importance especially as Waterfowl Habitat ¹²	Lake Ngardok Nature Reserve
Man and Biosphere Reserve ¹³	Ngaremeduu Conservation Area

Man and Biosphere Reserves are registered at United Nations Educational, Scientific and Cultural Organization (UNESCO).

BirdLife International, international nature conservation NGO, identifies internationally important habitats as Important Bird and Biodiversity Areas (IBAs) and promotes their conservation with local government and NGOs. There are 11 IBAs in Palau¹⁴.

(2) Social Environment

1) Legal framework

Palau is a presidential republic, entrusting the authority of defense and security to the United States under the COMPACT of Free Association. Congress is a bicameral system with 13 senators and 16 congressmen¹⁵. Under the President there are eight ministries¹⁶.

The Constitution gives the authority to designate 16 traditional municipalities in Palau as states. State's constitution defines the role of traditional leaders, and each state has a unique local government according to its constitution. The Palauan traditional chiefs have the advisory authority through the Council of Chiefs at the national level¹⁷. The legal system is a mixed law system of civil

¹⁰ UNESCO World Heritage Centre: <http://whc.unesco.org/en/statesparties/pw>

¹¹ UNESCO World Heritage Centre: <http://whc.unesco.org/en/statesparties/pw>

¹² Ramsar Convention: <http://www.ramsar.org/sites/default/files/documents/library/sitelist.pdf>

¹³ UNESCO

<http://www.unesco.org/new/en/apia/natural-sciences/biodiversity-biosphere-reserves-geoparks/current-pacific-biosphere-reserves/ngaremeduu-palau/>

¹⁴ BirdLife International: <http://datazone.birdlife.org/country/palau/ibas>

¹⁵ Ministry of Foreign Affairs, Japan: <http://www.mofa.go.jp/mofaj/area/palau/data.html#section2>

¹⁶ Government of Palau: <http://palaugov.pw/>

¹⁷ Government of Palau: <http://palaugov.pw/>

law, general law and customary law¹⁸.

2) Economy

Palau heavily relies on grant aid based on COMPACT with the United States, and in recent years aid from Taiwan is also increasing. Construction industry relying on grant aid from Japan, the United States and Taiwan, commercial and tourism industries based on import of food and consumer goods are major industries. Each industry heavily depends on foreign labor. The majority of Palauan is civil servants. Regarding food, taro and cassava are cultivated in Palau and coastal sea fishery provides local fishes, but most of the foods are imported from the mainland of the United States¹⁹.

3) Population

According to Bureau of Budget and Planning, Ministry of Finance, the population of 2015 is 9,433 men and 8,228 females, totalling 17,661 persons. There are 11,754 persons in Koror State, 66.6% of the total population, 2,455 persons 13.9% in Airai State, and 80.5% of the population lives only in the two states. This population is a statistic only for Palauan. Foreign workers such as Filipino and Bangladeshi live as foreign workers, and many of them also live in Koror and Airai States. The current total population may be from 21,000 to 22,000 persons²⁰.

4) Languages and ethnic groups

According to Budget and Planning Bureau, Palau people are 84% and other nationalities such as Carolina, Micronesian, Filipino, Chinese, Korean and Bangladesh are 16% of the total population. Regarding languages, in addition to Palau, which is the official language of most states, other languages such as Carolina, Micronesian and English are also spoken²¹.

5) Poverty

According to United Nations Development Program, Human Delegation Index (HDI) in 2014 of Palau is 0.780. Palau is ranked 60th in 188 countries in the world and is categorized as a group called “high human development”. The trend of the Palauan HDI from 2000 (0.743) to 2014 (0.780) shows that HDI of Palau steadily increases²².

¹⁸ Central Intelligence Agency World Factbook :

<https://www.cia.gov/library/publications/the-world-factbook/geos/ps.html>

¹⁹ Ministry of Foreign Affairs, Japan: <http://www.mofa.go.jp/mofaj/area/palau/data.html#section2>

²⁰ The figure “21,000” is from “Program - Inauguration Ceremony 10th Constitutional Government Republic of Palau (January 19, 2017)”, and the figure “22,000” is from UN: <http://data.un.org/CountryProfile.aspx?crName=palau>.

²¹ Central Intelligence Agency, USA:

<https://www.cia.gov/library/publications/the-world-factbook/geos/ps.html>

²² Human Development Report 2015 (United Nations Development Programme, 2015)

6) Gender²³

Under the Constitution, women can get equal opportunities with men, and the recommendations of the Female Chiefs Association (Mechesil Belau) are considered to be important in legislative issues. Women can vote and participate as candidates in elections of the president, congressmen and senators. Palau is not a signatory country of the Convention on the Elimination of All Forms of Discrimination against Women, but it establishes the Family Protection Act in 2013.

7) Infectious diseases²⁴

From 1993 to 2014, a cumulative total of 12 persons (8 males, 4 females) was confirmed as HIV / AIDS. Nine (9) persons were aged from 25 to 44 years old, and three (3) persons were from 45 to 64 years old. The infection rate of HIV / AIDS is considered to be low.

8) Natural disasters²⁵

Palau is a country with relatively few natural disasters. Natural disasters are mainly typhoons, drought and storm surge. Being like other Pacific islands, it is susceptible to extreme weather and sea level rise by the climate change.

7. Legal framework of the Environmental and Social Considerations in Palau

7.1 Relevant Laws

(1) Environmental and Social Considerations

1) Constitution

The Constitution (1979) describes the traditional rights in Article 5, and states "conservation of a beautiful, healthful and resourceful natural environment" as one of the responsibilities of the government in Article 6.

2) Environmental Quality Protection Act

Environmental Quality Protection Act sets up a framework of the environmental conservation and protection in the country. Environmental Quality Protection Board (EQPB) is established based on the act and regulates environmental approval.

3) Environmental Impact Statement Regulations

For earthmoving, public drinking water system, marine and freshwater discharge, solid waste management and air pollution, EQPB Permit is necessary. Among these, for the projects that the

²³ UN Women - Asia and the Pacific : <http://asiapacific.unwomen.org/en/countries/fiji/co/palau>

²⁴ 2015 Global AIDS Progress Report (Ministry of Health, 2015)

²⁵ United Nations Office for the Coordination of Humanitarian Affairs:
<http://www.unocha.org/pacific/country-profiles/palau>

EQPB Board assesses have impacts on the environment, Environmental Assessment (EA) and/or Environmental Impact Statement (ESI) are formulated and submitted to EQPB for its approval.

Environmental Impact Statement Regulations (Chapter 2401-61) stipulates procedures and contents of EA and EIS.

4) Strategic Environmental Assessment

Regarding Strategic Environmental Assessment (SEA), there are no laws and regulations in Palau.

5) Other regulations

The following regulations (including regulations on environmental standards) are defined.

- Chapter 2401-1 Earthmoving Regulations
- CHAPTER 2401-11 Marine and Fresh Water Quality Regulations
- CHAPTER 2401-13 Toilet Facilities and Wastewater Disposal Systems Requirements
- CHAPTER 2401-31 Solid Waste Management Regulations
- CHAPTER 2401-33 Pesticide Regulations
- CHAPTER 2401-51 Public Water Supply System Regulations
- CHAPTER 2401-71 Air Pollution Control Regulations
- CHAPTER 2401-81 Ozone Layer Protection Regulations

6) Relevant governmental organizations

The competent authority is Environmental Quality Protection Board. The Project Planning and Implementation Department, PPUC, coordinates with EQPB at the time of planning.

(2) Land acquisition and resettlement

In Palau, it is traditionally considered an honour to transfer right of a land to the government for public purpose. When it is necessary to acquire a land for public purpose, the owner transfers easement to the government and an agreement is exchanged. The government pays maximum efforts to avoid or minimize land acquisition and involuntary resettlement. Although there is no particular law concerning the transfer of easement and there is no compensation accompanying land acquisition, it is legally effective.

Land has private ownership, clan / lineage ownership, public land (nationally-owned land, state management land). It was during the Japanese occupation era (1920 to 1945) that personal ownership was approved and it was registered as a private property, but land ownership by clans and

linenages is still present²⁶. Land ownership other than the Palauan people is not permitted by the Constitution²⁷.

The competent authority is Palau Public Lands Authority, which manages all public areas. Bureau of Land and Survey, Ministry of Public Infrastructure, Industries and Commerce, conducts land survey and registration work.

(3) Climate Change

The government formulated Palau Climate Change Policy in 2015 and announced the year of 2020 as a target year for each sector to implement actions based on Climate Change Adaptation, Disaster Risk Management and Mitigation and Low Emission Development, and Institutional Mechanisms for Effective Policy Implementation.

The Intended Nationally Determined Contribution (2015) includes the following emission reduction targets from 2020 to 2025 as well as the reduction of transmission and distribution losses, the reduction of methane emission in the solid waste disposal sector, and the reduction of emission in the transport sector.

- 22% energy sector emissions reductions below 2005 levels by 2025
- 45% Renewable Energy target by 2025
- 35% Energy Efficiency target by 2025

Office of Climate Change, Ministry of Finance, is in charge of planning and implementation of issues related to climate change such as greenhouse gas emissions.

(4) Relevant international conventions

Table 2 shows relevant international conventions.

Table 2 International conventions related to environmental issues

No.	Convention	Year
1	Convention on Wetlands of International Importance especially as Waterfowl Habitat	20003
2	Convention Concerning the Protection of the World Cultural and Natural Heritage	2002
3	Convention on International Trade in Endangered Species of Wild Fauna and Flora	2004
4	Convention on Biological Diversity	1999

²⁶ Land Determination in the Republic of Palau, Jessica Y. Harrison

²⁷ Constitution of the Republic of Palau, Article XIII “General Provisions”, Section 8.

No.	Convention	Year
5	United Nations Framework Convention on Climate Change	2000
6	Paris Agreement	2016
7	Convention on the Elimination of All Forms of Discrimination against Women	Not yet ratified
8	Convention on Rights of the Child	1995 (accession)
9	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	2011

Source: Web site from each convention or UN

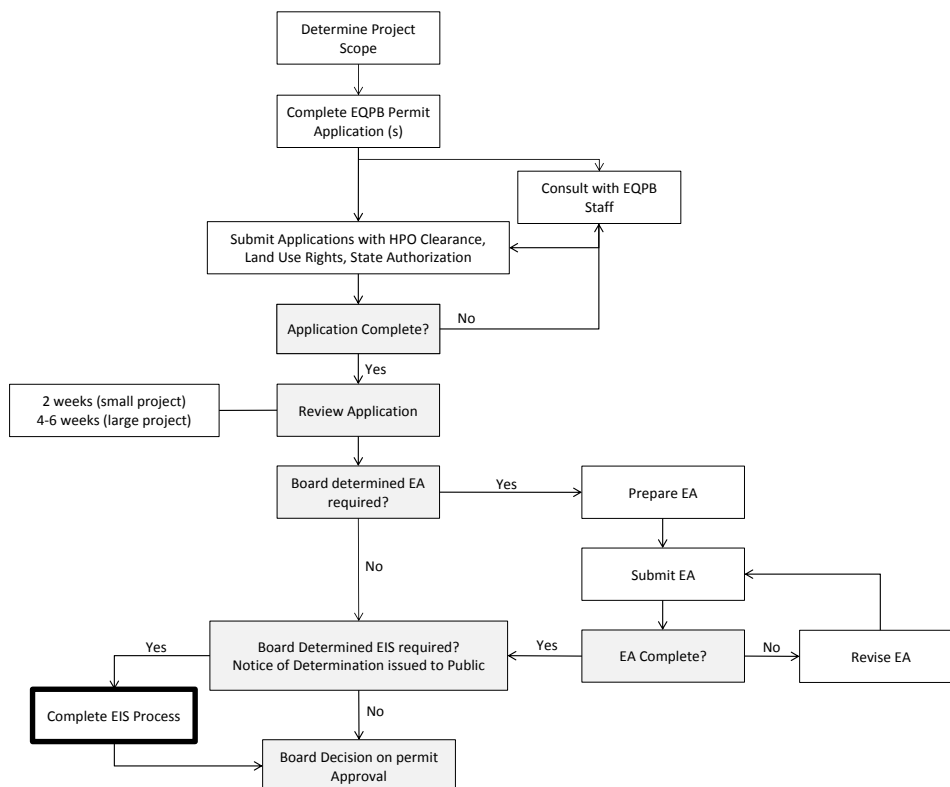
7.2 Environmental Impact Assessment

(1) Legislations

Procedures for the implementation of EA and EIS as part of EQPB Permit are stipulated in Environmental Quality Protection Act and Environmental Impact Statement Regulations.

(2) Procedure of EQPB Permit

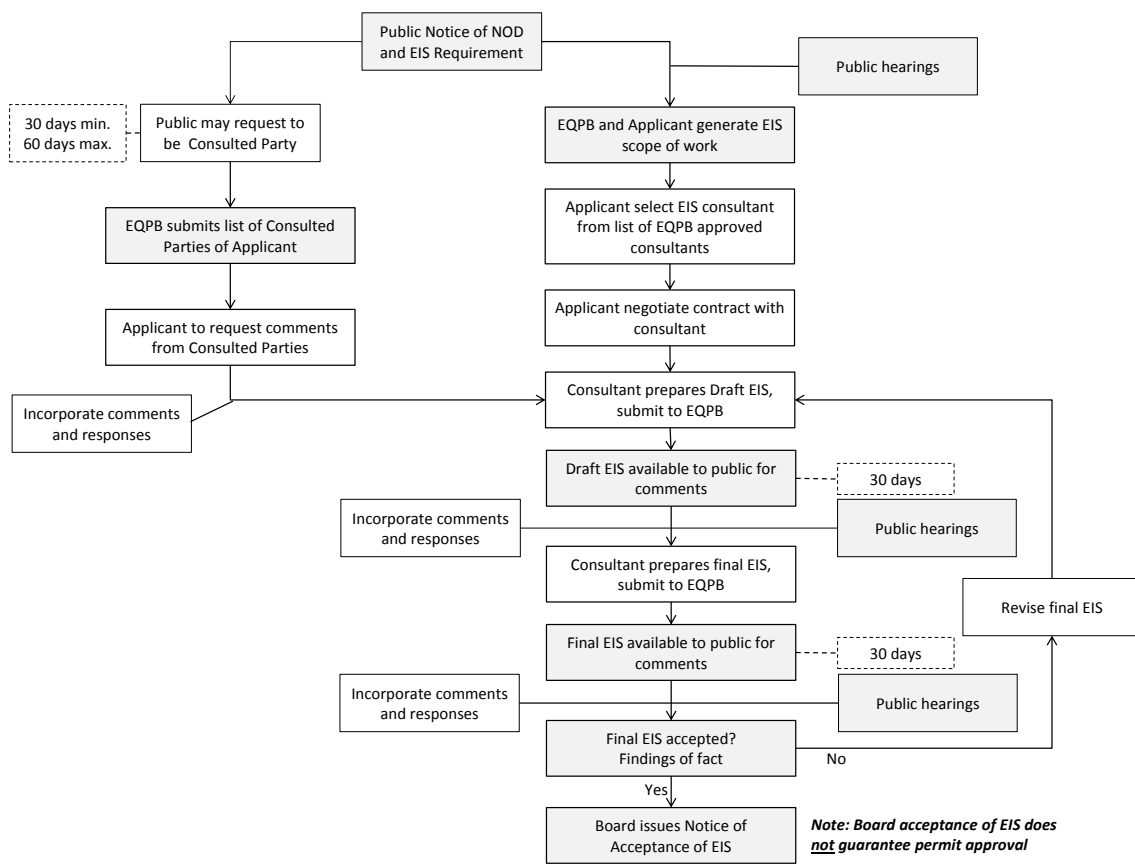
Figure 2 shows a flow of the procedure of EQPB Permit. Among these, for the projects that the EQPB Board assesses need EIS, studies on environment are conducted as shown in Figure 3.



Source: Modified flow diagram provided by EQPB (No change in contents)

Shaded activities conducted by EQPB.

Figure 2 EQPB Permit



Source: Modified flow diagram provided by EQPB (No change in contents)

Shaded activities conducted by EQPB.

Figure 3 Process of EIS

(3) SEA for the Project

There are no SEA laws / regulations in Palau. SEA for the Project is therefore implemented in accordance with existing law (Environmental Quality Protection Act and Environmental Impact Statement Regulations). Furthermore, there was a recommendation from the EQPB to implement the SEA with attention to the following points (23 January 2017).

- Appropriate considerations and recommendations for social and natural environments should be paid.
- "Significance Criteria (2401-61-06)" in Environmental Impact Statement Regulations should be well considered.

7.3 Necessary Permissions for public project

Regarding permissions for the implementation of public project, the following three permissions are

important.

- (1) Historic Preservation Office Clearance: Bureau of Arts and Culture, Ministry of Community and Cultural Affairs
- (2) EQPB Permit: EQPB
- (3) Building and Zoning Permit: Authorization by the state government where the project is implemented. The name is different from state to state, called "Building and Zoning Permit" in Koror State, and "Building Permit" in Airai State.

7.4 Important points in Palau for the Environmental and Social Considerations of the Project

Table 3 shows important points for the Environmental and Social Considerations of the Project.

Table 3 Important points in Palau for the Environmental and Social Considerations of the Project

Item	Important points
Public participation	➤ Comments are collected from residents on the draft and final versions of EIS and public hearings are held in the course of EQPB Permit.
Laws on land acquisition and resettlement	➤ There is no law concerning land acquisition and resettlement in Palau ➤ When it is necessary to acquire a land for public purpose, the owner transfers easement and an agreement is exchanged. The same also applies to resettlement of residents. Although there is no specific law, transferring easement is legally effective.
Resettlement plan	➤ There is no law for preparing resettlement plans.
Compensation	➤ Because providing land for public is conventionally considered an honor in Palau, there is no compensation, only by transferring easement and its agreement. However, the government minimizes the area acquired by project as small as possible. ➤ Building and Zoning permit requires that transferring easement is completed.

Source: Detailed Planning Survey Team

8. Provisional Scoping

A provisional scoping is conducted for the Power System Development Plan. The results are shown in Table 4.

Table 5 shows issues and mitigation measures regarding the introduction of renewable energy sources described in “Final report on the master plan study for the upgrading of electric power supply in the Republic of Palau (JICA, 2008)”.

Table 4 Provisional Scoping of the Power System Development Plan

Cate-gory	No.	Environmental Item	Evaluation		Explanation on impacts
			Planning and construction stages	Operation & monitoring stage	
Pollution Control	1	Air quality	B-	D	[Construction Stage] Air pollution caused by heavy machines and vehicles is expected. [Operation and monitoring stage (O&M stage)] No activities which give negative impacts are planned.
	2	Water quality	B-	D	[Construction Stage] Water pollution by oil and others from heavy machines and vehicles is expected. [O&M stage] No activities which give negative impacts are planned.
	3	Wastes	B-	D	[Construction Stage] Wastes from construction sites are expected. [O&M stage] No activities which give negative impacts are planned.
	4	Soil contamination	B-	D	[Construction Stage] Soil contamination by oil and others from heavy machines and vehicles is expected. [O&M stage] No activities which give negative impacts are planned.
	5	Noise and vibration	B-	B-	[Construction Stage] Noise and vibration from heavy machines and vehicles are expected.

Category	No.	Environmental Item	Evaluation		Explanation on impacts
			Planning and construction stages	Operation & monitoring stage	
					<ul style="list-style-type: none"> ➤ Noise and vibration during road works are expected. [O&M stage] Noise from substations is expected.
	6	Subsidence	D	D	No activities which give negative impacts are planned.
	7	Odor	B-	D	[Construction Stage] Odor from wastes and sewage from construction sites are expected. [O&M stage] No activities which give negative impacts are planned.
	8	Sediment	D	D	No activities which give negative impacts are planned.
Natural Environment	9	Protected areas	B-	B- B+	[Construction stage] Impacts on protected area in Babeldaob Island by relocation work of the existing transmission lines from the protected area are expected. [O&M stage] <ul style="list-style-type: none"> ➤ The impact is expected to be small, but in the vicinity of the protected area and forests, impacts induced by the management work such as grass cutting activities under the transmission / distribution lines are expected. ➤ When moving existing transmission lines within the protected area to the road side in Babeldaob Island, positive impacts such as reduction of impact on protected area are expected.
	10	Ecosystem	B-	B-	[Construction stage]

Cate-gory	No.	Environmental Item	Evaluation		Explanation on impacts
			Planning and construction stages	Operation & monitoring stage	
					<ul style="list-style-type: none"> ➤ Impacts on ecosystems are expected. ➤ Although impacts are expected to be small, collisions and electrocutions of Palau Flying Fox and birds are expected. [O&M stage] If project sites are close to unprotected important ecosystems such as IBAs, impacts are expected.
	11	Hydrology	D	D	No activities which give negative impacts are planned.
	12	Topography and geology	B-	D	[Construction stage] Construction works in mountainous and/or hilly areas may cause soil erosions. [O&M stage] No activities which give negative impacts are planned.
Social Environment	13	Involuntary resettlement	C	D	[Planning stage] No particular negative impact by the Project is expected, however impacts will be evaluated again when the content of the Project is determined. [O&M stage] No activities which give negative impacts are planned.
	14	Poor people	C	C	No particular negative impact by the Project is expected, however impacts will be evaluated again when the content of the Project is determined.
	15	Indigenous or ethnic minority	D	D	In Palau, there are no issues on indigenous and ethnic minorities.

Cate-gory	No.	Environmental Item	Evaluation		Explanation on impacts
			Planning and construction stages	Operation & monitoring stage	
	16	Local economies, such as employment, livelihood	B+	C	[Construction stage] Empoyment by the Project is expected. [O&M stage] No particular negative impact by the Project is expected, however imapcts will be evaluated again when the content of the Project is determined.
	17	Land use and utilization of local resources	C	C	No particular negative impact by the Project is expected, however imapcts will be evaluated again when the content of the Project is determined.
	18	Water usage	D	D	No activities which give negative impacts are planned.
	19	Existing social infrastructures and services	B-	C	[Construction stage] Impacts on road traffic are expected. [O&M stage] No particular negative impact by the Project is expected, however imapcts will be evaluated again when the content of the Project is determined.
	20	Social institutions such as social infrastructure and local decision-making	C	C	No particular negative impact by the Project is expected, however imapcts will be evaluated again when the content of the Project is determined.

Cate-gory	No.	Environmental Item	Evaluation		Explanation on impacts
			Planning and construction stages	Operation & monitoring stage	
		institutions			
	21	Misdistribution of benefits and damages	C	C	No particular negative impact by the Project is expected, however impacts will be evaluated again when the content of the Project is determined.
	22	Local conflicts of interest	C	C	No particular negative impact by the Project is expected, however impacts will be evaluated again when the content of the Project is determined.
	23	Cultural heritages	C	C	No particular negative impact by the Project is expected, however impacts will be evaluated again when the content of the Project is determined.
	24	Landscape	C	B-	[Construction stage] No particular negative impact by the Project is expected, however impacts will be evaluated again when the content of the Project is determined. [O&M stage] Impacts on the landscape are expected, because tourism is the one of the most important industries in Palau.
	25	Gender	C	C	No particular negative impact by the Project is expected, however impacts will be evaluated again when the content of the Project is determined.
	26	Children's rights	C	C	No particular negative impact by the Project is expected, however impacts will be evaluated again when the content of the Project is determined.
	27	Infectious diseases such as	C	C	No particular negative impact by the Project is expected, however impacts will be evaluated again when the content of the Project is determined.

Cate-gory	No.	Environmental Item	Evaluation		Explanation on impacts
			Planning and construction stages	Operation & monitoring stage	
		HIV/AIDS			
	28	Labor conditions	B-	B-	[Construction stage] <ul style="list-style-type: none"> ➤ Accidents by unexploded ordnance are expected. ➤ Accidents to workers such as electrocutions are expected. [O&M stage] <p>Accidents such as traffic accidents during maintenance activities are expected.</p>
Others	29	Accidents	B-	B-	[Construction stage] <ul style="list-style-type: none"> ➤ Accidents by unexploded ordnance and traffic congestions by disposal activities are expected. ➤ Accidents to neighboring residents are expected. [O&M stage] <p>Accidents such as traffic accidents during maintenance activities are expected.</p>
	30	Trans-boundary impacts / global warming	B-	B+	[Construction stage] <p>Emissions from heavy machines and vehicles are expected.</p> [O&M stage] <p>Positive impact is expected because of reduction of transmission line losses.</p>

A+/-: Significant positive/negative impact is expected. B+/-: Positive/negative impact is expected to some extent.

C: Extent of positive/negative impact is unknown. A further examination is needed, and the impact could be clarified as the study progress. D: No impact is expected.

Table 5 Issues and mitigation measures regarding the introduction of renewable energy sources (2008)

Renewable energy sources (Note 1)	Issues	Mitigation measures
Hydropower generation system	The success of hydropower generation depends on securing a water source. Palau has many rainfalls throughout the year and the largest Babeldaob Island has many small rivers. The potential of setting capacity of 100 kW class hydropower systems is high. However, land ownership issues and the nature conservation issues are complexly involved, and water source development of hydropower generation is not easy. A large amount of financing is also necessary to build a new hydropower station.	<p>In dam type hydropower generation, it is necessary to avoid protected areas, history / cultural heritage sites, and to avoid large-scale involuntary resettlement. It is also necessary to carry out a full-scale environmental impact assessment and river flow measurement and to minimize impacts on ecosystems and river basin.</p> <p>There is a plan to construct a water supply source for the new water supply system by the fund of Asian Development Bank in Babeldaob Island (Note 2). However, it is not planned to combine water supply and hydropower generation. In the case of small-scale power generation using dam overflow water, it is assumed that there are no particular environmental impacts.</p>
Photovoltaic power generation system	Most of Palau is covered with forests, and there are few large open areas for installing solar cells. Land ownership issues are complicated and new land acquisition is not easy. It is proposed to install solar batteries on the government buildings roof of Koror for the time being, but securing the installation place of solar cells is an issue to introduce photovoltaic power generation.	Photovoltaic power generation is generally considered to have small environmental impacts. If it adopts the grid interconnection method, there is no problem when the batteries become unnecessary. However, regular replacement is required when installing batteries, and it is necessary to establish a method of disposal of the used batteries.
Windpower generation system	As far as judging from wind speed data available at the present time, Palau does not have a high potential for wind power generation. In the future, when wind condition measurement and location selection are carried out to examine the possibility of wind power generation, it is necessary to pay attention to impacts on flying birds, the noise of the windmill and the landscape.	

Source: Final report on the master plan study for the upgrading of electric power supply in the Republic of Palau (JICA, 2008)

Note 1: "Solar heat utilization (solar water heater)" is also proposed as renewable energy use.

Note 2: A plan in 2008

9. Alternative to the Project Activities including “Zero (without project)” Option

Alternatives to the project activities will be studied in the Project.

10. Result of the Consultation with the Recipient Government on the Environmental and Social Considerations including Roles and Responsibilities

The Detailed Planning Survey Team explains to the counterparts of the Palau that the Project shall comply with the national laws and the “JICA Guidelines for Environmental and Social Considerations (2010)”. Both parties agree on the compliance to ensure that appropriate considerations shall be implemented for the environmental and social impacts expected by the Project. The Team also explains that a Strategic Environmental Assessment (SEA) shall be conducted in the Project as part of a master plan study, and it shall involve related stakeholders.

11. Terms of Reference for the Environmental and Social Considerations

(1) Rationale

The Project is a master plan study of the transmission and distribution system for the year 2030 and technical assistance for the reinforcement of operation & maintenance of transmission/distribution lines. It is required to conduct appropriate Environmental and Social Considerations under the Palauan act, regulations and JICA’s Guidelines.

- Environmental Quality Protection Act (Republic Palau Public Law 1-58)
- National Code Chapter 2401-61 Environmental Impact Statement Regulations (Palauan Regulations); and,
- JICA Guidelines for Environmental and Social Considerations (2010).

(2) Environmental and Social Considerations for the Project

The Environmental and Social Considerations are conducted in the following two components.

- Setting of Power System Development Plan
- Pre-feasibility Study on prioritized projects

For the Setting of Power System Development Plan, a Strategic Environmental Assessment (SEA) shall be conducted. Updating the power development plan, future development plan of renewable energy shall also be well examined and integrated into the SEA.

For the Pre-feasibility Study on prioritized projects, appropriate environmental and social considerations shall be conducted and necessary recommendations shall be made.

(3) Description of the SEA

1) Objectives

The objectives are;

- (a) To identify and assess potential impacts induced by the Project,
- (b) To avoid, reduce and mitigate these impacts,
- (c) To collect comments from stakeholders and reflect them to options proposed by the Project,
- (d) To evaluate the options from technical, financial and environmental points of view and,
- (e) To select the optimal option for the Project.

2) Study area of the SEA

Babeldaob, Koror and Malakal Islands

3) Methodology and the flow of the implementation of the SEA

- (a) Baseline surveys are conducted on the environmental and social conditions of the Study areas. Secondary data are utilized for the surveys. The following items should be well surveyed.
 - Policies, laws and regulations of Palau related to the environmental and social considerations (including Environmental Impact Assessment),
 - Natural conditions such as protected area system, internationally recognized important habitats and endangered species and,
 - Social conditions such cultural heritages and vulnerable people.
- (b) Planning options with which potential negative impacts on the social and natural environments are avoided, reduced and mitigated as much as possible.
- (c) A scoping for each option is conducted.
- (d) Based on the results of the scoping, social and environmental surveys are conducted to collect more information if necessary.
- (e) Impacts of the options are analyzed and evaluated, and the evaluation is conducted from technical, financial and environmental points of view.
- (f) Mitigation measures and a monitoring system of the selected option are recommended.
- (g) Comments from stakeholders are collected and reflected in the process of developing the options and selecting the optimal option. It is therefore required to hold stakeholders meetings.
- (h) Stakeholders meetings (SHM) are held during the course of the Project. Table 6 shows a proposed framework of the SEA, and two (2) SHMs are suggested (shaded steps in the Table 6). Stakeholders shall be identified in the early stage of the Project.

Table 6 Proposed flow of the SEA

No.	Step	Note
1	Information analysis	To evaluate and analyse data collected by Palau Public Utilities Corporation (PPUC) and the JICA Study Team.
2	Formulation of options	To formulate options by Palau Public Utilities Corporation (PPUC) and the JICA Study Team.
3	1 st SHM	To explain the options and collect opinions from related stakeholders.
4	Formulation of the optimal scenario	Based on the opinions, an optimal scenario are further developed and evaluated from environmental/ social, economic and technical points of view. The optimal scenario is formulated.
5	2 nd SHM	The optimal scenario is presented and approved at the 2nd SHM.
6	Review and approval	The final report is reviewed and approved by the Government of Palau.

(4) Implementation Organizations of the SEA and other Environmental and Social Considerations for the Project

The Environmental and Social Considerations including the SEA shall be conducted by Palau Public Utilities Corporation and the JICA Study Team.

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