PALAU
NATIONAL INFRASTRUCTURE INVESTMENT PLAN
2021 to 2030

2 JULY 2021

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FOREWORD

The completion of the Palau National Infrastructure Investment Plan ("NIIP") 2021 to 2030 comes at an unprecedented time when Palau is facing the challenging impacts of the COVID-19 global pandemic. The Palau NIIP can support our recovery efforts by rationalizing and mobilizing infrastructure investment opportunities to both reinstate and to expand commerce and trade and thereby restore and create new jobs as well as the government revenues that will allow us to get back on and remain on a sustainable growth path.

The Palau NIIP outlines our government's policies, priorities and plans for major infrastructure investments over the next ten years that will help us to recover and further develop our economy and society. The NIIP first takes a look at the national situation confronting us; the status and trends in demography, the social situation, the environment, and the economy. Studying this national picture helps determine a national level approach or a national strategy to investment in infrastructure. The national strategy guides a review of investment in all the component parts, or sectors of the economy; that is, from agriculture and education, to utilities and all forms of transportation and much more. Examining each of these sectors can then justify programs of future investment in infrastructure. This in turn helps identify all the individual future, required infrastructure projects. These projects need to be prioritized as resources are limited. A means to prioritizing projects has been developed and the long list of projects was prioritized by a small team of government staff to initiate the plan. The prioritized list is set against projected fiscal surpluses to produce a funding strategy for future government budgets.

The NIIP was assembled through a consultative process involving a wide range of stakeholders. A government task force was set up to lead its formulation. Projects were prioritized by a sub-committee of the task force. This committee will continue to meet each year to update the identification and prioritization of infrastructure projects as an input to the annual budget process. A further small committee was also formed to maintain a registry of infrastructure assets, to cost those assets and to help prepare them for prioritization.

We are thankful for the participation and contributions of both public and private sector stakeholders including the state governments, the business community, and the non-government organizations. We acknowledge the assistance of the Pacific Region Infrastructure Facility which provided the technical expertise and the support given by the Asian Development Bank as well as the cooperation of our other development partners in preparing this plan.

We look forward to the plan being fully integrated into our long term fiscal planning framework that will help ensure a bright future of growth, development, and improved standards of living for all the People of Palau.

Kaleb Udui, Jr.
Minister of Finance

Charles I. Obichang
Minister of Public Infrastructure and Industry

ACRONYMS

ADB	Asian Development Bank
BMR	Bureau of Marine Resource
BPW	Bureau of Public Works
BSCC	Belau Submarine Cable Corporation
BTTC	Belau Transfer and Terminal Company
CBA	Cost Benefit Analysis
CRA	Compact Review Agreement
CTF	Compact Trust Fund
EIRR	Economic Internal Rate of Return
EPO	Electric Power Operations
EQPB	Environmental Quality Protection Board
FAO	Food and Agriculture Organization
GAO	United States Government Accountability Office
GDP	Gross Domestic Product
GESI	Gender Equality and Social Inclusion
HCF	Healthcare Fund
HIES	Household Income and Expenditure Survey
IAEA	International Atomic Energy Organization
ICT	Information and Communication Technology
ILO	International Labor organization
IMF	International Monetary Fund
IOM	International Organization for Migration
IPP	Independent Power Producer
JICA	Japan International Cooperation Agency
JPRISM II	Japanese Technical Cooperation Project for Promotion of Regional Initiatives on Solid Waste Management in the Pacific Island Countries Phase II
KASP	Koror- Airai Sanitation Project
KSG	Koror State Government
KW	Kilowatt
MCA	Multi-Criteria Analysis
MOE	Ministry of Education
MOF	Ministry of Finance
MOH	Ministry of Health
MOJ	Ministry of Justice
MSA	Medical Savings Account
MTDS	Medium Term Development Strategy
MTEF	Medium-Term Expenditure Framework
MW	Megawatt
MWh	Megawatt-hour
M&E	Monitoring and Evaluation
NCD	Non- communicable Disease

NDC	National Determined Contribution
NDRMF	National Disaster Risk Management Framework
NEMO	National Emergency Management Office
NGO	Non- Governmental Organization
NHI	National Health Insurance
NIIP	National Infrastructure Investment Plan
NMDP	National Master Development Plan
NSWMS	National Solid Waste Management Strategy
OHCHR	United Nations Development Programme
O&M	Operations and Maintenance
PALARIS	Palau Automated Land and Resource Information System
PCCPF	Palau Climate Change Policy Framework
PCRAFI	Pacific Catastrophe Risk Assessment & Financing
PEA	Palau Energy Administration
PGD	Power, generation, distribution
PNA	Parties to the Nauru Agreement
PNCC	Palau National Communication Corporation
PNW	Palau Nature Works
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PPUC	Palau Public Utilities Corporation
PRIF	Pacific Regional Infrastructure Facility
SDG	Sustainable Development Goals
SOE	State Owned Enterprises
STP	Sewage Treatment Plan
SWM	Solid Waste Management
UN	United Nations
UN Environment	United Nations Environment
UN Women	United Nations Women
UNDP	United Nations Development Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Specific and Cultural Organization
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNISDR	United Nations international Strategy for Disaster Reduction
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNOPS	United Nations Office for Project Services
USDA	United States Department of Agriculture
WHO	World Health Organization
WWO	Water and Wastewater Operations

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EXECUTIVE SUMMARY

The Palau National Infrastructure Investment Plan (NIIP) outlines the Government of the Republic of Palau's (the "Government") priorities and plans for major infrastructure investments over the next ten years.

The NIIP was assembled through a consultative process involving a wide range of stakeholders. The government established a senior Steering Committee by Presidential Directive, chaired by the Ministry of Finance. This committee assigned a NIIP Task Force to provide necessary inputs and lead NIIP formulation. At the request of the Government, the Pacific Region Infrastructure Facility (PRIF) Coordination Office (CO) provided technical assistance (TA) to support the preparation of the NIIP and build government capacity in national infrastructure planning.

Investment in infrastructure serves the nation's national development goals. Post-COVID Palau requires a restored, larger and even more dynamic economy that can accommodate further investment in infrastructure and fully finance its recurrent costs. Infrastructure that serves economic recovery and expansion is therefore prioritized.

Palau has succeeded in securing comparatively good health and education for its people and there is a desire to further improve standards of living. The future population structure and population dynamics of Palau will likely alter the nature of the demand for future social infrastructure but not so much the extent of that infrastructure. Future investments in infrastructure will also need to take account of the needs of gender and disability. Actual and anticipated impacts of climate change and natural hazards further direct the demand for infrastructure.

Given the government's projected fiscal situation, economic recovery post-COVID will initially have to look to donor, development partner and private sector investment. Substantial investment in new private industry, most probably direct foreign investment in tourism, could however greatly change the projected demand for infrastructure. This in turn would likely boost the demand for local employment and therefore for a nearby resident population and also lead to an increase in demand for a wide range of domestic goods and services such as agricultural and fisheries produce and taxis and boat hire. Such investment will have to be accompanied by improved management, policies, and capital investment that correct losses incurred by some of the country's key utilities.

Palau has accommodated cultural change in the past and this in turn has supported new investment. However, when implementing the overall national strategy, priority, social, cultural and environmental goals will also need to be accommodated, as will the impact of the political economy.

The infrastructure goal is to sustain a relevant, efficient and effective program of infrastructure asset management and new investments that help meet the development goals of Palau. In this document, the development vision or goal for each of 14 sectors is first stated. This is contrasted with the current status of development in the sector, highlighting development performance, issues and opportunities. Contrasting the sector vision or goal with the status of that sector provides the rationale for the government's overall strategy in trying to progress improvement in each sector, overcoming concerns such as inadequate policy, or capacity limitations as well as a lack of infrastructure. The sector strategy can then justify the broad medium-term future infrastructure development programs or the demand for infrastructure in

each sector and therefore for each ministry and department. These broad programs can then be broken down into individual infrastructure projects that can be considered for future funding. As stated, future funds for infrastructure investment are likely to be limited until the economy can recover, and hopefully expand.

Infrastructure assets have been identified and their condition assessed. Costs of investment and maintenance have been assessed by category of infrastructure as relevant to Palau. The project cost estimates included in the NIIP are based on preliminary project concepts and these will need to be refined and updated when detailed design and specifications are developed for project implementation. A two stage process to first assess the readiness of all proposed infrastructure projects and to then prioritize them has been developed. The first step is referred to as an initial filter to assess if the proposed project has been fully prepared and can be considered for prioritization for government funding. The second step is project prioritization by a Multi-Criteria Analysis (MCA). MCA criteria are the government's national development objectives adjusted for the current need for the economy to recover from the impact of COVID-19. The initial project prioritization and proposed funding from 2021 to 2030 will be annually reviewed and revised as a part of the government's annual budget process.

A small Development Committee of senior officials from key agencies was formed to prioritize proposed infrastructure projects and to otherwise jointly assess and advise on the primary social, cultural and environmental development concerns of the government and society, as well as potential financial and economic impact. The Development Committee is chaired by the Director of the Bureau of Budget & Planning. The committee identified, scored and prioritized a total of 68 proposed investments in infrastructure. The top 20 priority projects are a mixture of infrastructure for resource development, utility renewal and expansion and to strengthen central government administration. This reflects the demands of national development, including some urgent investments in utilities. Project priorities may need to be adjusted in any individual fiscal year to allow for critical and urgent investments, for example in the case of a power failure.

In the future capital investments will be submitted by proponent departments as a component of annual budget formulation. Prioritized projects will be accommodated within the government's future financing envelope, the capacities for project implementation and the need to physically sequence some investments.

The project readiness filter and prioritization by MCA will most likely be refined and otherwise revised in the future as the government establishes its own standards for project assessment, as the Development Committee becomes more acquainted with the process and as newly elected governments revise development priorities.

The government's annual budgets have so far provided little funding for infrastructure other than for machinery and equipment, occasional partial construction such as in the case of the new correctional facility and for some repair, operation and maintenance. Outside of existing donor and development partner assistance programs and further potential Public, Private Partnerships (PPP) government funding for new investment in infrastructure will be most limited over much of the plan period. The government will therefore need to prioritize the generation of public revenues so that it may in the future finance its priority investments from its own funds as sole investor or in partnership with the private sector. Priority infrastructure investment will otherwise continue to be subject to negotiation with ongoing bilateral and multilateral assistance programs.

The NIIP will be gradually embedded in strengthened budget formulation and other public finance management including asset management, the management of foreign investment, CAPEX management, the medium-term fiscal and expenditure framework, and adequate operation and maintenance and other infrastructure lifetime cost management. The NIIP can then be annually monitored and evaluated as a component of the annual budget process. A NIIP Design and Monitoring Framework has been constructed. Monitoring and reporting on the implementation of the NIIP will be the responsibility of the Bureau of Public Works in cooperation with the Bureau of Budget and Planning as a component of the government's annual formulation of its budget.

I. INTRODUCTION AND BACKGROUND

Infrastructure Planning

High quality infrastructure investment can contribute to sustainable social and economic growth and development. On the other hand, poorly designed and poorly managed infrastructure cannot yield their full development potential. Poor infrastructure investments can also weaken debt sustainability, cause adverse social and environmental impacts and may be more vulnerable to natural hazards or to the effects of climate change. There is therefore an urgent need for all governments to carefully plan infrastructure spending.

The Palau National Infrastructure Investment Plan

The Palau NIIP outlines the government's priorities and plans for major infrastructure investments over the next ten years. The NIIP was assembled through a consultative process involving a wide range of stakeholders, including government, international agencies, civil society and the private sector. The Plan covers the following sectors:

- Agriculture and Forestry
- Central Government Administration
- Education
- Energy
- Fisheries
- Health
- Information and communications technology
- Public Safety, including correctional facilities
- Solid waste management
- Tourism
- Transport – Air
- Transport – Land
- Transport – Sea
- Water and Sanitation

The plan reviews the investment needs for the following infrastructure assets employed by various sectors in carrying out their operations:

- Airport Runways and Taxiways
- Buildings
- Bridges
- Coastal Protection Structures
- Culverts
- Electricity Generating Facilities, Transmission and Distribution Lines
- Landfill Sites
- Marine Ports, Slipway, Wharves and Jetties
- Roads and Footpaths
- Telecom Towers and Indoor and Outdoor Devices
- Wastewater Collection and Treatment Facilities
- Water Production Facilities, Pumping Stations and Distribution Lines

The plan does not cover needed investment in passenger vehicles, specialized motor vehicles, motorboats or ferries. These needs are usually accommodated in the government's recurrent budget.

Role and Objectives

Government Proprietorship

The government established a senior Steering Committee by Presidential Directive, chaired by the Ministry of Finance. This Committee met as required at key decision points to provide high-level direction and guide the formulation of the NIIP. At the request of the government, the Pacific Region Infrastructure Facility (PRIF) Coordination Office (CO) provided technical assistance (TA) to fund consulting services to support the preparation of the NIIP and build government capacity in national infrastructure planning. PRIFCO attended the meetings of the Steering Committee as an observer.[1]

The Project Steering Committee assigned a NIIP Task Force to provide necessary inputs and lead NIIP formulation. The NIIP Task Force was chaired by the Director of the Bureau of Budgeting and Planning, Ministry of Finance, and comprised director-level staff from the relevant Ministries and state-owned enterprises, including the Palau Public Utilities Corporation (PPUC). The Task Force facilitated consultation with the private sector, NGOs and civil society associations.

The NIIP Task Force reported to the Steering Committee and was responsible for the overall implementation of the TA in country. A highly consultative and interactive approach was employed to develop the NIIP. Beyond the central government, stakeholder consultations were held with the State Governors' Association and Speakers' Association in March and April 2021. A list of contributors is presented in Appendix 1. The final product provides key information for infrastructure planning including the prioritization and sequencing of projects for national budgets and coordination of partner and other funding modalities including private sector and public-private partnerships.

The Task Force reviewed options for prioritizing investments in infrastructure and tailored and adopted a process for this NIIP that will be refined and further developed over time. Infrastructure priorities will change over the next ten years and there will be a need to continue to assess proposed investments as a part of the government's annual budgeting exercises. A new Development Committee will therefore continue to assess infrastructure needs as part of the preparation of the government's annual capital budget.

PRIF CO established a development partners' Partner Advisory Group. The Partner Advisory Group will receive project outputs for review and comment and provided guidance on potential opportunities for donor funding.

[1] PRIF is a multi-partner coordination and technical assistance facility for improved infrastructure in the Pacific. The PRIF development partners are the Asian Development Bank (ADB), Australian Department of Foreign Affairs and Trade (DFAT), European Investment Bank (EIB), European Union (EU), the Japan International Cooperation Agency (JICA), New Zealand Ministry of Foreign Affairs and Trade (NZMFAT), United States Department of State (US) and the World Bank Group.

Technical Assistance

In commencing their work on the plan the consultant team reviewed the National Masterplan for Development (NMDP) 2020 and Medium-Term Development Strategy (MTDS) (2009-14), Identification of High-Level Goals for Palau's infrastructure development, the Pathway to 2030 – Palau's 2019 Voluntary National Review of the Sustainable Development Goals as well as all sector plans and strategies.[2] The TA was also directed by the needs for long-term expanded settlement and government and economic activity on Babeldaob, for economic recovery and jobs post COVID-19, the resilience of infrastructure to climate change and natural disasters, and disaster risk management and the development and funding of social infrastructure.

The NIIP Process

The process of preparing the NIIP has been tailored to fit the development needs of Palau. It has been directed by the above mentioned national plans and by all sector strategies and plans and other relevant documents. A list of references is presented in Appendix 2. It is also more immediately directed by the country's need to direct growth and development as it recovers from the impact of COVID-19. The plan also draws on lessons learned from the NIIPs for other Pacific Island Countries. As is reflected in the ensuing structure of the plan, the approach involved the following key activities:

- Analysis of the national situation and preparation of a national strategy that supports the goal of economic and social recovery after COVID-19 and the pursuit of further social and economic growth and development. This national picture was derived with particular reference to the nature and extent of the future national demand for infrastructure.
- Assessment of all sectors, their status and goals, key issues, sector strategies and the sector level justification or demands for future programs of investments in infrastructure.
- Compilation of all the country's infrastructure assets and their condition.
- Listing of proposed infrastructure investments in each sector and assessment of their lifetime costs.
- Development of a project prioritization process that is particular to the needs of Palau.
- Determination of priority projects through a two stage, participatory filtering of project readiness and project prioritization by Multi-Criteria Analysis.
- Preparation of a potential funding strategy for prioritized investments.
- Recommended organizational and institutional strengthening and
- The development of a Monitoring and Evaluation (M&E) framework to aid NIIP implementation.

More detail is provided in the following text supported by appendices where relevant.

[2] Government of Palau. 1996. Palau 2020 National Master Development Plan. Koror
Government of Palau. Actions for Palau's Future. 2009-2014. Medium-Term Development Strategy. Koror
Government of Palau. 2019. First Voluntary National Review of the SDGs. Koror

II. NATIONAL STRATEGY AND PRIMARY DEMANDS FOR INFRASTRUCTURE

National Development Goals

Investment in infrastructure serves the nation's national development goals. As announced in the NMDP and the MTDS the national development goals are summarized as (i) the pursuit of economic growth, (ii) improved distribution of the benefits of growth, (iii) the promotion of Palauan culture, (iv) the promotion of a national consciousness, (v) preservation of the natural environment, (vi) strengthening of government revenues, (vii) promotion of commerce and trade, (viii) stimulation of further investment, and (ix) enhancement of social welfare. These goals have more recently been joined by the desire for a) long-term expanded settlement and greater government and economic activity on Babeldaob, b) post COVID-19 economic recovery and job creation, c) the resilience of infrastructure to climate change and natural disasters, and disaster risk management, and d) the development and funding of social infrastructure.

These national development and infrastructure goals are pursued within the context of the country's development status and trends to determine an appropriate national level infrastructure development strategy that directs the primary demands for infrastructure.

Development Status and Trends

Demography

The total population of Palau has remained static at around 17,500 people for the past ten years and longer as a result of relatively low fertility[3], a low death rate, emigration and controlled immigration. A GAO report estimates there are some 3,435 (+/-707) Palau born persons living in the 50 US States.[4] That is a little more than a quarter of the estimated current Palauan population. Population distribution has also remained largely unchanged with the majority of the people resident in the urban areas of Koror and Airai. There would appear to have been little movement of people to other areas including the larger island of Babeldaob.

As projected by the Pacific Community the total population is expected to remain constant through to 2030 and then to slowly decline.[5] The population will also likely remain highly urbanized with most people living in Koror and Airai unless significant investment can be attracted to other islands, including Babeldaob. From 1986 to 2015 the number of foreign residents has grown from 1,550 to 4,771 reflecting the increased need for tourism and tourism related industry workers. See table 1.

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[3] The total fertility rate (TFR) in Palau fell from around 2.8 in 1990 to approximately 2.0 by 1998, where is has remained over the last 15 years. Fertility rates declined among women aged 15–34 between 1989 and 1998, which is consistent with the decrease in TFR seen over this period. There was minimal change in fertility rates among women aged 35 and older for the 20+ year period shown. While there was significant variation in terms of which age group demonstrated the highest fertility rates, rates among women aged 20–34 were similar over the time periods shown. Teenage fertility rates declined from approximately 50–75 births per 1000 women aged 15–19 in 1990 to approximately 25–35 births in the late 1990s. From about 1998 onwards, the teenage fertility rate has remained in the 25–35 range, demonstrating a pattern similar to that of the TFR. From: Pacific Community. 2019. Fertility Trends in Pacific Island Countries and Territories. Noumea

[4] United States Government Accountability Office. 2020. Report to the Chairman of the Committee on Energy and Natural Resources, U.S. Senate Compacts of Free Association Populations in U.S. Areas Have Grown, with Varying Reported Effects. Washington D.C.

[5] Pacific Community (SPC) 2020. Statistics for Development Division: https://sdd.spc.int/pw

Table 1. Key Demographic Development Indicators

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019*
Total population as of 1 July ('000) a)	18.3	17.9	17.6	17.4	17.4	17.7	17.9	17.9	17.5	17.5
Population (% annual change) a)	-1.9	-1.9	-1.9	-1.2	-0.2	1.8	1.2	0.2	-2.0	-0.5
Urban population (% of total population) a)	77.0	…	81.1	…	…	78.7	…	…	…	…
Palauan % of population b)	…	…	73.5	…	…	73.0	…	…	…	…

*: provisional, preliminary estimates
…: not available
a) Asian Development Bank Key Indicators for Asia and the Pacific
b) EconMap, PITI, VITI

As is also projected by the Pacific Community the population structure is aging (see figures 1 and 2).

Figure 1. 2020 Population Pyramid

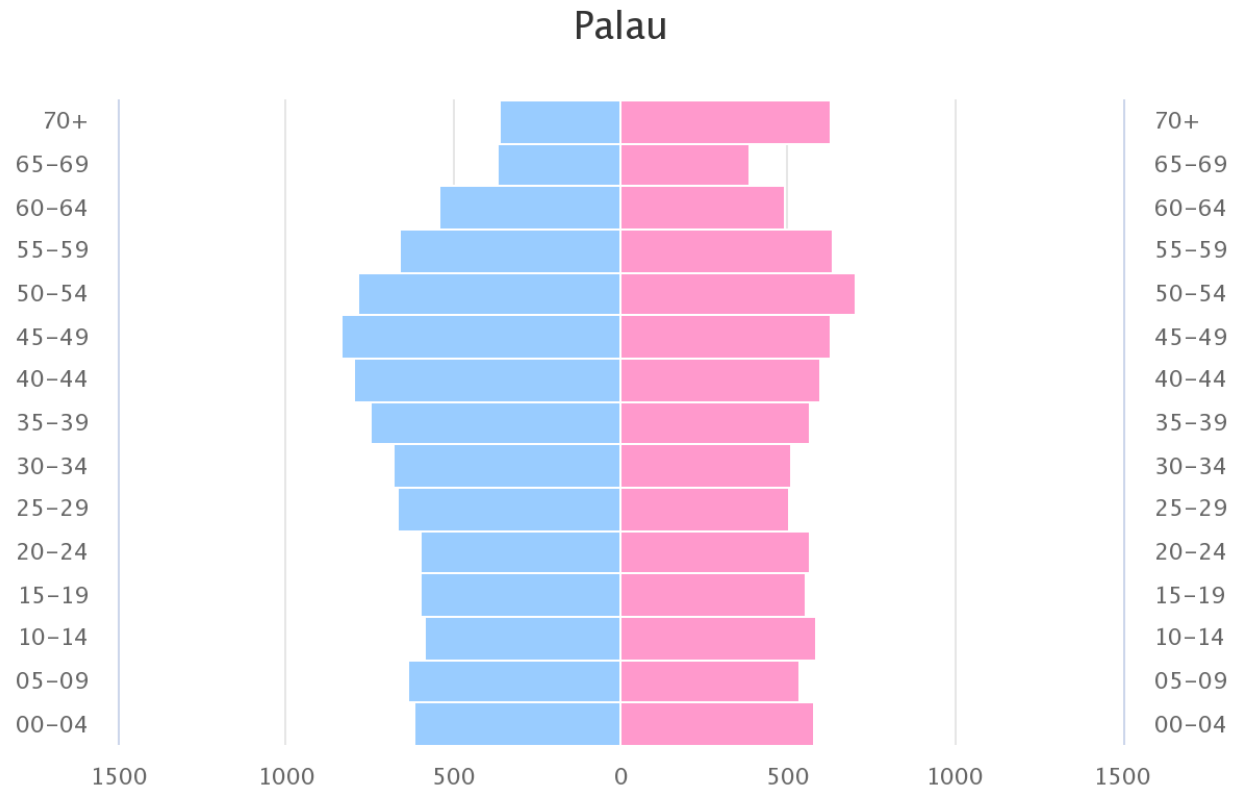
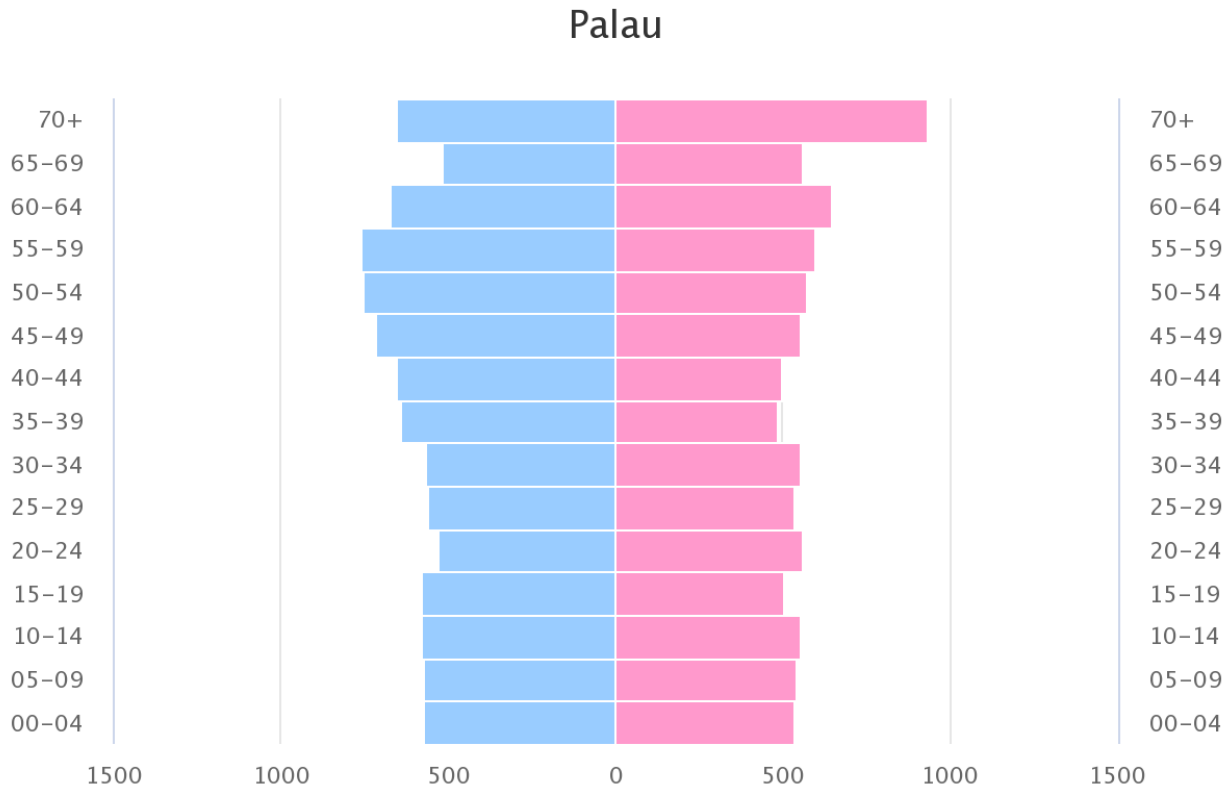


Figure 2. 2030 Population Pyramid



Social and Gender.

If current demographic trends continue then an ageing population will place greater demands on public services in the form of social protection and specialist health services, particularly for elderly women. There is also likely to be little if any increase in school enrolment. However, if economic growth and income growth can be restored post-COVID then there could be an increased demand for higher quality education and for specialist training in areas such as management, catering and accountancy.

An increasing incidence of non-communicable diseases (NCDs) is not only impacting health service programs and the health budget but it is also constraining labor productivity and the competitiveness of Palauan labor compared with migrant labor.

As reported in the SDG review, Palau is a matriarchal and matrilineal society in which women have traditionally held positions of power and respect in equality with their male counterparts.[6] The Constitution of the Republic of Palau guarantees women equality under the law. Women generally have higher levels of education and better health than men, however they are less likely to be employed in the formal economic sector than men. In public service, women are well represented at senior levels in the Judicial Branch of government and in policy making positions in the Executive Branch. They remain under-represented in the national

[6] Government of Palau. 2019. Pathway to 2030. Progressing with Our Past Toward a Resilient, Sustainable and Equitable Future 1st Voluntary National Review on the SDGs. Ngerulmud

congress (Olbiil Era Kelulau), the cabinet, and elected offices at state level. Women's lower levels of participation in the formal workforce and many of the formal decision-making structures can mean that decisions about infrastructure fail to take into account women's needs and concerns. While large infrastructure projects such as power transmission lines, power plants and bypass roads in uninhabited areas have limited community interface, they do have gender elements. Providing women access to jobs in the infrastructure construction workforce or mainstream roles with the infrastructure operator, and applying gender sensitive human resource practices, can have immediate practical benefits for women. Participative consultation for infrastructure design and operation results in infrastructure that meets the needs of women and men. It can also identify opportunities for downstream entrepreneurial activities where barriers such as access to start up finance are addressed.

According to UNWOMEN "In Palau, only 12.2% of indicators needed to monitor the SDGs from a gender perspective are available, with gaps in key areas such as Unpaid Care and Domestic Work, Key Labor Market indicators such as Gender Pay Gap and Skills in Information and Communication Technology (ICT)".[7] There is a need for gender disaggregated data collection as it highlights the different experience and impacts for men and for women and helps policy makers craft responses that benefit men and women.

Issues of involuntary resettlement and indigenous peoples are unlikely to be of concern in Palau.

Disability.

As revealed in the government's report on disability, a considerable proportion of the Palau population are living with disabilities.[8] While the government is committed to improving the welfare of persons with disabilities, existing disparities require policy attention. A total of 748 people reported facing some difficulties in seeing, 544 people reported facing some difficulties in mobility and 515 people reported facing some difficulties in memory. Across all domains, the female population are more likely to have difficulties compared to the male population.

With disability classified as having a lot of difficulty, of the 2.4 per cent of the population with disabilities, the prevalence of disability is higher among the female population at 3.2 percent compared to the male population at 1.7 percent.[9] The highest proportion of persons with disabilities are among the older population, aged 50 years and above (6.6 percent). East Babeldaob presents the highest prevalence of disability of 4.9 percent followed by Airai (2.8 percent) and West Babeldaob 2.4 percent. One possible explanation for this trend is that the highest proportion of persons above 50 years are found in East and West Babeldaob.

There are no significant disparities between the living conditions of persons with disabilities compared to persons without disabilities. There is no difference in access to basic

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[7] https://data.unwomen.org/country/palau

[8] Government of Palau. 2017. 2017 Palau Disability Report: An Analysis of 2015 Census of Population, Housing and Agriculture. Ngerulmud

[9] Disability is conceptualized as a continuum, from minor functioning difficulties to severe difficulties which have major impacts on one's life. The categories are designed to reflect this continuum. Cut-offs for disability can therefore be determined based on intended use. If the level of inclusion for disability is set at some difficulty, about 7.8 percent (1,279) of the population aged 5 and over will be classified as having some disability. If the level of inclusion for disability is set at a lot of difficulty, about 2.4 percent (397) of the population aged 5 and over will be classified as having some disability. If a very conservative cut-off level of cannot do it at all is chosen, the prevalence of disability is about 0.9 percent.

water and sanitation services. However, persons with disabilities are less likely to acquire education at the same level as their counterparts without disabilities. A bottleneck exists for the population with disabilities when transitioning to secondary and higher levels of education. This challenge is more visible in outlying states which present the lowest literacy rate of 25 percent for persons with disabilities. Only one in ten persons with disabilities are economically active.

Overall, there is not likely to be a need for substantial additional investments in new infrastructure in the social sectors. However, there is likely to be a need to adjust or improve existing infrastructure to take account of disability and emerging education and health needs, to maintain the existing stock and also accommodate the impacts of climate change and risks of natural hazards.

Cultural.

A firm understanding of culture and activity secure the essential platform for all social and economic growth in any country. As with all countries, culture preservation and protection is of prime concern to the development of Palau. The book "Just One House" narrates the successful history of competition and cooperation of Palauan society.[10] This long held, firm sense of belonging, organization and institutional arrangements probably helps explain the country's comparative social and economic progress.

As with all countries, cultural protection can impinge on the development of land, labor and capital markets. It has long been government policy in Palau to seek to control immigration, to place direct controls on foreign investment, and to implement programs to encourage the return of Palauans living; working and schooling overseas. Some in the community have also expressed concern over the loss of land to foreigners under long-term leases. Contrary to any perceived protectionism, Palau has succeeded in importing labor in what is a relatively large number for the country. Foreign investment in construction and tourism and previously in fisheries and textile manufacture has also been significant for the country. The competitive and cooperative nature of Palau culture has adapted and continues to adapt to the needs of a more modern society and economy.

Environment, Natural Hazards and Climate Change

The MTDS set the goal for environmental and natural resource management to protect, conserve and manage the environment and natural resources of Palau for present and future generations of Palauans, while providing for sustainable social, cultural and economic development.[11] The MTDS goes on to state that Palau has a unique and diverse environment with great potential for tourism development. However, preserving environmental values while also enabling development to occur is a major challenge.

The MTDS records that key issues facing the environment and natural resources sector are: (i) the lack of an overarching policy framework, (ii) an outdated, inappropriate and cumbersome regulatory framework, (iii) over-lapping and conflicting mandates and functions, (iv) insufficient funding leading to difficulties in undertaking evaluation, review, monitoring, compliance, and enforcement activities, and (v) ongoing tensions between state and national

[10] Roland W. Force, Maryanne Force. 1972. Just One House: A Description and Analysis of Kinship in the Palau Islands. Volumes 235-236. Bishop Museum Press.

[11] Government of Palau. Actions for Palau's Future. 2009-2014. Medium-Term Development Strategy. Ngerulmud

governments as to land and resource ownership and management and Environmental Quality Protection Board requirements.

In contrast to the concerns expressed by the MTDS, the State of the Environment report records: "We should be proud. We have healthy reefs and healthy forests. Our communities have clean water, sanitation, fresh foods, recycling programs, support for clean energy, and dedicated environmental health programs. We have passionate, committed Champions who excite and empower others to preserve and protect Palau and its resources. The Environment Sector and our Communities collaborate well together, are open to embracing change, quick to incorporate new and better methods, and have a track record for fixing problems. *All of the pressures facing our environment can be fixed by these strengths."*[12]

Palau faces a relatively moderate degree of risk to natural disasters, and mainly experiences tropical storms, drought and tidal surges due to its geographical location. However, as with other Pacific Island countries, Palau is particularly vulnerable to the impacts of climate change, including severe weather events and rising sea levels. Since 1945 Palau has had 68 recorded typhoons, tropical storms or tropical depressions within 200 nautical miles of its islands or reefs. At their nearest point to Palau, 20 of these were typhoon strength with winds ≥64kts, or an average of 1 typhoon every 3 years.

The country has an annual dry season from January to March which reduces the quality and quantity of potable water available to local communities. Environmental vulnerability in Palau is high due to diverse, but limited natural resources and fragile ecosystems that must withstand the pressures of increasing consumption and a usually bustling tourism industry. In the 2020 INFORM Global Risk Index, Palau had an overall risk of 2.5/10, which INFORM categorizes in the low risk class. Palau's risk score for Hazard and Exposure was 1.7/10, for Vulnerability was 2.1/10, and for Lack of Coping Capacity was 4.2/10.[13]

Palau is already feeling the acute impacts of climate change. Communities and researchers have confirmed impacts and risks such as rising sea levels and increased incidences of extreme weather. Direct impacts from climate change are expected to also include changes in seasonal rainfall, temperature regime changes, and increasing ocean acidification. This will impact both the existing stock of and future investments in infrastructure.

The government is aware of the risks to economic growth and the costs for ex-post response associated with natural disasters and climate change and has been building fiscal buffers and securing contingent financial assistance from the ADB.

Palau targets a 22 percent reduction in emissions below 2005 levels by 2025. This is to be achieved by a combination of energy efficiency and transition to renewable energy sources.[14] Energy is not the only sector that emits greenhouse gases. Other relevant sectors include waste management, construction, and transportation. For waste management, Palau is exploring methane recovery from the national landfill. For construction, Palau is promoting energy efficiency through a national building code, now under consideration by the congress. For

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[12] Government of Palau. 2019. State of the Environment Report. Ngerulmud

[13] Harvard University. 2020. Inform GRI 2020: Index for Risk Management. Cambridge, MA

[14] Government of Palau. 2017. Action Plan The Way Forward to a Clean Energy Future Implementing the Republic of Palau's Nationally Determined Contribution (NDC) to the Paris Agreement. Palau Energy Summit Paris Agreement Implementation Workshop 8 to 10 August 2017 Ngarachamayong Cultural Center. Summit Findings and Action Plan.

transportation, Palau is pursuing an innovative marine vessel design fueled by renewable energy. On land, Palau is pursuing a "Complete the Streets" initiative that supports use of alternative transport – walking, biking, and public transportation –in addition to transitioning to fuel efficient vehicles over the medium-term.[15] Further information is provided in Appendix 3.

Economy

Key development indicators for the economy are presented in table 2.

Table 2. Key Economy Development Indicators

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019*
Production and Income Earned										
Growth of Output (GDP % annual change) a)	-0.5	5.7	2.1	-1.4	5.4	8.6	-0.4	-2.4	5.1	0.3
GDP per capita, 2015 constant prices, $, FY	12,802	13,918	14,420	14,103	15,026	15,880	15,676	15,352	16,304	15,688
GNI FY ending 30 September ($ million) at current prices a)	199.4	209.8	229.8	243.4	262.1	301.0	322.5	306.3	306.9	289.5
GNI per capita, $	10,900	11,700	13,000	14,000	15,100	17,000	18,000	17,100	17,500	17,100
Structure of Output (% of GDP at current basic prices) a)										
Agriculture	4.2	4.2	4.1	4.1	3.7	3.3	3.3	3.6	3.5	3.4
Industry	11.0	9.7	9.4	8.9	8.5	8.9	10.3	9.2	9.4	10.4
Services	84.8	86.1	86.5	87.0	87.8	87.8	86.4	87.2	87.1	86.2
Gross fixed capital formation a)										
	43.7	54.3	55.6	49.3	71.8	76.2	80.4	86.1	78.2	85.2
Trade										
Exports of goods and services a)	91.4	109.2	127.5	131.9	148.0	163.5	155.1	142.6	133.5	117.5
Imports of goods and services a)	141.5	167.4	191.4	196.4	223.5	211.9	216.7	222.9	219.0	221.0
Energy consumption (kWh million) a)										
	88	88	80	82	84	84	89	90	…	…
Consumer price index (% annual change) a)										
	1.4	4.7	3.6	3.4	4.2	0.9	-1.0	0.7	1.6	0.6
Central Government										
Central Government Net operating balance FY ending 30 Sept ($ million) a)	18.3	17.0	19.6	11.4	19.8	27.9	27.5	22.2	24.4	13.3
External Debt (% of total GDP) a)	36.2	32.4	32.7	29.0	29.0	23.1	25.3	28.2	30.7	31.1
	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19
Tourism and Employment										
Total visitors to Palau b)	81,101	103,903	118,928	110,823	125,674	168,770	146,650	122,103	115,997	89,726
Tourism Direct Contribution % of GDP b)	18.9	21.3	23.5	25.6	26.6	27.4	25.1	22.7	21.0	19.7
Tourism employees as % of private sector b)	49.4	50.8	52.0	52.1	51.2	50.6	50.4	48.0	46.2	43.9
Unemployment rate (%) a)	…	…	4.1	…	…	1.7	…	…	…	…

*: provisional, preliminary estimates
…: not available
a) Asian Development Bank Key Indicators for Asia and the Pacific, b) EconMap, PITI, VITI

[15] Government of Palau. 2015. Palau Climate Change Policy.

Growth

The last IMF Article IV mission in November 2018 reported quite favorably on economic progress.[16] Although economic activity had slowed significantly in FY2016 and FY2017 as tourist arrivals fell this was on the back of substantial growth in 2014 and 2015, again a direct result of increased tourism. Inflation turned to a low positive figure of 0.9 percent in FY2017. The IMF anticipated that growth would recover moderately to 0.4 percent in FY2018 and increase to 2 percent in FY2019 with a recovery in construction activities and tourism. Inflation was projected to rise by 2.8 percent in FY2018, as commodity prices increase and the current account deficit was projected to come down to around 13 percent of GDP with a recovery of the tourism sector and the completion of major infrastructure projects. The fiscal position was projected to improve in the near-term as the overall fiscal balance would be temporarily boosted after the disbursement of the Compact capital grants.

Although the economy returned to growth in 2018 it has subsequently declined with declining visitor numbers - falling to zero in April 2020 as a result of the closure of borders in response to the COVID-19 pandemic. According to the USDA Graduate School EconMap, in FY2020 real GDP is now projected to fall by 13.8 percent in FY 2020 and a further 13.2 percent in FY 2021.[17] The IMF have recently predicted economic growth of -11.4% for 2020.[18]

Drivers of Growth

As is indicated by the contribution of services to GDP, prior to the pandemic tourism had become the lead sector driving economic growth in the country with a consistent growth in visitor numbers from FY 2010 to FY 2015. However, the majority of this increase benefited middle-to lower-grade establishments with an associated large increase in package-tour visitors predominantly from China, resulting in limited value-added to the domestic economy and a reported negative impact on the natural environment. The fall-off in tourist arrivals was largely due to a contraction in Chinese visitors. However, there have also been significant reductions in the more traditional, higher spending tourists.

Palau subsequently adopted a policy to attract high-value tourists. It is however very difficult to implement such a policy in Palau where authority over land is dispersed amongst national and state governments and individual families, where there are some restrictions to foreign investment and Palau remains little known to major foreign investors in tourism. As a result, tourism developments have been virtually unconstrained, and in an unregulated market, the economy has been subject to volatility and large swings in visitors.

No country would wish to be reliant on only one driver of economic growth. Economic diversification is essential. This will be facilitated by having a relatively stable, open and risk free environment for investment, commerce and trade. The World Bank Ease of Doing Business, the annual ADB and World Bank Country Policy and Institutional Assessments and the private sector assessments by the Private Sector Development Initiative all point to an environment for private sector development that could be improved.[19] One way to try to ameliorate this situation

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[16] IMF. 2019. Article IV. Washington DC

[17] Graduate School, USA, EconMAP. 2020. Technical Note. Where Do We Go from Here? Updating the Economic Impact of COVID-19 and Strategies for Mitigation in the Republic of Palau. Hawaii.

[18] IMF. 2020. World Economic Outlook (October 2020). Washington D.C.

[19] ADB. 2007. Palau: Policies for Sustainable Growth, A Private Sector Assessment. Manila
ADB. 2017. Private Sector Assessment for Palau Policies for Sustainable Growth Revisited. Manila
The World Bank. 2019. Ease of Doing Business in Palau. Washington DC

is for government to work with representatives of the private sector to list and then prioritize the issues of concern and then to jointly work through them with a view to making improvements.

Fiscal and Public Finance

The fiscal position had recently improved owing to concerted efforts at fiscal consolidation. The overall fiscal surplus (including grants and capital) rose to 4.8 percent of GDP in FY2017, with capital expenditure compressed at a low level due to low capital grant receipts. Public debt was recorded by the IMF at the time as moderate and sustainable.

In 2019 the IMF endorsed the government's proposal to develop a medium-term fiscal framework. They recommended fiscal adjustment over the medium-term to ensure sustained increases in public investment with the fiscal adjustment supported by tax reform and strengthened public financial management and continued efforts to lower subsidies to state-owned enterprises (SOEs). The IMF also commented on the need (i) for a comprehensive tourism strategy, (ii) to improve the investment climate, (iii) to address infrastructure bottlenecks (created at that time by the expanding tourism sector and the need to enhance resilience to natural disasters and climate change), and (iv) to tackle youth emigration (footnote 16).

According to the USA Graduate School EconMap, Palau's external debt in FY 2018 was low by regional standards at 32 percent of GDP.[20] Debt service of 7 percent of national government domestic revenues had remained well within the capacity of the national government to service and did not present any threat of debt stress. However, debt levels will most likely worsen in the near future. Comparatively large new loans include (i) the ADB loan for the Koror- Airai Sanitation Project (KASP) Phase I ($28 million), (ii) the submarine-cable project for providing access to the internet backbone ($25 million), (iii) a possible KASP Phase II ($25 million), (iv) the Republic of China housing loan ($15 million), and (v) a possible 2nd backup fiber optic cable loan ($25 million). The stress placed on Palau's fiscal position resulting from the government's response to COVID-19 will further weaken the country's debt position. The debt-to-GDP ratio is projected by the USA Graduate School to increase to over 80 % of GDP in FY 2022 but then fall as the economy recovers. Revenues could also be negatively impacted by any further loss of US Federal programs after the current Compact expires in FY 2024. The government's developing fiscal situation will greatly limit its capacity to finance, including borrowing for investment in infrastructure.

The IMF 2018 Article IV (footnote 16) and the USDA Graduate School EconMap 2019 (footnote 17) both refer to the need to strengthen public finance management. The latter notes the potential to translate the 2013 Public Expenditure and Financial Accountability self-assessment into a public finance management road map.[21] Other PICs have taken this course

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The World Bank. 2010 Country Policy and Institutional Assessments 2010 Assessment Questionnaire. Washington DC. See criteria #s 4 5 and 6 on structural adjustment policy. http://siteresources.worldbank.org/IDA/Resources/73153-1181752621336/3878278-1277851499224/CPIA2010questionnaire.pdf

The World Bank 2019. Doing Business. Washington DC https://www.doingbusiness.org

http://www.adbpsdi.org/p/what-is-psdi.html

ADB 2019. *Annual Report on the 2018 Country Performance Assessment Exercise. Institutional Document*. Manila. Only the ADB publishes ratings. See also: ADB (2016) Mapping Fragile and Conflict-Affected Situations in Asia and the Pacific The ADB Experience. Manila https://www.adb.org/sites/default/files/publication/211636/mapping-fcas-asia-pacific.pdf.

[20] Graduate School, USA, EconMAP. 2019. Economic Review Palau FY 2018. Hawaii.

[21] Pacific Financial Technical Assistance Centre. 2013. Indicator Scoring Workbook for PEFA Self-Assessments Palau Summary. Suva.

of action.[22] A practical Medium-Term Fiscal Framework and Medium-Term Expenditure framework would help Ministries and Departments link the country's national development goals, through sector goals or objectives with the budget that includes capital, including infrastructure investment and recurrent expenditure. ADB are planning to assist the government to strengthen public finance management under a proposed program loan that is currently under consideration. The proposed loan will also address fiscal reform and support for private sector development.[23]

Employment

The labor market in Palau was previously close to full employment, with Palauan employment having risen by 0.4 percent annually since FY2000. Nominal wages in the public and private sectors in Palau have grown by 2.3 and 2.6 percent, respectively, since FY2000 with public sector wages being 79 percent above those in the private sector. The labor market has been severely disrupted by the necessary response to COVID-19. A Graduate School Technical Note projects job losses of over 3,100 full-time equivalent positions—27 percent of those formally employed in Palau prior to the COVID-19 pandemic. The government has embarked upon a mitigation program of unemployment benefits, temporary jobs creation, and support to affected businesses in the private sector.

If current demographic trends continue, the future population of Palau cannot be expected to place much greater demand on employment in the post-COVID era. However, Palauans currently living overseas might be attracted to return to work in the country if skilled and higher salaried positions were to be created. This in turn would require a realistic appraisal of and support for potential drivers of a post-COVID economy.

A key finding of the Graduate School analysis of the economic impact of COVID-19 is that the borrowing undertaken to mitigate the fiscal and economic impacts of the pandemic, even with no tourist arrivals through the end of FY2021, will not pose an unacceptable financial burden on future generations, provided Palau adopts appropriate reforms and future pro-growth policies. However, the adoption of such reforms will, as always be subject to the demands of the political economy.

Economic Strategy

No country would wish to be reliant on only one driver of economic growth. Economic diversification is essential. This will be facilitated by having a relatively stable, open and risk free environment for investment, commerce and trade. The World Bank Ease of Doing Business, the annual ADB and World Bank Country Policy and Institutional Assessments and the private sector assessments by the Private Sector Development Initiative all point to an environment for private sector development that could be improved.[24] One way to try to ameliorate this situation

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[22] Government of the Republic of Vanuatu. 2017. Public Financial Management (PFM) Reform Roadmap 2017-2021. Prepared by the Ministry of Finance and Economic Management. Port Vila

[23] ADB. 2020. Concept Paper Proposed Programmatic Approach and Policy- Based Loan for Subprogram 1 Republic of Palau: Recovery through Improved Systems and Expenditure Support Program. Manila

[24] ADB. 2007. Palau: Policies for Sustainable Growth, A Private Sector Assessment. Manila
ADB. 2017. Private Sector Assessment for Palau Policies for Sustainable Growth Revisited. Manila
The World Bank. 2019. Ease of Doing Business in Palau. Washington DC
The World Bank. 2010 Country Policy and Institutional Assessments 2010 Assessment Questionnaire. Washington DC. See criteria #s 4 5 and 6 on structural adjustment policy.

is for government to work with representatives of the private sector to list and then prioritize the issues of concern and then to jointly work through them with a view to making improvements.

In addition to championing future drivers of growth economic growth strategy should be complemented by the promotion of government revenues through fiscal including tax reforms and SOE reforms. The IMF have estimated that eliminating subsidies to the PPUC over the next 5 years would yield a cumulative saving of 1 percent of GDP (footnote 16).

Political Economy

There are many stakeholders with an interest in the future of infrastructure. From private sector tourism facility operators and construction companies to national, state and municipal government and family land holders, to civil society organizations with social, cultural, environmental and spiritual interests, to employees in subsidized SOEs and more.

Bilateral and multilateral donors and development partners also influence the choice of investment in infrastructure. However, some investments in infrastructure would appear not to have been subjected to detailed socio-economic cost, benefit analysis including an assessment of recurrent cost implications, leaving the country with some assets that it finds difficult to maintain.

According to the NMDP, reaching and maintaining agreement in Palauan society is time consuming and requires respect and patience. [25] The NMDP goes on to state that (i) the dominance of individual and minority interests over institutional practices has enabled personal, clan and State jealousy and rivalry to continue, (ii) the focus on redistribution distorts incentive structures, and (iii) there is a fragmentation of authority and leadership. Proposed investments, reforms, and other change can necessitate extensive consultation and participation in decision making.

National Strategy

In summary, post-COVID Palau needs a restored, larger and even more dynamic economy that can accommodate further infrastructure including financing infrastructure recurrent costs. Infrastructure that serves economic recovery and expansion will need to be prioritized as well as infrastructure that aligns with improved utilities policy and institutional development.

Palau has been successful in securing comparatively good health and education for its people and there is a desire to further improve standards of living. The future population structure and population dynamics of Palau will likely alter the nature of demand for the type of

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http://siteresources.worldbank.org/IDA/Resources/73153-1181752621336/3878278-1277851499224/CPIA2010questionnaire.pdf
The World Bank 2019. Doing Business. Washington DC https://www.doingbusiness.org
http://www.adbpsdi.org/p/what-is-psdi.html
ADB 2019. *Annual Report on the 2018 Country Performance Assessment Exercise. Institutional Document*. Manila. Only the ADB publishes ratings. See also: ADB (2016) Mapping Fragile and Conflict-Affected Situations in Asia and the Pacific The ADB Experience. Manila
https://www.adb.org/sites/default/files/publication/211636/mapping-fcas-asia-pacific.pdf.

[25] Government of Palau. 1996. Palau 2020 National Master Development Plan. Ngerulmud. Chapter 3.1 Constraints on Development.

future social infrastructure but not so much the extent of that infrastructure. Future investments in infrastructure will need to take account of the needs of gender and disability. The impacts of climate change and natural hazards will also direct the demand for infrastructure.

Given the government's projected fiscal situation, economic recovery post-COVID will have to at least initially look to donor, development partner, and private sector investment. Substantial investment in new private industry, most possibly direct foreign investment in tourism, could greatly change projected demand for infrastructure. This would in turn likely boost the demand for local employment and therefore for an adjacent resident population and also lead to an increase in demand for a wide range of domestic goods and services such as agricultural and fisheries produce and taxis and boat hire. Palau has accommodated cultural change and this in turn has supported new investment and the country has been comparatively successful in generating a tourism private sector-led economy. However, priority social, cultural and environmental goals will also need to be accommodated, as will the impact of the political economy when implementing the overall national strategy.

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III. SECTOR STRATEGIES AND SECONDARY DEMANDS FOR INFRASTRUCTURE

The infrastructure goal is to sustain a relevant, efficient and effective program of infrastructure asset management and new investments that help meet the development goals of Palau. To repeat, the national development goals are summarized as (i) the pursuit of economic growth, (ii) improved distribution of the benefits of growth, (iii) the promotion of Palauan culture, (iv) the promotion of a national consciousness, (v) preservation of the natural environment, (vi) strengthening of government revenues, (vii) promotion of commerce and trade, (viii) stimulation of further investment, and (ix) enhancement of social welfare. These goals have more recently been joined by the desire for a) long-term expanded settlement and greater government and economic activity on Babeldaob, b) post COVID-19 economic recovery and job creation, c) the resilience of infrastructure to climate change and natural disasters, and disaster risk management, and d) the development and funding of social infrastructure.

In the following section of the NIIP the development vision or goal for each of Palau's 14 sectors is first stated. This is then contrasted with the current status of development in the sector, highlighting development performance, issues and opportunities. Contrasting sector vision or goal with status provides the rationale for the government's overall strategy in trying to progress improvement in each sector, overcoming concerns such as inadequate policy, or capacity limitations as well as a lack of infrastructure. The sector strategy can then justify the broad medium-term future infrastructure development programs and each ministry and department's demand for infrastructure projects.

Agriculture and Forestry[26]

Vision (Bureau of Agriculture)**:** "A healthy and productive nation in harmony with the environment where all families have the skills, resources and opportunity to ensure wise stewardship of natural resources and systems and sustained food production."

Status: Since the 1980's the contribution of agriculture to Palau's economy has steadily declined, now contributing about 3 percent to Palau's GDP. Over the same period food imports have steadily increased. For the period FY 2013- FY2017, food imports averaged $39 million per annum or about 22 percent of total imports (Statistical Yearbook, 2017). Food imports, valued at about $31 million in 2013 are 100% higher than in 2004 and represent 82% of the value of all food available in the economy.[27]

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[26] Documents consulted:
Government of Palau. 1996. Palau 2020 National Master Development Plan. Koror
Government of Palau. Actions for Palau's Future. 2009-2014. Medium-Term Development Strategy. Koror
Government of Palau. 2019. First Voluntary National Review of the SDGs. Koror
C.L.Cheshire. Undated. An Alternative Strategy for Developing a Micronesian Export Industry. University of Hawaii, Manoa.
United States Department of Agriculture. Undated. Soil Survey of the Islands of Palau, Republic of Palau.
Government of Palau and Asian Development Bank. 2008. Facility for Economic & Infrastructure Management Project. Agriculture Sector Report. Working Paper. Koror and Manila
Andrew McGregor, Leonard Basilius, and Thomas Taro. 2012. The Palau PACC Food Security Project: A Benefit Cost Analysis.
ADB. 2014. Palau Agricultural Policy 2014 Issues and Options. Manila.
Government of Palau. 2014. Bureau of Agriculture. Strategic Plan 2014-2019. Koror
Tim Martyn, Tuifa'asisina Steve Rogers, and Meiang Amy Chin. 2014. Linking farmers to markets: Realizing opportunities for locally produced food on domestic and tourist markets in Palau. FAO Subregional Office, Suva

[27] FAO and SPC (2014) Food Security Indicators database.

According to the USA Graduate School in 2014 "agricultural production is represented by a few commercial farms, informal growers, subsistence production for household consumption and government extension activities. Little is known about non-commercial production, and estimates are projected in relation to population change. With the recent estimated declines in population, production estimates are down, although backward linkages from the tourism sector would afford opportunities for increased output."[28] Social Security Administration data indicates that the number of people employed in agriculture has declined steeply with only 57 people recorded as being formally employed in the sector and paid full-time in 2012.

The average annual operating cost to maintain agriculture/forestry facilities is $250,000.00. Ministry staff and contractors carry out maintenance on facilities.

Key issues are:

- There has been a decline in Palauan interest in farming. However, a few earlier generation Chinese employing imported labor farm vegetables, fruit and traditional produce on a commercial basis. Some subsistence farming of traditional foods also continues. On the other hand, the SDG review reports that land used for agriculture increased from 306 hectares (FAO, 2014) to 543 hectares (PALARIS, 2017) and commercial farms increased from 16 (FAO, 2014) to 19 (PALARIS, 2017).
- According to the SDG review land is a scarce commodity in Palau and land suitable for agriculture and development is even scarcer. Only 14 percent of Palau's land area is considered optimal for agriculture (USDA, 1983); competition is intense for use of these same lands for other purposes – tourism, housing, and commercial development.
- There is a prevalence of poor soils and pests. However, there is potential for the production of a range of crops and livestock under certain husbandry conditions.
- There is a lack of public market access and middlemen although there are farm to supermarket sales. Imports are increasing and the overall demand for fresh produce greatly outstrips domestic supplies.
- The National Development Bank of Palau provides lending to agriculture including a Farm Loan Program but few loans have been approved. There may also be some store financing of farm production.
- There is an apparent conflict between conservation and production and the need for a planning mechanism to resolve the different preferences of society.
- Government resources and facilities (including research, land use planning, feasibility analysis) are insufficient.
- A number of agencies are involved in the sector with conflicting aims and objectives and a lack of cooperation between them has left past programs, policy and strategy to be strongly directed by a range of intermittent donor assistance.
- Palau has also undergone a dietary transition that has contributed to a rising level of obesity and diet related NCDs, as its households increasingly depend upon cheap imported food products high in salt and fat. NCDs are responsible for 78 percent of deaths in Palau, with evidence that NCD related mortality and

[28] USA Graduate School. 2014. Republic of Palau Fiscal Year 2013 Economic Review USDOI.

morbidity are rising according to a 2006-2009 survey of mortality.[29]

- Commercial demand for agricultural produce has previously grown as the tourism industry expanded. Agricultural produce also retains importance in traditional social exchange. This demand is being met by imports.
- The business environment can present difficulties for private investors.
- The Bureau of Agriculture with other partner agencies are training and encouraging farmers to increase production and commercialize farming operations.
- The Bureau of Agriculture has established a revolving fund scheme to charge minimal fees on its services for maintenance purposes.
- All taro patches are located in low-lying areas vulnerable to induced sea level rise. [30]

Strategy: The government is trying to gradually improve production and productivity in the sector through the provision of tilling services and programs of research, extension and training.

Demand for Infrastructure: The agriculture sector places specific increased demands on infrastructure in the form of the following:

(i) The Compact road on Balbeldaob has opened opportunity for farmers to access their lands but further access roads are needed.
(ii) Specific capital investments are also needed in electricity and water distribution.
(iii) The following major rehabilitation, renovation and additional capital investments are needed: (i) fruit fly laboratory, (ii) post-harvest processing facility, (iii) swine breeding facility, (iv) poultry hatching facility, (v) poultry slaughter house, and (vi) a central farmers' market.

Central Government Administration[31]

Goal: To support the provision of quality public services that fulfill the aspirations and increasing needs of all Palauans as well as the interests of international relations, private sector development including foreign investment and the community at large.

Status: The executive branch comprises the leadership responsible for the daily administration of the Republic of Palau and houses the Office of the President along with the Vice-President, the Council of Chiefs, and eight Ministries. The eight Ministries are the Ministry of Community & Cultural Affairs, the Ministry of Education, the Ministry of Finance, Ministry of Health, Ministry of Justice, Ministry of Natural Resources, Environment & Tourism, Ministry of Public Infrastructure, Industry & Commerce and Ministry of State.

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[29] FAO 2014. Linking farmers to markets: Realizing opportunities for locally produced food on domestic and tourist markets in Palau. Samoa.

[30] On average 6 percent of taro production is lost each year due to saltwater intrusion (Del Rosario et al., 2015). OERC reports that local food production declined by 50% during the severe drought of 1997-98 (OERC, 2008). Despite efforts to rehabilitate taro patches and promote salt and drought resistant crops, climate change continues to pose challenges to food security. (SOE 2019) – extracted from SDG review.

[31] Documents consulted:
Government of Palau. 1996. Palau 2020 National Master Development Plan. Koror
Government of Palau. Actions for Palau's Future. 2009-2014. Medium-Term Development Strategy. Koror
Government of Palau. 2019. First Voluntary National Review of the SDGs. Koror

The new capitol and central government offices were constructed in Ngerulmud in 2006. It is located 20 km northeast of Koror, the largest city in the country and the previous seat of government. Ngerulmud is the least-populous capital city in the world. Babeldaob has long been sparsely populated, though as the largest island in Palau it was well settled centuries ago.[32] Accounting for 70 % of the land area of Palau, Babeldaob offers important potential for the country's economic development.

Central government offices of the executive branch are spread across the islands of Palau with a significant separation and in some cases duplication of offices in both Koror and Ngerulmud in the state of Melekeok, north Babeldaob. This has led to some inefficiencies in the administration of central government.

A project involving major renovations to the buildings and facilities required to host "Our Oceans Conference" was recently completed at a cost of $4.8 million.

Access to land can present a problem for civil servants and others seeking to relocate to Babeldaob. In addition to commercial banks, the Palau National Development Bank and the Palau Housing Authority offers housing loans but, to secure a loan a prospective borrower is required to produce title or use rights to land, which is the main reason for extended delays.

The national government employed just over 2,000 people (part and full-time, Palauan and non-Palauan) in FY19 with government agencies employing 437 and State Governments employing 1,073. This public sector employment compares with a total number employed of 11,751 in the same fiscal year. Individual, organizational and institutional capacities are modest throughout government constraining the delivery and performance of all government services and requiring continuing reinforcement over the long-term.

The government payroll fell from 20 percent of GDP in FY2000 to 15 percent in FY2018. In effect government policy has been to stabilize payroll costs as a share of public expenditures and to reduce the overall size of government relative to the economy over time.

The Civil Service Pension Fund (CSPF) presents a significant risk to government. With an accrued net pension liability currently close on $260 million, fund assets are a mere 10 percent of liabilities. Without reforms the CSPF is projected to collapse before 2030 and require $7 million in annual support thereafter. Over time the deficit is projected to rise as benefits are projected to exceed contributions.

Key issues are:

- Government staff and private sector employees need to establish residences to relocate to Babeldaob. Although housing loans can be accessed, the availability of land can be a constraint necessitating government assistance in the form of a housing scheme
- Modest capacities require augmentation over the long-term
- The financial status of the CSPF presents a significant government financial liability
- There is an opportunity to further develop the island of Babeldaob and to continue to transfer all central government operations and the diplomatic community to the Malekeok area. This will require additional expenditure on public infrastructure, most

[32] https://www.ecosystems.uni-kiel.de/en/e_abteilung/e_abt_oeko_polar/earthworks-of-palau-micronesia/brief-history-and-state-of-research

noticeably the construction of a capital complex annex, a new national post office, and government warehouse

Strategy: Consolidation of the central government administration on Babeldaob island to better support continued improvement in governance, public administration, public finance management, policy formulation and the delivery of public services.

Demand for Infrastructure: The central government's delivery of public services can be strengthened by construction of (i) a capital complex annex, (ii) a new national post office, and (iii) government storage warehouse. The relocation of some of the populace to Babeldaob to serve both the national government and private sector activity will be facilitated by the construction of municipal services for housing subdivisions. Although it is not included in the current project list, in view of high housing costs in Palau, the Government of Palau, in cooperation with the state governments, will examine options to provide affordable housing for low-income families and for government employees, so they can be housed in close vicinity to their workplace. Infrastructure investment supporting preferred option(s) may be processed in future fiscal years.

Education[33]

Vision: "Our students will be successful in the Palauan society and the world."

Mission: "The Republic of Palau Ministry of Education, in partnership with students, parents, and the community, is to ensure student success through effective curriculum and instruction in a conducive learning environment."

Status: The Education Master Plan 2017-2026 aims to increase student success through educating the whole child – mind, body, and heart with emphasis on developing academic and career readiness, character, health, wellness, and the arts.

There are 18 public schools, 17 of which are elementary schools and one is a high school. The schools are spread throughout the Republic, from Kayangel State at the extreme north to Hatohobei State in the extreme south. For school year 2020-2021, there are 1,712 students in all public elementary schools and 547 students at Palau High School. In total, there are 2,259 students enrolled in the public schools.

Additionally, there are 2 private elementary schools and 5 private high schools. The one higher education institution is the public Palau Community College. In the same school year 421 students are enrolled in private elementary schools with 358 attending private high school. Palau Community College has an enrollment of 615 students.

Palau has achieved universal access to education and now strives to improve the quality of education. School enrollment is constant and school participation rates are high. Elementary and high school rates of graduation are high. The average graduation rate for the last 10 years is 88.3%. Teacher: pupil ratios are considered adequate. The student enrollment in the public schools has steadily declined in the past ten years due to low birth rate and out-migration.

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[33] Documents consulted: Government of Palau. 1996. Palau 2020 National Master Development Plan. Koror Government of Palau. Actions for Palau's Future. 2009-2014. Medium-Term Development Strategy. Koror Government of Palau. 2019. First Voluntary National Review of the SDGs. Koror Government of Palau. 2006. Education Master Plan. 2006-2016. Koror

Of the 17 public elementary schools, 12 of them enroll less than 100 students. The operational costs for many small schools is quite high. Because of this situation, the MOE consolidated three elementary schools on eastern Babeldaob into one school in 2011. The MOE plans to consolidate the remaining six public elementary schools on northern and western Babeldaob into two schools. This strategy would also address the relocation of three of these elementary schools to higher ground because of climate change and sea level rise.

An earlier plan was to build another public high school on Babeldaob to improve access to secondary education for residents there. However, this plan has not gained much support because of declining student enrollment over the years. Instead, daily student busing was implemented in 2009 to transport high school students from Babeladaob to and from Palau High School.

Most school buildings are still in use after 50 years of existence. While older school buildings for Koror Elementary School and Palau High School are still structurally sound, extensive refurbishment is required. Additionally, the school buildings that are still in use require constant maintenance with a few starting to show structural defects. Maintenance work is a major issue especially with limited resources. The typical maintenance approach has been to carry out minor repairs throughout the years while outsourcing major repairs whenever funding becomes available.

Strategy: The government intends to improve the appropriateness, staffing, management, learning environment, technology integration, monitoring and overall productivity of education.

Demand for Infrastructure: There is a great demand for construction of new schools in response to climate change. There is also a demand for the consolidation of schools due to declining student enrollment and improved road access between communities in the main island of Babeldaob. Finally, there is demand for renovation and maintenance of other school buildings in Koror and outlying States including acquisition of new school buses, vehicles, boats, and other equipment to replace the aging assets.

Energy[34]

Goal (MTDS)**:** The goal for infrastructure is to provide, protect and maintain infrastructure on an efficient and equitable basis to improve access, standards, reliability and value-for-money. At the 2017 Palau Energy Summit, held to develop an Action Plan for Palau to achieve its National Determined Contribution (NDC) to the Paris Agreement, a goal was set for Palau to generate at least 45% of its energy need from renewables by 2025.

Status: Palau Energy Administration (PEA), a government department in collaboration with the Palau Public Utilities Corporation (PPUC), a corporation solely owned by the

[34] Documents consulted:
Government of Palau. 1996. Palau 2020 National Master Development Plan. Koror
Government of Palau. Actions for Palau's Future. 2009-2014. Medium-Term Development Strategy. Koror
Government of Palau. 2010. Palau National Energy Policy.
Government of Palau. 2019. First Voluntary National Review of the SDGs. Koror
ADB. 2020. Proposed Programmatic Approach and Policy-Based Loan for Subprogram 1 and Technical Assistance Grant Republic of Palau: Palau Public Utilities Corporation Reform Program. Manila
National Renewable Energy Laboratory. 2016. The Republic of Palau Pursuing a Sustainable and Resilient Energy Future.

government, are responsible for the management, implementation and maintenance of new energy projects and infrastructure. PEA is the regulatory authority for energy production, purchase, and sale. PPUC is responsible for all remaining aspects of the electricity generation, transmission, and distribution business, from project planning to implementation, asset management and customer service functions. PEA is also involved in the selection of energy projects aimed at achieving the objectives of the Palau National Energy Policy (PNEP) adopted in 2010. PPUC currently has 293 employees and its operations are organized into eight divisions: (i) power, (ii) human resources, (iii) water and waste water, (iv) finance and accounting, (v) corporate services, (vi) projects, (vii) customer service, and (viii) safety.

Key Issues are:

Electricity Generation

The main sources of electricity generation in Palau are two diesel generating stations, Malakal Power Station, with rated plant output of about 24 MW, located in Koror; and Aimeliik Power Station, with rated plant output of about 10 MW, located on Babeldaob island[35]. Most of the diesel generators employed at Malakal Power station are currently more than 15 years old and are approaching the end of their useful life. Under their current operating condition, they are unable to provide rated output, and as a result, the real generating capacity of the two plants is approximately 20 MW. In recent years, several roof-top PV solar installations have been commissioned, with total generating capacity of about 2.8 MW (peak). Currently, the peak loading on the electricity grid is of the order of 12 MW, although it has reached a high of 16 MW, in the past.

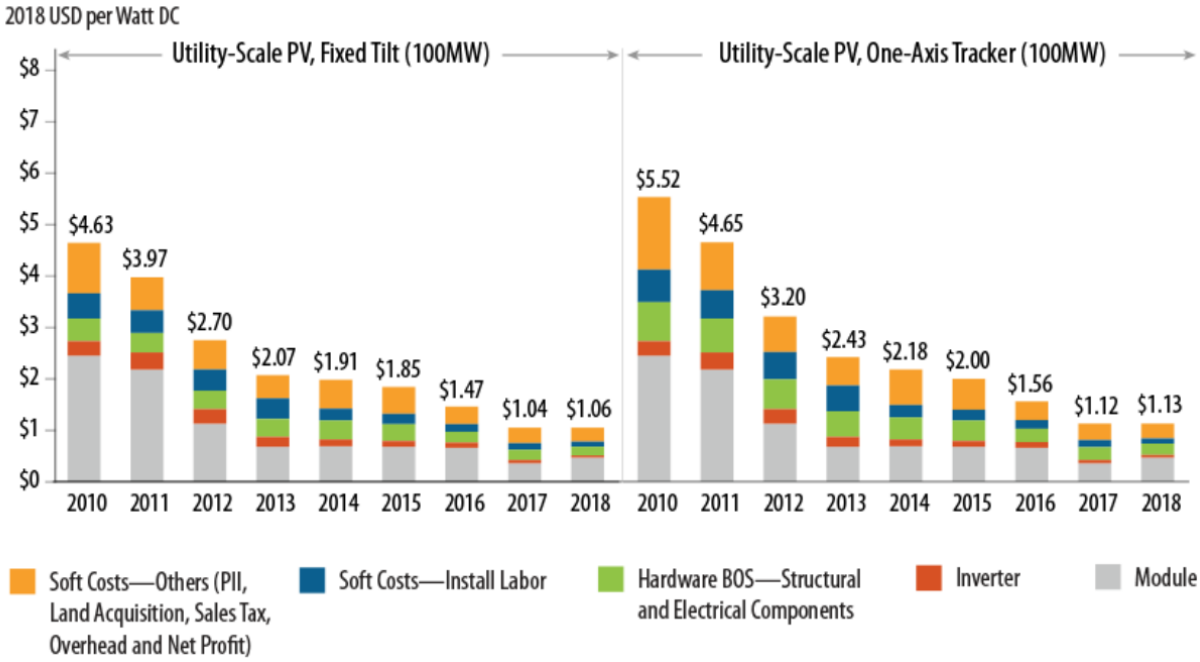
The peak electricity demand from the existing customers is expected to remain flat over the next ten years. However, the peak demand on the grid is expected to increase significantly from the current level and reach approximately 20MW, due to new commercial customers connecting to the grid, with growth in the tourism sector.

With fluctuations in the price of imported diesel fuel, electricity generation costs are subject to large swings, ranging from a low of $0.22/kWh to a high of $0.38/kWh over the past 10 years. Volatile electricity prices not only pose a hardship to local residents, they also present a risk to sustaining steady economic growth. As shown in Figure 3, the cost of PV solar generating equipment, has come down significantly over the past ten years, making PV solar generation a competitive alternative to diesel generation.[36]

[35] "The Project For Study On Upgrading And Maintenance Improvement Of National Power Grid In The Republic Of Palau" – Jica - 2017

[36] "Solar Installed System Cost Analysis" NREL, https://www.nrel.gov/analysis/solar-installed-system-cost.html

Figure 3. PV Solar Cost Trends



PUCC could contract out a large fraction of the electricity generation to independent power producers (IPPs) through long term power purchase contracts, at prices significantly lower than the cost of electricity generation through diesel generating plant.

Despite of the reduction in solar plant prices, the energy yield rate of PV solar plant continues to be low. For sake of comparison, a 250kW diesel generator, capable of generating 1 GWh of energy during a year (45% load factor) requires approximately 160 sq ft. land for installation. A solar farm capable of generating the same amount of electricity would require approximately 3 to 4 acres of land, depending upon the design selected.[37] Because of scarcity of land, PV solar plant installations floating on the ocean are currently being tested as pilot projects in several countries.[38] These installations are expected to provide a cost effective solution to not only reduce the long term electricity costs in Palau, but also allow the nation to meet its climate change commitment required in the Paris Agreement. Aside from PV solar, wind turbines owned and operated by IPPs and installed on hill tops are also expected to provide a viable and cost-efficient green energy alternative to diesel generation.

The momentary generation output from both wind and solar plant is highly variable and for stable operation, they would require a back-up energy source to provide fast-speed frequency and voltage regulation, either in form of a battery storage and, or diesel generation. The analysis provided in figure 3, indicates that the existing grid in Palau can accept renewable generation connections of up to 40% of its capacity, without losing stability. For larger penetration of renewable energy sources, storage batteries would be required to maintain system stability.

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[37] "Land-Use Requirements for Solar Power Plants in the United States" NREL, https://www.nrel.gov/docs/fy13osti/56290.pdf

[38] "A New Floating Solar Farm Shows That Renewables Can Be Easy" https://www.forbes.com/sites/emanuelabarbiroglio/2019/11/07/a-new-floating-solar-farm-shows-that-renewables-can-be-easy/?sh=118e4a4b7930

Because electricity generation from renewables can be contracted out to IPPs this should not require any capital investment. However, a part of the diesel generating plant, required as back up energy source, will still require investment to replace generators as they reach the end of their service life.

Electricity Transmission

The transmission system operating at 34.5 kV provides a tie link between the two generating stations. Transmission lines also provide connections to a total of twelve 34.5/13.8 kV step-down stations. The total length of 34.5 kV transmission lines is approximately 80 km and these are constructed in form of single circuit lines, with 150 mm^2 all aluminum conductor (AAC) and are typically supported on concrete poles. There are fourteen 34.5/13.8 kV step-down stations supplied from the transmission network, which supply 13.8 kV distribution feeders.

There are a number of weaknesses in the existing transmission network and to mitigate these would require major investments to improve supply system security and reliability:

(i) The Aimeliik and Malakal diesel generating plants are connected through a single circuit 34.5 kV transmission line and any outages on this line result in electrical separation of the two plants affecting grid stability. A second 34.5 kV circuit is required between these two generating stations.

(ii) For protection and control, circuit breakers are provided only at the two generating stations, with no automated switching or controls at step down stations and this results in poor reliability. The 34.5/13.8 kV stations have reached a service life of 35 years and are approaching the end of their useful life and will require replacement during the next 10 years. When the stations are rebuilt, additional protection and control devices should be included in their design.

(iii) The transmission network will need to be extended to the selected location of solar and wind power plants and reinforced to accept power from the proposed IPP owned power plants.

Electricity Distribution

The 13.8kV distribution lines begin at each of the 34.5/13.8 kV stations and supply 1-ph and 3-ph pole-mounted or pad-mounted distribution transformers. The distribution feeders in Palau typically employ 336 kcmil AAC conductor on trunk lines and AWG #2 or #4 copper conductors on branch lines. The total length of 13.8 kV network is approximately 180 km.

Based on the system condition assessment documented in the JICA report, the distribution lines experience frequent power interruptions. This is more serious in rural areas. Poor line design with inadequate protection and control devices, lack of maintenance and poor road access to reach the distribution lines are the key reasons for poor reliability. The lines pass through heavily treed areas and when tree trimming does not take place at required intervals, line contact with tree limbs result in power interruptions.

Capital investments will be required over the next ten years to reconstruct the aged distribution lines, relocate lines to the shoulders of paved roads and to apply automated reclosers. All these investments would improve reliability. 13.8 kV lines will also require some minor extensions to allow connection of small-scale generation, including a land-fill site generation facility.

Services and Retail Meters

Table 3 shows the number of electrical customers served by PPUC. About 65% of the customers are equipped with pre-paid meters and the remaining customers use conventional meters. The energy losses on the distribution system are excessively high and inaccurate metering or by-passed meters are expected to be the main cause of such high losses. Automated revenue meters (Smart Meters) are the most effective and cost-efficient solution for reducing energy pilferage and lowering operating costs.

Table 3. PPUC Electricity Customers

Total Number of Electric Customers

Type	Conventional	Prepaid
Residential	2,422	4,022
Commercial	582	325
ROP	384	56
Government	170	147
Total	3,558	4,550

Organization and human resources

Corporate plans need to be linked with job descriptions and performance assessments. There is insufficient finance staff. The overarching challenge in human resource management is to unify the organisation within a comprehensive HRM framework and discontinue the use of public service practices. There is also a need to expand office accommodation, possibly on a new site.

Strategy: The government prioritizes (i) tariff reforms to introduce market-driven incentives for the PPUC's sustainability, and (ii) leveraging private investments to meet the country's renewable energy target. The government has agreed to the PPUC's financial recovery plan to restore liquidity and profitability by 2022. The plan aims to enhance the PPUC's financial management, reform tariffs, and scale up renewable energy. The National Energy Master Plan (2019) emphasizes efficiency and the transition from diesel generation to renewable energy by introducing long-term concessions and power purchase agreements (PPAs) for private investments in renewable energy. While PPAs help hedge developers' risks in Palau, the financial distress of the PPUC is a key source of the government's financial risks. The PPUC's underperformance and liquidity deficit adversely impact the country's quasi-fiscal deficit because the government's contingent liability associated with PPA subsidies to keep the PPUC solvent costs about 1% of GDP.

Demand for infrastructure: (i) Replacement of diesel generating plant at the end of its service life with the larger generators requiring overhaul over the next 5 years, (ii) upgraded transmission network, (iii) new distribution lines, (iii) new smart meters, and (iv) new office

accommodation. In future fiscal years PPUC will also consider the feasibility of replacing existing overhead lines with underground, particularly in urban areas where it is difficult to maintain adequate clearances from structures.

Fisheries and Aquaculture[39]

Goal: "The sustainable economic development and management of the marine and coastal resources of Palau".

Status: The State of the Environment report estimates that 79 percent of the value of nearshore fisheries and 50 percent of the value of offshore fisheries are unsustainable.[40] The contribution of sustainable fisheries to the Palau economy is therefore about 1.8 percent of GDP. Overall, the demand for fish by the residential and tourism market far exceeds supply but the short-term emphasis needs to be on sustainability of catch, including greater use of pelagic food fish while adjusting catch in near shore reef fisheries to sustainable limits (footnote 38).

In October 2015 Palau passed the Palau National Marine Sanctuary bill which will preserve 80 percent of Palau's exclusive economic zone (EEZ) of 500,000 square kilometers as a protected area free from commercial fishing and exploitation. The reform was made effective on January 1, 2020. The sanctuary is one of the largest protected ocean areas in the world.

Pelagic fish have potential to meet demand for local consumption while reducing stress on near shore food fish. Earlier efforts to establish a commercial fisheries industry (Van Camp in the 1960s and 1990s tuna transshipment) were not sustained. The National Marine Sanctuary includes provisions for a new domestic fishing industry to support the local market. Palau is exploring strategic partnerships to develop a local fishing fleet, establishing a central fish auction market, build processing and wharf facilities, and to identify value-added products that can be developed from excess catch or by-catch.

Aquaculture is a relatively new industry with potential to contribute to the economy and food security while reducing stress on reef food fish. In 2014, milkfish and giant clam aquaculture was valued at $285,000[41], a level far below demand for local consumption and export. Constraints to growth include poaching, inadequate supply of seed clams, and the reluctance of farmers to assume loans for expansion due to uncertainties in the industry (footnote 38).

As a member of the Parties to Nauru Agreement, Palau benefits from the sale of vessel days to commercial fishing operators. While the country's allocation of fishing days is small compared with other PNA members, fishing royalties have grown significantly in recent years and brought in $8.5 million in revenues in FY2018. Palau hopes to maintain the benefits of the

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[39] Documents consulted: Government of Palau. 1996. Palau 2020 National Master Development Plan. Koror
Government of Palau. Actions for Palau's Future. 2009-2014. Medium-Term Development Strategy. Koror
Government of Palau. 2019. First Voluntary National Review of the SDGs. Koror
The David and Lucile Packard Foundation 2007. Strategy for Market-Intervention Tools to Conserve Marine Fisheries Marine Fisheries Subprogram Strategy 2006–2011
Government of Palau and Asian Development Bank. 2008. Facility for Economic & Infrastructure Management Project. Aquaculture and Fisheries Plan. Final. Koror and Manila

[40] Government of Palau. 2019. State of the Environment Report. Ngerulmud

[41] Gillett, R. 2016. Fisheries in the Economies of Pacific Island Countries and Territories. Secretariat of the Pacific Community, Forum Fisheries Agency, and Australian Aid. Noumea, Honiara and Canberra

PNA through sale of days to other members. However, other partners have argued that it is inconsistent with a fish conservation policy when it encourages an increase in fishing in other waters. Palau hopes that if it does, indeed, suffer a loss of fishing days, that the appeal as a conservation area will motivate demand for high value tourism to make up the short fall. The country also hopes to gain support from environmentally focused donors to offset any loss to its direct revenue base.

Grant aid from Japan for up to 500 million yen (approximately $4.8 million) recently provided the government with a set of equipment to build two monitoring stations in Ngeremlengui and Malakal. These new stations will help Palau to improve its capacity to monitor main sea passages and coastal areas. As a result, it is expected that Palau will be able to address illegal fishing and shipping accidents.

The average annual cost to operate and maintain existing fisheries facilities is $600,000. Public works, private contractors and staff carry out the maintenance on fisheries buildings and facilities.

Key issues are:

- Ongoing work to review and update policies, legislation and regulations.
- The Bureau of Marine Resources (BMR) needs support to streamline its policies, strategies and priority actions to reflect work programs that are realistically achievable within the constraints of its staff and budget resources.
- The overall management of fisheries needs to be strengthened.
- The BMR needs support to focus on the management of resources and to act as a facilitator for the development of these resources in cooperation with national and state government agencies, NGOs and private sector.
- Compliance with national and state regulations, including enforcement, is a priority issue that must be addressed to ensure both economic and environmental sustainability. This compliance must be attained through voluntary actions and more effective formal enforcement measures.
- There are income opportunities associated with the tourist sector for fishers (e.g. sport fishing, crew on boats) and aquaculture.
- The National Code of Conduct for Responsible Aquaculture needs to be completed.
- The government cannot afford the O&M of existing facilities.
- Climate change will impact fisheries and aquaculture through rising sea temperatures and tides and a predicted increase in the incidence of typhoons.

Strategy: The government intends to improve the policies, legislation, regulation and management of all its fisheries and to further research and help develop commercial aquaculture.

Demand for Infrastructure: (a) the development of a public, private partnership for domestic commercial tuna fishing, (b) renovation of the giant clam hatchery, (c) construction of fish markets and (d) flood proofing of existing buildings.

Health[42]

Vision (MTDS): "Healthy Palau in a healthful environment" at a cost affordable to government and people."

Status: According to the MTDS the convergence of improved standards of living and good health services, especially public health services, has led to effective management of many communicable diseases which in turn has raised life expectancy and reduced infant and child mortality. Lifestyle changes, however, have spawned an epidemic of NCDs that are eroding long-term gains in life expectancy and require life-long management at significant cost. In 2014-2016 life expectancy at birth was 66.5 years for men and 70.9 for women. The 5 leading causes of death in 2016 were heart disease, cancer, injuries, diabetes and respiratory diseases.

The government through the Ministry of Health (MOH) is the lead provider of health services operating one 80-bed Belau National Hospital in Koror, five strategically located primary care community health centers in Babeldaob (Melekeok, Ngarchelong, and Ngaremlengui) and one in Iouldaob (Peleliu) and five satellite community health centers in Airai, Kayangel, Angaur, Sonsorol, and Hatohobei. All Palau residents live within one-half hour travel time to a primary care facility. There are four primary care private clinics with pharmacy and facilities for ambulatory care and associated ancillary services.

There are three off-shore health insurance companies with Palau offices that sell group health insurance to Palau businesses. In support of community health, there are also a number of independent community-based organizations that have close ties to the Ministry of Health.

The Palau Constitution mandates government, through the MOH to provide free preventive health services and subsidized health care for citizens. Because there is adequate-to-generous funding for some activities from U.S. Federal sources, local funds have been earmarked primarily for clinical care for which there is little grant support. User fees are insufficient to cover costs.

To implement the health mandate sustainably, the Palau Healthcare Fund (HCF) was established in 2010 and consists of two components, individual Medical Savings Accounts (MSA) and a pooled universal social health insurance fund commonly known as National Health Insurance (NHI). These components are funded through mandatory contributions on earned income (2.5 percent of earnings contributed by the employee and matched by an equal contribution by the employer). NHI complements MSA by providing coverage for catastrophic illnesses and off- island referrals approved as medically necessary by a Medical Referral Committee established within the MOH. Government pays the MSA premiums for unemployed senior citizens and the severely disabled using funds earmarked for this purpose from tobacco taxes. With this, Palau has largely achieved Universal Health Coverage. HIES data show that

[42] Documents consulted:
Government of Palau. 1996. Palau 2020 National Master Development Plan. Koror
Government of Palau. Actions for Palau's Future. 2009-2014. Medium-Term Development Strategy. Koror
Government of Palau. 2019. First Voluntary National Review of the SDGs. Koror
Government of Palau and Asia Development Bank. 2008. Medium-Term Sustainable Financing Strategy Health Services. Final Koror and Manila
Government of Palau. Undated. Non-communicable Disease Prevention and Control Strategic Plan of Action. Healthy Communities Healthy Palau 2015-2020. Koror

less than 2 percent of average household expenditures are for health suggesting that the HCF is achieving financial risk protection.[43]

MOH does not have spare capacity to meet the service needs of the next 10 years and there is no designated space for sick tourists. MOH also does not have sufficient space to handle emergencies and must therefore use other government facilities that are not necessarily tailored for health. The physician-to-population ratio is aligned with global averages. However, there is a shortage of some key medical professionals and a general need for training of other staff. The MOH has a mechanism to collect relevant data and establish service levels but it does not have the expertise and capacity to analyze the data and assess service performance.

Some of the existing buildings require major capital repairs and rehabilitation in order to reliably provide health services. The existing buildings do not provide sufficient space for all health sector services and some services have to be scheduled to share existing infrastructure, for example NCD clinics are operated 3 days a week at the Belau Hospital Outpatient Department allowing two days for other clinical services. The MOH carries out building maintenance assisted by the Transportation and Equipment Department and from time to time, the Bureau of Public Works and Local and outside Contractors. Maintenance staff are not trained and insufficient in number. Combined funding from the government, US Federal Government and donors covers annual O&M.

Key issues are:

- Palau has closed its borders in response to the worldwide pandemic COVID-19 and so far there are no cases of the virus in the country.
- In common with many other Pacific Island Countries the incidence of NCDs are now the most common health concern.[44]
- Palau does not have an extended care facility for people who do not require the services of an acute care hospital but cannot be cared for at home. Extended care patients are occupying hospital beds needed for acutely ill patients therefore causing the inadequate beds per capita.
- The current Belau National Hospital, Angaur Community Health Center, Kayangel Community Health Center, Peleliu Community Health center and Southwest Islands community health centers are all located in low lying areas which may be subject to flooding and temporary loss of use.[45]
- The Ministry plans to further develop the main community health centers in Melekeok and Peleliu into mini-hospitals.
- MOH has a 10 year plan to build a new Public Health Building.
- Old medical equipment needs to be replaced.

[43] Government of Palau. 2014. Household Income and Expenditure Survey. Ngerulmud

[44] With almost 38 percent of adults obese, Palau now ranks #3 on the list of the "world's most obese countries" behind Nauru and the Cook Islands (World Population Review, 2019) – extracted from SDG review.

[45] The U.S. Government constructed the hospital prior to independence. Because of construction flaws, the U.S. Department of the Interior funded a comprehensive review to determine the most cost-effective course of action (review completed and report pending as of May 2008). The option favored by the Ministry is construction of a new hospital on high ground in the Airai-Aimeliik area with a public health center located in Koror to provide primary and preventive services to the population there. Whatever decision is reached about the hospital – repair or re-construction, it is anticipated that associated costs will be borne by the U.S. Government, not the Republic (Health Services Administration, personal communications, 2007).

Strategy: The government is attempting to improve the appropriateness, staffing, management, monitoring and overall delivery of all health services and to encourage the community to take responsibility for their own health.

Demand for Infrastructure: In order of priority, as prioritized by the Ministry of Health.

(i) Relocation of the main hospital to a new facility with a dedicated biosafety laboratory, adequate and appropriate space for hyperbaric, larger laboratory department to accommodate all new laboratory technologies and major medical equipment, dedicated hospice care; adequate operation room to accommodate new technologies and medical equipment; expanded supply warehouse with adequate cooling system; dedicated storage space with proper and adequate cooling system, adequate space for hazardous waste management; adequate parking spaces that includes disability access; expansion of wards; expansion of negative pressure isolation rooms; environmental health facilities with its dedicated laboratory; incorporation of workers lounges into the overall structure; and adequate parking.
(ii) Construction of a dedicated public health building.
(iii) Extended care facility.
(iv) Further development of the main community health centers in Melekeok and Peleliu.
(v) Replacement of other medical equipment, including adequate incinerator equipment; a lighting system that is energy efficient; new plumbing systems; radio; major medical equipment and general major equipment.
(vi) Access to transportation services.

ICT[46]

Goal: According to the MTDS the goal for infrastructure is to provide, protect and maintain infrastructure on an efficient and equitable basis to improve access, standards, reliability and value-for-money.

Status: Palau relied entirely on costly, limited satellite links for internet connectivity until 2017, when, supported by ADB funding of $25 million, it inaugurated a high-speed internet fiber optic cable connection to the Southeast Asia–United States submarine cable network, linking Palau to the international cable hub in Guam. The Belau Submarine Cable Corporation (BSCC), a state-owned enterprise, owns and operates the submarine cable system, offering internet bandwidth to local retail service providers on a wholesale basis in an equitable and nondiscriminatory way. Limited satellite arrangements provide redundancy support during a cable service disruption. With the cable, supply has increased, and prices have declined significantly. In 2015, a 2 megabits per second (mbps) connection cost $1,000/month; in 2019, a 20 mbps connection was $120/month. Bandwidth availability rose from 450 megabytes in 2017 to over 6,000 megabytes in 2019.

[46] ADB. 2015. Report and Recommendation to the President Proposed Loans Republic of Palau: North Pacific Regional Connectivity Investment Project. Manila
ADB. 2019. Concept Paper. Proposed Policy-Based Loan Republic of Palau: Telecommunications Sector Reform Program. Manila
Government of Palau. 1996. Palau 2020 National Master Development Plan. Koror
Government of Palau. Actions for Palau's Future. 2009-2014. Medium-Term Development Strategy. Koror
Government of Palau. 2019. First Voluntary National Review of the SDGs. Koror

In 2017, the government's Telecommunications Act established an ICT regulatory regime with a range of regulatory requirements for retail service providers, aimed at encouraging competition. The act elevated the Division of Communications to the Bureau of Communications, and granted it regulatory jurisdiction and authority over intrastate operations of retail service providers responsible for overseeing pricing and quality of ICT services and developing comprehensive and coherent policies to address online safety and security. The act provides that the Bureau of Communications will create a cybersecurity framework to keep pornographic and other harmful material out of the hands of minors and address national security concerns. Also, all retail service providers pay a Universal Access levy of 15% of gross revenue. This levy is meant to repay the RUS Loan, pay for backup capacity, and fund new Universal Access projects. However, retail service providers see this as burdensome, as it is above the normal corporate tax that they pay and is added to a 4% Gross Revenue Tax.

The Bureau of Communication through a World Bank Technical Assistance Grant is commissioning a Market Implementation Support study which will amongst other things seek to determine a baseline to measure service performance and market saturation levels. All major communications assets are owned by either the Palau National Communications Corporation (PNCC) or BSCC. While PNCC requires a sovereign guarantee to help repay the RUS loan, it has not needed a government subsidy for any major capital investments. PNCC operations are fully supported through user fees and throughout its history has not received government subsidies for major capital investments.

A second submarine cable connection for Palau, with a capital cost of approximately $30M is currently under implementation, under the supervision of BSCC. It concludes 13.3 million financing from DFAT and $3 million from USAid. This second submarine cable will significantly improve the reliability of international telecom connectivity, required for commerce and business. This project is already under way, with the Marine Survey already complete and it is scheduled to be completed in 2022 and fully connected and functioning by the first quarter of 2023. BSCC has two other smaller projects under way:

- CAP-A Technical Center to allow enhanced customer access, including co-location, at Airai airport site ($600K); and

- Eastside fiber extension from Ngeremlengui to the north and west, closing the loop around Babeldaob to ensure resilience of Airai connection point, and provide capabilities for Retail Service Providers like PNCC and PT ($2.3M)

Key issues are:

- Internet prices remain high relative to standards of the United Nations Broadband Commission for Sustainable Development.
- Coverage has risen in Koror and Airai but the remote rural Southwest Island States have little or no coverage because of the high cost of providing services to those locations.
- Security of internet services is a growing concern, as highlighted by occasional events involving unauthorized access to private data.
- Redundancy through satellite services does not guarantee uninterrupted connection in case of service outages over the international fiber cable.
- Modern and up-to-date sector policies are needed to address issues of affordability, access, Quality of Service, and security.

- There is currently limited competition in the telecoms market with only three retail service providers permitted to purchase wholesale capacity from BSCC. The Palau National Communications Corporation (PNCC) as the dominant service provider allows it to set terms and conditions on interconnection, facility sharing, and pricing arrangements. This may hinder open market competition, but as the dominant service provider it is subject to more regulatory oversight.
- PNCC's financial performance is constrained by a $39 million loan (with a 35-year term and 4.9% interest rate) that it took out with the United States Department of Agriculture's Rural Utilities Service in 1992 to construct domestic network infrastructure. With annual repayments of $2.3 million and unsubsidized universal service obligations in rural areas, it is challenging for PNCC to generate a profit, impeding its ability to reduce prices and improve service quality.
- Given the quality of services provided by PNCC in comparison to its competition, the satisfaction level is deemed fair in terms of services, but cost levels remain restrictively high.

Strategy: The government is committed to continuing reforms in the ICT sector in support of extending universal access, as well as extending private competition with the goal of reducing prices and enhancing social and economic growth and development.

Demand for Infrastructure:

(i) The remote South West Islands of Palau require substantive investment in communication infrastructure to ensure access to the internet. Such connectivity will aid communication constraints related to health, education, emergencies and security. Universal Access Projects addressing this issue need to be prioritized.
(ii) Mobile network coverage and capacity has steadily increased across Palau. However, accessibility to services such as high speed mobile data and internet still need substantive improvements.

In addition to the above projects, an undersea communication cable installation project, with cost estimate of $30 million and funded JBIC/SMBC, DFAT and USAid is currently under implementation, to provide a second telecom cable connection from Palau to USA and Singapore.

Public Safety[47]

Goal: "To work in partnership with the community to provide quality preventive and responsive policing and safety services"

Status: The Ministry of Justice has the primary objective of providing law enforcement services throughout the entire 16 States of the Republic of Palau. While there are two substations (one in East Babeldaob, and one in West Babeldaob), main facilities under the

[47] Documents consulted:
Government of Palau. 2016. Koror Jail Improvement Steering Committee Comprehensive Progress Report. Koror
Westcare Pacific Islands. 2015. Technical Assistance to the Ministry of Justice of the Republic of Palau: a review of the Koror Jail. Koror
Government of Palau. 1996. Palau 2020 National Master Development Plan. Koror
Government of Palau. Actions for Palau's Future. 2009-2014. Medium-Term Development Strategy. Koror
Government of Palau. 2019. First Voluntary National Review of the SDGs. Koror
Rosenthal, Michael J. 2004. The Koror Jail: Cultivating a Community within a Prison. Corrections Today Vol. 66, No.

Bureau of Public Safety are situated in Koror and operations are primarily focused on Koror and Airai. Due to constraints in personnel and equipment, the Ngardmau substation only hosts a Fire and Rescue Unit while the Melekeok substation in the east hosts a Patrol Unit. This means that cross-responses from the east to the west and vice versa are required depending on services required and this results in slower response time. The country does not have a natural hazards early warning system.

The Division of Fire currently relies on limited fire hydrants in Koror and Babeldaob. In western Babeldaob, only two states have working water hydrants while the limited hydrants in eastern Babeldaob are outdated and usually require additional adaptors to connect to fire tankers. Fire emergencies in the last two years alone have demonstrated the slow response time due to traveling distances between fire hydrants and response sites. There have been two recent procurements of fire tankers through grant assistance. However, more than half of the fleet of fire emergency vehicles are secondhand and are overdue for replacement. There is also limited space to house fire and ambulatory service vehicles.

The Koror Jail is currently at maximum capacity, housing 88 inmates. A 2016 assessment linked a high risk of escapes and contraband to deteriorating infrastructure. Personnel shortage and accountability of correctional officers were also cited as major factors in operational deficiencies. Health and safety risks posed by limited infrastructure were also highlighted in the 2016 assessment. Short-term infrastructure improvements including fencing and the addition of CCTV equipment were made to the Koror Jail and as part of the government's strategy, a plan for a new and relocated correctional facility began to be implemented. The new facility is in Ngchesar and is still under construction. Funded through a piecemeal approach, the completion of the new correctional facility depends on further budget appropriations.

Grant aid from Japan for up to 500 million yen (approximately $4.8 million) recently provided the government with a set of equipment to build two monitoring stations in Ngeremlengui and Malakal. These new stations will help Palau to improve its capacity to monitor main sea passages and coastal areas. As a result, it is expected that Palau will be able to address illegal fishing and shipping accidents.

Public Works and contractors carry out maintenance. All of public safety's buildings are situated in locations that have minimal risks of flooding.

Key issues are:

- Babeldaob and outer island response times need to be reduced.
- Public Safety presence must be increased in anticipation of further development and population growth in Babeldaob, in line with the national strategy.
- Fire tanker/engine fleet and fire hydrants are limited and cause slow response times risking public safety.
- The Fire and Rescue Division has limited space to house its fleet of emergency vehicles.
- Koror Jail is overcrowded and deteriorating.
- The Division of Corrections still has insufficient personnel. At any given shift, the ratio of correctional officers to inmates is between 1:18 to 1:30. Recruitment is challenging as the pool of interested applicants is limited.

- A 2016 report also cited health concerns that stemmed from mosquitos, sewer malfunctions, limitations on potable water, and the lack of personnel to escort inmates to hospital appointments as concerns.
- The new correctional facility needs to be completed but there is a lack of additional funding due to piecemeal appropriations.

Strategy: The overall strategy is to ensure responsive policing and emergency services to the entire Republic of Palau through adequate staffing, facilities and equipment.

Demand for Infrastructure:

(i) Expanding substations to include both police units and fire and ambulatory services to ensure consistent response times in all parts of Babeldaob, including the provision of vehicles and equipment.
(ii) Additional fire tankers are needed in Koror and Babeldaob to replace old fire engines.
(iii) The fire hydrant system needs to be updated to ensure faster refill and response time.
(iv) Additional capital is needed to complete the new correctional facility.
(v) Establishment of an early warning system.

Solid Waste Management[48]

Vision: A clean and safe Palau through solid waste management.

Mission: To develop and implement a comprehensive waste management system with the 3R+Return Policy, by employing sustainable solutions consistent with traditional and cultural values

Status: Based on a 2019 survey under the Japanese Technical Cooperation Project for Promotion of Regional Initiatives on Solid Waste Management in Pacific Island Countries Phase II (JPRISM II) project, unit generation rate of household waste in Koror is .682kg/person/day and unit generation rate of Municipal Solid Waste (MSW) is 2.6kg/person/day. Koror State generates approximately 30 tons of MSW/day which 26% from households and 74% from "other than household". The recycling rate to total generation waste amount is 11.2%. For Babeldaob States, household waste generation is 3.35 tons per day, unit generation rate is .640kg/person/day and the recycling rate is 23%. There is no data for the remote islands.

The proximity of Palau to Asia and other consumer societies has contributed to the country's significant change in the nature of consumption and waste generation. The country is now confronted with substantial waste management issues that need to be addressed in the immediate to short-term period. This is further exacerbated by limited land, resources, institutional and human capacity, as well as a vulnerability to climate change.

[48] Documents consulted:
Government of Palau. 1996. Palau 2020 National Master Development Plan. Koror
Government of Palau. Actions for Palau's Future. 2009-2014. Medium-Term Development Strategy. Koror
Government of Palau. 2019. First Voluntary National Review of the SDGs. Koror
ADB. 2014. Solid Waste Management Palau Country Snapshot. Manila
SPREP. Undated. National Solid Waste Management Strategy: The Roadmap towards a Clean and Safe Palau 2017 to 2026.
Stefan Hajkowicz, Kyonori Tellames and Joseph Aitaro. 2005. Economic cost scenarios for solid waste-related pollution in Palau. IWP-Pacific Technical Report (International Waters Project) no. 28

Waste collection is a State responsibility. Recently, the Koror state government started implementing a new system for collecting waste from segregation stations. Households and institutions such as schools, are required to segregate their waste. Eventually, once waste segregation stations are established throughout the state, garbage collectors will only pick up solid waste from these stations. Some residents and businesses transport their own rubbish to the landfill.

The national government through the Solid Waste Management Office of the Bureau of Public Works (SWM- BPW) is responsible for management of the M-dock landfill in Koror. Koror's landfill, known as the "M-dock," is the country's largest waste disposal facility. The M-dock has been in operation for about 50 years and is located in an area of shallow reef and mangrove wetland, and in close proximity to residential areas and tourism facilities. It covers an area of about 13 acres. Previously, M-dock was operated as an open dumpsite, which polluted the surrounding marine environment as a result of leachate run-off. With support from the Japan International Cooperation Agency (JICA), M-dock was rehabilitated over the period 2005 to 2008 into a semi-aerobic, "Fukoka-method" landfill. Other States' dumpsites (8 in Babeldaob, 1 Peleliu, 1 Angaur) are operated and maintained by State Governments. Only M-dock landfill in Koror and the new National Landfill in Aimeliik are designed to minimize environmental impact. M-dock landfill has 2 years remaining capacity with 25 years for the new national landfill. All other dumpsites are subject for closure in the near future. Alternative sites have been identified for new landfill site development. The main hospital has a high temperature incinerator to burn medical waste. All the open dumpsites in the country could potentially contaminate fresh water open reservoirs and ground water.

Legislation governing solid wastes include the Environmental Quality Protection Act (1981), associated solid waste management regulations under this act which became effective in 1996 and the Recycling Act (2006). The Ministry of Public Infrastructure, Industry and Commerce, through the BPW, has the responsibility over SWM infrastructure planning, public awareness on SWM issues, and the operation and management of the national landfill. The Environmental Quality Protection Board (EQPB) is responsible for the enforcement of regulations on solid waste storage, collection, and disposal. The EQPB is also responsible for issuing licenses to establish, modify, or operate solid waste disposal facilities. In addition, the Division of Environmental Health deals with issues related to public health and safety.

The National Solid Waste Management Strategy and its action plans and the manual for landfill operations and maintenance have established service levels for solid waste management.

The construction of the new national landfill in Aimeliik State has been completed and a ribbon cutting ceremony was held on November 19, 2020. Heavy equipment, tools and office equipment will now be moved to the new landfill site. This project was funded by Japan's grant aid program. The total land area is 20 acres. Although the estimated lifespan is 25 years, increasing recycling activities will increase the lifespan significantly beyond this. The landfill operations and management were to be moved to the National Landfill in Aimeliik State by January 2021.

BPW is in the process of outsourcing the waste collection service for Babeldaob States. Bid proposals have been evaluated and submitted to the contracting officer (Director of BPSS) with a recommendation to award. This contract will serve all Babeldaob households and public schools by collecting their solid waste and disposing of them properly to the new landfill site in

Aiemliik. The Babeldaob States' dumpsites that are hazards to the environment can then be closed.

A revolving fund finances the Babeldaob waste collection service. This revolving fund is also the source of funding for the Division of Solid Waste Management operations including landfill operations and personnel salaries. Revenue from a Recycling Fund is approximately $360,000 annually.

Other current and on-going programs are:

- Operation and maintenance of M-Dock Landfill. The total land area of the landfill is 13 acres and the final disposal site area is 9 acres. Estimated waste amount entering M-dock landfill is 30 tons/day and the current life expectancy is 2 years.
- Waste tires shredding project. A shredder machine was procured in 2016 and operation started in 2017. More than a hundred thousand tires have been shredded and there are more than fifty thousand tires stockpiled at the landfill area. The amount of waste tires entering the landfill is approximately 800 to 1000 pieces per month.
- Scrap metal project. BPW has a contract (Contract No. 12-029) with Palau Waste Collection to collect all scrap metal entering M-dock landfill for recycling purposes. The contract also includes buying and shipping out redeemed beverage containers (steel, aluminum and plastics) from the recycling program (RPPL 7-24).
- Recycling Program (RPPL 7-24). The Division of Solid Waste Management is managing the program through a partnership with Koror State Government (KSG), Belau Garbage and Scrap Company (BGSC) and Palau Waste Collection. KSG and BGSC are the redemption centers and Palau Waste Collection is the exporter of the recyclables.
- Awareness programs. Awareness programs are conducted throughout the year to promote 3Rs (Reduce, Reuse, Recycle), waste segregation and the importance of best waste management practices. Activities includes school visits, activities with students, tours at the national landfill, information booths during special events, coastal clean-ups, walk n pick activities and talk shows.

Special non-recurring projects are:

- International Center Environmental Technology Transfer (ICETT) "Project of Working Together with the Government and the Citizens for Zero Waste Society Promotion in the Republic of Palau". This project started on August 2018 and will continue until August 2021. The project is implemented by Mie Prefecture Government and ICETT together with the Bureau of Public Works and other government agencies. The project is implementing a waste recycling system through segregation in selected target areas, which are Ibobang, Ngatpang State and Mongami, Aimeliik State following the concept of 3R+Return.
- Japanese Technical Cooperation Project for Promotion of Regional Initiatives on Solid Waste Management in Pacific Island Countries Phase II (JPRISM II). This project consists of nine countries in the Pacific including Palau. There are four outputs for Palau:
    (i) A new National Solid Waste Management Strategy (NSWMS) and its action plan prepared in line with the Cleaner Pacific (2016-2025) and officially submitted to the Minister. This has been completed.
    (ii) Good practices of solid waste management, that is "3R" are promoted in the country and the region. This is ongoing.
    (iii) Solid waste collection is improved in 10 States of Babeldaob Island and in Koror. This is also ongoing.

(iv) The ongoing transition from M-dock landfill to a new landfill.

Specific contracts include:

- Service Contract No. 12-029 with Palau Waste Collection to collect all scrap metal entering M-dock landfill for recycling purposes. This contract also includes buying and shipping out certain redeemed beverage containers (steel, aluminum and plastics) from the recycling program (RPPL 7-24).
- Service Contract No. 16-084 with Belau Garbage and Scrap Company for the company to operate as a Redemption Center under the Recycling Program (RPPL 7-24).
- MOU with KSG to operate as an initial Redemption Center under the Beverage Container Recycling Regulations (RPPL 7-24).
- A service Contract for Babeldaob States Waste Collection Service is pending.

Strategy: The government will gradually introduce state of the art facilities and best practices to dispose of solid wastes and thereby promote improved health and preserve the natural environment.

Demand for Infrastructure:

(i) With the construction of the new national landfill in Aimeliik State the older, now disused waste disposal sites need to be closed and the land rehabilitated and returned to commercial or agricultural use, and
(ii) Waste to Energy technology would significantly reduce the volume of waste disposed at landfill and at the same time produce usable energy.

Tourism[49]

Vision (Palau Visitors Authority)**:** "Ensuring a pristine paradise. Palau for everyone."

Goal (MTDS)**:** "To upgrade the image of Palau as a tourist destination and position Palau as the island of choice for environmentally conscious visitors. This will involve ensuring quality visitor experiences and high financial and other benefits to Palau on a sustainable basis."

Status: Tourism has become the lead economic sector in the country and likely has potential for further expansion, most especially on the island of Babeldaob. The total number of visitors increased from just over 85,000 in FY 2005 to 168,770 in FY 2015. Visitors have since reduced in number and have fallen to no visitors as a result of the necessary response to COVID-19.

[49] Documents consulted:
Government of Palau. 1996. Palau 2020 National Master Development Plan. Koror
Government of Palau. Actions for Palau's Future. 2009-2014. Medium-Term Development Strategy. Koror
Government of Palau. 2019. First Voluntary National Review of the SDGs. Koror
Government of Palau and Asian Development Bank. 2008. Facility for Economic & Infrastructure Management Project. Tourism Action Plan Final. Koror and Manila
Government of Palau. Bureau of Tourism Ministry of Natural Resources, Environment and Tourism. 2016. Palau Responsible Tourism Policy Framework. Ensuring a Pristine Paradise. Palau for Everyone. 2017-2021. Koror
Father Francis Xavier Hezel. Undated. Tourism in Palau
Rhona Barr, Kim Bonine, Nicholas Conner and Aaron Bruner. 2016. Sustainable tourism pathways for Palau: findings and recommendations from a cross-sectoral workshop. Discussion Paper. The David & Lucille Packard Foundation and Margaret A. Cargill Philanthropies

The Palau Responsible Tourism Policy Framework was adopted in 2015. The policy shifts the industry profile from low-end mass market packaged tours to a high-value model delivering a Pristine Paradise Palau brand experience to discerning travelers. Implementation will require strong partnership and a shared vision across government, the industry, and communities.

The Palau tourism product currently has a prior focus on ocean activities and island culture. This could be added to in future with Palau seeking to develop the honeymoon, sports, and international convention among other industries as well as to expand its existing product to Babeldaob and other outer islands.

Key issues are:

- An earlier conflict between high end and lower end tourism with a resultant, heightened trade-off between commercial and environmental objectives.
- The challenge of increasing domestic value-added. This is especially difficult in the case of lower end pre-paid package tourism.
- Access to land, most especially on the coastal areas of Babeldaob.[50]
- The need for an industry directed strategy post COVID-19 to attract high-end, high-value tourism foreign investors to invest in Babeldaob. What would Club Med, Hyatt, Marriott, or other internationally recognized hotel investors require for them to invest in Palau?
- An improvement in the environment for investment and commerce be pursued.[51]
- Limited land, sea and air transport facilities.
- Limited and insecure supplies of electricity, water and sewerage.
- Dispersed authority over tourism development, most especially in access to land, requiring continued consultation and participation in the development of the industry.

Strategy: The Bureau of Tourism, Palau Visitors Authority and Belau Tourism Association, with the help of government is seeking to (i) improve tourism awareness, to align the needs of tourism development with other policy planning including land use planning, (ii) improve the management of tourism, (iii) encourage the development of high-value markets, (iv) promote a Palau brand of tourism, (v) increase domestic value-added, and (vi) engage communities in planning and decision-making. There are also opportunities for the country to diversify its tourism products.

Demand for Infrastructure: Further growth in tourism would place a strong demand on increased public infrastructure in the form of access roads, improved airstrips and air links, and an extended utilities reticulation if foreign direct investment can be attracted to open up a new high-value tourist destination on Babeldaob and, or other islands. There is also an opportunity for Palau to diversify its tourism industry by constructing a convention center and sports facilities that target regional and international use and by improving access to waterfalls and other sites of natural beauty.

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[50] See Father Francis Xavier Hezel. Undated. Tourism in Palau for a historical perspective on how the easing of access to land has aided the expansion of the industry.

[51] See World Bank's Ease of Doing Business, PSDI Private Sector Assessment, and ADB and World Bank annual assessments of policies and institutions regarding the relatively costly and difficult business environment.

Transport - Air[52]

Goal: (MTDS): The goal for infrastructure is to provide, protect and maintain infrastructure on an efficient and equitable basis to improve access, standards, reliability and value-for-money.

Status: Palau has only one airport, which is the main point of entry and 2 airfield facilities throughout the country. The main international airport in Palau is in Airai State, and is operated under the Bureau of Aviation under the Ministry of Public Infrastructure, Industries, and Commerce. There are also two small airfields located on the islands of Peleliu and Angaur to the South of Babeldoab. Both latter airfields are managed and operated by their respective local state governments. The aviation sector in Palau is small and relies primarily on tourism. Prior to COVID-19 there were approximately 30 flights per week into and out of Palau. Palau is serviced by United Airlines, Korean Air, Asiana Airlines and China Airlines through international scheduled flights that all land at Palau International Airport. Seasonal Charters included Japan Airlines, Tway, Skymark, Sky Angkor, and Lanmei Airlines. The largest aircraft to service Palau is a 767-200 and the smallest is a 737-700.

General aviation activities providing service on demand includes Pacific Mission Aviation, Smile Air Inc. using single engine aircraft and Palau Helicopters Inc. Prior to COVID-19 cargo services were provided by United Airlines Cargo, as part of the almost daily scheduled route, and by Asia Pacific Air (APA), a subsidiary of Tan Holdings, that provides Air Cargo charter out of Guam. Domestic carriers are limited to small tourist charter airlines. Pacific Missionary Aviation (PMA), based in Yap, in the Federated States of Micronesia, provides charter services to outer islands and around Palau if required.

The Main Palau international airport is regulated by the Palau National Aviation Administration, and routinely undertakes operational and safety compliance reviews. The Bureau of Aviation and Palau International Airport Corporation carry out day to day maintenance for airport facilities. Contractors are outsourced for major improvement projects costing more than $ 5,000. The average annual operating cost to maintain airport facilities is $2,500,000. Actual expenditure on maintenance in each of the last five years was $2.2 million. Major reseal of the runways and taxiways can be performed locally. Current sources of revenue for civil aviation are landing fees paid by airlines and boarding fees paid by passengers. The availability of skilled staff is not an issue. Certified Aircraft Rescue Firefighting personnel that are Pro Board certified and meet all aviation training certification standards.

The government's first Public-Private Partnership project approved in early 2017 constructed a new annex building, departure building and renovated the existing building to the main arrival building.

Key issues are:

- Air services can likely only develop alongside increased demand from tourism.

[52] Documents consulted:
Government of Palau. Actions for Palau's Future. 2009-2014. Medium-Term Development Strategy. Koror
Government of Palau. 2019. First Voluntary National Review of the SDGs. Koror
Logistics Capacity Assessment: https://dlca.logcluster.org/display/public/DLCA/2.1+Palau+Port+of+Koror

- Palau needs to continue to work towards addressing the International and Civil Aviation Organization (ICAO) SARPS (Standards and Recommended Practices) based on the 2010 ICAO audit.
- The Peleliu and Angaur airfields need to be developed to meet basic safety standards. There are no lighting systems, security fences, navigational aids, and windsocks to support airfields.
- Additional government funding is needed to support the operation and maintenance of Angaur and Peleliu Airfields.

Strategy: To slowly build air service facilities, and the safety and regulatory environment as the demand for air services increases.

Demand for Infrastructure:

(i) The main international airport has two aprons and approved future improvements include: (a) Hanger construction at North Parking Apron (Compete); (b) Fuel Bunker installation at North Apron; and (c) Passenger Terminal Building and Annex Building. The expansion of airport facilities is needed to help boost tourism.
(ii) Peleliu and Angaur Airfields need to be developed.
(iii) The international airport's existing runway and taxiways will require a surface re-seal during the next 10 years.
(iv) Other major investments required are in: navigation equipment, security fences, aircraft gate ramps, baggage handling, security scanning equipment, and building renovations.

In addition to the above, a project involving major renovations to the international airport, including additional new gates and with estimated cost of $40 million funded by JICA/JBIC/SMBC is currently implementation. A proposal to expand the scope of this project by including X Ray equipment and a computerized Customs management system (ASYCUDA) at a cost of $5 million, is also currently under consideration.

Transport - Land[53]

Vision or Goal: (MTDS): The goal for infrastructure is to provide, protect and maintain infrastructure on an efficient and equitable basis to improve access, standards, reliability and value-for-money.

Status: Palau has approximately 85 miles of highways and approximately 30 to 35 miles of unsealed roads. In 2017, resurfacing and repair began for the main loop road on Babeldoab under the Compact Agreement and was completed in 2018. The main loop road pavement surface is still in excellent condition. However, sporadic areas where embankment settlement related pavement failures are noted and documented. The specifications of the compact road construction, managed by the US Army Corp of Engineers, follow the American Association and State Highways Transportation standards in terms of geometric design for highway and streets. A small road network also exists on Peleliu and Angaur islands. Peleliu has approximately 4 miles of sealed road from the port to the main town – the rest is unsealed. The Babeldoab loop road is mainly inland and significantly above sea level, with the exception of the eastern side near Ngiwal and in the north at Ngaraard, where the road crosses a low lagoon area by

[53] Documents consulted, as footnote 52

causeway. Causeways between Koror Meyuns and Malakal are also the only road-access connections in Koror. The existing roads network adequately serves nation's need. The main periphery road (the Compact Road) in Babeldaob is paved. Unpaved roads are mostly roads from each state that connect to the Compact Road or to communities within a state. There are no toll roads.

Access from the main island of Babeldoab to Koror is by way of a suspension bridge. The original bridge collapsed in 1996 but was rebuilt and now acts as a critical link between Koror and the main Babeldaob Island. Causeways also connect Koror to Malakal Island and to Meyuns west of Koror Island.

The speed limit is 25mph/40kmph. Vehicles must slow down through villages and drive through at a respectful pace without loud music. There are no issues with road security. There are no weighbridges in the road network, nor are there mandatory or regulated mass limits for vehicles apart from the Koror bridge - vehicle configuration that allows for the transport of 40ft containers. Assuming maximum weight of a 40 ft container to be 30 metric Ton, this translates into maximum axle load of 80kN, assuming a dual axle trailer pulled by a 3-axle prime mover.

The Public Works Bureau performs road maintenance at a very basic level such as vegetation management, storm drain and culvert debris and small scale landslide removal. Pavement repairs and other major works such as embankment repairs are outsourced. Maintenance equipment consists of two 5 ton dump trucks and wheel loader. Local expertise exists for asphalt and cement concrete paving, fog seal, and slurry seal and foreign contractors are not needed. The average annual operating cost to maintain roads is approximately $1.4 million per annum.

Key issues are:

- The challenge of adequately funding the O&M of the existing road, causeway and bridges network.
- The limited staff with required skills in engineering and management.
- The impact of climate change on existing causeways and some low lying roads.
- Traffic congestion in downtown Koror.
- How do we integrate "Complete Streets" policies into the road networks to enable safe access to all users that does not negatively impact the flow of vehicular traffic?

Strategy: To slowly build up the roads, causeways and bridges network and associated safety and regulatory environment as the demand for land transport increases.

Demand for Infrastructure:

(i) Climate proofing of low-lying roads and causeways.
(ii) Capital repairs to the Compact Road, Package D North
(iii) Upgrading dirt roads to link to existing paved roads. Paving the roads from each state that connect to the Compact Road or to communities within a state will remain a priority for the next 10 years.
(iv) The Malakal bridge will either need rehabilitation or replacement in the next decade. Culverts on Malakal and Meyuns causeways also need replacement as structural failure signs are already visible and progressive.
(v) Rehabilitate or build new pedestrian walkways in Koror.

(vi) Periodic repair of random road areas to prevent premature pavement impairment

In addition to the above listed projects, the government will also examine options to invest in public transportation, with the objective of reducing congestion and CO_2 emissions.

Transport - Sea[54]

Goal: (MTDS). The goal for infrastructure is to provide, protect and maintain infrastructure on an efficient and equitable basis to improve access, standards, reliability and value-for-money.

Status

Ports

There are two international ports, 28 local docks and two anchorages. The Port of Malakal is the main port of Palau, and is situated on Malakal island, adjacent to Koror Island. The port is situated in a protected lagoon and is serviced by local companies in partnership with three shipping lines, namely Kyowa Lines, Matson Navigation and PIL/ Mariana Lines. The three local companies serve various routes from the US mainland, Guam and Asia under an Entry Assurance Scheme. The port has two main docks, each able to handle vessels up to 500 ft in length. Access to the port is via channels through the outer reef. The docks are 156m and 159m in length with a safe draft of 9m and with a self-imposed draft of 7.2m.

Belau Transfer and Terminal Company (BTTC) is a private operator and undertakes all terminal services and stevedoring activities at the port and freight delivery services to customers. BTTC leases the port premises from the Koror State Government. Freight movement is predominantly containerized, with 200 to 400 containers received each month, and approximately 100 mt of bulk break cargo per month.

The port handles approximately 6 to 8 cargo vessels per month that are almost exclusively container freight; Kyowa line and PIL Eurasia/MIL lines provide scheduled services to Koror. Container arrival per month varies depending on the time of year and infrastructure projects being undertaken. Historically, freight volumes increase during November to April due to Thanksgiving and Christmas holidays. During major infrastructure programs, maximum handling has reached 500 containers per month, not including break bulk cargo. Containers must all be unloaded by gantry crane, as no container cranes are available at the dock. Depending on the ships' gantry crane and operator capacity, containers can generally be unloaded at a rate of 6 to 10 per hour.

Malakal port has no reefer stations for the siting and temporary powering of refrigerated containers. Unloading and dispatch from the port for customers with reefer containers (e.g. main supermarkets) are synchronized and planned to ensure containers are dispatched to the consignees site directly upon unloading from the vessel. It is often the case that reefer containers are unloaded within 4 to 6 hours of discharge from the vessel. In case of emergencies, generators can be provided for temporary power supply.

[54] Documents consulted, as footnote 52

All port logistical services are carried out at the BTTC building located within the port. The building is two-stories high. The concrete part is roughly 46' by 46' in size with an adjacent space of 46' by 62' which is used as the Container Freight Station area. About 25%-30% of BTTC's overall budget is allocated to maintaining facilities. Currently, revenue for Malakal Commercial Port is collected from user fees/tariffs associated with stevedoring, demurrage and wharfage. User fees cover all costs. WESPAC Construction maintains the surfacing and maintenance of facilities at Malakal Commercial Port. The other ports are maintained by the National Government and/or state government. The port has staff with required skills in engineering and management.

Malakal port lies adjacent to the fisheries port, owned and operated by Tan Holdings. This neighboring dock facility is for the exclusive purposes of unloading fishing vessels and packaging for export and does not handle general cargo. The marine ports that provide passenger and freight transport service to other islands are, for international movements: (i) Malakal Commercial Port, (ii) Aimeliik Tanker Facility, and (iii) Palau Pacific Resort anchorage, and for domestic movement: (i) Kayangel Port, (ii) Peliliu Port, and (iii) Angaur Port. There are no new marine transport facilities planned for construction during the next 10 years.

Grant aid from Japan for up to 500 million yen (approximately $4.8 million) recently provided the government with a set of equipment to build two monitoring stations in Ngeremlengui and Malakal. These new stations will help Palau to improve its capacity to monitor main sea passages and coastal areas. As a result, it is expected that Palau will be able to address illegal fishing and shipping accidents.

Vessels serving Peliliu, Angaur and SouthWest States

Currently, at least four individually operated vessels service Peliliu and Angaur States. MV Odesangel Dil and Nippon Maru II provide a twice a week service to Peliliu State operated by Peliliu Marine Transport Authority. Angaur State Government runs MV Regina IV and a smaller boat to provide a twice a week service for Angaur State. Services to the South-West States of Sonsorol and Hatohobei are provided on a charter basis using some local live-aboard vessels operated at a significant cost.

Shipyard

Belau Transfer and Terminal Company leases and operates the only slipway facility in Palau. The slipway does not have a work crew, and provides slipping at high cost. An alternate facility for small vessel repair, including yachts, is provided on Airai side of Toachel Mid channel at a facility owned and operated by Surangel and Sons Company. Current potential users of the facilities are all the local vessels with inboard engines that are over 40 feet in length, fishing vessels, and the live-aboard vessels in Palau that have to be slipped for inspections twice in a five-year cycle.

Key issues are:

- The Malakal port lacks adequate room to have a separate storage area for dangerous goods (hazardous cargo), such as LPG gas , chlorine, and other corrosive chemicals, as required by International Maritime Organization(IMO) regulations. Occasionally, when there is a backlog of empty containers to be picked up, the port becomes very congested

and containers are stacked three high. Port handling equipment is in a fair to good condition, but only a small amount of equipment is available.

- To provide a more efficient and affordable means of transportation to Peliliu, Angaur, Sonsorol and Hatohobei, it is recommended that a purpose-built passenger/cargo vessel with twin engines and bow thrusters be procured to provide the service. This vessel can be operated by the national government as a training ship to train local seafarers and provide the twice a week service to Peliliu and Angaur and a quarterly service to Sonsorol and Hatohobei.
- To ensure proper and adequate maintenance of local vessels and to promote sea safety, it is recommended that the national government build and man a drydock facility at a suitable location to accommodate vessels of up to 500GT. The manning can be undertaken independently, or through joint ventures with other shipyards in the region.

Strategy: To slowly build up the sea transport network and associated safety and regulatory environment as the demand for sea transport increases.

Demand for Infrastructure:

(i) A priority project for government is to relocate the main commercial seaport to Babeldaob. Other existing ports, wharves and jetties adequately serve the nation's needs, but the current main port at Malakal lacks adequate lighting for night time use. The aids to navigation for the channels are unlit and make night navigation unsafe. The lack of lighting at the port and channels pose challenges to achieving SDG 5 and 8. The government has applied for a grant to install lighting at the port areas but the project remains unfunded.

(ii) The major rehabilitation and renovation projects related to marine transport required during the next 10 years are: a) rehabilitation of the range markers in the West Pass entrance, b) rehabilitation of current Malakal Commercial Port infrastructure, and separate berths and, or terminals to accommodate different passenger and cargo vessels, c) rehabilitation of aids to navigation in waterways of local states, d) dredging of port areas and e) a hydrographic survey of Peliliu Port.

(iii) The local docks are maintained by the national government and state governments. These docks are primarily used by local fishermen and for passengers on small crafts. Sita, Ochelochel and Angaur Port are also used for freight. While the existing docks can adequately serve the nation's needs, the port lacks adequate lighting for night time use. The aids to navigation for the channels are unlit and make night navigation unsafe.

(iv) Construction of a slipway for drydocking large vessels.

In addition to the above listed projects, the government will examine options for investment in a government run ocean going vessel. This could be considered for prioritization and funding in future fiscal years.

Water and Sanitation[55]

Goal: (MTDS) The goal for infrastructure is to provide, protect and maintain infrastructure on an efficient and equitable basis to improve access, standards, reliability and value-for-money.

Status: Almost every household has some sort of rainwater catchment system, ranging from simple plastic lined 55 gallon steel barrels to imported aluminium 400 gallon tanks to constructed cement tanks. Desalination has been raised in the past though never thoroughly explored. Store-bought water bottles are a popular alternative source of drinking water. Watersheds are heavily relied upon as water sources. The Koror/Airai treatment plant estimates extraction of 4.5 million gallons per day from the Ngerimel Dam and Ngerikiil River, based on the amount processed within the plant, not actual amount of intake. There are 20 public water systems, all monitored regularly by the Palau Environmental Quality Protection Board for chlorine residual, bacteria, and turbidity. Competing water supply demands come from the tourism industry, which diverts hundreds of thousands of gallons. Mangroves and coral reefs are also dependent on freshwater. The impact of water extraction on the coastal environment and the extent to which impounding water has on decreasing fresh water flow to coral reefs is unknown.

The main source of pollution is sedimentation caused by poor erosion control, loss of riparian buffers, and poor land use practices. Pollution into the groundwater sources is from poorly maintained septic tanks, leachate from nearby landfills, and also from saltwater intrusion. On the reef platforms and atolls, there is a need to limit the amount of water extracted per day. Coastal waters are impacted daily from land-based pollution, gasoline and oil from outboard motors and ships. With more development expected on the larger islands, other sources of pollution will be inevitable such as sewage, chemical pollution, and oil spills.

In 2015, 42.8 percent of homes in Koror and Melekeok were connected to the public sewer system while 43.2 percent used on-site septic systems.[56] Koror has a centralized sewerage system which services more than 80% of the Koror population. The network comprises 40 kilometers (km) of gravity mains, 13 km of force (pumped) mains, 46 pump stations, and a sewage tertiary treatment plant located on the island of Malakal. Koror sits over a ridge falling to the coast on either side. For the most part, the commercial sector is located at the crest of the ridge and the residential hamlets stretch down to the coast. Sewage is pumped up to the ridge and flows to the sewage treatment plant (STP). Two other islands, connected by causeways, are also part of the network. The Koror sewerage system network and STP was built in the mid 1970s and is in poor condition. The STP was refurbished around 2001 but

[55] Documents consulted:
Government of Palau. 1996. Palau 2020 National Master Development Plan. Koror
Government of Palau. Actions for Palau's Future. 2009-2014. Medium-Term Development Strategy. Koror
Government of Palau. 2019. First Voluntary National Review of the SDGs. Koror
ADB. 2010. Report and Recommendation to the President. Proposed Loans: Republic of Palau: Water Sector Improvement Program. Manila
ADB. 2013. Report and Recommendation to the President. Proposed Loans: Republic of Palau: Koror – Airai Sanitation Project. Manila
ADB. Undated. Sector Assessment (Summary): Water Supply and Other Municipal Infrastructure and Services (Water Supply and Sanitation)
SPC, Water, Sanitation Program (Undated). Republic of Palau Status of Water Resources. Noumea

[56] Government of Palau. 2015. Census of Population, Housing and Agriculture for the Republic of Palau. Volume 1. Basic Tables. Ngerulmud

limited funds for maintenance and limited technical skills mean that much of the plant is unable to operate as designed. The current sewerage flow already exceeds the design capacity of the network and the STP.

With the exception of Koror, the other 15 state sewerage and wastewater systems are predominately on-site sewerage systems. The Melekeok sewerage treatment works services the Capital Building and the surrounding village. For the majority of states, septic tanks are an appropriate technology for the very low population density.

In July 2013, Palau Public Utilities Corporation Water and Wastewater Operations became responsible for the delivery of water supply and sewage systems. The water system services about 98.9% of the urban population and 86.2% of the rural population, or 96% of the total population.

Key issues are:

- Even with the high system losses, per capita demand for water is very high and is attributed to limited consumer appreciation of the value of water and inadequate tariffs. Current demand is much greater than the yield of the current water sources for Ngerikil and Ngerimel rivers.
- Disruptions to water supply are experienced during severe droughts affecting approximately 14,000 people. The frequency of droughts could increase as a result of climate change.
- The national water supply systems, including water treatment plants, have been substantially improved over the past 15 years and the water supply networks expanded, particularly in Airai state. However, operations are still inefficient and losses are high (estimated at about 43%), unmetered connections remain and a flat fee tariff is applied for water and sewer until 100% metering is in place.
- The poor state of the sewage network and treatment plant leads to system blockages resulting in overflows at the low lying pump stations and discharges of raw sewage to the surrounding environment. The problem is exacerbated by (i) poor maintenance, (ii) an inadequate emergency response capability, (iii) ground water infiltration, and (iv) illegal storm water connections. The frequency of overflows is increasing as the network deteriorates and when tourist numbers increase.
- Increases in population in Airai are beginning to create a health and safety problem as block sizes are declining and the soil types are inappropriate for septic tanks. The major housing development in Airai (Kesebelau) can no longer maintain septic systems without weekly pumping.
- The Belau Hospital has been monitoring the incidence of gastroenteritis since 2008. From 1 April 2011 to 31 March 2012, the hospital recorded 862 cases in Koror, 429 (50%) of which occurred during 3 months from November 2011 to January 2012 when sewerage overflows were the greatest. Hospital records show that during the worst month, 1.25% of Koror's population was treated for gastroenteritis. Given the number of people who do not seek treatment, the actual number of cases is estimated at 6.25% of the total. The risk of a much more serious water borne disease outbreak such as cholera is high.
- In 2011 the cost of providing water and sewerage services was approximately $3.8 million with a government subsidy of 74%. A framework of tariffs and tariff increases to achieve full cost recovery has been agreed and is being implemented.

- The stand-by generators, which are a critical piece of equipment required for safety and security of water supply during prolonged power outages, are dysfunctional at most of the water treatment plants and pumping stations, due to lack of maintenance or lack of spare parts. This is a serious deficiency that needs to be urgently addressed.

Strategy: The government seeks to further amend legislation and regulations in support of improved water management. The government is investing in new plant, gradually raising tariffs to reduce subsidies, adopting new, more appropriate ownership, and has taken action to strengthen water and sewer management and to otherwise seek to improve operational efficiencies and effectiveness.

Demand for Infrastructure: The sector has recently received substantial investment in infrastructure through (i) the ADB 2009 Water Sector Improvement program, and (ii) the ADB funded Koror-Airai Sanitation Project which was approved in October 2013. A second phase of the latter project is planned. For water, specific infrastructure programs demanded are the rehabilitation of the Koror-Airai system, the rehabilitation of rural water pumping stations and distribution systems, the rehabilitation of water desalination plants and the construction of water storage tanks. For sewage, specific infrastructure programs needed are the renovation and expansion of the Melekeok treatment plant and the replacement and rehabilitation of sewage pumping stations and collection pipes in rural areas.

In addition to the above listed projects, the government will examine alternative methods of sewage disposal, such as Kubota treatment plants, which are considered to provide highly efficient and environment friendly.

IV. EXISTING ASSET REGISTRY; CONDITION, COSTING AND MAINTENANCE

Providing public services effectively and cost-efficiently requires on-going investments in infrastructure asset maintenance, repairs and renewal on a timely basis. A policy of build, neglect and rebuild results in a high cost compared with adequate maintenance. In the absence of such investments, infrastructure assets suffer premature impairment and failures, disrupting public services and significantly reducing the service life of assets. To correctly assess the investment needs for infrastructure employed for providing public services in Palau, the infrastructure managers in each sector were requested to update the infrastructure asset registries, by assessing the current operating condition of all existing assets. To ensure condition assessment of infrastructure assets is performed by all sectors using a uniform and objective process, a methodology was provided to all sectors. This is included in Appendix 4. This methodology is based on the Guide for Infrastructure Condition Assessment by PRIF/PCRAFI and is aligned with the best international practices for asset management.[57]

With the exception of the Palau Public Utilities Corporation, all other government departments and SOEs have completed infrastructure condition assessment by sector and the results are summarized in Appendix 5. The infrastructure condition assessment exercise has allowed identification of the assets or asset components in “Poor” functional state and unable to reliably perform their intended functions. For the assets found in “poor” condition all available alternatives to improve the functional state of assets to “Fair” or “Good” were considered and evaluated and the most economical alternative has been selected for implementation, including asset rehabilitation through component renewal or complete asset replacement. By taking into account the recent public sector infrastructure construction experience in Palau, other Pacific Island Countries and the rest of the world, unit costs of construction were developed for estimating investment needs of the following infrastructure assets:

- Airport runway and runway components
- Bridges and culverts
- Buildings and building components
- Coastal protection – sea walls and ripraps
- Roads and road components
- Wharfs and boat harbours

The unit costs employed for preparing cost estimates for the investment plan are summarized in Appendix 4. It is noteworthy that due to its remote location and small market size, the costs of construction in Palau are approximately 30% to 40% higher in relation to larger Pacific Island countries, such as Fiji. For electricity, water and wastewater assets, PPUC has established unit costs for estimating construction projects and the cost estimates for the investment plan were provided by PPUC.

For safe, reliable and efficient operation of infrastructure, all infrastructure assets require a maintenance plan. Without adequate maintenance infrastructure, assets may suffer from premature impairment. Appendix 6 provides maintenance guidelines to mitigate the risk of premature asset impairment and failures. The maintenance guidelines provided in Appendix 6 are general and generic and will need to be tailored to meet the asset specific requirements by a civil/structural engineer for complex engineered structures.

[57] Shawn Otal (2019) Methodology for Condition Assessment of Public Sector Infrastructure Assets in Pacific Islands Countries. To be published by PRIF, January 2021.

The scope of maintenance activities varies significantly for different asset types to achieve the desired objectives of: (i) preventing premature asset impairment; (ii) reducing the risk of in-service asset failures; and (iii) providing economically efficient asset operations, throughout the assets' life cycle. The level of optimal maintenance required by an asset depends on a number of factors. Generally speaking, those assets that employ a large number of moving parts for their operation experience a higher degree of wear and tear and therefore require more frequent and more extensive maintenance. Similarly, those assets that are routinely exposed to a corrosive environment, experience accelerated degradation of metal surfaces due to oxidation and therefore require more extensive maintenance to restore the condition of corroded surfaces. The maintenance effort required for an asset also increases with the asset's service age. As assets age and approach the end of their typical useful life they require significantly greater maintenance effort in relation to brand new assets.

Based on the scope of maintenance activities required for different assets classes the annual maintenance budget requirements should be calculated as a percentage of gross replacement cost of the assets as indicated in table 4 below. The indicated costs are for routine maintenance, inspections and minor emergency repairs and do not cover the cost of major component renewal.

Table 4. Average annual maintenance cost

Asset Class	Avg annual mtc Cost as % of Replacement Cost
Residential Building	1.0%
office / Institution Building	1.0%
Sealed Roads - Surface maintenance	1.5%
Runway - Surface mantenance	1.5%
Motor Vehicle Light Duty	3.0%
Motor Vehicle Heavy Duty and Machinery	3.0%
Motor Boats	5.0%
Disel Generators	4.0%
PV Solar	2.0%
Electricity Distribution Assets	2.0%
Telecom Assets	2.0%
Coastal Protection Assets	2.0%
Miscellaneous Assets	2.0%

There is a need for a small team to carry-out periodic condition assessment of critical infrastructure assets, listed on the asset register. Since this activity is required periodically, with work scope detailed in Asset Condition Assessment Guide, it does not require full time staff, but could be composed of existing staff within Bureau of Public Works and Public Utilities Corporation.

V. FUTURE PROJECT READINESS AND PRIORITIZATION

Project Long List

The long list of aggregated projects is derived from the preceding chapters on national and sector strategies that justify the demand for investment in infrastructure to program and then project level. All projects have been costed with reference to standard costs of construction and the purchase prices for materials, machinery and equipment applicable in Palau.[58] Table 5 presents a summary of these projects.

[58] Some pipeline projects remain insufficiently specified and this curtails accurate costing. Projects for which the cost estimates require further vetting are shown in red font in Table 5.

Table 5. Project Long List

S. No.	Proj #	Project Name	Sector	Project Scope	Estimated Capital Cost	Annual Maintenance Cost	Prioritization Score
1	Agr-1	New buildings to improve small farm production and productivity - Fruit fly lab and Post harvest processing facility	Agriculture & Forestry	Construction of new buildings	$ 300,000	$ 4,500	55
2	Agr-2	New buildings to improve poultry and hog farm production - Swine breeding facility, poultry hatching facility and poultry	Agriculture & Forestry	Construction of new buildings	$ 500,000	$ 5,000	54
3	Agr-3	Central Farmers Market	Agriculture & Forestry	Construction of new buildings	$ 1,500,000	$ 15,000	26
4	Cen-1	Capital Complex Annex Building	Central Govt	Construction of new buildings	$ 12,000,000	$ 60,000	65
5	Cen-2	Government Storage Warehouse (to store equipment and other gov't assets)	Central Govt	Construction of new buildings	$ 1,000,000	$ 5,000	15
6	Cen-3	New National Post Office	Central Govt	Construction of new buildings	$ 1,000,000	$ 5,000	50
7	Cen-4	Koror Babeldaob Island - Resilient Urban Development - Municipal services for housing subdivision	Central Govt	Roads, Water, Waste water and electricity services for new subdivision in Babledaob	$ 35,000,000	$ 175,000	83
8	Cen-5	Pedestrian Walkway in Koror	Central Govt	Construction of pedestrian walkways in city center - approx. 5 km length	$ 1,000,000	$ 10,000	65
9	Cen-6	Capital Repairs to existing State Government owned Buildings	Central Govt	Repair building components found in poor condition	$ 5,000,000	$ 375,000	55
10	Cen-7	Capital Repairs to existing National Government Buildings	Central Govt	Repair building components found in poor condition	$ 4,500,000	$ 337,500	55
11	Edu-1	Three New School Building in Babeldaob 200 students	Education	Construction of three new school building to consolidate seven existing schools	$ 11,000,000	$ 55,000	60
12	Edu-2	Renovation and capital repairs to school buildings	Education	Replace some components of the asset in poor condition	$ 2,200,000	$ 165,000	41
13	Ene-1	34.5 kV line construction to improve system stability	Energy	Construct new transmission lines	$ 9,000,000	$ 180,000	50
14	Ene-2	34.5 kV line construction to connect IPPs	Energy	Construct new transmission line	$ 3,600,000	$ 72,000	52
15	Ene-3	Rehabilitation of 34.5/13.8 kV Stations	Energy	Rehabilitate all existing stations, provide 34.5 kV circuit breakers	$ 1,750,000	$ 35,000	51
16	Ene-4	Reconstruction of 13.8 kV lines	Energy	Reconstruct the 13.8 kV lines and construct them along accessible roads	$ 5,600,000	$ 112,000	52
17	Ene-5	Replacement and Rehab of existing diesel generating stations	Energy	Replace / Rehabilitate Diesel Generating plant	$ 8,000,000	$ 160,000	53
18	Ene-6	Smart metering	Energy	Replace existing meters with smart meters	$ 1,700,000	$ 34,000	50
19	Fsh-1	Renovation of Giant Clam Hatchery	Fisheries	Capital repairs to existing building	$ 250,000	$ 25,000	46
20	Fsh-2	Flood- proofing of buildings in low lying areas	Fisheries	Capital repairs to existing buildings	$ 1,000,000	$ 75,000	32

Table 5. Project Long List (Continued)

S. No.	Proj #	Project Name	Sector	Project Scope	Estimated Capital Cost	Annual Maintenance Cost	Prioritization Score
21	Fsh-3	National Fish Auction Market	Fisheries	New building	$ 800,000	$ 4,000	52
22	Fsh-4	Wharf for small boats for pelagic fishing with cold storage and freezer faculties	Fisheries	New Wharf	$ 750,000	$ 3,750	41
23	Hea-1	Belau National Hospital	Health	Redevelopment of Belau National hospital on	$ 60,000,000	$ 300,000	43
24	Hea-2	Public Health Building	Health	Construction of a new building to provide public	$ 3,000,000	$ 15,000	37
25	Hea-3	Extended Care facility	Health	Construction of Extended care facility	$ 1,500,000	$ 7,500	37
26	Hea-4	Community Health Center	Health	Construction of community health center	$ 562,500	$ 2,800	40
27	Hea-5	Community Health Center	Health	Construction of community health center	$ 562,500	$ 2,800	40
28	ICT-1	New communication infrastructure in remote South West islands	ICT	Construction of new ICT infrastructure	$ 3,000,000	$ 15,000	51
29	ICT-2	Improving Mobile Network Coverage in Palau	ICT	New Telecom Towers to Improve mobile	$ 2,000,000	$ 10,000	48
30	Pub-1	Expand the size of two police/fire stations	Public Safety	Increase the size of two existing buildings	$ 2,000,000	$ 10,000	36
31	Pub-2	Completion of the Correctional Facility, already under construction	Public Safety	Construction of correctional facility	$ 2,500,000	$ 25,000	32
32	Pub-3	Early warning system	Public Safety	Public Announcement and Warning	$ 1,000,000	$ 20,000	46
33	Sol-1	Remediation of existing landfill sites	Solid Waste	Land remediation at existing land fill facilities by	$ 2,000,000	$ 10,000	42
34	Sol-2	Waste to Energy - Land fill site incinerator	Solid Waste	Burning waste to produce electricity	$ 1,000,000	$ 5,000	46
35	Tou-1	Ngeremlengui Waterfall	Tourism	Tourism attraction sites	$ 900,000	$ 4,500	57
36	Tou-2	Ngchesar Waterfall	Tourism	Tourism attraction sites	$ 900,000	$ 4,500	57
37	Tou-3	Ngiwal Park	Tourism	Tourism attraction sites	$ 900,000	$ 4,500	52
38	Tou-4	Back-to-back Softball Stadium	Tourism	Sports Facility	$ 2,500,000	$ 12,500	50
39	Tou-5	New National Gym	Tourism	Sports Facility	$ 3,500,000	$ 17,500	33
40	Tou-6	Sports Training Center (Swimming, Wrestling, Weightlifting)	Tourism	Sports Facility	$ 2,000,000	$ 10,000	50

Table 5. Project Long List (Continued)

S. No.	Proj #	Project Name	Sector	Project Scope	Estimated Capital Cost	Annual Maintenance Cost	Prioritization Score
41	Tou-7	Palau National Convention Center	Tourism	1000 capacity convention center	$ 8,000,000	$ 40,000	57
42	TrA-1	PIA Runway reseal	Transport-Air	Reseal the surface layer	$ 10,000,000	$ 200,000	30
43	TrA-2	PIA Main Tarmac and Secondary Apron reseal	Transport-Air	Reseal the surface layer	$ 6,000,000	$ 120,000	29
44	TrA-3	PIA Taxiways (A, B and C) reseal	Transport-Air	Reseal the surface layer	$ 1,100,000	$ 22,000	33
45	TrA-4	Peleliu Airstrip development	Transport-Air	Reconstruct the base and seal the surface	$ 13,250,000	$ 265,000	52
46	TrA-5	Angaur Airstrip - development	Transport-Air	Reconstruct the base and seal the surface	$ 9,000,000	$ 180,000	52
47	TrA-6	Airport Navigation Equipment	Transport-Air	Upgrade the Navigation equipment	$ 1,000,000	$ 20,000	27
48	TrA-7	Airport Runway Security Fence Replacement	Transport-Air	Replace and rebuild pf security fence	$ 1,000,000	$ 20,000	16
49	TrA-8	Expansion of the Palau International Airport Parking Area	Transport-Air	Expansion and Improvement of Existing Parking Area	$ 2,500,000	$ 12,500	37
50	TrA-9	Aircraft gate ramps	Transport-Air	Repair and improvement of existing gate	$ 5,000,000	$ 100,000	20
51	TrL-1	Melekeok to Ngardmau Road - Paving of three existing dirt road sections, including rehabilitation of existing bridges, and construction of drainage structures	Transport-Land	Modifications for Climate Change Adaptability	$ 9,800,000	$ 147,000	49
52	TrL-2	Climate proofing of low lying roads and causeways and paving priority unpaved roads - Airai to Koror	Transport-Land	Modifications for Climate Change Adaptability	$ 6,300,000	$ 94,500	41
53	TrL-3	Capital Repairs to Compact Road, Airai to Ngarchelong	Transport-Land	Replace some components of the asset in poor	$ 6,500,000	$ 97,500	38
54	TrL-4	Rehabilitation of Koror-Airai Main Road	Transport-Land	Replace some components of the asset in poor	$ 6,000,000	$ 90,000	22
55	TrL-5	Rehabilitation of roads in rural areas (six roads)	Transport-Land	Replace some components of the asset in poor	$ 48,400,000	$ 726,000	35
56	TrL-6	Major repairs to existing road bridges	Transport-Land	Replace some components of the asset in poor	$ 1,800,000	$ 36,000	37
57	TrS-1	Rehabilitation of Malakal port development	Sea Transport	Expanding port capacity to allow docking of larger	$ 120,000,000	$ 600,000	40
58	TrS-2	Rehabilitation of markers and navigation aids	Sea Transport	Expanding port capacity to allow docking of larger	$ 1,500,000	$ 7,500	38
59	TrS-3	Construct new slipway	Sea Transport	Constructing new slipway for dry docking of large	$ 2,000,000	$ 10,000	28
60	TrS-4	Babeldaob Commercial Seaport	Sea Transport	New Commercial Sea Port	$ 120,000,000	$ 600,000	77

Table 5. Project Long List (Continued)

S. No.	Proj #	Project Name	Sector	Project Scope	Estimated Capital Cost	Annual Maintenance Cost	Prioritization Score
61	Wat-1	Rehabilitation of Koror-Arai water pumping stations and distribution pipes system	Water	Rehabilitation of pumping stations and distribution	$ 6,000,000	$ 180,000	43
62	Wat-2	Rehabilitation of Rural Water pumping stations and distribution pipes	Water	Rehabilitation of pumping stations and distribution	$ 3,000,000	$ 90,000	53
63	Wat-3	Rehabilitation of water desalination plants	Water	Rehabilitation of water desalination	$ 1,700,000	$ 85,000	50
64	Wat-4	Construction of water storage tank	Water	Four New Water Storage Tanks	$ 4,300,000	$ 85,000	50
65	WW-1	Melekeok Treatment Plant	Waste Water	Replace some components of the asset in poor condition	$ 300,000	$ 9,000	46
66	WW-2	Melekeok Treatment Plant	Waste Water	Capacity Increase of Existing infrastructure to	$ 950,000	$ 28,500	51
67	WW-3	Replacement /Rehabilitation of Sewage pumping stations in rural areas	Waste Water	Major refurbishment works for civil, mechanical	$ 5,000,000	$ 150,000	45
68	WW-4	Replacement /Rehabilitation of Sewage collection pipes in rural area	Waste Water	Major Rehabilitation of Sewage	$ 3,000,000	$ 90,000	39

Readiness and Prioritization

A two stage process to first assess the readiness of all proposed infrastructure projects and to then prioritize them has been developed. The first step is referred to as an initial filter to assess if the proposed project has been fully prepared and can be considered for prioritization for government funding. The second step is project prioritization by a Multi-Criteria Analysis (MCA). MCA criteria are the government's national development objectives adjusted for the current need for the economy to recover from the impact of COVID-19. The NIIP Task Force reviewed and endorsed the two step process on 11 December 2020.

Project Readiness

All projects are first cleared by (i) the Judiciary Branch for legal implications, (ii) the Ministry of Finance for recurrent cost implications, (iii) the Office of Administration for questions of capacity, cost-efficiency and potential impact on public services, (iv) the Ministry of Public Infrastructure, Industries & Commerce for any concerns over technology and regulatory requirements, (v) the Ministry of Community and Cultural Affairs for potential social impact, (vi) the Ministry of Natural Resources, Environment and Tourism for potential environmental impact and resilience to climate change and natural hazards, and (vii) the Bureau of Land and Survey to confirm that the required land is available. Presented in table 6, these checks are essential inputs to any proposed investment in infrastructure before it can be considered for government funding.

Table 6. Initial Project Readiness Filter

Check	Responsible Office	✓ x t.b.d or n.a.
1. Is it legal?	Judiciary Branch	
2. If the private sector is investing is it from a sound proponent?	Judiciary Branch	
3. Is sufficient funding allocated to preventative maintenance to deter premature impairment of the investment?	Ministry of Finance	
4. Does the central government and, or SOE have the capacities to procure, manage and maintain and if not, have sufficient funds been allocated to build these capacities?	Office of Administration and Ministry of Finance	
5. Is this project the most cost-efficient alternative for provision of public services or are there more cost-efficient alternatives?	Office of Administration, Ministry of Finance and proponent Ministry.	
6. Is it of proven technology?	Ministry of Public Infrastructure, Industries & Commerce	
7. Have gender sensitive, equality and social inclusion (GESI) measures been incorporated?	Ministry of Community and Cultural Affairs, Bureau of Aging and Gender	
8. Does it meet all the government's regulatory requirements such as building codes and zoning restrictions?	Ministry of Public Infrastructure, Industries & Commerce	
9. Does it meet all the government's environmental regulations?	Ministry of Natural Resources, Environment and Tourism Environmental Quality Protection Board	
10. Is the project design resilient to withstand climate change impacts and natural hazards?	Ministry of Natural Resources, Environment and Tourism and Ministry of Public Infrastructure, Industries & Commerce	
11. Is this project necessary to remove constraints in providing critical public services? Will the quality of public services suffer and reach an unacceptable level in the absence of this project? Or, will the project result in significant improvement in required public services?	Office of Administration	
12. Is this project required in the immediate future (next 10 years) or can the project investment be deferred without significant impact on public services?	Office of Administration	
13. Is the necessary land available?	Bureau of Land and Survey	
14. Does it have a potentially "large impact" on public revenues and the economy, the environment, social and, or cultural priorities that will require a detailed assessment of EIRR and, or social, cultural or environmental impact and, or have objections been raised?	Ministry of Finance, Ministry of Natural Resources, Environment and Tourism, Ministry of Community and Cultural Affairs, and Bureau of Domestic Affairs	

Notes.

- t.b.d. – to be determined
- n.a. = not applicable
- EIRR = economic internal rate of return

The NIIP Task Force, chaired by the Director of Finance met to commence a review the first project pipeline for project preparedness on 17 December 2020. In future this clearance

process could be conducted by email. A negative check could lead to delayed consideration or rejection of a proposal. If any member of the future Development Committee raises concerns that the proposal could have a potentially “large impact” on either public revenues and the economy, or the environment, or social and, or cultural priorities they could also call for a detailed assessment of the economic internal rate of return, and, or social, cultural or environmental impact.

The following pipeline projects have been identified as potentially having such a large impact and should be subjected to appropriate detailed assessment of economic return and other feasibility analyses. They have nevertheless been included in the initial prioritization process.

- Babeldaob Commercial Seaport
- Belau National Hospital
- Central Farmers’ Market
- Commercial fisheries development
- Construction of a new slipway
- Construction of new power transmission lines
- Improved water and sanitation reticulation systems
- Malakal port
- Malakal and Aimeliik power stations improvements
- National Fish Auction Market
- Palau International Airport projects
- Peleliu and Angaur Airstrip developments

Project Prioritization

Once a project is cleared by the initial project readiness filter, the following MCA is employed to prioritize the proposed infrastructure investment. Unlike the initial filter this MCA is solely an assessment of estimated impact. It is trying to answer how each proposed investment in infrastructure may best serve the country’s development needs. The approach does not include any assessment of inputs or preparation of the investments. Input assessments are considered under the initial filter, Project Readiness.

As stated above the 8 assessment criteria are the nation’s current development objectives adjusted for considerations of post-COVID-19 recovery. The development objectives are an aggregation of objectives identified in the National Master Development Plan, the Medium-Term Development Strategy and the government’s own review of the Sustainable Development Goals. These development objectives are listed at the start of the above chapter on the national strategy. Each criterion is broken down into a rating value with accompanying rating description to enable scoring for each criterion from 0 to 3 depending on degree of impact. Some simple cost, benefit analysis (CBA) is embedded in the MCA where needed to aid scoring. Where relevant the private sector investor should assess the CBA. Otherwise, CBA on non-revenue generating public investments only requires the calculation of financial ratios (total cost to annual average net benefit, total cost per person served or cost-effectiveness set against sector standards, regional standards or alternative investments). Lastly, each score is weighted by the government of the day’s mandate and interpretation of relative development needs. The current weighting reflects the need to place emphasis on economic recovery post COVID-19. The NIIP Task Force undertook a first round prioritization of selected sector projects on 17

December 2020. This resulted in an adjustment to the earlier set of criteria, joining culture and national consciousness development objectives. Table 7 details the MCA.

Table 7. Multi-Criteria Analysis to aid Project Prioritization

Criteria or Impact ***(Based on NMDP Development Goals and Strategies and adjusted for post-COVID recovery)***	Rating Description	Rating Value	Post COVID Recovery Weighting (%)
1. Economic growth, post-COVID economic recovery *NMDP i) 3.4.2.2* **and Stimulating further investment, commerce and trade** *3.4.2.4; 3.4.2.6; 3.4.2.12; 3.4.2.13; 3.4.2.14; 3.4.2.15; 3.4.2.16;* *SDG 8* *Where infrastructure supports private sector revenue generating investments*	High impact on post-COVID economic recovery and growth, investment, commerce and trade	3	20
	Medium impact on post-COVID economic recovery and growth, investment, commerce and trade	2	
	Low impact on post-COVID economic recovery and growth, investment, commerce and trade	1	
	No impact on post-COVID economic recovery and growth, investment, commerce and trade	0	
2. Employment recovery post-COVID-19 (direct and indirect job creation) *3.4.2.3* *Where infrastructure either directly and, or indirectly leads to the creation of new jobs.* *Total of 11,751 people employed in FY 19* *SDG 8*	High impact – where the infrastructure either directly and, or indirectly leads to the creation of an estimate of 100 or more new jobs (including construction and maintenance) such as for a medium size, 100 plus bedroom hotel.	3	15
	Medium impact – estimate of 50 to 99 new jobs.	2	
	Low impact – estimated 1 to 49 new jobs.	1	
	No impact, unknown job creation or no new jobs.	0	
3. Increasing government revenues (including SOEs) *3.4.2.1; 3.4.2.5* *SDG 6, 7*	High impact – eg. investment yield is assessed at more than a 5% average annual financial return, possibly through charging tariffs or fees such as on utilities and port charges and, or through cost savings.	3	15
	Medium impact - eg. investment covers its life costs	2	
	Low impact – some revenue to government	1	
	No revenue impact	0	
4. Improved distribution of growth benefits to Palauans (re. GESI considerations) *ii)* *Average monthly per capita income of $750 according to 2014 HIES* *SDG 1, 2, 5, 10*	High impact – most of the investment benefits go to low-income, female headed or other disadvantaged households.	3	10
	Medium impact – investment estimated to partially benefit low-income, female headed or other disadvantaged households.	2	
	Low impact – investment estimated to minimally benefit low-income, female headed or other disadvantaged households.	1	
	No impact, unknown or no benefits to low-income, female headed or other disadvantaged households.	0	
5. Improved geographical distribution of growth benefits with expanded settlement and government and economic	High impact – investment fully located in Babeldaob and, or other outer islands	3	10
	Medium impact – investment partially located in Babeldaob and, or other outer islands	2	

activity on Babeldaob and, or other outer islands *SDG 9*	Low impact – investment minimally located in Babeldaob and, or other outer islands	1	
	No impact or unknown – infrastructure located on Koror only	0	
6. Promoting Palauan culture *iii)* **and Promoting national consciousness** *iii)* *SDG 11, 16, 17*	High impact – such as a cultural festival center, culture recording studio, construction of a Bai or traditional sailing vessel, or museum. Also investments in government buildings that promote Palauan sovereignty or national identity	3	10
	Medium impact – such as a tourism promotion center that partly focuses on traditions. Also investments in government buildings that partly promote Palauan sovereignty or national identity.	2	
	Low impact – such as tourist accommodation that incidentally references traditions and culture. Also investments in government buildings that incidentally promote Palauan sovereignty or national identity.	1	
	No impact, unknown or negative impact	0	
7. Enhancing the natural environment *iii)* 3.4.2.18 *SDG 12, 13, 14, 15*	High impact – investment greatly enhances the natural environment such as through a land or marine reserve, or reforestation or renewable energy investment that displaces diesel consumption.	3	10
	Medium impact – investment on balance partially protects or enhances the environment such as through solar energy plant that requires land that could otherwise be used for agriculture or ecotourism.	2	
	Low impact – investment has a small, positive impact on the environment	1	
	No impact, unknown or overall negative impact	0	
8. Improving social welfare and social infrastructure (health, education and training, gender, the poor and vulnerable) *3.4.2.19; 3.4.2.20; 3.4.2.21* *SDG 2,3,4,6*	High impact – hospital, childcare center, clinics, schools, training facilities, public housing, welfare centers and women's shelters that either cover the full life cycle net cost or are assessed as cost-effective or produce a reasonable (compared with other Pacific Island Countries) cost per person served and address identified gender needs.	3	10
	Medium impact - hospital, childcare center, clinics, schools, training facilities, public housing, welfare centers and women's shelters that produce less than comparable cost per person served but additional costs can be justified.	2	
	Low impact - hospital, clinics, childcare center, schools, training facilities, public housing, welfare centers and women's shelters that produce less than comparable cost per person served but additional costs are accepted by government.	1	
	No impact, unknown or negative impact- hospital, clinics, schools, training facilities, public housing and welfare centers where cost recovery is unknown or unlikely and at a high cost per person served	0	
Total			**100**

Notes:

- For the benefits distribution criteria, #4, GESI = gender, equity and social inclusion.

Hypothetical examples that were developed to illustrate the application of the MCA to ensure consistency of assessment are attached in Appendix 5.

Project scoring necessitates some key assumptions. These include: (i) investments in future utilities infrastructure will be accompanied by improved management, organization and policy, (ii) investments in future utilities infrastructure will also be accompanied by a gradual increase of tariffs to levels of full cost recovery, (iii) construction of infrastructure will lead to increases in employment, (iv) the agriculture and fisheries sector projects support increases in smallholder production and productivity, and (v) the cost of the construction of new ICT infrastructure will be recovered by user charges.

All machinery and equipment projects have been excluded from prioritization as these items are usually funded in the government's recurrent budget. As mentioned above, some "large impact" projects have been identified for more detailed assessment of economic rate of return and other feasibility study. The "large impact" projects have nevertheless been included for prioritization. Projects have also been aggregated into larger infrastructure programs where relevant. For example in the case of road rehabilitation all road repair projects have been aggregated into two large projects, one covering the urban regions of Koror and Airai and the second covering the rest of the states. Similarly the building repairs projects have been aggregated into a single project for each sector.

A new Development Committee of leading government executives met on January 18 and again on January 26 to prioritize the project long list. The initial project readiness filter and prioritization by MCA will most likely be further refined and otherwise revised for future NIIPs as Palau's own standards for project assessment become established, as the Development Committee becomes more acquainted with the process and as newly elected governments apply new priorities for the nation's development. For now, with scoring limited to a scale of zero to 3 this will result in a bunching of total scores. This can also be refined with experience. Some projects may need to be completed before others can be implemented such as Project "Sol2 – Waste to Energy" would require PPUC to construct the power distribution line first, to accept power generated by the plant. The sequencing of prioritized projects may also be impacted by physical, technical and management capacities. The prioritized project list may also need to be adjusted in any individual fiscal year as critical and urgent public infrastructure investments need to be reprioritized for example in the case of a power failure.

The resultant total scores and prioritization of projects was subjected to a sensitivity test where the 8 criteria were equally rated (as opposed to the greater post COVID weighting given to criteria 1 to 3). This reweighting of the criteria did not affect the overall outcome. The list of prioritized projects is presented in table 8.

Table 8. Priority Projects for FY 2021/22 to FY 2030/31 by Sector

S. No.	Proj #	Project Name	Sector	Project Scope	Estimated Capital Cost	Annual Maintenance Cost	Prioritization Score
1	Agr-1	New buildings to improve small farm production and productivity - Fruit fly lab and Post harvest processing facility	Agriculture & Forestry	Construction of new buildings	$ 300,000	$ 4,500	55
2	Agr-2	New buildings to improve poultry and hog farm production - Swine breeding facility, poultry hatching facility and poultry slaughter house	Agriculture & Forestry	Construction of new buildings	$ 500,000	$ 5,000	54
3	Agr-3	Central Farmers Market	Agriculture & Forestry	Construction of new buildings	$ 1,500,000	$ 15,000	26
4	Cen-4	Municipal Services for housing subdivision	Central Govt	Roads, Water, Waste water and electricity services for new subdivision in Babledaob	$ 35,000,000	$ 175,000	83
5	Cen-1	Capital Complex Annex Building	Central Govt	Construction of new buildings	$ 12,000,000	$ 60,000	65
6	Cen-5	Pedestrian Walkway in Koror	Central Govt	Construction of pedestrian walkways in city center - approx. 5 km length	$ 1,000,000	$ 10,000	65
7	Cen-6	Capital Repairs to existing State Government owned Buildings	Central Govt	Repair building components found in poor condition	$ 5,000,000	$ 375,000	55
8	Cen-7	Capital Repairs to existing National Government Buildings	Central Govt	Repair building components found in poor condition	$ 4,500,000	$ 337,500	55
9	Cen-3	New National Post Office	Central Govt	Construction of new buildings	$ 1,000,000	$ 5,000	50
10	Cen-2	Government Storage Warehouse (to store equipment and other gov't assets)	Central Govt	Construction of new buildings	$ 1,000,000	$ 5,000	15
11	Edu-1	Three New School Building in Babeldaob 200 students	Education	Construction of three new school building to consolidate seven existing schools	$ 11,000,000	$ 55,000	60
12	Edu-2	Renovation and capital repairs to school buildings	Education	Replace some components of the asset in poor condition	$ 2,200,000	$ 165,000	41
13	Ene-5	Replacement and Rehab of existing diesel generating stations	Energy	Replace / Rehabilitate Diesel Generating plant	$ 8,000,000	$ 160,000	53
14	Ene-4	Reconstruction of 13.8 kV lines	Energy	Reconstruct the 13.8 kV lines and construct them along accessible roads	$ 5,600,000	$ 112,000	52
15	Ene-2	34.5 kV line construction to connect IPPs	Energy	Construct new transmission line	$ 3,600,000	$ 72,000	52
16	Ene-3	Rehabilitation of 34.5/13.8 kV Stations	Energy	Rehabilitate all existing stations, provide 34.5 kV circuit breakers	$ 1,750,000	$ 35,000	51
17	Ene-1	34.5 kV line construction to improve system stability	Energy	Construct new transmission lines	$ 9,000,000	$ 180,000	50
18	Ene-6	Smart metering	Energy	Replace existing meters with smart meters	$ 1,700,000	$ 34,000	50
19	Fsh-3	National Fish Auction Market	Fisheries	New building	$ 800,000	$ 4,000	52
20	Fsh-1	Renovation of Giant Clam Hatchery	Fisheries	Capital repairs to existing building	$ 250,000	$ 25,000	46

Table 8. Priority Projects for FY 2021/22 to FY 2030/31 by Sector (Continued)

S. No.	Proj #	Project Name	Sector	Project Scope	Estimated Capital Cost	Annual Maintenance Cost	Prioritization Score
21	Fsh-4	Wharf for small boats for pelagic fishing with cold storage and freezer faculties	Fisheries	New Wharf	$ 750,000	$ 3,750	41
22	Fsh-2	Flood- proofing of buildings in low lying areas	Fisheries	Capital repairs to existing buildings	$ 1,000,000	$ 75,000	32
23	Hea-1	Belau National Hospital	Health	Redevelopment of Belau National hospital on higher level to replace existing hospital building, with	$ 60,000,000	$ 300,000	43
24	Hea-4	Community Health Center	Health	Construction of community health center	$ 562,500	$ 2,800	40
25	Hea-5	Community Health Center	Health	Construction of community health center	$ 562,500	$ 2,800	40
26	Hea-3	Extended Care facility	Health	Construction of Extended care facility	$ 1,500,000	$ 7,500	37
27	Hea-2	Public Health Building	Health	Construction of a new building to provide public health functions	$ 3,000,000	$ 15,000	37
28	ICT-1	New communication infrastructure in remote South West islands	ICT	Construction of new ICT infrastructure	$ 3,000,000	$ 15,000	51
29	ICT-2	Improving Mobile Network Coverage in Palau	ICT	New Telecom Towers to Improve mobile coverage	$ 2,000,000	$ 10,000	48
30	Pub-3	Early Warning system (Storms and Tsunami)	Public Safety	Public Announcement and Warning System	$ 1,000,000	$ 20,000	46
31	Pub-1	Expand the size of two police/fire stations	Public Safety	Increase the size of two existing buildings	$ 2,000,000	$ 10,000	36
32	Pub-2	Completion of the Correctional Facility, already under construction	Public Safety	Construction of correctional facility	$ 2,500,000	$ 25,000	32
33	Sol-2	Waste to Energy - Land fill site incinerator	Solid Waste	Burning waste to produce electricity	$ 1,000,000	$ 5,000	46
34	Sol-1	Remediation of existing landfill sites	Solid Waste	Land remediation at existing land fill facilities by transporting buried waste to new land fill site	$ 2,000,000	$ 10,000	42
35	Tou-1	Ngeremlengui Waterfall	Tourism	Tourism attraction sites	$ 900,000	$ 4,500	57
36	Tou-2	Ngchesar Waterfall	Tourism	Tourism attraction sites	$ 900,000	$ 4,500	57
37	Tou-7	Palau National Convention Center	Tourism	1000 capacity convention center	$ 8,000,000	$ 40,000	57
38	Tou-3	Ngiwal Park	Tourism	Tourism attraction sites	$ 900,000	$ 4,500	52
39	Tou-4	Back-to-back Softball Stadium	Tourism	Sports Facility	$ 2,500,000	$ 12,500	50
40	Tou-6	Sports Training Center (Swimming, Wrestling, Weightlifting)	Tourism	Sports Facility	$ 2,000,000	$ 10,000	50

Table 8. Priority Projects for FY 2021/22 to FY 2030/31 by Sector (Continued)

S. No.	Proj #	Project Name	Sector	Project Scope	Estimated Capital Cost	Annual Maintenance Cost	Prioritization Score
41	Tou-5	New National Gym	Tourism	Sports Facility	$ 3,500,000	$ 17,500	33
42	TrA-4	Peleliu Airstrip development	Transport-Air	Reconstruct the base and seal the surface	$ 13,250,000	$ 265,000	52
43	TrA-5	Angaur Airstrip - development	Transport-Air	Reconstruct the base and seal the surface	$ 9,000,000	$ 180,000	52
44	TrA-8	Expansion of the Palau International Airport Parking Area	Transport-Air	Expansion and Improvement of Existing Parking Area	$ 2,500,000	$ 12,500	37
45	TrA-3	PIA Taxiways (A, B and C) reseal	Transport-Air	Reseal the surface layer	$ 1,100,000	$ 22,000	33
46	TrA-1	PIA Runway reseal	Transport-Air	Reseal the surface layer	$ 10,000,000	$ 200,000	30
47	TrA-2	PIA Main Tarmac and Secondary Apron reseal	Transport-Air	Reseal the surface layer	$ 6,000,000	$ 120,000	29
48	TrA-6	Airport Navigation Equipment	Transport-Air	Upgrade the Navigation equipment	$ 1,000,000	$ 20,000	27
49	TrA-9	Aircraft gate ramps	Transport-Air	Repair and improvement of existing gate ramps to support increased tourist volume	$ 5,000,000	$ 100,000	20
50	TrA-7	Airport Runway Security Fence Replacement	Transport-Air	Replace and rebuild pf security fence	$ 1,000,000	$ 20,000	16
51	TrL-1	Melekeok to Ngardmau Road - Paving of three existing dirt road sections, including rehabilitation of existing bridges, and construction of drainage structures	Transport-Land	Modifications for Climate Change Adaptability	$ 9,800,000	$ 147,000	49
52	TrL-2	Climate proofing of low lying roads and causeways and paving priority unpaved roads - Airai to Koror	Transport-Land	Modifications for Climate Change Adaptability	$ 6,300,000	$ 94,500	41
53	TrL-3	Capital Repairs to Compact Road, Airai to Ngarchelong	Transport-Land	Replace some components of the asset in poor condition	$ 6,500,000	$ 97,500	38
54	TrL-6	Major repairs to existing road bridges	Transport-Land	Replace some components of the asset in poor condition	$ 1,800,000	$ 36,000	37
55	TrL-5	Rehabilitation of roads in rural areas (six roads)	Transport-Land	Replace some components of the asset in poor condition	$ 48,400,000	$ 726,000	35
56	TrL-4	Rehabilitation of Koror-Airai Main Road	Transport-Land	Replace some components of the asset in poor condition	$ 6,000,000	$ 90,000	22
57	TrS-4	Babeldaob Commercial Seaport	Sea Transport	New Commercial Sea Port	$ 120,000,000	$ 600,000	77
58	TrS-1	Rehabilitation of Malakal port development	Sea Transport	Expanding port capacity to allow docking of larger ships	$ 120,000,000	$ 600,000	40
59	TrS-2	Rehabilitation of markers and navigation aids	Sea Transport	Expanding port capacity to allow docking of larger ships	$ 1,500,000	$ 7,500	38
60	TrS-3	Construct new slipway	Sea Transport	Constructing new slipway for dry docking of large boats	$ 2,000,000	$ 10,000	28

Table 8. Priority Projects for FY 2021/22 to FY 2030/31 (Continued)

S. No.	Proj #	Project Name	Sector	Project Scope	Estimated Capital Cost	Annual Maintenance Cost	Prioritization Score
61	Wat-2	Rehabilitation of Rural Water pumping stations and distribution pipes	Water	Rehabilitation of pumping stations and distribution pipes	$ 3,000,000	$ 90,000	53
62	Wat-3	Rehabilitation of water desalination plants	Water	Rehabilitation of water desalination plants	$ 1,700,000	$ 85,000	50
63	Wat-4	Construction of water storage tank	Water	Four New Water Storage Tanks	$ 4,300,000	$ 85,000	50
64	Wat-1	Rehabilitation of Koror-Arai water pumping stations and distribution pipes system	Water	Rehabilitation of pumping stations and distribution pipes	$ 6,000,000	$ 180,000	43
65	WW-2	Melekeok Treatment Plant	Waste Water	Capacity Increase of Existing infrastructure to meet increased demand	$ 950,000	$ 28,500	51
66	WW-1	Melekeok Treatment Plant	Waste Water	Replace some components of the asset in poor condition	$ 300,000	$ 9,000	46
67	WW-3	Replacement /Rehabilitation of Sewage pumping stations in rural areas, including capaciy increase to allow services in new subdivision developments in Babeldaob	Waste Water	Major refurbishment works and capacityt increase for civil, mechanical (replace pumps, internal plumbing system and replace valves etc.).	$ 6,000,000	$ 180,000	45
68	WW-4	Replacement /Rehabilitation of Sewage collection pipes in rural area, including extensions to allow services in new subdivision developments in Babeldaob	Waste Water	Major Rehabilitation and extension of Sewage collection pipes	$ 3,000,000	$ 90,000	39

The top 20 projects are also listed below in table 9.

Table 9. Top 20 Projects with Highest Priority

S. No.	Proj #	Project Name	Sector	Project Scope	Estimated Capital Cost	Annual Maintenance Cost	Prioritization Score
1	Cen-4	Koror Babeldaob Island - Resilient Urban Development - Municipal services for housing subdivision	Central Govt	Roads, Water, Waste water and electricity services for new subdivision in Babledaob	$ 35,000,000	$ 175,000	83
2	TrS-4	Babeldaob Commercial Seaport	Sea Transport	New Commercial Sea Port	$ 120,000,000	$ 600,000	77
3	Cen-1	Capital Complex Annex Building	Central Govt	Construction of new buildings	$ 12,000,000	$ 60,000	65
4	Cen-5	Pedestrian Walkway in Koror	Central Govt	Construction of pedestrian walkways in city center - approx. 5 km length	$ 1,000,000	$ 10,000	65
5	Edu-1	Three New School Building in Babeldaob 200 students	Education	Construction of three new school building to consolidate seven existing schools	$ 11,000,000	$ 55,000	60
6	Tou-1	Ngeremlengui Waterfall	Tourism	Tourism attraction sites	$ 900,000	$ 4,500	57
7	Tou-2	Ngchesar Waterfall	Tourism	Tourism attraction sites	$ 900,000	$ 4,500	57
8	Tou-7	Palau National Convention Center	Tourism	1000 capacity convention center	$ 8,000,000	$ 40,000	57
9	Agr-1	New buildings to improve small farm production and productivity - Fruit fly lab and Post harvest processing facility	Agriculture & Forestry	Construction of new buildings	$ 300,000	$ 4,500	55
10	Cen-6	Capital Repairs to existing State Government owned Buildings	Central Govt	Repair building components found in poor condition	$ 5,000,000	$ 375,000	55
11	Cen-7	Capital Repairs to existing National Government Buildings	Central Govt	Repair building components found in poor condition	$ 4,500,000	$ 337,500	55
12	Agr-2	New buildings to improve poultry and hog farm production - Swine breeding facility, poultry hatching facility and poultry slaughter house	Agriculture & Forestry	Construction of new buildings	$ 500,000	$ 5,000	54
13	Wat-2	Rehabilitation of Rural Water pumping stations and distribution pipes	Water	Rehabilitation of pumping stations and distribution pipes	$ 3,000,000	$ 90,000	53
14	Ene-5	Replacement and Rehab of existing diesel generating stations	Energy	Replace / Rehabilitate Diesel Generating plant	$ 8,000,000	$ 160,000	53
15	Ene-4	Reconstruction of 13.8 kV lines	Energy	Reconstruct the 13.8 kV lines and construct them along accessible roads	$ 5,600,000	$ 112,000	52
16	Tou-3	Ngiwal Park	Tourism	Tourism attraction sites	$ 900,000	$ 4,500	52
17	Fsh-3	National Fish Auction Market	Fisheries	New building	$ 800,000	$ 4,000	52
18	Ene-2	34.5 kV line construction to connect IPPs	Energy	Construct new transmission line	$ 3,600,000	$ 72,000	52
19	TrA-4	Peleliu Airstrip development	Transport-Air	Reconstruct the base and seal the surface	$ 13,250,000	$ 265,000	52
20	TrA-5	Angaur Airstrip - development	Transport-Air	Reconstruct the base and seal the surface	$ 9,000,000	$ 180,000	52

The outcome of prioritization of projects was tested for sensitivity against the post COVID recovery weighting. Each of the 8 MCA criteria were given equal weighting in the sensitivity test. This resulted in little difference to the designated priorities. As it presently stands with criteria rated only from zero to 3 this results in significant bunching with total scores in the 40s and 50s. This is to be expected as the MCA has only just been initiated. However, the process is likely provide more of a spread of scoring as the it is developed and refined. A detailed listing and description of all projects is provided in Appendix 7.

Budget Process

Prioritized projects will need to be accommodated within the government's future ability to provide finance. Future capital investments in infrastructure will be submitted by proponent departments and reviewed by the Development Committee as a component of the annual budget formulation. The government's fiscal year runs from 1 October to 30 September. Table 10 summarizes the government's budget process. The budget call that includes requested estimated costs of new spending proposals is issued in early/ mid-April. The Development Committee will meet to review and prioritize new investment, including infrastructure investment under the Medium-Term Budget Framework in late April. The Development Committee may also need to meet at other times of the year to review individual project readiness and to comment on any issues raised concerning scoring. All budget submissions have to be completed by the end of May. This allows sufficient time during the month of May for the project readiness filter and project prioritization process to be completed and for the NIIP to be effectively updated. This leaves the remainder of the year for infrastructure projects to be identified and prepared including a thorough preliminary assessment of readiness and for any detailed feasibility analyses to be conducted if called for by the Development Committee.

Table 10. Budget Calendar and the NIIP

Month	Budget Process	NIIP Activity
Jan	Budget calendar issued	Infrastructure projects identified and prepared including a preliminary assessment of readiness and for any detailed feasibility analyses to be conducted if called for
Feb	Notice for annual performance report issued	
Feb	Medium-Term Fiscal Framework update completed	
Mar	Provisional Medium-Term Budget Framework (MTBF)developed	
Mar	Deadline for submission of annual performance reports	
Apl	State of the Republic Address	
Apl	Submission of Consolidated Annual Performance Report to OEK	
Apl - May	OEK Performance Review hearings	
Apl	Budget call issued	Development Committee meet to review readiness and prioritize projects for new MTBF
May	Budget submissions deadline	Infrastructure projects identified and prepared including a preliminary assessment of readiness and for any detailed feasibility analyses to be conducted if called for
Jun	MTBF finalized	
Jul	Budget Authorization and Appropriation Bill submitted to OEK	
Jul	Economic and fiscal forecasts updated	
Jul - Sep	OEK budget hearings	
Sep	Authorization and Appropriation Bill transmitted to the President	
Sep	Deadline for submission of revised budget from budgeted activities	
Oct	Budget allotments executed	

VI. EFFECTIVE PRIORITIZATION AND FUNDING STRATEGY

Supply of Finance

Potential sources of funding for investment in infrastructure are: (i) the national government's own revenues and borrowing, (ii) state government revenues and borrowing, (iii) donor grants, (iv) development partner loans, (v) climate funds, (vi) Public-Private Partnerships (PPP), (vii) SOEs and other revenue-retaining institutions, and (viii) private sector investment. One other source of financing for some forms of infrastructure could be the National Development Bank of Palau.

National Government Finances

The national government has previously been able to invest very little in the development of infrastructure, outside of the purchase of machinery and equipment and occasional partial construction such as building the foundations for a new correctional facility. Rather the government has had to rely on donor grants and development partner loans to finance infrastructure.

The USA Graduate School predict a widening government budget deficit from FY 2020 to FY 2022 requiring a total funding of $110 million or 35% of GDP.[59] According to the USA Graduate School, Palau's external debt in FY 2018 was low by regional standards at 32 percent of GDP.[60] However, the debt-to-GDP ratio is projected to increase to over 80 % of GDP and then fall as the economy recovers. Given the projected levels of deficits, reserves[61] and debt the government is unlikely to be in a position to increase investment in infrastructure in the near future, unless it undertakes fiscal reforms such as cutting recurrent expenditure including reducing subsidies, tax reform and improved public finance management. Based on USA Graduate School projections (forthcoming) and assuming no change to government fiscal policies, the overall fiscal balance is projected to remain quite limited until well into the 10 year period of FY 2021 through to FY 2030. The government is unlikely to be able to consider using its own funds for investment in infrastructure until FY 26 at the earliest.[62]

A prior call on future government finances should be the adequate financing of repair and rehabilitation, and the operation and maintenance for existing infrastructure. A paper on improving maintenance services in 2008 estimated that the maintenance backlog on public assets, based on restoring assets to an optimal condition, was $86m. The annual maintenance requirement was assessed at the time as $33m in the medium-term, rising to $38m in year 2018. It was noted that this requirement could be reduced through better protection and conservation, by $3- 5m per year, with extended life and efficiency of assets and equipment, especially of the most expensive items in the new Capitol, hospital, bridges, roads, electricity generators, and the pumps for water and wastewater treatment plants. However, the then current (2008) funding of around $11m was about 30% of what was needed for adequate and

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[59] Graduate School, USA, EconMAP. 2020. Technical Note. Where Do We Go from Here? Updating the Economic Impact of COVID-19 and Strategies for Mitigation in the Republic of Palau. Hawaii.

[60] Graduate School, USA, EconMAP. 2019. Economic Review Palau FY 2018. Hawaii.

[61] According to the Ministry of Finance in December 2020, the total cash reserves in the banks are only enough to support the Government's operations for the next five (5) to six (6) months, this does not take into account of the current level of local revenue collections and other financing like COFA Trust Fund and Loans.

[62] Graduate School, USA, EconMap. Forthcoming. Economic Review Palau. Hawaii.

cost-effective maintenance. For planning purposes, the Working Paper recommended a realistic target of $16m per year for the next five years.[63]

State Government Finances

With the possible exception of Koror State, the State Governments have limited finance to invest in infrastructure. Based on a review of the Public Auditor's audits in FY 2017 the States committed from $85,000 (Hatohobei) to $ 477,000 (Angaur) in infrastructure related programs. These expenditures covered "Construction Projects", "Public Works", "Projects and Programs", "Capital Investment Program", Protected Area Network projects and specific repairs and maintenance.[64] Although Koror State has previously invested more heavily in infrastructure related programs[65] its finances are now reported to be precarious (footnote 21) due to a continuing commitment to substantial levels of wages and salaries and a loss of tourism revenues. Koror State finances would presumably improve with the recovery of Palau's tourism industry.

Donor Grants

By far the largest donor to Palau is the Government of the United States with funding provided under the Compact of Free Association with the US Government. Other donors are the Governments of Australia, Japan, the Republic of China, the United Arab Emirates and the United Nations. The government also receives occasional lesser levels of assistance from the Governments of Canada, Germany, Italy, New Zealand, the Republic of Korea and from the EU and the Global Environment Facility.

The US Government

Palau became independent in 1994 after having been under U.S. administration. As part of a 50-year Compact of Free Association, the United States provided US$580 million in financial aid to Palau during 1994–2009 for infrastructure investment, budget support, and the establishment of a Compact Trust Fund (CTF). With an initial endowment of US$70 million the CTF was to provide Palau with annual revenue of US$15 million from FY2010 to FY 2044. However, the CTF funds proved insufficient and a new Compact Review Agreement (CRA) extending financial assistance for another 15 years was signed in 2010. After a long delay, the agreement was ratified by the U.S. Congress in late 2017. The total assistance under the new agreement amounts to US$229 million, with over US$120 million to be disbursed in FY2019.[66]

Palau has continued to receive substantial U.S. financial assistance despite the delay in the ratification of the new Compact Agreement. Before the ratification, Palau received current grants of US$13.1 million and annually withdrew US$5 million from the CTF from 2010 to 2017. Following ratification in late 2017, the remaining funds under the new agreement are to be disbursed in a lump sum, with US$65 million to be added to the CTF, including US$34 million for capital improvement projects and US$25 million for current assistance in FY2018–19.

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[63] Government of Palau and Asian Development Bank. 2008. Facility for Economic & Infrastructure Management Project. Improving Maintenance Services. Working Paper 4. Ngerulmud and Manila

[64] Republic of Palau. Office of the Public Auditor. Financial Audits of ROP State Government: http://www.palauopa.org/state-governments.html

[65] $3 m in public works, over $2 million in Capital Improvement Projects, and almost $680,000 in State projects, among other expenditures in 2016 (last audit figures).

[66] IMF. 2019. Republic of Palau Article IV Consultation

The terms originally specified in the Compact Renewal Agreement were for continuing current grant assistance, although at a declining level. Additional resources were provided to support the Compact Trust Fund, infrastructure maintenance and capital projects. At the present time it is not known what infrastructure projects the Compact Renewal Agreement will finance.

In 2019 the Federal Aviation Administration (FAA) provided $300,000 to the government to purchase a sweeper to pick up debris off the national airfield pavement. The government was also set to receive a $10.2 million grant from FAA to expand the national airport.[67]

Australia

The Government of Australia has provided technical assistance in ICT sector reform, maritime surveillance, private sector investment and inclusive development.[68]

Japan

The Government of Japan and JICA have assisted economic and social development of Palau through various projects since 1990, reaching $256 million in total. Based on the commitment of the Pacific Islands Leaders Meeting (PALM)[69], the Country Assistance Policy and Rolling Plan for the Republic of Palau, which are revised every 2-3 years, determine Japan's basic policy and priority areas of assistance: 1) Realization of a sustainable ocean, 2) Strengthening social infrastructure and industrial development infrastructure, supporting private investment and human resource development, and 3) response to climate change, environmental issues and disaster prevention.[70]

With regard to infrastructure, Japan has particularly assisted the following ongoing projects, some of which are combined with JICA's technical assistance.

1. ICT – construction of the new submarine cable ($8 million, loaned by JBIC/SMBC)
2. Solid waste management – construction of the new national landfill ($13 million)
3. Transportation – renovation of the Airport ($40 million investment and loan)
4. Maritime security – provision of radar stations ($4.8 million)
5. Our Ocean Conference – renovation of facilities ($4.8 million) through UNOPS
6. Disaster management – provision of equipment ($7.5 million) through UNDP

JICA's technical assistance includes technical cooperation projects in Palau, training courses that 267 Palauan officials have taken in Japan and dispatch of more than 270 volunteers.

In terms of agriculture, Japan started a new bilateral cooperation project to promote domestic agricultural production. In addition, Japan has supported fisheries in Palau for more than 20 years, amounted to $26 million. Moreover, States and NGOs have applied Grassroots Grant Projects (GGP) to acquire funds for their community-level infrastructure projects.

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[67] https://www.transportation.gov/briefing-room/us-transportation-secretary-elaine-l-chao-announces-more-12-billion-infrastructure

[68] https://www.dfat.gov.au/geo/palau/development-assistance/Pages/development-assistance-in-palau

[69] https://www.mofa.go.jp/a_o/ocn/page4e_000825.html

[70] https://www.palau.emb-japan.go.jp/files/100074574.pdf

Republic of China

The Republic of China has provided assistance in agriculture, culture, education, fisheries, medical services, tourism and water supply infrastructure.[71]

United Arab Emirates

The UAE has provided assistance in solar energy and water access.

Development Partners

ADB

Palau is classified as a "group B developing member country" with the Asian Development Bank (ADB) and is therefore eligible for a mix of concessional and non-concessional lending. ADB has provided assistance in energy, finance, ICT (cable), public sector management (disaster relief), urban infrastructure and services, and water and sanitation.[72]

- In 2010 ADB provided a loan of $10 million for water supply improvements.
- 2013 ADB provided a loan of $28.8 million for sanitation improvements in Koror and Airai (KASP).
- In 2015 ADB provided a loan totaling $25 million to connect Palau to the Southeast Asia – United States submarine cable that joins the international cable hub in Guam.
- In 2018, Palau secured a policy-based contingent loan for natural disasters from ADB for up to US$15 million over the following three years.
- In July 2020 ADB processed a concessional loan for $20 million for the Proposed Countercyclical Support Facility Loan Republic of Palau: Health Expenditure and Livelihoods Support Program.

ADB is preparing:

- A proposed program loan to assist PPUC reform potentially totaling $10 million with $5 million disbursed in each of 2 subprograms.
- A possible loan for KASP Phase II of $25 million.
- A possible second backup fiber optic cable loan of $25 million.
- A further program loan, "Recovery through Improved Systems and Expenditure Support Program". The proposed financing will be disbursed in two subprograms of $25 million ($20 million concessional ordinary capital resources loan and $5 million regular ordinary capital resources loan) in FY2021 and $30 million (regular ordinary capital resources loan) for FY2022.

Republic of China

The Republic of China is preparing a further housing loan of $15 million. Funds will be on-lent to private borrowers through the Palau National Development Bank. The government will

[71] https://interactives.lowyinstitute.org/archive/pacific-aid-map-country-profiles/downloads/LOWY2192_PALAU.pdf
[72] ADB. 2019. 11 Small Pacific Island Countries 2020-2022. Manila.

be responsible for helping to set lending policy and for monitoring and reporting on the program.[73]

United Nations

The UN Joint Country Action Plan 2021 is assisting Palau in (i) climate change, disaster resilience and environmental protection, (ii) gender equality, (iii) sustainable and inclusive economic empowerment, (iv) equitable basic services, (v) governance and community engagement, and (vi) human rights. A total of $8.94 million has been funded with an unfunded budget of $1.87 million.

The UNDP also plans to assist Palau, together with Fiji, Samoa and Vanuatu with border management in support of COVID-19 recovery and preparedness.

The World Bank

Palau's gross national income per capita attained a level of $17,072 in FY2017. It is therefore classified as a high income country by the World Bank and is not entitled to concessional financing.

The World Bank has assisted Palau with ICT and oil and gas exploration and is planning to provide technical assistance to strengthen the operations of BSCC and PNCC and to analyze additional ICT infrastructure needs with possible financing to use the international submarine cable more effectively, and to promote sector growth and development[74].

Climate Funds

Over the medium-term (3 to 5 years), ensuring greater assistance from multilateral climate change schemes might help to cope with the substantial adaptation cost to prepare for natural disasters and climate change and to finance any proposals for wave-energy, solar-energy and other renewable energy projects.

Public-Private Partnerships

Subprogram 2 of the proposed policy-based loan from ADB aims to assist the government to prepare a framework for Public-Private Partnerships (PPP).[75] PPPs so far are:

- The government and Japan Airport Terminal Company (JATCO) signed a Joint Venture Agreement in August 2017 to renovate and expand the Palau International Airport. ($28 million phased over 2 years according to the US Graduate School).[76]

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[73] https://www.facebook.com/ThinkBigPalau/posts/4791818637525201

[74] https://projects.worldbank.org/en/projects-operations/project-detail/P160504?lang=en, and https://projects.worldbank.org/en/projects-operations/project-detail/P130592?lang=en&tab=procurement&subTab=notices, and https://projects.worldbank.org/en/projects-operations/project-detail/P103034

[75] ADB 2020. Concept Note. Proposed Programmatic Approach and Policy- Based Loan for Subprogram 1 Republic of Palau: Recovery through Improved Systems and Expenditure Support Program. Manila

[76] https://www.palaugov.pw/wp-content/uploads/2017/08/Press-Release_Signing-of-Joint-Venture-Agreemnt_07AUG2017_FINAL.pdf

- The government formed a PPP with EarthX, GridMarket, and the Global Island Partnership (GLISPA) in July 2018 to develop renewable energy in the country.[77]
- Palau Nature Works (PNW), the subsidiary of Guam Nature Works (GNW), and Aimeliik State Government signed a PPP Agreement to build Integrated Greenhouses for both agriculture and aquaculture farm operation in Aimeliik, Palau (year unknown). In the PPP Agreement, PNW obtained a 30-year lease of 50-acres (200,000 sqm) from Aimeliik State, which will be used for both farming and tourism industry. The initial investment for the construction facilities, marketing and farm operation is $ 3 million. A USDA rural development guaranteed loan will provide $2.4 million of the required funds.[78]

The government is also considering further PPPs including in domestic commercial tuna fishing. Future PPPs might also be considered in tourism, vessel slipway and port development.

Regional Development Assistance

The European Union is planning a new regional assistance program to African, Caribbean and Pacific member countries covering the period 2021 to 2027. For the 13 Pacific Island Countries proposed priorities are (i) priority area 1, climate action and environmental sustainability, (ii) priority area 2, inclusive and sustainable economic development, and (iii) priority area 3, fundamental values, human development, peace and security. Implementation modalities are (i) budget support, (ii) technical assistance, (iii) national projects, (iv) large-scale regional or multi-country projects, (v) support for blended finance, and (vi) support for civil society organizations.

Palau also benefits from assistance provided by other regional organizations such as the Pacific Association of Supreme Audit Institutions, the Pacific Financial Technical Assistance Centre, the Pacific Regional Infrastructure Facility, and the Pacific Private Sector Development Initiative.[79]

State-Owned Enterprises

There are four major SOEs: (i) the Palau National Communications Corporation (PNCC), (ii) the Palau Public Utilities Corporation (PPUC), (iii) the National Development Bank of Palau, and (iv) the Belau Submarine Cable Company (BSCC). The provision of airport operations remains a government department, as is the Post Office, and the main port at Malakal is owned by Koror State but operated by a private company under a 25-year concession.

As the USDA EconMap reports there is insufficient legal framework to support the commercial operations of the SOEs and the sector performs poorly.[80] Board members are political appointees and may lack experience in the functions of the SOE. Prices have been set at “affordable” rather than commercial rates. There is no monitoring mechanism of the sector and corporate planning is weak. As a result, maintenance is often insufficient and excessively deferred, resulting in disruption of services and, ultimately, in higher capital costs. In 2014 the

[77] https://www.globenewswire.com/news-release/2018/07/16/1537710/0/en/New-Public-Private-Partnership-to-Transform-Island-Grids-on-the-Front-Lines-of-Climate-Change.html

[78] file:///Users/stephenpollard/Dropbox/Palau/NIIP%20Documents/Agriculture/Public%20Private%20Partnership%20(PPP)%20Agreement%20in%20Palau%20–%20guamnatureworks.html

[79] https://www.pasai.org/, https://www.pftac.org/content/PFTAC/en1.html, https://www.theprif.org/, https://www.adb.org/publications/pacific-psdi-brochure

[80] Graduate School, USA, EconMAP. 2019. Economic Review Palau FY 2018. Hawaii.

President issued an SOE policy with a primary objective that SOEs should operate as successful businesses and recover all their costs, including the costs of capital. A set of policy principles were outlined including support to the primary objective of financial sustainability, specification of community service obligations (CSOs), appointment of qualified directors excluding political appointees, preparation of annual performance targets, and performance monitoring and benchmarking. The policy statement was not enacted into law.

As previously noted ADB is considering a $10 million loan to the government, disbursed in two subprograms, to finance reforms in the energy sector. Reforms are in tariff adjustments, enhanced PPUC management and the strengthening of PPUC governance and transparency. This will include the financing of some infrastructure improvements. As also noted above the World Bank is planning to provide technical assistance to strengthen the operations of BSCC and PNCC.

Private Sector

Palau does not have access to private foreign capital markets. Other private sector investments in infrastructure are at present unknown.

Funding Strategy[81]

Outside of existing donor and development partner assistance programs funding for new investment in infrastructure will most likely continue to be most limited over the plan period. The medium (3 to 5 year) and longer-term funding strategy for infrastructure as other government capital expenditure must be to prioritize the generation of government revenues so that the government may in the future finance its priority investments from its own funds. Priority infrastructure investment will otherwise continue to be subject to the negotiation of ongoing bilateral and multilateral assistance programs. A tentative funding schedule for priority projects for the next ten years is presented in table 11.

[81] As previously noted, some priority projects remain insufficiently specified. This curtails accurate costing and consideration for financing. This is particularly the case for PPUC and PPNC projects.

Table 11. Provisional Funding Schedule for Priority Projects FY 2021/22 to FY 2030/31[82]

FY 21/22	FY 22/23	FY 23/24	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31
Possible Donor and Development Partner Financed Infrastructure Investments (with priority number)									
		Belau National Hospital (38)							
Babeldaob Landfill (40)	Waste to Energy (36)	Rehabilitation of Koror-Arai water pumping stations and distribution pipes system (KASP II) (39)							
Possible Government Financed Infrastructure Investments (with priority number)									
Projected Overall Fiscal Balance (US$ million) a)									
-38.7	*-19.5*	*-7.2*	*-0.4*	*0.1*	*2.0*	*3.9*	*6.4*	*9.0*	*12.1*
---	---	---	---	---	Municipal Services for housing subdivision (1)				
---	---	---	---	---	---	---	Capita Complex Annex Building (3) b)	Koror Pedestrian Walkway (4)	New School Buildings (5)
Possible Critical and Urgent Investments are listed in table 12 below									
Possible Private Sector Investments, including PPP (with priority number)									
	Construction of New Slipway (62)								
Improving Mobile Network Coverage in Palau (32)									

a) As projected by USEconMap. Forthcoming Report
b) Projected fiscal surpluses could not cover the cost of the Babeldaob Commercial Seaport at $120 million (#2 priority)

[82] To be reviewed and revised for the final draft.

Table 12. Critical and Urgent Projects

S. No.	Proj #	Project Name	Sector	Project Scope	Estimated Capital Cost	Annual Maintenance Cost	Prioritization Score
1	Wat-2	Rehabilitation of Rural Water pumping stations and distribution pipes	Water	Rehabilitation of pumping stations and distribution pipes	$ 3,000,000	$ 90,000	53
2	Ene-5	Replacement and Rehab of existing diesel generating stations	Energy	Replace / Rehabilitate Diesel Generating plant	$ 8,000,000	$ 160,000	53
3	WW-2	Melekeok Treatment Plant	Waste Water	Capacity Increase of Existing infrastructure to meet increased demand	$ 950,000	$ 28,500	51
4	Ene-3	Rehabilitation of 34.5/13.8 kV Stations	Energy	Rehabilitate all existing stations, provide 34.5 kV circuit breakers	$ 1,750,000	$ 35,000	51
5	Ene-1	34.5 kV line construction to improve system stability	Energy	Construct new transmission lines	$ 9,000,000	$ 180,000	50
6	Wat-3	Rehabilitation of water desalination plants	Water	Rehabilitation of water desalination plants	$ 1,700,000	$ 85,000	50
7	Wat-4	Construction of water storage tank	Water	Four New Water Storage Tanks	$ 4,300,000	$ 85,000	50
8	WW-1	Melekeok Treatment Plant	Waste Water	Replace some components of the asset in poor condition	$ 300,000	$ 9,000	46
9	Pub-3	Early Warning system (Storms and Tsunami)	Public Safety	Public Announcement and Warning System	$ 1,000,000	$ 20,000	46
10	WW-3	Replacement /Rehabilitation of Sewage pumping stations in rural areas, including capaciy increase to allow services in new subdivision developments in Babeldaob	Waste Water	Major refurbishment works and capacity increase for civil, mechanical (replace pumps, internal plumbing system and replace valves etc.).	$ 6,000,000	$ 180,000	45
11	Hea-1	Belau National Hospital	Health	Redevelopment of Belau National hospital on higher level to replace existing hospital building, with expanded services (100 beds)	$ 60,000,000	$ 300,000	43
12	Wat-1	Rehabilitation of Koror-Arai water pumping stations and distribution pipes system	Water	Rehabilitation of pumping stations and distribution pipes	$ 6,000,000	$ 180,000	43
13	WW-4	Replacement /Rehabilitation of Sewage collection pipes in rural area, including extensions to allow services in new subdivision developments in Babeldaob	Waste Water	Major Rehabilitation and extension of Sewage collection pipes	$ 3,000,000	$ 90,000	39

VII. IMPLEMENTATION INCLUDING MONITORING AND EVALUATION

The NIIP will be gradually embedded in strengthened budget formulation and other public finance management (including asset management, the management of foreign investment, CAPEX management, the medium-term fiscal and expenditure framework, and operation and maintenance and other infrastructure life-time cost management). As such the NIIP will be annually monitored and evaluated as a component of the annual budget process.

As one component of the annual budget process, the monitoring of specific infrastructure investment under the NIIP will be brief and implementable. The draft Monitoring and Evaluation (M&E) framework presented below summarizes the NIIP. It focuses on a few key indicators at each level; impact, outcome, outputs and inputs and activities.

M&E impact is derived from the national strategy, that is the pursuit of a restored, larger and even more dynamic economy.

M&E outcome is the infrastructure goal, that is to sustain a relevant, efficient and effective program of infrastructure asset management and new investments that help meet the development goals of Palau.

M&E outputs summarize the goals of the 14 sectors. These sectors are aggregated into economic infrastructure, social infrastructure and public infrastructure.

M&E inputs and activities summarize the funding and capacity development required to implement the NIIP. A key element is the continued functioning of the Development Committee.

Monitoring and reporting on the implementation of the NIIP will be the responsibility of the Bureau of Public Works as a component of the government's annual formulation of its budget.

DRAFT NIIP M&E FRAMEWORK

	Performance Targets and *Indicators*	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact	A restored, larger and even more dynamic economy *with average annual growth in GDP reaching 2.5% from 2020 to 2030. (Average annual GDP growth was 2.25% from 2010 to 2019)*	• Growth in GDP from IMF Article IV and USDA EconMap	
Outcome	To sustain a relevant, efficient and effective program of infrastructure investments and asset management that help meet the development needs of Palau *Annual capital expenditure budget with complementary annual recurrent expenditure*	• Annual budget documents • 2013 and future PEFAs.	• The supply of other complementary land, labor, and capital inputs to development continue to improve. • Performance of core government functions of public service delivery, public finance management, policy formulation and regulated environment for business continue to improve.
Outputs	• Prioritized public economic infrastructure (roads, ports and wharves, utilities, public market centers, …) in place to support private investment in tourism, fisheries, aquaculture, agriculture and telecommunications that is gender sensitive, adapted to climate change and natural hazard resilient *(public economic infrastructure investment program, 2020 to 2030)* • Prioritized public social infrastructure (schools, hospital, clinics, child welfare center, public housing, welfare centers, women's shelters, training centers, …) in place to support social development that is gender sensitive, adapted to climate change and natural hazard resilient *(social infrastructure investment program, 2020 to 2030)* • Prioritized public infrastructure in place to support the central government administration and public safety that is gender sensitive, adapted to climate change and natural hazard resilient *(central government and public safety infrastructure investment program, 2020 to 2030)* *Asset registry in place by end June 2021 and maintained thereafter* *Infrastructure investments detailed in MTEF and annual budget from 2021 onwards*	• Annual budget documents • Medium-Term Expenditure Framework documentation • Reports of Government Development Committee • Government office and SOE reports on infrastructure construction and purchases and MCA impact • PEFA report on Asset registry and MTEF	• Government Development Committee continue to regularly meet to review potential environmental, social, cultural and economic impact, and to filter and prioritize infrastructure investments • New government support for executive Development Committee

Inputs and Activities	• Funding of prioritized new, replacement, rehabilitated infrastructure, *with an increasing proportion of funding provided by government generated revenue from no funding of capital expenditure in FY 2021 to 10 % of capital expenditure in FY 2030.*
	• An increase in annual funding of Operation and Maintenance *to full funding by FY 2030*.
	• Capacity development including:
	  ○ Skills training as needed.
	  ○ Formalization of the executive Development Committee
		• Annual budget documents
		• Medium-Term Expenditure Framework documentation
		• Reports of Government Development Committee
		• Presidential Directive re. the formalization of Development Committee.
			• Government Development Committee continue to regularly meet to review potential environmental, social, cultural and economic impact, and to filter and prioritize infrastructure investments
			• All donors and development partners coordinate their programs through the Government Development Committee
			• Budget prioritizes O&M

Appendix 1

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Appendix 2

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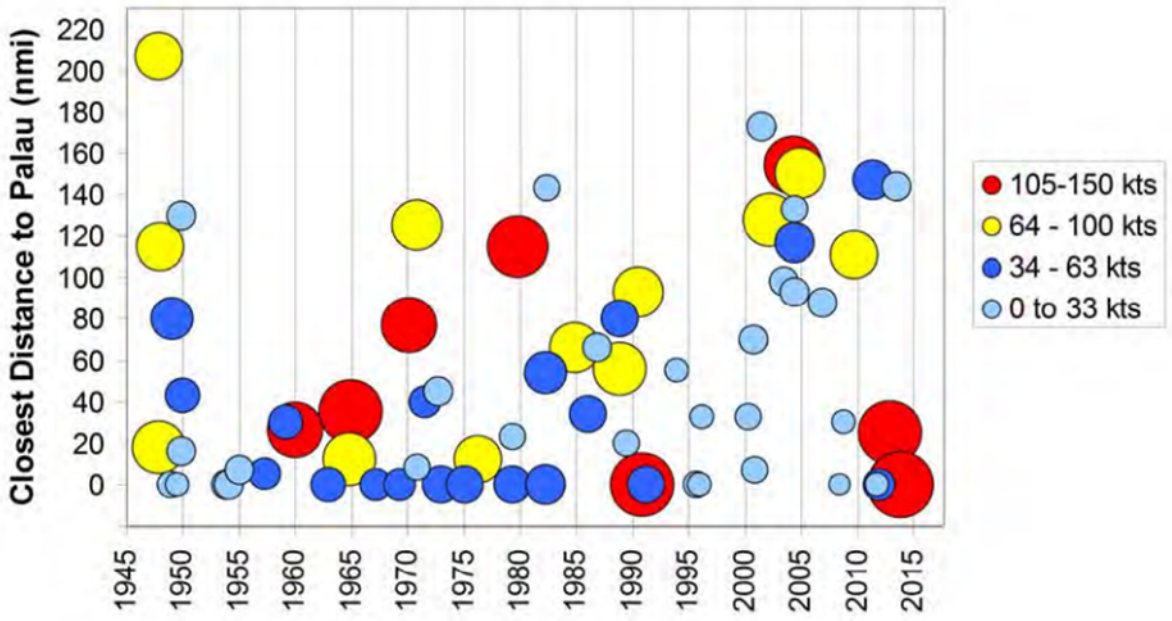
Appendix 3

CLIMATE CHANGE AND DISASTER PREPAREDNESS

Like all island countries in the Pacific, Palau is vulnerable to natural disasters, including typhoons, flooding, salt-water intrusion and droughts. Climate change induced events, such as the rise in seawater level, increase in temperature and chlorination of ocean water are expected to increase the risk of harm from such natural disasters.[83]

Figure 1 below summarizes the severe-wind-speed events experienced by Palau during the 70-year period from 1945 to 2015. [84] Palau has been subjected to 68 recorded typhoons, tropical storms or tropical depressions which came within 200 nautical miles (nmi) of its islands or reefs since 1945. Out of the 20 typhoon-force wind speed storms, 8 passed within 35 nmi of Palau, with significant harm to the country.

Figure 1. History of Severe Wind-speed Events By Year within 200 nmi of Palau



As shown in Figure 2, the islands of Kayaagnel and Angaur, with lower population densities in relation to Koror, have been hit by typhoons more frequently in relation to Koror and as a result the extent of harm to life and property has been relatively low, in the past.

Palau is expected to incur, on average, 2.7 million USD per year in losses due to earthquakes and tropical cyclones. In the next 50 years, Palau has a 50% chance of experiencing a loss exceeding 30 million USD and casualties larger than 45 people, and a 10% chance of experiencing a loss exceeding 247 million USD and casualties larger than 175 people.[85]

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[83] Country Profile – Palau - Pacific Catastrophe Risk Assessment and Financing Initiative September 2011.
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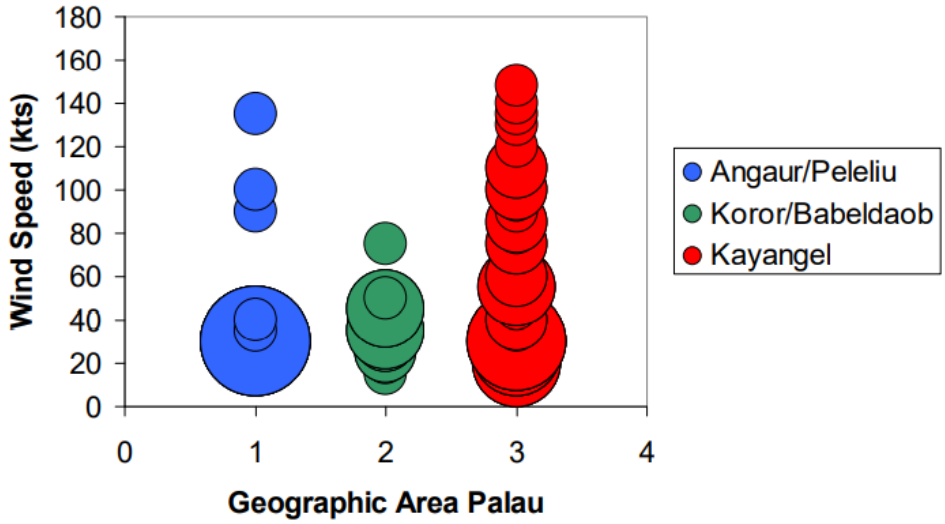
[85] Pacific Catastrophe Risk Assessment and Financing Initiative September 2011

Figure 2. History of Severe Wind-speed Events by Geographic Regions



Following many disaster-free years, Palau was hit with major typhoons in 2012 and 2013 and by severe droughts in 1998 and 2016. These events highlighted a need for building codes and integrated planning at state and national levels inclusive of vulnerability and adaption assessments.

To address the risk of natural disasters and climate change the sustainable development goals call for work on two parallel tracks:

Climate Mitigation

Climate mitigation involves measures to slow or reverse climate change by reducing or sequestering greenhouse gas emissions. Palau's greenhouse gas emissions are small in the global picture, but relatively high per capita at average of 12.3 metric tons per capita. The majority of the emissions are created by the fossil-fuel based energy sector which accounts for 84% to 96% of total emissions.[86] Palau has set a target to reduce its 2005 levels of greenhouse gas emissions by 22% in 2025 through a combination of energy efficiency and transition to renewable energy sources.

Several small scale solar projects have been developed with support from multiple donors including the European Union, Japan, New Zealand and the UAE, with solar panels installed at public sites (capitol, airport, hospital, sports facilities, and state government offices) that feed into the national grid, as well as rooftop solar systems on houses and businesses in line with the net metering. The contribution of these projects to total energy requirements reached 3.3% by 2019, with the remote northern island of Kayangel powered 100% through solar power. The National Energy Master Plan (2019) emphasizes energy efficiency and transition from diesel generation to renewable energy. A project involving the development of solar power plant with energy storage by Independent power producers is currently under way for Babeldaob and Koror.

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[86] Palau Climate Change Policy 2015

For waste management, Palau is exploring methane recovery from the national landfill and Palau is promoting energy efficiency through a national building code. For transportation, Palau is pursuing an innovative marine vessel design fueled by renewable energy. On land, Palau is pursuing the use of alternative transport; walking, biking, and public transportation, in addition to transitioning to fuel efficient vehicles over the medium-term.

Climate Adaptation

This includes measures to reduce the impact of climate change by improving the country's ability to manage unexpected disasters to minimize disaster risks. The Palau Climate Change Policy of 2015 responds to climate change adaptation with three overarching policy objectives:

- Enhance climate change adaptation across all sectors
- Improve ability to manage unexpected disasters and minimize disaster risks
- Mitigate climate change by maximizing energy efficiency, protecting carbon sinks (e.g. oceans and forests), and minimizing greenhouse gas emissions

The United Nations Development Programme (UNDP), together with the Government of Japan and the Government of Palau, are currently implementing a project aimed at strengthening disaster communication and climate and tsunami monitoring systems and also enhancing the disaster preparedness capacity at national level and community level. The project will contribute to achieving the goals of the Sendai Framework for Disaster Risk Reduction and the Sustainable Development Goals.

The policy addresses climate mitigation and adaptation across nine sectors (agriculture and fisheries, health, biodiversity conservation and natural resource management, society and culture, tourism, critical infrastructure, utilities, finance and economic development, and education). Within limitations imposed by available resources, actions are ongoing across all sectors. The policy identifies six priorities for actions:

- Agriculture – Promote climate resilient agriculture and aquaculture
- Forestry - Protect forests which are important climate sinks
- Health – Increase public awareness about mosquito-borne diseases and reduce mosquito breeding sites
- Natural Resource Management - Sustainably manage coastal ecosystems and protect ocean health as this is an important sink for greenhouse gases
- Policy and Planning – Develop a comprehensive vulnerability and adaptation strategy that also addresses wider development, social and environmental issues
- Water – Improve management and maintenance of existing systems, watershed protection, drought and flood preparedness, and centralized water treatment in urban areas.

Appendices 4 is provided in a separate file.

Appendix 5

Multi-Criteria Analysis Hypothetical Example: Babeldaob Club Med

Criteria or Impact *(Based on NMDP Development Goals and Strategies and adjusted for post-COVID recovery)*	Rating Description	Rating Value	Post COVID Recovery Weighting (%)
1. Economic growth, post-COVID economic recovery *NMDP i) 3.4.2.2* **and Stimulating further investment, commerce and trade** *3.4.2.4; 3.4.2.6; 3.4.2.12; 3.4.2.13; 3.4.2.14; 3.4.2.15; 3.4.2.16;* *SDG 8* *Where infrastructure supports private sector revenue generating investments*	High impact on post-COVID economic recovery and growth, investment, commerce and trade	3	20 6
	Medium impact on post-COVID economic recovery and growth, investment, commerce and trade	2	
	Low impact on post-COVID economic recovery and growth, investment, commerce and trade	1	
	No impact on post-COVID economic recovery and growth, investment, commerce and trade	0	
2. Employment recovery post-COVID-19 (direct and indirect job creation) *3.4.2.3* *Where infrastructure either directly and, or indirectly leads to the creation of new jobs.* *Total of 11,751 people employed in FY 19* *SDG 8*	High impact – where the infrastructure either directly and, or indirectly leads to the creation of an estimate of 100 or more new jobs (including construction and maintenance) such as for a medium size, 100 plus bedroom hotel.	3	15 4.5
	Medium impact – estimate of 50 to 99 new jobs.	2	
	Low impact – estimated 1 to 49 new jobs.	1	
	No impact, unknown job creation or no new jobs.	0	
3. Increasing government revenues (including SOEs) *3.4.2.1; 3.4.2.5* *SDG 6, 7*	High impact – eg. investment yield is assessed at more than a 5% average annual financial return, possibly through charging tariffs or fees such as on utilities and port charges and, or through cost savings.	3	15 4.5
	Medium impact - eg. investment covers its life costs	2	
	Low impact – some revenue to government	1	
	No revenue impact	0	
4. Improved distribution of growth benefits to Palauans (re. GESI considerations) *ii)* *Average monthly per capita income of $750 according to 2014 HIES* *SDG 1, 2, 5, 10*	High impact – most of the investment benefits go to low-income, female headed or other disadvantaged households.	3	10 1
	Medium impact – investment estimated to partially benefit low-income, female headed or other disadvantaged households.	2	
	Low impact – investment estimated to minimally benefit low-income, female headed or other disadvantaged households.	1	
	No impact, unknown or no benefits to low-income, female headed or other disadvantaged households.	0	
5. Improved geographical distribution of growth benefits with expanded settlement and government and economic activity on Babeldaob and, or other outer islands	High impact – investment fully located in Babeldaob and, or other outer islands	3	10 3
	Medium impact – investment partially located in Babeldaob and, or other outer islands	2	
	Low impact – investment minimally located in Babeldaob and, or other outer islands	1	

SDG 9	No impact or unknown – infrastructure located on Koror only	0	
6. Promoting Palauan culture *iii)* **and Promoting national consciousness** *iii)* *SDG 11, 16, 17*	High impact – such as a cultural festival center, culture recording studio, construction of a Bai or traditional sailing vessel, or museum. Also investments in government buildings that promote Palauan sovereignty or national identity	3	10 1
	Medium impact – such as a tourism promotion center that partly focuses on traditions. Also investments in government buildings that partly promote Palauan sovereignty or national identity.	2	
	Low impact – such as tourist accommodation that incidentally references traditions and culture. Also investments in government buildings that incidentally promote Palauan sovereignty or national identity.	1	
	No impact, unknown or negative impact	0	
7. Enhancing the natural environment *iii)* 3.4.2.18 *SDG 12, 13, 14, 15*	High impact – investment greatly enhances the natural environment such as through a land or marine reserve, or reforestation or renewable energy investment that displaces diesel consumption.	3	10 1
	Medium impact – investment on balance partially protects or enhances the environment such as through solar energy plant that requires land that could otherwise be used for agriculture or ecotourism.	2	
	Low impact – investment has a small, positive impact on the environment	1	
	No impact, unknown or overall negative impact	0	
8. Improving social welfare and social infrastructure (health, education and training, gender, the poor and vulnerable) *3.4.2.19; 3.4.2.20; 3.4.2.21* *SDG 2,3,4,6*	High impact – hospital, childcare center, clinics, schools, training facilities, public housing, welfare centers and women's shelters that either cover the full life cycle net cost or are assessed as cost-effective or produce a reasonable (compared with other Pacific Island Countries) cost per person served and address identified gender needs.	3	10 0
	Medium impact - hospital, childcare center, clinics, schools, training facilities, public housing, welfare centers and women's shelters that produce less than comparable cost per person served but additional costs can be justified.	2	
	Low impact - hospital, clinics, childcare center, schools, training facilities, public housing, welfare centers and women's shelters that produce less than comparable cost per person served but additional costs are accepted by government.	1	
	No impact, unknown or negative impact- hospital, clinics, schools, training facilities, public housing and welfare centers where cost recovery is unknown or unlikely and at a high cost per person served	0	
Total			**100** **21**

Notes:

- For the benefits distribution criteria, #4, GESI = gender, equity and social inclusion.

Multi-Criteria Analysis Hypothetical Example: New Central Hospital

Criteria or Impact *(Based on NMDP Development Goals and Strategies and adjusted for post-COVID recovery)*	Rating Description	Rating Value	Post COVID Recovery Weighting (%)
1. Economic growth, post-COVID economic recovery *NMDP i) 3.4.2.2* **and Stimulating further investment, commerce and trade** *3.4.2.4; 3.4.2.6; 3.4.2.12; 3.4.2.13; 3.4.2.14; 3.4.2.15; 3.4.2.16;* *SDG 8* *Where infrastructure supports private sector revenue generating investments*	High impact on post-COVID economic recovery and growth, investment, commerce and trade	3	20
	Medium impact on post-COVID economic recovery and growth, investment, commerce and trade	2	2
	Low impact on post-COVID economic recovery and growth, investment, commerce and trade	1	
	No impact on post-COVID economic recovery and growth, investment, commerce and trade	0	
2. Employment recovery post-COVID-19 (direct and indirect job creation) *3.4.2.3* *Where infrastructure either directly and, or indirectly leads to the creation of new jobs.* *Total of 11,751 people employed in FY 19* *SDG 8*	High impact – where the infrastructure either directly and, or indirectly leads to the creation of an estimate of 100 or more new jobs (including construction and maintenance) such as for a medium size, 100 plus bedroom hotel.	3	15 1.5
	Medium impact – estimate of 50 to 99 new jobs.	2	
	Low impact – estimated 1 to 49 new jobs.	1	
	No impact, unknown job creation or no new jobs.	0	
3. Increasing government revenues (including SOEs) *3.4.2.1; 3.4.2.5* *SDG 6, 7*	High impact – eg. investment yield is assessed at more than a 5% average annual financial return, possibly through charging tariffs or fees such as on utilities and port charges and, or through cost savings.	3	15 1.5
	Medium impact - eg. investment covers its life costs	2	
	Low impact – some revenue to government	1	
	No revenue impact	0	
4. Improved distribution of growth benefits to Palauans (re. GESI considerations) *ii)* *Average monthly per capita income of $750 according to 2014 HIES* *SDG 1, 2, 5, 10*	High impact – most of the investment benefits go to low-income, female headed or other disadvantaged households.	3	10 2
	Medium impact – investment estimated to partially benefit low-income, female headed or other disadvantaged households.	2	
	Low impact – investment estimated to minimally benefit low-income, female headed or other disadvantaged households.	1	
	No impact, unknown or no benefits to low-income, female headed or other disadvantaged households.	0	
5. Improved geographical distribution of growth benefits with expanded settlement and government and economic activity on Babeldaob and, or other outer islands *SDG 9*	High impact – investment fully located in Babeldaob and, or other outer islands	3	10 3
	Medium impact – investment partially located in Babeldaob and, or other outer islands	2	
	Low impact – investment minimally located in Babeldaob and, or other outer islands	1	
	No impact or unknown – infrastructure located on Koror only	0	

6. Promoting Palauan culture *iii)* **and Promoting national consciousness** *iii)* *SDG 11, 16, 17*	High impact – such as a cultural festival center, culture recording studio, construction of a Bai or traditional sailing vessel, or museum. Also investments in government buildings that promote Palauan sovereignty or national identity	3	10 2
	Medium impact – such as a tourism promotion center that partly focuses on traditions. Also investments in government buildings that partly promote Palauan sovereignty or national identity.	2	
	Low impact – such as tourist accommodation that incidentally references traditions and culture. Also investments in government buildings that incidentally promote Palauan sovereignty or national identity.	1	
	No impact, unknown or negative impact	0	
7. Enhancing the natural environment *iii)* 3.4.2.18 *SDG 12, 13, 14, 15*	High impact – investment greatly enhances the natural environment such as through a land or marine reserve, or reforestation or renewable energy investment that displaces diesel consumption.	3	10 2
	Medium impact – investment on balance partially protects or enhances the environment such as through solar energy plant that requires land that could otherwise be used for agriculture or ecotourism.	2	
	Low impact – investment has a small, positive impact on the environment	1	
	No impact, unknown or overall negative impact	0	
8. Improving social welfare and social infrastructure (health, education and training, gender, the poor and vulnerable) *3.4.2.19; 3.4.2.20; 3.4.2.21* *SDG 2,3,4,6*	High impact – hospital, childcare center, clinics, schools, training facilities, public housing, welfare centers and women's shelters that either cover the full life cycle net cost or are assessed as cost-effective or produce a reasonable (compared with other Pacific Island Countries) cost per person served and address identified gender needs.	3	10 3
	Medium impact - hospital, childcare center, clinics, schools, training facilities, public housing, welfare centers and women's shelters that produce less than comparable cost per person served but additional costs can be justified.	2	
	Low impact - hospital, clinics, childcare center, schools, training facilities, public housing, welfare centers and women's shelters that produce less than comparable cost per person served but additional costs are accepted by government.	1	
	No impact, unknown or negative impact- hospital, clinics, schools, training facilities, public housing and welfare centers where cost recovery is unknown or unlikely and at a high cost per person served	0	
Total			**100** **17**

Notes:

- For the benefits distribution criteria, #4, GESI = gender, equity and social inclusion.

Appendices 6 to 8 are provided in separate files.